Appendix C

Smart Storeroom Phase II

Business Case Analysis

Business Case Analysis

I. Program Management Information

A. Project title: SMART Storeroom, Phase II
B. Points of Contact

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II. Background

A. Radio Frequency Technologies Operational Proof of Concept

1. This initiative meets CNO directive to NAVSUP to "pursue incorporation of RF technology as a long term afloat inventory management solution...[with] the potential to dramatically reduce, if not eliminate, the need for physical inventories."
2. This effort clearly demonstrated the effectiveness and efficiency of using RFDC and RFID emitter technology to enhance current afloat supply business processes in the areas of receipt, stow, issue, and inventory.

    a. The use of this RF technology nearly eliminates the need for manual data entry, which requires the majority of SK manhours.
    b. Use of RF technology also improves inventory accuracy by eliminating the errors that accompany manual data entry. Each system captures the data provided in the appropriate barcoded information on the receipt document and the material.
    c. The data captured by the RF systems is fed to the onboard AIS in near real-time improving asset visibility.
    d. The RF emitter system nearly eliminates the need for physical inventory of designated material (DLRs in this case).
    e. Use of RF technology will enable managers more accurate information on knowing where assets are located.

B. Risks and risk-reduction strategy
    1. Programmatic risks
        - Budget process

- Adopt a full team concept with NAVSEA, NAVSUP and other necessary players to constantly monitor and address new risks associated with the budget process

- Interfacing with necessary information systems
  - While no risk mitigation plan can assure stable design, it will be necessary to stay closely linked to mapping legacy application use, as well as ERP deployment schedules.

- Technology obsolescence
  - Industry standards for RF seem unlikely, but there will be great value in maximizing the final system design's likeness to open systems and maturing commercial preferences.

2. Technical risks

- No current software interface between RF systems and shipboard AIS
  - Efforts are ongoing to coordinate the proper interfaces with SPAWAR.

- Hazards of Electromagnetic Radiation to Ordnance (HERO)
  - NAVSEA Indian Head is working with NAVSEA Dahlgren (conduct HERO Certification) and Naval Ordnance Safety and Security Agency (NOSSA) (determine ordnance handling policy) to establish an appropriate HERO test for these relatively low-powered RF systems used for asset management.

- Joint Frequency Management Office (JFMO)/Host Nation Agreement (HNA)
  - JFMO approval was obtained for all shipboard RF system testing. In addition, HNA of chosen frequencies must be finalized. Finding a single frequency accepted by all foreign countries is a unique challenge. Multiple frequencies may be required. The Navy AIT Project Office is monitoring this.

- NMCI/IT21/N6 Compliance:
  - CINCLANTFLT and COMNAVSURFLANT N6 approval was obtained to use the RF systems aboard ship for the demonstration period. Compliance with NMCI/IT21 will be resolved prior to installing these systems.

- RFID NCITS T-6 and other hardware standards:
  - Not all hardware standards have been determined yet. As stated above, the various AIT groups and committees are monitoring the setting of these standards and compliance will be enforced as appropriate.

C. Classification of initiative: Mission Essential.

Mission essential – As stated previously, this initiative is in response to the CNO directive to NAVSUP to pursue incorporation of RFID technology into Supply business processes in an attempt to eliminate physical inventories.

Business practice change – The RF systems all but eliminate the manual entry of receipt, stow, issue, and inventory data into the shipboard AIS. In concert with that functionality, the accompanying data entry errors are also eliminated. The RFDC system captures all barcode data from the receipt document, the material, and the shipboard location and feeds that information to the shipboard AIS in near real-time. It also has a non-RF functionality, which allows the scanner to batch process the captured data via a docking station into the shipboard AIS. The RF emitter system all but eliminates the physical inventory requirement for designated material. It provides both global and portal tracking capability.

Enabler – The insertion of these RF systems significantly enhance inventory accuracy while facilitating improved manpower allocation and productivity.

III. Alternatives

A. Alternatives List:

a. Continue the current process.

b. Insert the RFDC System: The RFDC system supports current and future barcode technology. It can be used in either a non-RF or RF configuration, so those ships without RF capability can utilize the system immediately in the non-RF mode and quickly transition when the RF capability is available. Use of this system nearly eliminates the need for manual data entry, which takes up the majority of SK manhours.

c. Insert the RFID Emitter System: Cost and tag size limit the use of this system. The RFID emitter system is proven cost-effective and efficient in monitoring high-dollar-value, high-visibility items (DLRs in this case). The RFDC (barcode) system must be used to marry the tag identification with the material and the storage location in the shipboard AIS upon initial receipt. Once this information is in the AIS, inventory management of this material becomes a hands-off function. The beaconing of the emitter tags provides a global inventory of all tagged material on at least a daily basis (or whatever the beacon periodicity is set at). The portals capture all movement of the material into and out of storage locations.

d. Insert both the RFDC and RFID Systems

B. When reviewing the alternatives, costs and benefits were analyzed by ship class. For the RFDC system, only those ship classes (AOE, AS, CG, CV, CVN, DD, DDG, FFG, LHA, LHD, MCS, SSBN, T-AFS) that were able to payback their variable costs within five years were included in the overall analysis. For the RFID system, only the classes (AOE, CV, CVN, LHA, LHD, T-AFS) with a large volume of DLR transactions were included in the overall analysis. When looking at the cost and benefit on each ship class, existing bar code capabilities for that ship class were considered. It was also assumed that SNAP II ships that are not scheduled to receive R-SUPPLY Force until after FY 03 would be receiving PDT 7240 bar code scanners.

For workload savings, an afloat FTE was considered 3484 hours. Cost savings were based on the FY 02 composite rate for an E-5. For inventory savings, an estimate of inventory carrying cost was generated. To do this we estimated that 10% of the additional inventory being held could be saved.

IV. Discussion and Evaluation of Alternatives

A. Rank the alternatives

1. The RFDC and RFID systems should be installed on those ship classes identified in paragraph IIIB.

2. The RFDC system should be installed on those ship classes identified in paragraph IIIB beginning with those without barcode scanners.

3. The RFID system should be installed on all Navy ships that store large quantities of DLRs as soon as possible. Depot Level Repairables should be monitored with this system.

B. Explain and illustrate each initiative's return on investment (ROI) and payback period.

1. The combined RFDC and RFID systems will have a net benefit of $51.5 million after five years. The Return on Investment (ROI) will be 2.6 over the five year window ending in FY 07. After FY 07 installs will be complete. This will reduce costs, while the benefits are retained, driving up the ROI in later years. Payback occurs in FY 05.

RFDC & Limited RFID	FY 03	FY 04	FY 05	FY 06	FY 07	5 Yr Total
Planned Installs RFDC	0	25	50	71	30	176
Planned Installs RFID	0	8	14	15	3	40
Workload Savings	$0	$4,184,890	$10,880,941	$18,876,495	$19,907,746	$53,850,071
Inventory Savings	$0	$2,934,240	$6,262,350	$9,778,275	$9,966,090	$28,940,955
Total Benefits	**$0**	**$7,119,130**	**$17,143,291**	**$28,654,770**	**$29,873,836**	**$82,791,026**
Install Hardware Costs	$0	$1,344,035	$2,171,100	$2,767,885	$501,380	$6,784,400
Tag Costs	$0	$363,432	$505,814	$619,992	$279,000	$1,768,238
Install/Integration Teams	$0	$1,800,000	$2,700,000	$5,400,000	$3,600,000	$13,500,000
Replacement Hardware	$0	$0	$323,875	$870,685	$1,568,170	$2,762,730
Software Costs	$1,500,000	$500,000	$250,000	$250,000	$250,000	$2,750,000
Training Costs	$200,000	$250,000	$50,000	$50,000	$50,000	$600,000
Program Support Costs	$1,433,000	$433,000	$433,000	$433,000	$433,000	$3,165,000
Total Costs	**$3,133,000**	**$4,690,467**	**$6,433,789**	**$10,391,562**	**$6,681,550**	**$31,330,368**
Net Benefits	**-$3,133,000**	**$2,428,663**	**$10,709,501**	**$18,263,208**	**$23,192,286**	**$51,460,658**
ROI	**0.0**	**1.5**	**2.7**	**2.8**	**4.5**	**2.6**

2. The RFDC system alone will have a net benefit of $30.1 million after five years. The Return on Investment (ROI) will be 2.3 over the five year window ending in FY 07. After FY 07 installs will be complete. This will reduce costs, while the benefits are retained, driving up the ROI in later years. Payback occurs in FY 05.

RFDC System Only	FY 03	FY 04	FY 05	FY 06	FY 07	5 Yr Total
Planned Installs RFDC	0	25	50	71	30	176
Workload Savings	$0	$4,158,657	$10,823,443	$18,785,745	$19,815,006	$53,582,851
Total Benefits	**$0**	**$4,158,657**	**$10,823,443**	**$18,785,745**	**$19,815,006**	**$53,582,851**
Install Hardware Costs	$0	$984,035	$1,541,100	$2,047,885	$411,380	$4,984,400
Install/Integration Teams	$0	$1,800,000	$2,700,000	$5,400,000	$3,600,000	$13,500,000
Replacement Hardware	$0	$0	$251,875	$438,810	$580,485	$1,271,170
Software Costs	$500,000	$200,000	$100,000	$100,000	$100,000	$1,000,000
Training Costs	$200,000	$250,000	$50,000	$50,000	$50,000	$600,000
Program Support Costs	$433,000	$433,000	$433,000	$433,000	$433,000	$2,165,000
Total Costs	**$1,133,000**	**$3,667,035**	**$5,075,975**	**$8,469,695**	**$5,174,865**	**$23,520,570**
Net Benefits	**-$1,133,000**	**$491,622**	**$5,747,468**	**$10,316,050**	**$14,640,141**	**$30,062,281**
ROI	**0.0**	**1.1**	**2.1**	**2.2**	**3.8**	**2.3**

3. The RFID system alone will have a net benefit of $6.4 million after five years. The Return on Investment (ROI) will be 1.3 over the five year window ending in FY 07. After FY 07 installs will be complete. This will reduce costs, while the benefits are retained, driving up the ROI in later years. Payback occurs in FY 06.

RFID System Only	FY 03	FY 04	FY 05	FY 06	FY 07	5 Yr Total
Planned Installs RFID	0	8	14	15	3	40
Workload Savings	$0	$26,233	$57,498	$88,644	$92,739	$265,114
Inventory Savings	$0	$2,934,240	$6,262,350	$9,778,275	$9,966,090	$28,940,955
Total Benefits	**$0**	**$2,960,473**	**$6,319,848**	**$9,866,919**	**$10,058,829**	**$29,206,069**
Install Hardware Costs	$0	$360,000	$630,000	$720,000	$90,000	$1,800,000
Tag Costs	$0	$363,432	$505,814	$619,992	$279,000	$1,768,238
Install/Integration Teams	$0	$1,800,000	$2,700,000	$5,400,000	$3,600,000	$13,500,000
Replacement Hardware	$0	$0	$72,000	$180,000	$297,000	$549,000
Software Costs	$900,000	$300,000	$150,000	$150,000	$150,000	$1,650,000
Training Costs	$200,000	$250,000	$50,000	$50,000	$50,000	$600,000
Program Support Costs	$1,200,000	$433,000	$433,000	$433,000	$433,000	$2,932,000
Total Costs	**$2,300,000**	**$3,506,432**	**$4,540,814**	**$7,552,992**	**$4,899,000**	**$22,799,238**
Net Benefits	**-$2,300,000**	**-$545,959**	**$1,779,033**	**$2,313,927**	**$5,159,829**	**$6,406,831**
ROI	**0.0**	**0.8**	**1.4**	**1.3**	**2.1**	**1.3**

C. Consequences to customer's current operations: Fleet representatives who witnessed the shipboard demonstration of these systems immediately recognized the value of RF technology in the afloat environment. They were satisfied these systems confirmed the material was onboard the ship. The added asset visibility and inventory accuracy was also appreciated. As stated previously, the RFID system all but eliminates the need for physical inventories of designated material. If used with DLRs as demonstrated, the majority of manhours dedicated to DLR inventory management can be applied to improving inventory management of other material. In addition, the use of the RFDC system will significantly reduce the time required to manage the majority of material onboard. These systems will get the SKs away from the keyboard and out in the spaces where they can focus on true inventory management.

D. For each initiative, identify risks that could adversely affect it, and assess the possibility that the initiative can be successful; specify a risk-reduction strategy for each risk. Please see risks identified in paragraph VC.

V. Recommendation

A. Recommend one alternative based on the following criteria: Recommend installing the RFDC systems beginning with the ships that do not have scanners in the near-term and the RFID system for monitoring DLRs (on AOE, CV, CVN, LHA, LHD, T-

AFS) beginning in FY04. NAVSEA 04L52 has submitted POM input to fund the installations from FY04-FY07.

1. Return on investment (ROI): The shipboard demonstration shows a manhour savings in man-years.

2. Critical to mission performance and readiness: These RF systems will enhance material availability and asset visibility both onboard ship and ashore, especially the RFID emitter system. Using technology to link the repair depots, distributions points, and end-users in the DLR repair and procurement processes will provide total asset visibility called for in GAO and Navy Audit Service reports.

3. Support of DoD's strategic objectives, such as investigating new technology (DRID 54).

4. Fulfillment of user's requests and objectives: Fleet representatives from CINCLANTFLT, COMNAVSURFLANT, FISC Norfolk, and Ship's Force had very positive responses to the demonstration RF systems; especially the RFID systems. The Ship's CO and Supply Officer requested the RFID emitter system be left onboard for their upcoming Supply Management Inspection. It provided 100% visibility of onboard DLRs.

5. Pursue both retrofit and new construction deployment plans.

B. Describe metrics to measure initiative's progress:

Reduced DLR in-transits
Improved material availability
Reduced new procurement of DLRs
Increased overall shipboard inventory accuracy
Reduced data input process time

C. Discuss risks in implementing selected initiative and risk-reduction strategies:

Electrical power (115v) is required for the RFID emitter system readers and portals, and, the RFDC Access Points, cradles, and rechargers. Coordination with NAVSEA 04L52 (Configuration Management) is ongoing to prepare appropriate ship configuration changes.

HERO certification of final hardware configurations. NAVSEA Indian Head is working with NAVSEA Dahlgren (conduct HERO testing & certification) and Naval Ordnance Safety and Security Activity (NOSSA) (Ordnance Handling Policy) to establish an appropriate HERO test for these relatively low-powered RF systems used for asset management. It must also be noted any changes in configuration require additional HERO certification.

Host Nation Approval: Efforts are ongoing to negotiate acceptable RF frequencies for use in foreign countries. At this time, there is no single frequency approved for all foreign countries.

NMCI/IT21/N6 Compliance: CINCLANTFLT and COMNAVSURFLANT N6 approval was obtained to use the RF systems aboard ship for the demonstration period. Compliance with NMCI/IT21 will be resolved prior to installing these systems.

RFID NCITS T-6 and other hardware standards: Not all hardware standards have been determined yet. As stated above, the various AIT groups and committees are monitoring the setting of these standards and compliance will be enforced as appropriate.

Training: Many new systems are fielded without adequate training prior to fielding or as follow-on training as systems are updated. Training for all user must be completed prior to fielding these systems. Curriculum updates must be developed for Navy Supply Corps School and SK 'A' School. Training teams and training CDs will also be developed.