RFID for Maritime

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July 2005

About ChainLink Research

ChainLink Research, Inc. is a Supply Chain research organization dedicated to helping executives improve business performance and competitiveness through an understanding of real-world implications, obstacles and results for supply-chain practices, processes, and technologies. The ChainLink Inter-Enterprise Model is the basis for our research; a unique, real-world framework that describes the multi-dimensional aspect of links between supply chain partners.

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Table of Contents

Executive Summary

THE CHALLENGE

Supply Chains today are global. And a huge amount of the world's consumable products, automobiles, computers, and perishables move across the ocean. Statistics vary, but most of what you drive, see, and sit on, and the packaging of these items, travels on the ocean to get to your business or home. Globalization and the virtualization of the supply chain have increased the challenges in controlling the ocean chain. Outsourcing has replaced the exotic thinking about imports. Supply chains may be cheaper, but demanding customers *still want* supply chain flexibility. Products can travel on their ocean cruise from 2 to 8 weeks, eliminating many of the gains of the 1990s in supply chain effectiveness, due to technology and process improvements (from APS[1] to 'Just in Time', etc.)

There are many challenges associated with ocean shipping. Staggering losses (estimates are around $50 billion each year) occur due to cargo theft. Piracy (the modern Blue Beards) still roams the high seas. In addition, after 9-11, security concerns in the transportation industry have increased. New regulations and the threats of more regulations have been introduced in the process.[2]

Many enterprises are exploring and implementing RFID and related technology as a way to solve these problems. In fact, RFID has already been successfully used in a variety of Maritime business process areas and can provide *real* value to a global firm. RFID in Maritime is not an unproven strategy. We will discuss the trials and success.

In this report, we will address the Maritime application of RFID. We will look at:

- The end-to-end processes that span Maritime;

- The RFID solutions and applications—it's not just about Tags;

- And the key technology providers in this growing field.

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[1] Advanced Planning and Scheduling

[2] For source information and updates on these requirements go to: www.customs.gov/xp/cgov/import/commercial_enforcement/ctpat/

With each policy change and technology innovation, this disruptive technology—RFID—creates opportunities for firms to evaluate new services and new business models. Yet we must not miss the speculative nature of some endeavors. In addition, firms are able to address process change by taking advantage of large ocean carriers to not only move their freight, but to also manage their logistics. So 3rd party providers are becoming part of the technology model. RFID is looking a bit like the internet boom right now—with all the shows and advertising. The good news is that much of the efforts and technologies in the Maritime space were piloted before the hype—*BW* vs. *AW* (Before Wal-Mart and After Wal-Mart), also *BH (*Before Hype). RFID in Maritime is clearly a BW endeavor and many applications are already implemented. Business cases have been done, and in many cases firms have already gained value. That is not to say that the innovation is not in the fast lane. But Maritime has a credible story to tell (vs. retail) when it comes to working RFID applications.

Maritime End-to-End Requirements and Solutions with RFID

These are still early days for RFID—in a mass scale—in most industries. Maritime applications are also early days—but the foundation, which is quite costly, is being put in place.[4] We will address these foundational investments, strategies and projects later in this paper. But first, let's look at where the needs are.

WHAT END-USER FIRMS WANT

So, what are the fundamental business challenges and priorities that users want to address? Although security gets all the press, it does not provide the investments return that businesses like to focus on. Our survey (figure 1) shows these concerns:
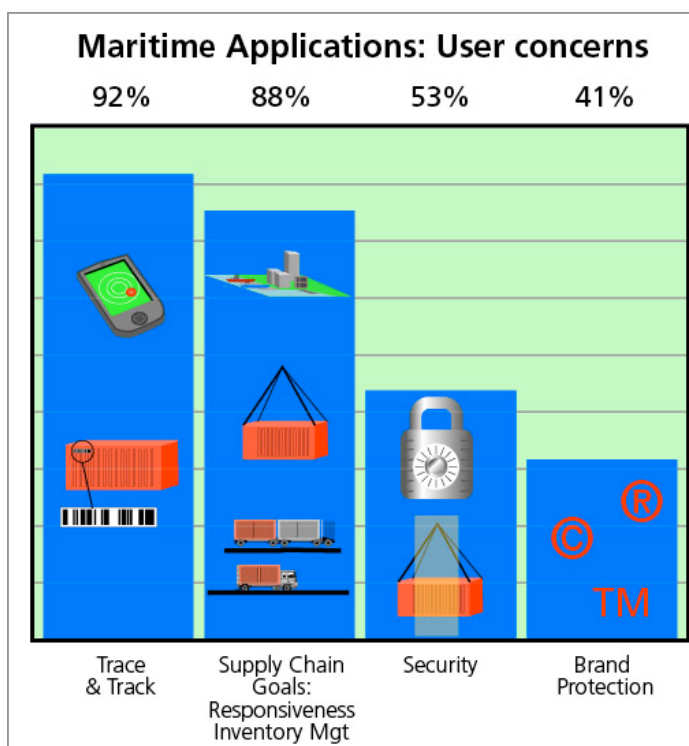

Figure1

- **Trace and Track**: This term has a broader context than knowing where the shipment is. Today, firms want to track the chain of custody. Who actually, physically and *financially* has the product? They want to dynamically manage—diverting assets to the current needed recipient. This is being tried in diverse businesses from P&G to the US Department of Defense.

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[4] And with the recent announcement of Savi Networks, the joint venture by Hutchison Port Holdings and Savi, teaming the technology with one of the world's largest ocean/port enterprises, the investments in the Maritime solutions are growing.

RFID FOR REAL: INITIATIVES AND CASE STUDIES

We provide here both existing investments/projects, as well as positions that firms are taking to complete the Maritime RFID application space. There are three main maritime related RFID applications – Shipment tracking, Yard management and Container security. In addition, managing Inter-modal shipping and International Trade Regulations Compliance are included.

Application	Description/Summary	Examples
Yard Management	**Key Drivers:** Increased efficiency reduced handling cost; this appears to be the initial driver of RFID programs that have some actual success stories since the 1990s. **Capabilities:** Yard solutions: • Tag containers entering the yard are effectively put in the proper locations, and located if they are not in the right location. Chassis can also have tags and readers to synchronize location where containers are put, as well as to identify vehicles coming in and out of the yard: • Space allocation • Data Collection and integration • Yard Entry and Exit management	• **Port of Singapore** (PSA) deployed 1000s of RFID transponders into the asphalt to create a multi-dimensional tracking grid in 1993. Texas Instruments was the supplier. The Port of Singapore tracks many thousands of multi-ton cargo containers daily, and also manages arrivals and departures of up to 50 ships. PSA spent close to $910 million in 1993 on development projects. A centralized system manages the placement and location of containers. • **Port of Rotterdam:** European Combined terminals, one of the largest operators of container handling systems in Holland's massive port of Rotterdam. Buried RFID transponders guide automated guided vehicles (AGVs). Deployment began in 1990 using Texas Instruments technology. The new automated terminals achieve a much higher efficiency than its manned counterparts. All container transfers are controlled by automated guided vehicles, and unmanned bridge cranes carry out stacking operations – all without human intervention. • **SSA Marine**, a large, privately held container terminal operator and cargo-handling company in Seattle, is deploying the WhereNet wireless Marine Terminal Solution at four West Coast ports this year. "The goal is to help ports handle as many containers as possible." • **NYK Logistics** at Long Beach has deployed the WhereNet® real-time locating system and WhereNet yard management solution to help manage more than 50,000 inbound and 30,000 outbound ocean freight containers.
Container Security	**Key Drivers:** Security, Financial Loss, Government Compliance **Summary:** Large number of recent projects driven either by vendors trying to prove solution viability or by government funded projects **Government Initiatives:** • U.S. Customs and Border Patrol (CBP) • Container Security Initiative (CSI) • Customs Trade Partnerships Against Terrorism (C-TPAT) • Operation Safe Commerce (OSC) • Secure Trade in the APEC Region (STAR)	• **Asia-Pacific Economic Cooperation** (APEC) launched a program in early 2002 to focus on Secure Trade in the APEC Region (STAR) and promote the efficient and secure movement of goods across borders. The first STAR initiative, STAR-BEST (Bangkok Laem Chabang Efficient and Secure Trade), served as a demonstration project that tested concepts and technologies for implementing a supply chain security system. The project affixed RFID sensor seals then tracked containers throughout their route from Laem Chabang, through ports in Taiwan and Korea, and on to the Port of Seattle, using a real-time, web-enabled software application developed by Savi Technology. After arriving at the Port of Seattle terminals, the containers were discharged from the ships and the e-seals checked before the containers left the premises. Next, they were sent to their final destination point where operators with hand-held computers verified the containers' origin and contents. • **NYK Logistics** at Long Beach (see above)

Table B, cont. to →

MOVING ABOVE THE TAGS

With all the *AW* [14] noise in the market now, many firms can get lost in the noise. Maritime uses the whole stack of technologies that we have discussed to accomplish its tasks. In Maritime, the reality is that there are a few providers of note. And the good news here is that they are willing to provide a whole stack of solutions for their clients.

For buyers, focusing on what problems you are solving, what questions you are asking of the system, or what information it is providing, is the key to understanding a solution.

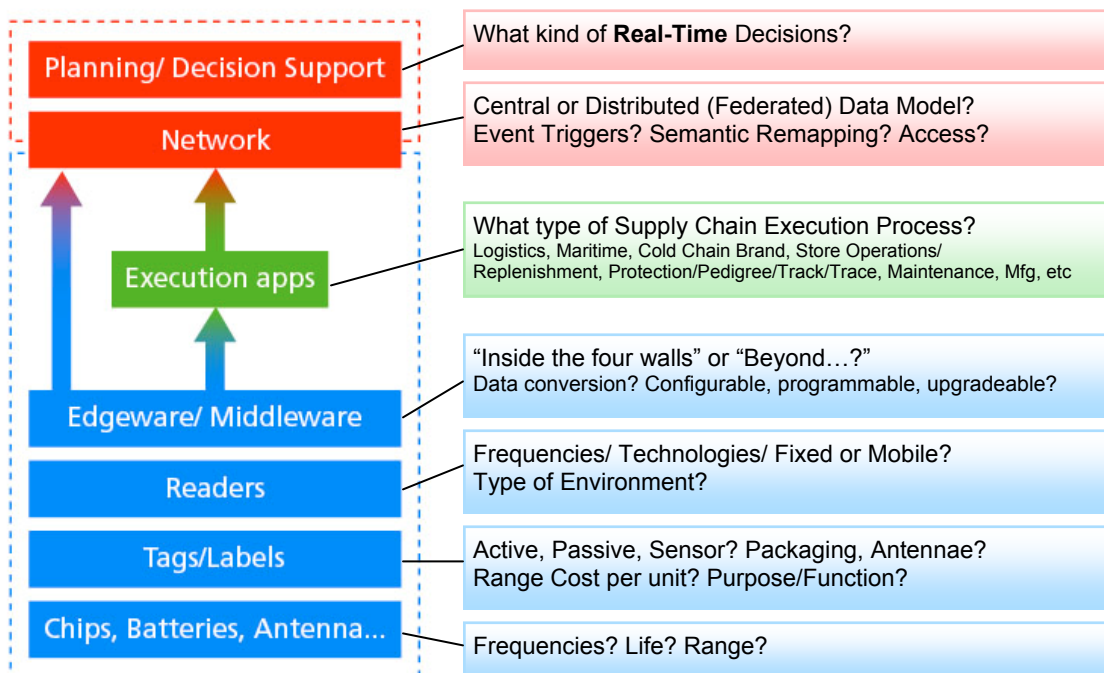### Another View of the Stack

Figure 3

Referring back to the list of user requirements (table 1, pg 9), the key for RFID in Logistics in the future will be to get *within* the shipment, i.e., to provide visibility. Today, 3rd party and most enterprise solutions are not able to bridge between the shipment levels and link into the item level information. These types of capabilities are required—not desired—by the global leaders.[15] This requires an understanding of the data model.

[14] After Wal-Mart

[15] The US Department of Defense UID strategy

www.chainlinkresearch.com/research/detail.cfm?guid=D7D38A76-BDF6-40AE-B52C-E86D76C903C1

The Tags. NaviTag offers a whole range of products. But the big star is their active remote reporting tag with security sensors that monitors containerized cargo in-transit. So if some one attempts to open the container or break in by cutting through the walls, the NaviTag automatically sends an alert message to the NaviTag Datacenter through its global satellite network, and then onto users by email, FAX, SMS or by XML link.[22]

It's like how you get your cell phone and cell service. Devices and their communication protocols are industry standard, inexpensive, get activated easily, and go to work. Start-up costs are extremely modest, and firms can start small and grow.

What is interesting about NaviTag is their capability to provide intermodal Maritime solutions in an easy to adopt and cost affordable way. A customer can start with a few active tags on their ocean containers in a pilot program that includes global satellite coverage, and expand to cover all their secure supply chain needs. We found this approach to be non-intimidating for firms who are not sure what they will do—and who will do it for them. This is a good approach for anyone. But for small shippers, it seems like the way to go. Maritime for the Masses!

WHERENET

WhereNet specifically provides Real-Time Locating System (RTLS) technology, offering capabilities for several application areas, including yard and asset tracking in many industries. The company also designs and develops its own branded hardware. So, they support functions like locating containers and managing the flow in a port, yard, etc., or tracking expensive assets for large equipment/industrial operations.

What many people don't understand when declaring that the 'price of tags is high' is how it relates to the functions they are performing, the value it is adding.[23] For example, tracking very expensive and fragile products. Or the revenue your equipment earns for you (where is that machine when we need it.). If you look at the savings or the revenue earned, then deploying active tags in many environments might actually add value and *make money* for the firm! You got that, readers?

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[22] We have only seen this approach from Savi and NaviTag

[23] Tag prices should be amortized over the life of the device and number of uses, as well.

Addendum

Vendors listed in this Report:

Acsis - pg 14

Altobridge - pg 23

APL - pg 11

Avante - pg 23

BEA - pg 14

Chep - pg 27

Cisco - pg 12

ConnecTera - pg 14

EJ Brooks - pg 11

EPCglobal - pg 19

GlobeRanger - pgs 14, 27

GT-Nexus - pg 19

Hi-G-Tek - pg 11

Hunter Paine Enterprises - pg 27

Hutchison Port Holdings - pgs 6, 9, 18

Hutchison Whampoa Ltd - pg 11

Ingersoll-Rand - pg 23

Intermec - pg 24

Maersk - pgs 11, 20

Maersk Data (sold to IBM) - pg 20

Maersk Logistics - pgs 9, 20

Mitsui - pg 26

NaviTag - pgs 11, 20, 21, 22, 28

NYK Logistics - pg 10

Oat Systems - pg 14

PSA Corp. Ltd - pg 11

Savi Networks - pgs 6, 9, 18, 29

Savi Technology - pgs 9, 11, 18, 19, 26, 28

Symbol - pg 24

TIBCO - pg 14

VeriSign - pgs 14, 16, 19, 24, 25

Vizional - pg 23

webMethods - pg 14

WhereNet - pgs 22, 23, 28