



*Fleet & Industrial Supply Center
Norfolk*

**Ocean Terminal
Passive
Radio Frequency Identification
Project**

Ready. Resourceful. Responsive!

Mr. Dave Cass
Director, Ocean Terminal Division

- ◆ **Overview of the FISC Norfolk Project**
- ◆ **Redesigning the Business Process**
 - ◆ *Visibility vs. Transaction of Record*
 - ◆ *Determining Read Context*
 - ◆ *Accommodating Limitations of RFID*
- ◆ **The FISC Norfolk approach**
- ◆ **For further information**

Project Overview

- ◆ **Passive RFID integrated into Container Freight Station operations**
- ◆ **Tag is affixed to each piece during receipt process**
- ◆ **Shipments from DDSP are pre-tagged at source**
- ◆ **RFID used to create container manifests during loading process**

What aspect of the business? What do we want from the process?

What aspect of the business?

- Document of receipt and loading of export freight in the Container Freight Station.***



Out of the
truck...



...into the
staging area...



... into the SEAVAN
shipping container...



... and onto the
container manifest.

What do we want out of the process?

- Timely and accurate receipts.***
- Accountability for each piece of every shipment throughout the entire cycle.***
- Correct routing of each shipment.***
- Accurate container manifests.***

Nature of Our Freight

- ◆ **We deal with shipment units at the case and pallet level.**
- ◆ **Shipments range in size from small envelopes to multiple pallets.**
- ◆ **Small shipments palletized for movement convenience must all be individually documented.**
- ◆ **Shipments are moved via forklift, and are not depalletized to be processed on high-speed conveyors or via automated sortation.**
- ◆ **Many shipments are to Navy ships, so destination at loading time may have changed since receipt.**



Redesigning the Business Process

- ◆ **Passive RFID technology cannot simply be inserted into existing processes as a replacement of existing manual or barcode applications.**

- ◆ **The business process must be reviewed, and redesigned to accommodate the technology, in order to receive full benefits from the technology.**

- ◆ **Three important questions must be answered before developing the new processes:**
 - ◆ ***Implementing a Visibility Tool or a Transaction of Record?***
 - ◆ ***How will context be assigned to the reads?***
 - ◆ ***How will limitations of the technology be accommodated?***

Visibility Versus Transaction of Record

◆ **Visibility**

- ◆ *Simply recording where and when shipments were seen*
- ◆ *Compliments existing documentation processes, but does not replace them*

◆ **Transaction of Record**

- ◆ *Replaces existing documentation processes*
- ◆ *Requires that each RFID read be interpreted to determine a context*
- ◆ *Requires a high rate of accuracy*

Determining Context

◆ No Context

- ◆ *Do not interpret the read, simply record it*
- ◆ *Applies to using passive RFID as a visibility tool. Cannot be used with a transaction of record.*

◆ Context determined by location

- ◆ *e.g., tags seen by the reader in the receiving bay are always processed as receipts*

◆ Context determined by directionality

- ◆ *e.g., tag was seen by the reader on the inside of a door, then a few seconds later by a reader on the outside of the door, and is processed as an issue.*

◆ Context dynamically assigned

- ◆ *Requires input and output interaction with a user*

Rate of Accuracy

- ◆ **Cannot expect 100% reads of 100% of shipments 100% of the time**
 - ◆ *Business processes must accept this limitation of the technology up front*
 - ◆ *Technology will improve over time, and will soon be dramatically better than it is today, but there will always be rules of physics that will prevent absolute accuracy*

- ◆ **Not acceptable for transactions of record**
 - ◆ *Human interaction required to provide a check and balance that everything that should have been read was read*
 - ◆ *Requires input and output interaction with a user*

- ◆ **Wanted a transaction of record**
 - ◆ *Required 100% accuracy of the business process*
 - ◆ *Had to design an interface and process that ensured no shipments were being missed*
 - ◆ *Incorporated both passive RFID and barcode technologies*
 - ◆ *Wanted an validation process to capture freight errors*

- ◆ **Wanted to use the same portal for both receiving and loading**
 - ◆ *Context had to be dynamically assignable*
 - ◆ *Context had to be very specific*
 - ◆ *Specific container into which the shipments were being loaded*

◆ Receiving

- ◆ *As each shipment is received, label is printed for each piece of the shipment.*
- ◆ *User scans a passive RFID tag to be assigned to that piece.*
 - ◆ *For shipments from DDSP, RFID is already affixed to shipment, and system knows ID from the Advance Shipping Notice.*
- ◆ *System links the ID of RFID tag to the Transportation Control Number & Piece Number of the shipment.*



◆ **Passive RFID reading portal**

- ◆ ***Manned by a portal operator who interacts with the forklift drivers, the freight, and the reader software.***



- ◆ ***Prior to bringing freight through the portal, the forklift operator is registered to a specific context.***
- ◆ ***The driver's name is then used as the key for setting the portal before each read.***

Our Solution, Continued.

- ◆ **To activate the portal for each read, the operator and forklift driver determine the number of pieces to be read, and enter that number into the workstation.**
- ◆ **If the RFID reader does not capture the correct number of shipments, a barcode scanner is used until all shipments have been accounted for.**

ePC Counter

Number of EPC Tags Expected:

1	2	3	4	5
6	7	8	9	10

Unknown

1 / 3

shipments scanned since the last reset

Sound Bell when incrementing

Concept of Operations

◆ **The system performs validation of each shipment that is read, and determines if it is proper to be applied to the current portal context. The operator is provided a color coded listing of shipments.**

◆ **The portal operator then determines what will and will not be processed.**

Electronic Product Code (EPC) Portal

Function: STUFF Doorway: 10 New Driver: DAVE
 TCN: DAVESTESTVAN00003 Consignee: N60514 Remove
 Container Number: USMJ0000031
 POD: PQ7 May also load: PQ3 DAVE
 CACY: A230

Scanned Shipments								Processed Shipments	
Add	New	TCN	Consignee	POD	DIC	Cmty	Sec	TCN	enigh
Add	<input type="checkbox"/>	*ASAS-8005-6231-831 2					0/0	NTESTTESTTESTESZ	NTE
Add	<input type="checkbox"/>	F42453-3772-6364-XXX	N63032	AU8	VH1	39529	5/5		
Add	<input checked="" type="checkbox"/>	N07184-4104-E028-XXX	N07184	PQ7	TX1	70029	1/1		
Add	<input type="checkbox"/>	NTESTT-ESTT-ESTT-ESZ	NTESTT	PQ7	VX4	70029	2/5		
Add	<input checked="" type="checkbox"/>	V03367-3237-1250-KAX	V03367	PQ7	VX1	74229	1/1		
Add	<input checked="" type="checkbox"/>	V03367-4231-1304-BXX	V03367	PQ7	TJ0	63409	1/1		
Add	<input checked="" type="checkbox"/>	V48649-4277-0342-XXX	V48649	PQ7	TJ1	835W9	1/2		

TCN to add: [. . .]

ePC Readers: Reader 1 [Disabled] Reader 2 [Constant] Reader 3 [Disabled] Reader 4 [Disabled]

- ◆ **Our project report is available to anyone who would like to request a copy.**
- ◆ **david.cass@navy.mil**

