

ICBS-R Automated Identification Technology (AIT) Requirements



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Overview

This document provides a list of the AIT requirements for the re-engineered ICBS system (ICBS-R). The requirements are summarized from a report provided by the Automated Identification Technology (AIT) Task Group. This group was tasked with researching the Interagency Cache Business System (ICBS) and recommend benefits that can be achieved by taking advantage of new and existing technology.

The task group produced a comprehensive report that took into consideration the business requirements of ICBS, the present and future mission of the National Interagency Support Cache (NISC) system and identified where AIT can be implemented for added performance and efficiency. Once finalized, that report will be available at www.icbs.nwccg.gov.

Figure 1 provides an overview of the supply flow between vendors, caches, and incidents. The major business processes of receipts, returns, issues and inventory illustrated. It should also be noted that some caches issue items to other customers not associated with an incident. Some examples of these cache customers include agencies and individuals who purchase Publication Management System (PMS) publications and training materials, and National Symbols Program educational materials (e.g. Smokey Bear items).

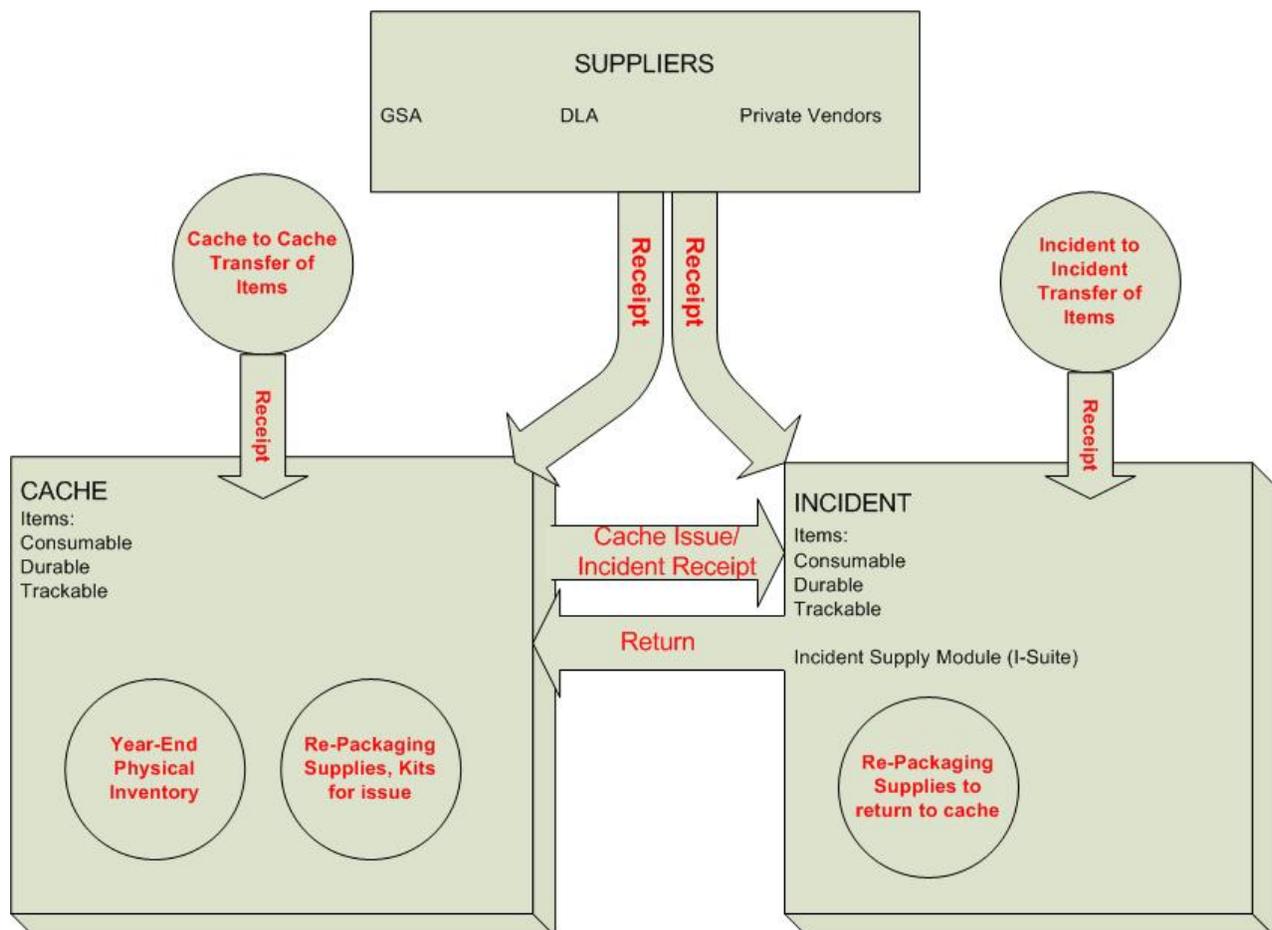


Figure 1: Incident Supply Flow

Scope of AIT Usage in Cache Community

The re-engineered system must include the capability for AIT to be used at any National or Local Area Cache as an optional method of input. It also must have the capability of keyboard entry. The cost of obtaining any system components (e.g. scanners, label printers, wireless networks, local servers, etc.) needed to implement AIT would be borne by the host agency or local unit. Many Local Area Caches may determine that, due to their relatively infrequent or low volume of business and temporary staffing situation, adopting AIT would yield no increased efficiency or return on investment.

Task Group Findings

The ICBS-R AIT Task Group concluded that implementation of AIT in the caches would be most practical if done by a combination of methods that include affixing identification tags to some (but not likely all) individual items, and tracking and processing items using shelf labels and box labels. Trackable property (such as a chain saw or pump), is currently identified by an agency-assigned property number affixed with a permanent label or etching. Trackable items are the items that initially would most likely be identified with an AIT tag.

In addition, the ICBS-R Expired Items task group has identified the potential to use AIT to track items with a shelf life (or other date-dependent properties). There may be other instances in which it would be practical to affix tags to durable items, but this would need to be determined by experimentation or individual cache discretion.

Given these assumptions, AIT would be utilized by the caches in the following general ways:

- Shelf labels that identify the contents and shelf location within the cache.
- Box/Package labels that identify the box contents and quantities.
- Identification tags permanently affixed to a trackable property item (or other items where feasible).
- Scannable information on issuing and shipping documents
- Scannable item catalog
- Scannable bulletin board or reference cards

The ICBS-R AIT Task Group found that 1 Dimensional (1D) and 2 Dimensional (2D) bar codes and Radio Frequency Identification (RFID) all have pros and cons but each has a niche and these technologies can co-exist in a common program. The AIT Task Group recommends a combined AIT approach that takes advantage of the different technologies based on functionality, cost-benefits and performance.

A matrix of business processes and Automated Identification Technologies (Table 1 on page 5 of the AIT Report) shows that all of the currently recommended cache processes for AIT except receiving from private vendors can be accomplished by introducing 1D and 2D bar coding, and that RFID would add additional information storage capability for trackable or date-dependent items (“expired items”).

In most caches, private vendors provide a relatively small percentage of the supplies that caches purchase, so the return on investment is likely to be small for incorporating AIT in receiving from these sources. Also, RFID tagging with a universal standard is not yet commonplace in the private sector. In any case, the Business Requirements Team and vendor need to further explore AIT alternatives in the “receipt from private vendors” cache process so that opportunities to capitalize on this technology are not missed.

Some of the key points in considering each specific technology are:

- The capability to create, read and process both 1D and 2D labels would allow the caches to process orders from GSA (General Services Administration – the caches’ prime supplier) and DLA (Defense Logistics Agency – which supplies the cache system with a limited number of items).
- The 2D labels would allow the caches to share information with the I-Suite supply module (an incident-based supply application) efficiently and dynamically. No NFES catalog would be required in I-Suite. 2D labels would also allow caches to maintain detailed information about trackable and date-dependent items.
- RFID tags would allow the caches to maintain detailed information about trackable and date-dependent items and the additional ability to update the tag/label.

The task group focused on using RFID for managing trackable items in the caches, even though the main usage the task group found in the market place for RFID technology included shipping, receiving and security. The task group did not examine using RFID technology for receiving at the caches, because so many suppliers do not currently make use of the technology.

It should be noted that the ICBS-R AIT Task Group also recognizes that the RFID technology is rapidly evolving. Along with the benefits they also found limitations that may or may not be resolved with new generations of this technology. For example, during times of heavy use, an RFID label may not survive on certain types of equipment like a chain saw. All of the information stored on a RFID tag could be encoded on a 2D label. The advantage an RFID tag has over a 2D tag is that it can be rewritten when any of the information changes. Also, the RFID tag/label would have a smaller footprint on the item. If maintaining information about an item itself does not prove to be beneficial given the cost, then a 1D tag for trackable items would suffice.

ICBS-R AIT Requirements

The re-engineered ICBS requires the capability to use a combination of automated identification technology types to meet its business needs. At a minimum, the caches need ICBS to allow 1D and 2D bar code reading and labeling in order to accomplish the processes the task group feels would most benefit from AIT. RFID capability may not be purchased the first year of implementation, but in order to allow for future use, ICBS needs to be capable of handling the general requirements for RFID as specified in this document. Specific requirements would need to be further determined through experimentation and cost/benefit analysis.

The following general capability is required:

- Ability to produce and read 1 dimensional (1D) symbology 3 of 9 bar codes
- Ability to produce and read 2 dimensional (2D) symbology PDF 417 bar codes
- Ability to read passive radio frequency identification (RFID) tags of type Class 0, Class 1 UHF or UHF Generation 2
- Ability to write data to passive radio frequency identification (RFID) tags

AIT will be implemented in the following major cache business processes:

1. Issue
2. Return
3. Receipt
4. Physical Inventory
5. Warehouse Maintenance (box labels, shelf labels, item tags, etc...)

Detailed AIT requirements for each process can be found in the following sections.

The ICBS-R Core Team considers the AIT Report and this AIT Requirements document as a good foundation for the detailed system design and development work ahead. We expect the vendor team, with its vast supply chain and warehouse expertise, to suggest alternative approaches for incorporating AIT in the most efficient

manner, and to suggest solutions for any other areas that we might have overlooked. The ICBS-R SMEs will work collaboratively with the system developers to arrive at the best AIT approach for the NFES cache system.

Issue AIT Requirements

When an issue is pended/posted and sent to the floor to be picked a label is printed in issuing that contains a barcode (1D) for the issue number and the alphanumeric text string for the issue number. An employee selects a scanning unit and scans the issue number before picking the items.

When an issue or shipping document is printed two types of barcodes will print on each page. The first type (2D) will contain two data elements, the resource order number and the issue number.

This barcode will only appear once on each page of the document. The second type (2D) will print for each cache item listed on a page and will contain the following data elements:

- a. The cache item number, including trackable numbers as well.
- b. The cache item description.
- c. The cache item unit of issue.
- d. The quantity shipped for the item.
- e. The issue/shipping document line number for the item listed.
- f. The resource order request number for the item ordered, if applicable.

Given the space a 2D barcode will require to print with this many elements, it may be necessary to list the barcodes on a separate page and number them to correspond to each line on the document. This will facilitate the receipt of the cache items into I-Suite when they arrive on site at the incident.

Issue AIT Requirements

Requirement	AIT Specification	Data
Print Issue Number Label	Print 1D Bar Code	Issue Number Char(7)
Print Issue Number and Resource Order Number on each page of Issue or Shipping Document	Print 2D Bar Code	Issue No Char(7) Order No Char(30) Incident/project name Office reference number Financial code(s)
Print cache item information for each item included in the issue in Issue or Shipping Document	Print 2D Bar Code	Cache Item Number Number(6) Property Number Number(12) Cache Item Description Char(60) Unit of Issue Char(2) Qty Issued Number(6) Line Number Number(6) Request No Char(30)
Accept data from scanning device of cache items picked and use values to update the database	Read 1D and 2D Bar Code Read RFID Tag Write to RFID Tag Decode and process data from scanning device	<i>Data scanned from labels/ tags:</i> Issue No Char(7) Order No Char(30) Cache Item Number Number(6) Property Number Number(12) Last Date serviced Date <i>Data entered into scanning device:</i> Qty Issued Number(6)

		<i>Data updated in RFID tag:</i> Date/Time Issued from the Cache Incident Number Issued too Person ID if issued to individual
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Return AIT Requirements

When returning cache items there are at least three options for scanning cache item barcode labels. First the item itself may have a readable label. Second a bulletin board or a quick reference card listing the barcodes of the most commonly returned cache items. Third option is a catalog with a complete listing of each barcode associated with each cache item.

When processing returns it would also be useful to have each incident number and incident charge code encoded into a barcode that could be scanned at the beginning of the return process. This means that an employee only needs access to a scanner to begin and complete a return and credit the appropriate incident.

Return AIT Requirements

Requirement	AIT Specification	Data
Accept data from scanning device of cache items returned and use values to update the database	Read 1D and 2D Bar Code Read RFID Tag Decode and process data from scanning device	<i>Data required to identify return:</i> Type of Order Char(1) Cache Id Char(10) Temp Return No Number(7) Issue No Char(7) Order No Char(30) Account Code Char(30) <i>Data scanned from labels/tags:</i> Order No Char(30) Account Code Char(30) Cache Item Number Number(6) Property Number Number(12) Last Date Serviced Date Owning/Supply Cache Date/Time issues from Cache Person id if issued to person <i>Data entered into scanning device:</i> Qty RFI Number(6) Qty WO Number(6) Qty Unserviceable Number(6) Comment Char(240)

Receipt AIT Requirements

When receiving orders from GSA or DLA the caches could make use of the barcode labels with the national stock number, unit of issue, quantity and dollar amount to receive in the items. The receipt process would have to convert to the cache system unit of issue for the instances in which our unit of issue was different from GSA

or DLA. For other orders and suppliers the caches may not be able to directly enter items by scanning a bar code label.

The AIT Task Group also noted that if the caches could arrange for e-mail transmission of GSA’s Advanced Shipping Notices, they could scan the 1D bar code with the GSA Transportation Control Number (TCN) to enter the most useful data from the Military Shipping Label (MSL) into ICBS. 1D bar code reading would be required to capitalize on this opportunity. For more information on this, see page 22 of the AIT Report. This capability needs to be further explored by Business Requirements Team SMEs and the vendor to ensure that no opportunity to automate this process is overlooked.

Receipt AIT Requirements

Requirement	AIT Specification	Data
Accept data from scanning device of cache items received and use values to update the database	Read 1D and 2D Bar Code Decode and process data from scanning device	<i>Data required to identify receipt:</i> Purchase Order No Char(15) Requisition No Char(30) Document No Char(15) Cache Id Char(10) Account Code Char(30) Supplier Code Char(4) Date Date <i>Data scanned from labels/tags:</i> NSN (National Stock Number) Qty Received Number(6) Actual Cost Number(6) <i>Data entered into scanning device??</i> Property Number Number(12) Cache Item Number Number(6)

Physical Inventory AIT Requirements

To perform physical inventory, teams are selected to count and at least two teams are assigned to each location. A team takes one or more scanning units and selects or creates a physical inventory input document for the location to be counted. At an assigned location a team begins the physical counts. For each cache item a team member scans the cache item number, scans the physical location of the item and enters a count of the number of individual items at the location.

When a location has been counted by at least two different teams they compare their counts. If differences are found then the teams resolve the differences until they have counts that agree. The next step is for Cache Admin to generate a variance report with the information provided by the teams. Any differences between the physical counts and the system inventory are resolved and the system inventory is corrected as needed.

When taking a physical inventory the cache personnel would scan the 1D or 2D barcode for the cache item on the shelf. It would contain the cache item number, the physical location of the cache item and the unit of issue. Then input the count on the scanner.

Physical Inventory AIT Requirements

Requirement	AIT Specification	Data
Accept data from scanning device of cache items inventoried and use values to update the database	<p>Read 2D Bar Code</p> <p>Read RFID Tag</p> <p>Decode and process data from scanning device</p>	<p><i>Data scanned from labels/tags:</i></p> <p>Cache Item Number Number(6)</p> <p>Property Number Number(12)</p> <p>Physical Location Char(60)</p> <p>Unit of Issue Char(10)</p> <p><i>Data entered into scanning device:</i></p> <p>Physical Item Count Number(6)</p>

Warehouse Maintenance AIT Requirements

Warehouse Maintenance AIT Requirements

Requirement	AIT Specification	Data
Print Shelf Labels	Print 1D or 2D Bar Code	<p><i>Data formatted into Bar Code:</i></p> <p>Cache Item Number Number(6)</p> <p>Physical Location Char(60)</p> <p><i>Additional text:</i></p> <p>Cache Item Number</p> <p>Cache Item Description</p> <p>Physical Location</p>
Print Box Labels	Print 1D or 2D Bar Code	<p><i>Data formatted into Bar Code:</i></p> <p>Cache Item Number Number(6)</p> <p>Qty in Box Number(6)</p> <p><i>Additional text:</i></p> <p>Cache Item Number</p> <p>Cache Item Description</p> <p>Qty in Box</p>
Print Box Labels for Kits w/ Trackable Property	Print 1D or 2D Bar Code	<p><i>Data formatted into Bar Code:</i></p> <p>Cache Item Number Number(6)</p> <p>Property Number Char(12)</p> <p>Qty in Box Number(6)</p> <p><i>Additional text:</i></p> <p>Cache Item Number</p> <p>Cache Item Description</p> <p>Qty in Box</p>
<p>Print Scannable Catalog containing all cache items</p> <p>Print Scannable item bulletin board or reference cards</p>	Print ID Bar Code	<p><i>Data formatted into Bar Code:</i></p> <p>Cache Item Number Number(6)</p> <p>Unit of Issue Char(10)</p> <p><i>Data formatted into Bar Code:</i></p> <p>Cache Item Number</p> <p>Cache Item Description</p> <p>Unit of Issue</p>

Tags for Trackable property or other individual inventory items	Print 2 D Bar Code Write to RFID Tag	<i>Data formatted into Bar Code:</i> Cache Item Number Number(6) Property Number Char(12) <i>Other updatable information such as:</i> Last Date serviced Owning/Supply Cache Date/Time Issued from the Cache Incident Number Issued too If issued to a specific person, then that person's id
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Input/Scanning Validation Requirements

Portable barcode scanners and RFID tag readers must be connected in **real-time** to the cache inventory system to facilitate the following order and inventory integrity checks.

In general when a barcode is scanned or an RFID tag is read, the cache item number must be verified against the cache system as a valid number. If the barcode scanned is not in the cache system then the user is to be notified immediately that an invalid cache item number was scanned. A warning message should display on the AIT device instructing the user to correct the input error.

When an issue is being picked the barcode scanned or RFID tag read should be checked against the order for which the item is being picked. If the item is not on the order the user is to be notified immediately that the item was not requested for the order being picked. A warning message should display on the AIT device instructing the user to correct the input error.

Security Issues with Wireless Networks

There are currently concerns within the government agencies about the use of wireless networks. Use of wireless technology is subject to approval by the government.

Any data transfer solution must at a minimum provide the option to use a wired connection.