
RFID
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BAE Systems Gets Smart with Warehouse Utilization and POU Replenishment

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Who We Are

- At BAE Systems, our advanced defense technology protects people and national security, and keeps critical information and infrastructure secure.
- We search for new ways to provide our customers with a competitive edge across the air, maritime, land and cyber domains.
- We employ a skilled workforce of 89,600 people in more than 40 countries, and work closely with local partners to support economic development by transferring knowledge, skills and technology.

RFID Partners

- Tapestry Solutions
  - Tapestry Solutions is a member of Boeing Global Services, which delivers complete, cost-competitive service solutions for commercial, defense and space customers.
  - Tapestry has developed our RFID tracking software and has been a partner of BAE Systems for many years

- Hurst Green Plastics
  - Plastic mold injection manufacturer, that specializes in smart inventory control systems
  - Their binflag solutions made both of today's case studies possible

Overview

- Exposure to the Auto-replenishment system and the “Up/Down” style of RFID ordering has allowed us to adapt that process to develop these two new use cases.

Warehouse Optimization

Point of Use

Warehouse Optimization

RFID Enabled
Binflag System

RFID Handheld/Antenna
Sends Signal to RFID Software

Business Intelligence
Dashboard displays
vacant/occupied shelving
locations

New Use Case

- BAE Systems warehouse team in New Hampshire required a management system that offers real time storage and space utilization data

It needed to be:

- Affordable
- Simple to implement
- Easy for users to understand
- Adaptable and scalable

Proposed Solution

- Leveraged existing RFID technologies.
- Adapted the automated material replenishment capabilities and convert shelf and rack locations into inventory bins.
- Bins utilize RFID to determine if the locations are filled or empty.
- Utilization information is updated automatically and presented in dashboard format.

Process Overview

Each rack contains BinFlags that corresponds to each shelf location

1

BinFlags display GREEN if shelf location is occupied and RED if empty

2

User scans Binflags to update location data in ESI

3

Inventory Bin Setup

- Each shelf/rack location is assigned a BinFlag RFID unit containing two RFID tags; a bin tag, and a replenishment tag

- Shelf/rack locations are built as inventory “Bins” as well as “Assets” within ESI
  - Name
  - Location
  - Tag Information
  - Fill Status

Inventory Bin as Parent Asset

- Bin creation will also create an Asset to be used for parent/child relationships

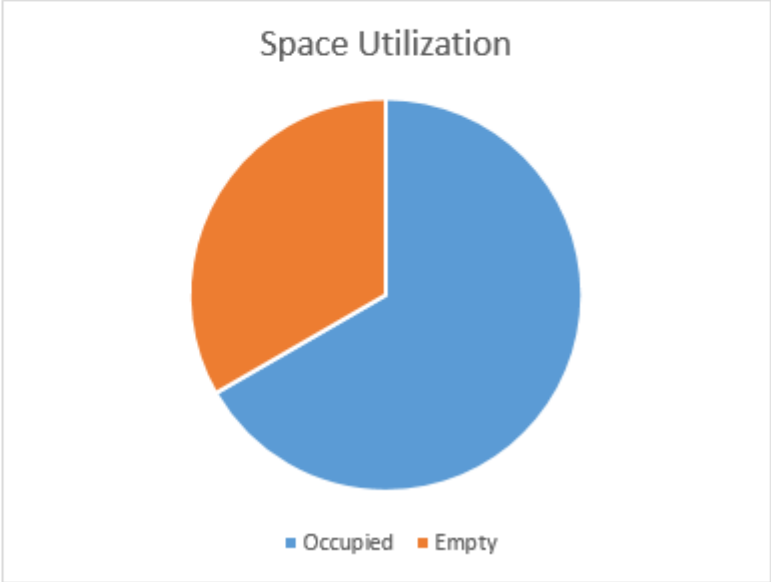
- Inventory bin/asset setup answers the question, *"Is this rack location filled, if so what is stored there?"*

- Rack utilization and components presented on management dashboard for quick reference

Facsimile Dashboard

Bin	Location	Asset Description	Status
A01	Rack A	Work Benches	Occupied
A02	Rack A	Test Equipment	Occupied
A03	Rack A	Skid of Pink Foam	Occupied
A04	Rack A	Skid of Pink Foam	Occupied
A05	Rack A	Skid of Pink Foam	Occupied
A06	Rack A	Null	Empty
A07	Rack A	Null	Empty
A08	Rack A	Null	Empty
A09	Rack A	Wrapping Paper	Occupied
B01	Rack B	Wrapping Paper	Occupied
B02	Rack B	12 Cartons of Shipping Boxes	Occupied
B03	Rack B	24 Cartons of Shipping Boxes	Occupied
B04	Rack B	14 Cartons of Shipping Boxes	Occupied
B05	Rack B	Humidifier Parts	Occupied
B06	Rack B	Null	Empty
B07	Rack B	Null	Empty
B08	Rack B	Null	Empty
B09	Rack B	Air Chiller	Occupied

Total Slots	Occupied	Empty	Occupied %
18	12	6	66.67%



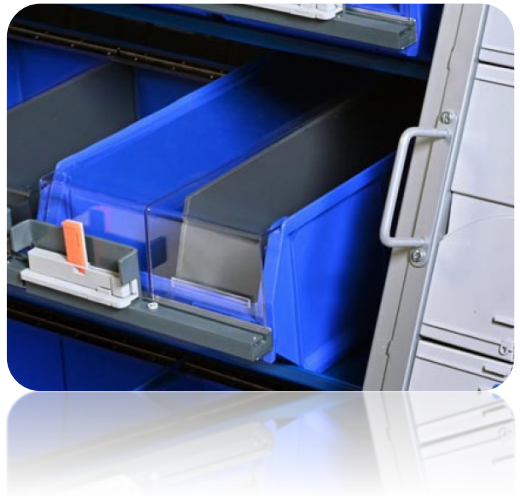
Challenges and Solutions

- It was difficult to initially get funding for this project
  - It took several months of pitching the value of this project to the warehouse team and their supervisors in order to get funding

- This particular site did not have complete overhead reader coverage
  - Utilized the handheld applications which had been previously developed by the Boeing team

Point of Use

RFID Enabled Poke-Yoke Two-Bin System



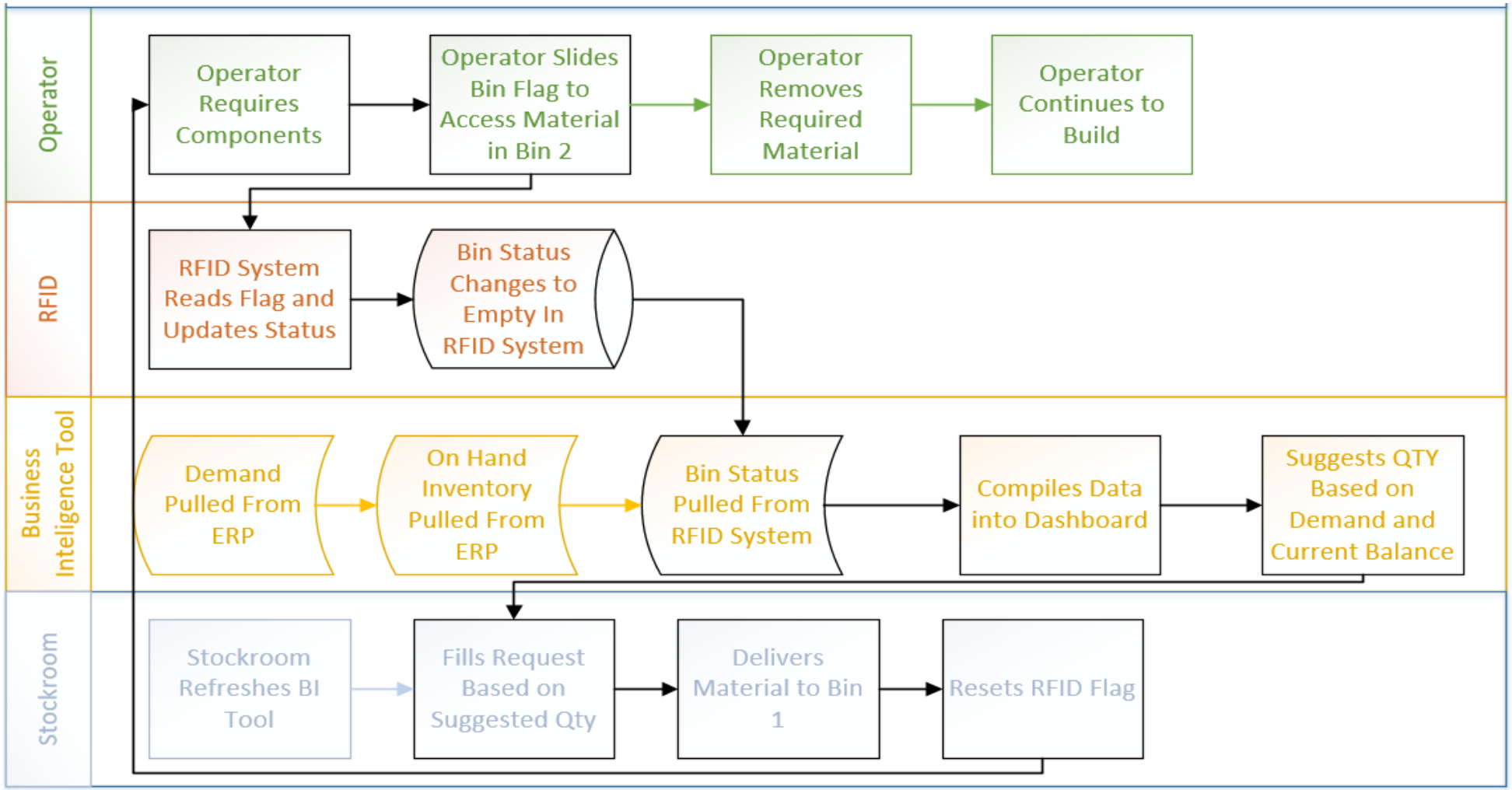
RFID Handheld/Antenna Sends Signal to RFID Software

Business Intelligence Dashboard shows empty bin and suggests fill quantity

New Use Case

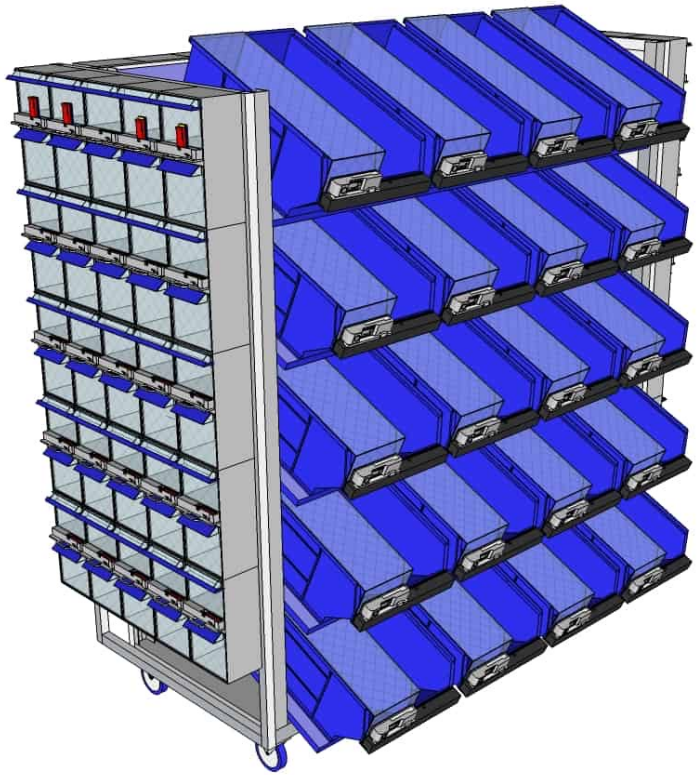
- The business utilizes multiple time consuming Point of Use (POU) solutions
  - Microsoft Sharepoint Requests (manual entries in multiple Microsoft Sharepoint Sites)
  - Email Requests – Manual request to stockroom email
  - Manual two-bin - Return labeled bin to stockroom when empty
  - Kanban Cards – two-bin system where card from second bin is delivered to stockroom
- The supply is not Inventory Issues
  - Causes “Hot” picks
  - Very manual and difficult process to pull demand (not common knowledge)
  - Different Processes for different factories
  - Process variations create manufacturing stoppages

Process


Operator
Operator Requires Components
Operator Slides Bin Flag to Access Material in Bin 2
Operator Removes Required Material
Operator Continues to Build
RFID
RFID System Reads Flag and Updates Status
Bin Status Changes to Empty In RFID System
Business Inteligence Tool
Demand Pulled From ERP
On Hand Inventory Pulled From ERP
Bin Status Pulled From RFID System
Compiles Data into Dashboard
Suggests QTY Based on Demand and Current Balance
Stockroom
Stockroom Refreshes BI Tool
Fills Request Based on Suggested Qty
Delivers Material to Bin 1
Resets RFID Flag

RFID Enabled POKE-YOKE Two-Bin System

- Bin only allows user to access one bin at a time without alerting the stockroom material is required.
  - Ensures less material shorts
  - Increased Inventory Accuracy
  - Reduced Inventory = Reduced Exposure
  - Direct to supplier option



Facsimile Dashboard

RFID Smart POU Replenishment

Bin Status

	Part	Bin	Factory	Status
X	1001	A01	1	Empty
	1002	A02	1	Full
	1003	A03	1	Full
	1004	A04	1	Full
	1005	A05	1	Full
	1006	A06	1	Full
	1007	A07	1	Full
	1008	A08	1	Full
	1009	A09	1	Full
	1010	A10	1	Empty
	1011	A11	2	Full
	1012	A12	2	Full
	1013	A13	2	Full
	1014	A14	2	Full
	1015	A15	2	Full
	1016	A16	2	Full
	1017	A17	2	Full
	1018	A18	2	Full
	1019	A19	2	Full
	1020	A20	2	Full

Remaining Orders

2	5%	

Selected Order

Quantity On Hand	2 Week Demand	Suggested Fill
25	75	50

Request Transaction Reduction

- Nearly 5900 Parts In POU locations across enterprise
  - On average there are 3 transaction per part
  - Each consisting of about 4 minutes per transaction

Transactions
70k/year to 23k/year

Hours
4600/year to 1500/year

Reduced Planning Mgmt.

- Nearly 5900 Parts In POU locations across enterprise
  - There should be at least 2 demand checks per year
  - Each consisting of about 15 minutes per transaction

Transactions
12k/year to 0/year

Hours
2924/year to 0/year

Other Benefits

- Unified Process

- Reduced Manufacturing Stoppages
- More Frequent Checkups = Less Material on Floor = Less inventory Exposure
- Potential for Automation to ERP system

Thank you!

THANK YOU

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