

Case Study:

Naval Supply Systems Command Wireless Initiatives: Secure, Cost Effective Technology Transforms Navy Logistics with Mobile Wireless AIT and pRFID

The challenge:

The U.S. Navy along with many DoD organizations has struggled for years with the implementation of wireless mobile Automated Identification Technology (AIT) technologies. Customers implementing wireless mobile AIT in logistics and Asset Visibility applications experience huge operational and business benefits as well as daunting concerns regarding how to succeed with a secure, enterprise-wide architecture in the DoD environment.

What if you could . . .

- *Manage your entire wireless device and data collection infrastructure from a single location?*
- *Breathe new life into existing legacy applications with new technologies like mobile wireless and passive Radio Frequency Identification Devices (pRFID)?*
- *Implement secure wireless solutions for less than ever before?*

Main Sail and our partners know how to implement secure enterprise mobile wireless and pRFID for logistics while adhering to the seven key enterprise architecture design principles listed in Figure 1.

These are not just theoretical concepts; we have implemented this solution today for the U.S. Navy, using Sprint as the cellular broadband wireless provider and Intermec as the mobile AIT handheld provider.

Network Architecture Guiding Principles		
1	Provide connectivity options that are cost effective and performance appropriate to each facility	One size (or type of solution) typically does not fit all facilities. The wireless designer has a number of wireless technology tools in his designer toolbox including 802.11b/g/n, public carrier provided broadband cellular (CDMA or GSM), privately operated cellular CDMA and an evolving WiMAX range cellular capability. All of these technologies can be operated securely under FIPS 140-2 and DISA wireless STIG rules and all are currently in use within DoD installations somewhere in the world. The CACI-Main Sail Team has extensive experience in picking and implementing the right tools for the site.
2	Utilize enterprise management concepts wherever possible to centralize network and device management, standardize solutions, reduce complexity and enhance reliability	Having a common platform that can "see" all wireless devices and network components across the entire enterprise allows for early problem identification and reduced costs. The technology that enables a network operations "cockpit" that monitors the health of the entire wireless network from a central location is here today. This could be contrasted with the past approaches that place a heavy emphasis on local network servers and device managers at each site which do not allow visibility to devices and operations within the site.
3	Support today's devices and future enhancements with forward looking architecture	The content of today's network may be 3270 screen emulation character mode operations. While these may continue to meet the basic needs of the warehouse working on the floor there is an evolving need for additional communications approaches. Supervisors status reports, material shortage alerts, critical receipt notifications, special or classified item handling, digital/CAC signatures for incoming and outgoing materials, GPS tracking of parts in outdoor storage areas and many more applications are just a small sample of the types of data that may be moving across the network.
4	Select and purchase every component in the architecture to have a minimum lifecycle of 3 to 5 years	The architecture must be robust enough to deliver this type and volume of content to logistics workers, their supervisors and management team members. Information provides people with the ability to solve problems and logistics information wirelessly delivered to material handlers, supervisors and managers increases accuracy, decreases delivery times and ultimately reduces the cost of not being to "find your stuff" when you need it. None of these efficiencies can be gained without a solid wireless network.
5	Develop architecture to survive AIT (Automated Identification Technology) device technical innovation cycles by at least 3 technical refresh cycles	Currently mobile devices that support logistics operations have a lifecycle of about 3 years but as the pace of innovation increases the lifecycle between major device upgrades shortens. The architecture must remain stable and therefore cannot and need not change as the new devices are introduced.
6	Standardize devices, operating systems and network components to reduce complexity, reduce cost and increase reliability and supportability	Currently most AIT devices are based on the Microsoft Windows Mobile (based on Windows CE core) operating system. Microsoft has recently announced updates to the Windows Mobile operating system suite that would extend support through 2019. The CACI-Main Sail Team closely tracks the introduction of Apple (iOS based) and DROID (Android OS based) devices and there is an effort underway by various services to bring both of these platforms into DoD wireless networks. An experienced networking team like the CACI-Main Sail Team considers these technology trends in making recommendations to DLA.
7	Architect for Information Assurance (IA) demands that will continue to become more complex as cyber security threats continue to increase	Defense in depth solution approaches are requiring experience in both device (end point) as well as network security demands of the DoD environment.

Figure 1 Mobile Architecture Guiding Principles

What we did:

Since 2004, to support the Navy AIT Program Office, Main Sail has developed wireless implementations that have now catapulted to the enterprise level.

Beginning with the Bangor pRFID Evaluation (BRE) project, Main Sail helped introduce the Navy's first SAP-based Warehouse Management system for the Trident Nuclear Submarine base in Bangor, WA. This effort incorporated pRFID automated receiving lines, handheld bar code and pRFID readers and extremely cost-effective and reliable CDMA based wireless communications throughout three warehouse buildings (350,000 SF), managing 120,000 line items.

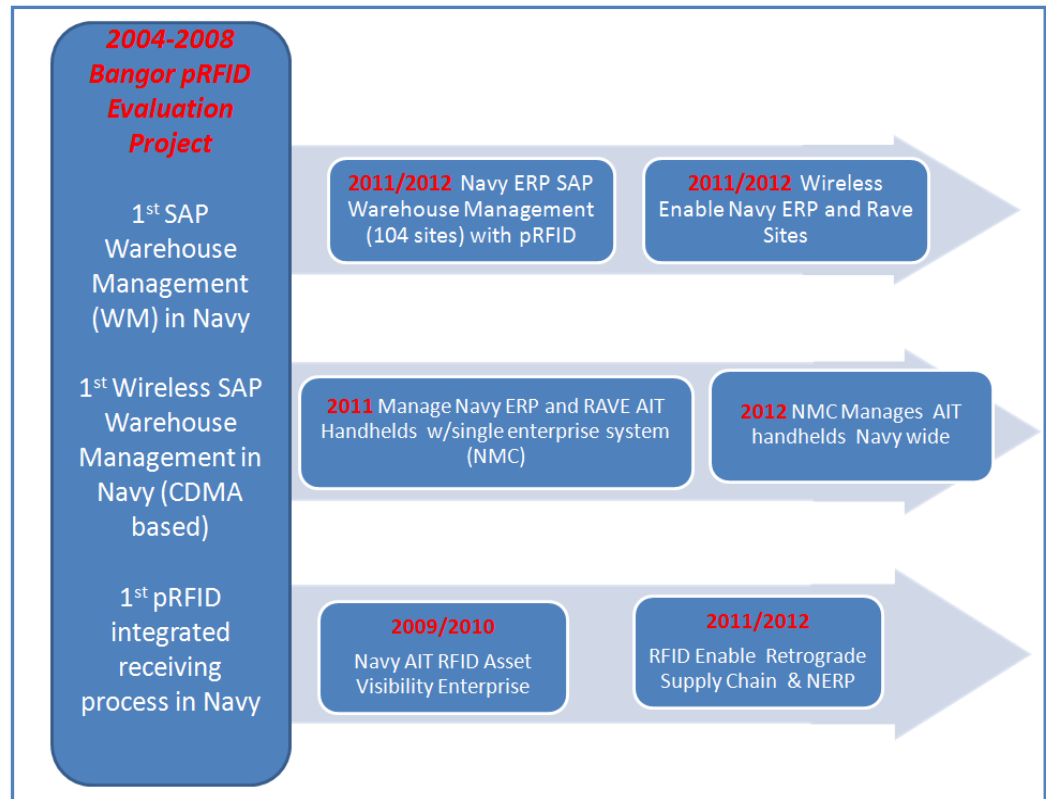


Figure 2 Main Sail sparked Navy AIT Evolution

Main Sail's experience and expertise through the BRE project implementation has been leveraged by the Navy to launch three (3) significant current mobile wireless based efforts (see Figure 2).

1. **Navy ERP logistics** - This effort will place 104 Navy warehouses under the SAP WM (Warehouse Management) solution. The larger warehouses will utilize CDMA based wireless utilizing Intermec CN4eg devices that Main Sail worked with the Navy to standardize. The Navy's RFID Asset Visibility Enterprise (RAVE) project, which allows the Navy to meet Office of the Secretary of Defense's (OSD's) pRFID implementation goals, will also utilize the same wireless implementation approach.
2. **Navy Mobile Computing (NMC)** - Main Sail has worked diligently with the Navy to create a wireless AIT solution to allow virtually all mobile handheld devices to be managed under a single enterprise architecture. The net result is that all organizations wanting to implement AIT for their applications will no longer have to go through a separate Information Assurance (IA) process to get the devices IA accredited. Instead the IA accreditation and device management can now be done for the Navy under the new Navy Mobile Computing System ATO (Authority to Operate). Organizations reference this accreditation system in their applications' IA documentation, saving an incredible amount of IA documentation effort and allowing accelerated implementation. This opens the door for many Navy organizations to gain AIT efficiencies with an approach that cuts years off the approval process.
3. **RFID Asset Visibility Enterprise (RAVE)** - The Navy is implementing an enterprise approach to RFID based material tracking under the new RAVE system. This revolutionary approach: 1) eliminates on-site and regional servers commonly found in older RFID architectures; 2) reduces infrastructure and sustainment costs; and 3) allows rapid RFID technology deployment. Site implementations that took weeks can now be done in days. To implement this technology a unique application of wireless technology employs CDMA-based routers and in-building CDMA repeaters that allow RFID fixed portals; mobile handhelds and RFID tag

printers to be inserted into a building without touching the existing network infrastructure. These all communicate directly with an enterprise server that manages all the RFID equipment and the RFID data flow from a central enterprise location.

RAVE has integration capabilities that will allow it to track materials into and out of Navy warehouses regardless of the WM system used to manage the warehouse. Initially it is being used to enhance the Electronic Retrograde Material Management System (eRMS) by automating the Receipt in Process tracking of materials in this supply chain, and is slated for integration into the Navy ERP SAP-WM solution to perform automated Receipt In Process processing for RFID tagged shipments from DLA and GSA.

In all these efforts Main Sail provides thought and technical leadership and implementation expertise.

Technology Highlights and customer benefits:

Main Sail has used the following technologies and techniques to provide cutting edge solutions for the Navy:

- Extensive use of CDMA broadband technology separately or in conjunction with 802.11x technology allows for extremely cost effective solutions for logistics facilities. In many cases the use of broadband technology allowed infrastructure costs to be reduced to 20% of the cost of outfitting a facility with an 802.11x WLAN. In CONUS locations where existing CDMA signal strength was sufficient the infrastructure costs were zero, simply using existing signal strength from nearby cell towers.
- Incorporating FIPS 140-2 compliant components in every wireless software and hardware component results in a fully Information Assurance compliant architecture that meets all security requirements.
- Enterprise level mobile wireless device management and RFID device management eliminates all middleware components allowing for a very reliable, very cost effective solution that lends itself to plug and play attachment of new mobile wireless or RFID technology. This allows the customer maximum flexibility to insert new technology faster without changing the basic architecture. This ultimately allows us to keep a step ahead of our competitors and our enemies with logistics systems that can provide rapid, reliable response to world situations.
- Unparalleled enterprise integration. The RAVE (RFID Asset Visibility Enterprise) solution uses a Web Methods integration platform that allows the Navy to standardize the “user facing”, data collection front end and its business processes. This allows these standard processes to be integrated with virtually any legacy “back end” system. Ultimately this extends the life of legacy systems while allowing new technology (like RFID and wireless mobile handhelds) to be inserted into the business process.
- Standardizing mobile handheld specifications has allowed the Navy to “set the bar” for all suppliers and allowed the creation of a true enterprise network. This has set the stage for rapid adoption of wireless mobile and RFID technology across a broad spectrum of the Navy enterprise.

In a letter from the Defense Standardization Program Office (DSPO) dated January 25, 2010, it was announced that the Navy pRFID Implementation Program Team, with principal support from Main Sail, was 1 of 6 winners of the 2009 Defense Standardization Program (DSP) Outstanding Achievement Award, given to individuals and organizations achieving significant improvements in quality, reliability, readiness, cost reduction, and interoperability through standardization.

Contact Main Sail for further information or a technical review of your wireless implementation challenges.

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