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STOCKAGE POLICY ANALYSIS. ANNEX C. NON-DEMAND BASED STOCKAGE PO--ETC(U)  
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STOCKAGE POLICY ANALYSIS

ANNEX C

NON-DEMAND BASED STOCKAGE POLICIES

*AUGUST 31, 1980*

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1.0 DOCUMENTATION OF CURRENT POLICIES AND PROCEDURES

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## NON-DEMAND BASED STOCKAGE

### Documentation of Current Policies and Procedures

The Stockage Policy Analysis sub-group on Non-Demand Based Stockage reviewed all of the Components' current policies and procedures on this subject. The review was structured to identify current practices within each of the Components in the areas of definitions and selection criteria, review and reclassifications procedures, requirements level determination and stratification. These areas are discussed below by Component.

#### Current Definitions and Selection Criteria

Army. The Army categorizes secondary items into demand based and non-demand based items. Within the demand based category, the Army has two sub-categories: stocked items and Numeric Stockage Objective (NSO) items. Stocked items are those items which have either twelve or more demands (requisitions) annually or, if less than twelve annual demands, the cost to stock is less than the cost to not stock as determined by the Cost Differential (COSDIF) model. A demand based NSO item, referred to as NSO1, is an item with planned requirements only (i.e., in support of a special program, such as a modification work order or a depot overhaul program).

The Army's non-demand based stocks are classified into NSO items, insurance items and retention/non-stocked items. The NSO items referred to as NSO2, are items with no, or extremely low, expected failures but are considered essential items as determined by the Army. Insurance items have no expected failures and have a source code of PB. The retention/non-stocked category includes items which have less than twelve annual demands, have failed COSDIF, are not source coded PB, are not considered essential and are not classified as NSO1 or NSO2.

Navy. Except during the provisioning process, Navy does not generally categorize items into demand vs. non-demand based categories. However, if Navy were to make such a distinction for replenishment items, Navy could distinguish secondary items between demand based and non-demand based categories, except for repairables managed by the Aviation Supply Office. The rules for replenishment items would be somewhat arbitrary and would contain somewhat different definitions and selection criteria for both Inventory Control Points, Ship Parts Control Center (SPCC) and ASO, as well as between provisioning and replenishment items.

The demand based provisioning items are those items expected to have recurring demand based upon expected failure rates. At SPCC, the item must also pass the COSDIF model and at ASO the item must pass the UICP Provisioning model.

Demand based replenishment items would be those items which are expected to have recurring demand based upon past demand experience. At SPCC, consumable items and 4G cognizance material with an annual demand frequency of four or more would be classified as demand based

stocks. The remaining repairables would be classified demand based stocks if annual demand frequency is two or more. At ASO, consumable items would be classified demand based when the annual units demanded are four or more. The ASO would not categorize repairables into demand and non-demand based categories since file data and management practices do not provide distinguishable categories.

Both SPCC and ASO consider a provisioned, non-demand based item as an item which has failed the COSDIF, or equivalent, model but is stocked due to essentiality. At SPCC, essential non-demand based items fall into two categories. First, the item is on a shipboard allowance list or, if not on a shipboard allowance list, the item has a predicted failure rate of at least once in eight years and the failure would cause a casualty (CASREPT C3/C4). These items are stocked as NSO. The other category of a provisioned non-demand based item at SPCC is insurance. These items must meet the following criteria: have a PB source code, belong to a major mission essential equipment, have a zero predicted failure rate and would cause a casualty (CASREPT C4) if a failure occurred.

At ASO during the provisioning process, a minimum quantity is stocked for items with PB source codes (insurance items). For Closed Loop Aeronautical Program (CLAMP) items which do not otherwise qualify for stockage, a NSO quantity of one is stocked to cover a repair float.

With respect to replenishable, non-demand based items, SPCC would consider an item beyond the demand development period to be in this category if it has less than four annual demands for consumables and 4G repairables and less than two annual demands for all other repairables. In addition, however, the item either would have to be on a shipboard allowance list, experienced a previous casualty report (CASREPT), would have been subjected to cannibalization, or experienced a Not Mission Capable, Supply (NMCS) requisition.

At ASO, consumable items would be considered non-demand based if less than four annual demands are forecasted. There would be no other filters applicable. As indicated previously, the repairables managed by ASO would not be categorized into demand and non-demand based stocks since neither file data nor management practices provide a categorization breakdown.

Air Force. The Air Force also categorizes secondary items into demand based and non-demand based stocks. The Air Force categorizes non-demand based items into insurance and NSO. An insurance item is a stocked, essential item for which no failure is predicted through normal usage, but if failure did occur without an available replacement, the operational capability of the weapon system would be seriously hampered. These items are source coded PB. An NSO item is one which the probability of demand is so low that it does not meet the stockage criteria at a given activity as a demand based item. The Air Force has no consumable items classified as NSO.

Investment/repairable items having these specific requirements are also defined as NSO:

- o Items needed to support particular programs of a nonrecurring or sporadic nature (e.g., set assembly, nonrepetitive overhaul program) where reprocurement is not required once the particular program has been completed.
- o Items that are acquired on a life-of-type basis or which are "brought-out" at the termination of a production program.
- o Items that are not fully consumed during a one-time or non-repetitive program but which should be retained for possible future need on similar programs.

With regard to selection criteria for insurance items, the equipment specialist determines which items are coded as insurance. Stockage is limited to insurance items having an application to high priority weapon systems and/or items which represent technically critical parts where nonavailability would create unacceptable weapon system downtime and prevent mission accomplishment or cause a safety hazard. Items identified, as such, must be established in the central cataloging system.

The selection criteria for NSO items is as follows:

- o Provisioning: Meet the definition shown above.
- o Replenishment: (Investment Items Only).
  - oo All items which have experienced 3 or less demands (base repaired this station [RTS], NRTS, condemnations, depot repairable generation, and condemnations) per year over a 2-year base period (within projected increase in usage) should be coded NSO.
  - oo Items experiencing 4 to 12 demands per year, over a 2-year base period, may be reviewed for coding as NSO. Code these items NSO when the demand pattern is sporadic in nature or when demands occur on a frequency which is not consistent with resultant requirements/ or repair projections. Items, in this category, reflecting consistent usage, evenly distributed throughout the base period, should continue to be managed as demand based items.
  - oo Under certain conditions (sporadic/unpredictable demands, serviceable asset position such that no further repair is anticipated, etc.), items experiencing more than 12 demands per year may be considered for management under the NSO, require complete justification and documentation. These items require a periodic review to determine if the NSO code should be

retained. This review should be accomplished upon receipt of a Usage Printout (D041.F92A), which is generated only when usage has been reported in the last quarter.

Defense Logistics Agency. The DLA does not use the specific terms of demand based and non-demand based in categorizing its inventories. Rather, the terms replenishment demand and NSO are used. In reality, replenishment demand equates to demand based while NSO relates to non-demand based. DLA defines a demand based (replenishment demand) item as an item for which requirements are forecasted on the basis of a historically derived or predicted demand rate. The non-demand based (NSO) items are defined as those items which are expected to be required too infrequently to warrant stockage on the normal basis of demand frequency; however, prudent judgment dictates that a nominal quantity should be stocked for the reason cost not to stock ( in terms of military effectiveness or actual costs incurred) would exceed the cost to stock the items.

With regard to the selection criteria, an item being submitted to DLA in provisioning will be stocked as demand based when expected annual recurring demands are 12 or more; or when demands are less than 12 and the cost of stocking the item is less than the cost to be incurred by not stocking it and subsequently needing it as determined by a cost differential model. A provisioning item will be considered non-demand based (NSO) when the submitter indicates the item has a source code PB (insurance item) or if the item does not qualify as stocked and the submitter has indicated with his submission that minimal stockage is required based upon the item's essentiality to the weapon system being provisioned.

For items being transferred from the Military Services under Item Management Coding, an item will be stocked as demand based when the Military Service indicates the projected demands are based upon actual demand experienced in the past 12 months and the actual demands that were experienced were equal to or greater than 12. A transfer will be stocked as non-demand based when the Military Service recommends stockage as NSO with a recommended stockage quantity of at least one or if the actual projected demands are less than 12.

#### Review and Reclassification Procedures

Each of the Components' varying policies and procedures for the review and reclassification of their respective secondary item inventories are described below.

Army. When an item is initially stocked, its categorization is based upon the assigned source code. After the item has been in the system for three years, it is subjected to an automatic surveillance program on a monthly basis to verify the stockage category and to reclassify the item if appropriate. If an item has less than twelve demands annually, and was previously classified as a demand based item, it will automatically migrate to non-demand based (retention/non-stocked) if it fails COSDIF. No automatic migration occurs into or out of any other category; other changes require manual review and reclassification, if appropriate.

Navy. Once an item is introduced into the Navy's system, all identification in terms of demand and non-demand based categories is foregone in that there is no specific coding structure. Consequently, the Navy has no review and reclassification procedure. The only differentiation is in the levels to be computed for an item. In this regard, an ICP will compute demand based levels (DODI 4140.39 rules), compare to a minimum quantity (normally, a minimum replacement unit) value when assigned to essential items, and select the larger value as the levels for the item. That procedure insures at least the designated minimum quantity is set for specified essential items.

Air Force. The review and reclassification of demand and non-demand based items occurs whenever an item is in a procurement, repair, excess or termination position. At that time, the inventory manager will review the circumstances and make the reclassification, if appropriate.

Defense Logistics Agency. DLA has an automatic reclassification procedure for items migrating from non-demand based to demand based categories. If the item has had three demands for a total quantity of twelve or more with a dollar value over \$20, it is automatically categorized as a demand based item. Conversely, if a demand based item experiences less than three demands in the past year, or had less than twelve units demanded, or experienced less than an annual demand of \$20, it may be reclassified as a non-demand based item but only at the discretion of the inventory manager.

#### Requirements Level Determination

The calculation of the levels established for non-demand based stocks for each of the Components is discussed below.

Army. Unlike any of the other Components, the Army utilizes an "insurance item model" for predicting future requirements, and therefore levels computations, for non-demand based items. Essentially, the Army estimates the mean and variance of demand given the actual demand experience for all insurance/NSO2 items. These values are then used with a particular item's actual demand history to forecast requirements using the EOQ/VSL policies of DODI 4140.39.

Navy. An ICP will compute demand based levels (DODI 4140.39 rules), compare to a minimum quantity (normally, a minimum replacement unit) value when assigned to essential items, and select the larger value as the levels for the item. That procedure insures at least the designated minimum quantity is set for specified essential items.

Air Force: The levels computation in the Air Force is described below:

- o Provisioning: For insurance and numeric stockage objective items, a minimum requirements objective normally set to the quantity per next higher assembly is established by the equipment specialist. When a quantity greater than two times the quantity per next higher assembly is recommended, section level approval is required.

- o Replenishment: Requirements objectives for these items will be set equal to a fixed level. Stocks will normally be maintained at the depot level only. When no fixed level is established, the requirements objective will be equal to the available assets. AFLC policy prohibits the use of INS/NSO designations as a method to solely retain assets and requires periodic reviews to insure fixed levels have been established for INS/ NSO items.

Defense Logistics Agency. The stockage level for a non-demand item which is a new item is equal to the replenishment quantity reflected in the incoming document from the Military Services. In reclassifications, the levels computation is different for each of the ICPs, as follows:

- o Defense Electronics Supply Center (DESC)
  - oo Weapon System Items - Level equals greater of following three computations:
    - Unit Price Quantity: Level will vary with unit price from 2 (unit price over \$500) to 24 (unit price from \$.01 to \$1.00)
    - Demand Quantity: Level equals annual demand quantity less FMS multiplied by 1.25.
    - Asset Quantity: Level equals one-sixth of item's asset quantity.
  - oo Non-Weapon System Item - Levels equal greater of following two computations (as described above)
    - Demand Quantity
    - Asset Quantity
- o Defense Constuction Supply Center (DCSC)
  - oo If an item experienced demand in the past year, the level will be set to equal that demand.
  - oo If an item had no demand in the past year, but does have Fleet Issue Load List (FILL), weapon system application, mobilization, special program requirement (SPR), or provisioning requirement or stock on-hand/ due-in, the level will be set to equal sum of assets on-hand and due-in or \$11, whichever is less.
- o Defense General Supply Center (DGSC)

- oo If an item experienced demand in the past year, the level will be set to equal that demand.
- oo If an item experienced no demand in the past year and there are no assets on hand or due-in, but the item is weapon system related, the level will be set at two.
- oo If the item experienced no demand in the past year, has no assets on-hand or due-in, and is not weapon system related, the level will be set at one.
- oo If the item experienced no demand in the past year and on-hand/due-in assets are less than \$50, the level will be set to equal the sum of the assets on-hand/ due-in or \$50, whichever is greater. If the value of the assets are greater than \$50, the Inventory Manager sets the levels at his discretion.
- o Defense Industrial Supply Center (DISC)
  - oo If the item experienced demand in the past year, the level will be set according to the following:
    - Units demanded equal 1-4; level is set at 4
    - Units demanded equal 5-8; level is set at 8
    - Units demanded equal 9-11; level is set at 12
  - oo If the item experienced no demand in the past year but has assets, the level will be set at two if it experienced demand in past two years; if no demand was experienced in the past two years, level will be set at zero.
  - oo If the item experienced no demand in the past year and has no assets, but is weapon system related, the level will be set to equal one-third of the procurement quantity which is established as follows:
    - Unit Price equals \$.01-\$5.00; procurement quantity equals \$25.00.
    - Unit Price equals \$5.01-\$25.00; procurement quantity equals \$100.00.

- Unit Price equals \$25.01-\$200.00; procurement quantity equals \$200.00.
- Unit Price equals greater than \$200.00; procurement quantity is established by Inventory Manager.

### Stratification

The final area of policies and procedures examined by the Sub-Group working on Non-Demand Based Stockage was stratification.

Army. The non-demand inventories for insurance and NSO2 items, are stratified into these categories: stock due-out (backorders), numeric stockage objective, procurement cycle and retention. The numeric stockage objective category includes only that portion of the requirement identified as "level one" or reorder point. Requirements in excess of this level are placed into the procurement cycle category. Retention levels are also allowed.

Navy. All items which have a Planned Program Requirement (PPR) in the file with a specific expiration date are reflected in stratification on the "NRDEM" line for the applicable time period. All items which have a PPR without an expiration date, e.g., FBM Protection Levels, Operational Support Inventories, are stratified on the "NUM STK OBJ" line. Levels requirements for slow moving items (quarterly demand forecast  $\leq$  0.25) are also stratified on the "NUM STK OBJ" line. It should be noted, however, that the numeric stockage objective category in stratification will contain both demand based as well as non-demand based requirements and inventories.

Air Force. Non-demand based item requirements objectives are shown on the numeric stockage objective line of the stratification print-out. For consumables, assets above the fixed level will stratify as potential DOD excess. For investment items/repairables, assets above the fixed objective will be stratified as either contingency retention or potential DOD excess.

Defense Logistics Agency. All items classified as non-demand based items, either upon entry into the DLA system through item management coding or upon reclassification, are stratified into the category of numeric stockage objective. DLA generates a separate stratification report for this category of items.

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2.0

INVENTORY INVESTMENT QUANTIFICATION

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## Inventory Investment Quantification

### Introduction

The data included in this Section of Annex C represents the Components' quantification of inventory investment in Secondary Items. The quantification of inventory investment, requirements objectives, and value of annual demand is based upon the Components' current definitions of demand, non-demand and non-stocked items and not the recommended definitions contained in the Final Report.

Since current management products do not adequately reflect demand, non-demand and non-stocked inventory data, numerous sources of data were used. These included stratification reports, special one-time extracts from Inventory Control Point data bases, other periodic management reports and off-line data bases maintained as historical records for use in operations research projects.

NON-DEMAND BASED STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT: DoD-wide		TYPE OF MATERIAL: TOTAL	
	DEMAND BASED	NON-DEMAND BASED	NON-STOCKED	TOTAL
SERVICEABLE ON HAND (SOH)	\$ 12,540.2	\$ 2,991.9	\$ 673.8	\$ 16,205.9
UNSERVICEABLE ON HAND (UNSOH)	8,943.7	1,286.7	401.5	10,631.9
MOBILIZATION ON HAND	2,044.5	343.7	4.0	2,392.2
DUE-IN	8,725.3	543.9	145.3	9,414.5
REQUISITIONING OBJECTIVE (RO)	23,477.9	3,137.4	456.6	27,071.9
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	46,478.4	3,520.1	1,283.0	51,281.5
SOH GREATER THAN AFAO	3,108.9	1,597.7	405.4	5,112.0
UNSOH GREATER THAN AFAO	2,804.9	1,195.8	172.6	4,173.3
PLANNED PROCUREMENTS	6,740.4	993.1	299.8	8,033.3
PLANNED REPAIRS	2,053.6	37.9	63.9	2,155.4
PAST ANNUAL DEMAND	14,578.8	804.6	594.5	15,977.9
LINE ITEMS	1,445,769	1,279,587	933,442	3,658,798

$$\%NDB \text{ Investment} = \frac{NDB \text{ SOH}(\$2991.9) + NDB \text{ Due-in} (\$543.9)}{\text{TOTAL SOH}(\$16,205.9) + \text{TOTAL DUE-IN} (\$9414.5)} = \frac{\$ 3,535.8}{\$25,620.4} = 13.8\%$$

NON-DEMAND BASED STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT:		ARMY NON-DEMAND BASED	TYPE OF MATERIAL:	
	DEMAND BASED			NON-STOCKED	TOTAL
SERVICEABLE ON HAND (SOH)	\$ 2,063.9		\$ 77.1	\$ 316.7	\$ 2,457.7
UNSERVICEABLE ON HAND (UNSOH)	1,164.2		17.4	37.0	1,218.6
MOBILIZATION ON HAND	408.3		-	1.3	409.6
DUE-IN	2,534.4		34.9	80.0	2,649.3
REQUISITIONING OBJECTIVE (RO)	4,875.2		56.5	128.3	5,060.0
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	9,159.5		71.1	217.8	9,448.4
SOH GREATER THAN AFAO	583.7		59.8	269.2	912.7
UNSOH GREATER THAN AFAO	330.2		13.9	31.1	375.2
PLANNED PROCUREMENTS	1,336.1		11.3	66.8	1,414.2
PLANNED REPAIRS	313.5		5.6	10.9	330.0
PAST ANNUAL DEMAND	1,979.7		26.0	85.1	2,090.8
LINE ITEMS	154,909		19,263	169,375	343,547

NON-DEMAND BASED STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT:		ARMY NON-DEMAND BASED	TYPE OF MATERIAL: INVESTMENT	
	DEMAND BASED			NON-STOCKED	TOTAL
SERVICEABLE ON HAND (SOH)	\$ 668.7	\$ 26.8	\$ 64.4	\$ 759.9	
UNSERVICEABLE ON HAND (UNSOH)	1,164.2	17.4	37.0	1,218.6	
MOBILIZATION ON HAND	193.1	-	.3	193.4	
DUE-IN	684.3	12.5	29.2	726.0	
REQUISITIONING OBJECTIVE (RO)	1,830.5	23.6	26.8	1,880.9	
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	3,970.7	34.4	36.2	4,041.3	
SOH GREATER THAN AFAO	116.8	19.3	63.7	199.8	
UNSOH GREATER THAN AFAO	330.2	13.9	31.1	375.2	
PLANNED PROCUREMENTS	432.0	7.6	14.2	453.8	
PLANNED REPAIRS	313.5	5.6	10.9	330.0	
PAST ANNUAL DEMAND	927.4	17.1	25.9	970.4	
LINE ITEMS	11,284	2,002	5,565	18,851	

NON-DEMAND BASED STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT:		ARMY NON-DEMAND BASED	TYPE OF MATERIAL:	
	DEMAND BASED			NON-STOCKED	EXPENSE TOTAL
SERVICEABLE ON HAND (SOH)	\$ 1,395.2	\$ 50.3	\$ 252.3	\$ 1,697.8	
UNSERVICEABLE ON HAND (UNSOH)	-	-	-	-	
MOBILIZATION ON HAND	215.2	-	1.0	216.2	
DUE-IN	1,850.1	22.4	50.8	1,923.3	
REQUISITIONING OBJECTIVE (RO)	3,044.7	32.9	101.5	3,179.1	
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	5,188.8	36.7	181.6	5,407.1	
SOH GREATER THAN AFAO	466.9	40.5	205.5	712.9	
UNSOH GREATER THAN AFAO	-	-	-	-	
PLANNED PROCUREMENTS	904.1	3.7	52.6	960.4	
PLANNED REPAIRS	-	-	-	-	
PAST ANNUAL DEMAND	1,052.3	8.9	59.2	1,120.4	
LINE ITEMS	143,625	17,261	163,810	324,696	

NON-DEMAND BASED STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT:		NAVY NON-DEMAND BASED	TYPE OF MATERIAL:		TOTAL
	DEMAND BASED			NON-STOCKED	TOTAL	
SERVICEABLE ON HAND (SOH)	\$ 1,873.9		\$ 1,793.2	\$ 131.1	\$	3,798.2
UNSERVICEABLE ON HAND (UNSOH)	2,629.0		953.8	256.5		3,839.3
MOBILIZATION ON HAND	186.9		16.7	2.7		206.3
DUE-IN	1,723.4		333.9	13.8		2,071.1
REQUISITIONING OBJECTIVE (RO)	5,023.9		1,673.3	198.1		6,895.3
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	12,730.5		1,815.8	499.0		15,045.3
SOH GREATER THAN AFAO	257.2		1,154.7	76.5		1,488.4
UNSOH GREATER THAN AFAO	741.6		844.0	141.5		1,727.1
PLANNED PROCUREMENTS	1,530.9		834.4	49.7		2,415.0
PLANNED REPAIRS	700.8		1.9	53.0		755.7
PAST ANNUAL DEMAND	3,732.1		68.6	152.4		3,953.1
LINE ITEMS	120,506		504,399	79,434		704,339

NON-DEMAND BASEL STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT:		NAVY NON-DEMAND BASED	TYPE OF MATERIAL: INVESTMENT	
	DEMAND BASED			NON-STOCKED	TOTAL
SERVICEABLE ON HAND (SOH)	\$ 1,145.3		\$ 1,154.1	\$ 95.4	\$ 2,394.8
UNSERVICEABLE ON HAND (UNSOH)	2,629.0		953.8	256.5	3,839.3
MOBILIZATION ON HAND	114.4		9.1	2.4	125.9
DUE-IN	654.6		236.8	8.7	900.1
REQUISITIONING OBJECTIVE (RO)	3,238.9		1,335.9	171.8	4,746.6
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	9,598.5		1,416.8	455.4	11,470.7
SOH GREATER THAN AFAO	110.1		703.9	51.4	865.4
UNSOH GREATER THAN AFAO	741.6		844.0	141.5	1,727.1
PLANNED PROCUREMENTS	835.6		737.6	33.4	1,606.6
PLANNED REPAIRS	700.8		1.9	53.0	755.7
PAST ANNUAL DEMAND	3,071.7		30.4	143.4	3,245.5
LINE ITEMS	23,502		139,363	37,476	200,341

NON-DEMAND BASED STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT:		NAVY NON-DEMAND BASED	TYPE OF MATERIAL:		EXPENSE TOTAL
	DEMAND BASED			NON-STOCKED		
SERVICEABLE ON HAND (SOH)	\$ 728.6	\$	639.1	\$	35.7	\$ 1,403.4
UNSERVICEABLE ON HAND (UNSOH)	-		-		-	-
MOBILIZATION ON HAND	72.4		7.6		.3	80.3
DUE-IN	1,068.8		97.2		5.1	1,171.1
REQUISITIONING OBJECTIVE (RO)	1,785.0		337.4		26.3	2,148.7
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	3,132.0		399.0		43.7	3,574.7
SOH GREATER THAN AFAO	147.1		450.7		25.0	622.8
UNSOH GREATER THAN AFAO	-		-		-	-
PLANNED PROCUREMENTS	695.3		96.8		16.3	808.4
PLANNED REPAIRS	-		-		-	-
PAST ANNUAL DEMAND	660.4		38.2		9.0	707.6
LINE ITEMS	97,004		365,036		41,958	503,998

NON-DEMAND BASEL STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT: AIR FORCE		TYPE OF MATERIAL:		TOTAL
	DEMAND BASED	NON-DEMAND BASED	NON-STOCKED	TOTAL	
SERVICEABLE ON HAND (SOH)	\$ 7,031.4	\$ 758.6	\$ 143.0	\$ 7,933.0	
UNSERVICEABLE ON HAND (UNSOH)	5,150.5	315.5	108.0	5,574.0	
MOBILIZATION ON HAND	1,325.6	324.8	*	1,650.4	
DUE-IN	3,229.0	134.0	-	3,363.0	
REQUISITIONING OBJECTIVE (RO)	11,013.1	1,303.2	*	12,316.3	
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	18,889.3	1,303.2	*	20,192.5	
SOH GREATER THAN AFAO	1,870.4	106.4	*	1,976.8	
UNSOH GREATER THAN AFAO	1,733.1	337.9	*	2,071.0	
PLANNED PROCUREMENTS	2,547.6	90.9	*	2,638.5	
PLANNED REPAIRS	1,039.3	30.4	*	1,069.7	
PAST ANNUAL DEMAND	7,217.0	629.0	139.0	7,985.0	
LINE ITEMS	543,354	109,025	32,133	684,512	

\* Air Force unable to identify

NON-DEMAND BASED STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT: AIR FORCE		TYPE OF MATERIAL: INVESTMENT	
	DEMAND BASED	NON-DEMAND BASED	NON-STOCKED	TOTAL
SERVICEABLE ON HAND (SOH)	\$ 5,048.4	\$ 712.6	\$ 108.0	\$ 5,869.0
UNSERVICEABLE ON HAND (UNSOH)	5,150.5	315.5	108.0	5,574.0
MOBILIZATION ON HAND	1,324.9	324.8	*	1,649.7
DUE-IN	1,920.0	121.0	-	2,041.0
REQUISITIONING OBJECTIVE (RO)	7,250.7	1,236.3	*	8,487.0
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	13,468.2	1,236.3	*	14,704.5
SOH GREATER THAN AFAO	992.9	106.4	*	1,099.3
UNSOH GREATER THAN AFAO	1,733.1	337.9	*	2,071.0
PLANNED PROCUREMENTS	1,373.6	85.0	-	1,458.6
PLANNED REPAIRS	1,039.3	30.4	-	1,069.7
PAST ANNUAL DEMAND	6,485.0	458.0	123.0	7,066.0
LINE ITEMS	61,132	79,995	2,744	143,871

\* Air Force unable to identify

NON-DEMAND BASED STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT: AIR FORCE		TYPE OF MATERIAL: EXPENSE	
	DEMAND BASED	NON-DEMAND BASED	NON-STOCKED	TOTAL
SERVICEABLE ON HAND (SOH)	\$ 1,983.0	\$ 46.0	\$ 35.0	\$ 2,064.0
UNSERVICEABLE ON HAND (UNSOH)	-	-	-	-
MOBILIZATION ON HAND	.7	-0-	-	.7
DUE-IN	1,309.0	13.0	-	1,322.0
REQUISITIONING OBJECTIVE (RO)	3,762.4	66.9	*	3,829.3
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	5,421.1	66.9	*	5,488.0
SOH GREATER THAN AFAO	877.5	-0-	*	877.5
UNSOH GREATER THAN AFAO	-	-	-	-
PLANNED PROCUREMENTS	1,174.0	5.9	-	1,179.9
PLANNED REPAIRS	-	-	-	*
PAST ANNUAL DEMAND	732.0	171.0	16.0	919.0
LINE ITEMS	482,222	29,030	29,389	540,641

\* Air Force unable to identify

NON-DEMAND BASED STOCKAGE POLICY

INVENTORY INVESTMENT QUANTIFICATION DESCRIPTION (\$ IN MILLIONS)	COMPONENT: DEFENSE LOGISTICS AGENCY		TYPE OF MATERIAL: EXPENSE	
	DEMAND BASED	NON-DEMAND BASED		NON-STOCKED
SERVICEABLE ON HAND (SOH)	\$ 1,571.0	\$ 363.0	\$ 83.0	\$ 2,017.0
UNSERVICEABLE ON HAND (UNSOH)	-	-	-	-
MOBILIZATION ON HAND	123.7	2.2		125.9
DUE-IN	1,238.5	41.1	51.5	1,331.1
REQUISITIONING OBJECTIVE (RO)	2,565.7	104.4	130.2	2,800.3
APPROVED FORCES ACQUISITION OBJECTIVE (AFAO)	5,699.1	330.0	566.2	6,595.3
SOH GREATER THAN AFAO	397.6	276.8	59.7	734.1
UNSOH GREATER THAN AFAO	-	-	-	-
PLANNED PROCUREMENTS	1,325.8	56.5	183.3	1,565.6
PLANNED REPAIRS	-	-	-	-
PAST ANNUAL DEMAND	1,650.0	81.0	218.0	1,949.0
LINE ITEMS	627,000	646,900	652,500	1,926,400

NON-DEMAND BASED STOCKAGE POLICY

OMB'S PERCEIVED INVESTMENT IN "HEDGE STOCKS"			
COMPONENT	FY 1978	FY 1979	FY 1980
ARMY	\$ 229.0M	\$ 235.0M	\$ 244.0M
NAVY	\$ 1,249.0M	\$ 1,554.0M	\$ 1,585.0M
AIR FORCE	\$ 1,979.0M	\$ 2,193.0M	\$ 2,354.0M
DEFENSE LOGISTICS AGENCY	\$ 511.0M	\$ 524.0M	\$ 538.0M
DoD WIDE	\$ 3,968.0M	\$ 4,506.0M	\$ 4,721.0M

Note: Includes Variable Safety Levels, Numeric Stockage Objectives and Air Force Negotiated Levels.

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3.0      RESPONSE TIME MEASUREMENT QUANTIFICATION

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## Response Time Measurements

### Introduction

The data contained in this Section of Annex C reflects the Components' measurement of response time associated with current stockage levels. This "measure" was selected because response time is a meaningful measure which attempts to evaluate supply system performance from the viewpoint of the customer. Further, the response time measure incorporates other acceptable performance measures applicable to wholesale stockage such as supply availability and average time awaiting parts.

Response time is defined as the average time elapsed from receipt of a demand at the wholesale level until stock is made available for issue. Response time does not consider bin picking or transportation time.

The Components developed their respective response times using current definitions of demand, non-demand based and non-stocked items and by developing a one-time compilation of the Fiscal Year 1980 data necessary to determine response times based upon current inventory levels.

The Components measured response time in terms of the current inventory investment (on-hand and due-in) in Non-Demand Based items. They also computed what the response time would have been if no investment was made in Non-Demand Based items. From these calculations the Components were able to determine the "contribution" the inventory investment in Non-Demand Based items makes toward response time.

Each of the Components papers contained in this section reflect the Data Input, Definitions and Data Element Documentation used in determining the computed response times and the contribution of Non-Demand Based stockage.

## ARMY RESPONSE TIME MEASURE

### I. Summary

#### A. Value of Measure

- |                         |           |
|-------------------------|-----------|
| 1. All Items            | 25.4 Days |
| 2. Without stocking NDB | 25.6 Days |
| 3. NDB Contribution     | 0.7%      |

- B. Meaning. Stocked non-demand based items in the Army account for approximately 6% of the items, 2% of the stock on hand and due in from procurement, (\$112M), and 1% of the demands with a contribution to response time of approximately 0.7%.

### II. Data Input

<u>Stockage Category</u>	<u>Annual Demands</u>	<u>Supply Availability</u>	<u>Avg. Time On B/O (In Days)</u>	<u>Response Time (In Days)</u>
Stockage DB	93.2%	83.7%	133.7	22.6
Stockage NDB	.9%	76.3%	214.6	51.6
Non-Stocked	5.9%	73.0%	244.8	66.8

### III. Definitions

(Items in the Army's standard data base are coded with a two-digit code which was used to group items and demands into the appropriate stockage category).

- A. Stocked demand based items include items which are centrally managed and acquired in anticipation of demands (these items either pass COSDIF or are used in support of planned requirements).
- B. Stocked non-demand based items include insurance and numerical stockage objective items which are also centrally managed and acquired in anticipation of demands (these items are

essential items either with source code of PB or which fail COSDIF).

- C. Non-stocked items are acquired on demand only (i.e., no re-order point is computed) buy may in fact have stock on hand at the wholesale level in various retention levels (these items are usually nonessential items which fail COSDIF).

#### IV. Data Element Documentation

A. Annual Demands (percentage). The Army's standard data base includes an active requisition history file (called the document control file) which was used for the demand percentage computation, stock availability percentages for stocked NDB and nonstocked items, and average backorder days.

1. Assumption: Demands in the document control file in July 1980 are representative of all Army demands processed in a year.
2. Source: A special, one-time program was run using each Army ICP's document control file in July 1980.
3. Procedure: By use of a two-digit Army code (the IMPC/ Inventory Management Processing Code) demands were categorized into each stockage category.
4. Cautions: None.

B. Stock Availability (percentage)

1. Assumptions: None.
2. Source: For stocked demand based items, MILSTEP availability percentages for 3rd quarter FY80 were used to compute an average availability. For stocked NDB and NS items, the special, one-time program was run using each Army ICP's document control file in July 1980.

3. Procedure: Simple average from MILSTEP. From the document control file, demands without backorders were counted and divided by total demands in each category to compute availability.
  4. Cautions: Although nonstocked items account for almost 50% of all items in the Army's inventory, in fact a large percentage of these items have stock on hand in retention levels which would account for the availability figure of over 70%. These nonstocked items would actually be classified NDB-retention in our proposed definitions.
- C. Immediate Issue Time. Per agreement of the subgroup, immediate issue time was assumed to be one (1) day.
- D. Average Backorder Days
1. Assumptions: That moving stocked NDB items to the nonstocked category would result in stocked NDB items achieving the same stock availability percentage and the same average backorder days as nonstocked items in the Army today.
  2. Source: The special, one-time program was run using each Army ICP's document control file in July 1980.
  3. Procedure: For each category of stocked item, the date from receipt of the demand at the ICP to the date of the last materiel release order was measured and divided by all backorder demands giving average backorder days. For nonstocked items, the date from receipt of the demand at the ICP to the date of last shipment notice was measured and divided by all backorder demands giving average backorder days.

4. Cautions: It should be noted that the measure used by the Army is exact and includes the total time a requisition stayed on backorder whereas MILSTEP Format 1A-1 (Mean Days for Delayed Issues) excludes all requisitions over 365 days old. Therefore, to use the MILSTEP data would require some subjective adjustment to comprehend those backorders over 365 old in order to develop a more accurate measure of response time.

## NAVY RESPONSE TIME MEASURE

### I. Summary

#### A. Value of Measure.

1. All items 18.5 Days
2. Without stocking NDB 101.9 Days
3. NDB Contribution 81.8%

B. Meaning. Non-Demand Based items (NSOs plus Insurance items in the Navy stratification statistics) account for 72% of the total items and 36% of the inventory investment (\$2,127M). Current average response time is 18.5 days or 81.8% less than the 101.9 day response time that would be experienced if NDB items were not stocked. Expressed in another way, response time will increase to about 5½ times the current average if we stop stocking NDB items. Further analysis revealed that 32% of the NIINs causing an NMCS/PMCS condition in the past two years were NDB items: 98% of the NIINs causing a CASREP condition in the past two years were NDB items.

(Note: There were slight differences in the AACs defined as NDB for inventory stratification and for the response time computation. The biggest difference is that terminal items were counted as Not Carried in the inventory stratification, but counted as NDB in the response time computations. Exact values are not available, but terminal items accounted for less than 3% of the inventory.)

### II. Data Input

<u>Stockage Category</u>	<u>Annual Demands</u>	<u>Supply Avail.</u>	<u>Average Time On Backorder (In Days)</u>	<u>Response Time (In Days)</u>
Stocked DB	77.0%	79.6%	82.9	17.7
Stocked NDB	22.6%	83.0%	82.0	14.8
Not Stocked NDB	.4%	0%	384.0	384.0

### III. Definitions

- Not Stocked NDB = AAC J, L, H, and F in ICP files as of September 1979.
- Stocked DB = AQD  $\geq$  1 in ICP files as of September 1979.
- Stocked NDB = AQD  $<$  1 in ICP files as of September 1979.

### IV. Data Element Documentation

- A. Annual Demands. Approximately five years of Navy Transaction Item Reports were used to compute the historical percent of demands for stocked demand based, stocked non-demand based, and not stocked. The data base included over 13,000,000 demands. Part number demands were not considered.
- B. Supply Availability. Taken from MILSTEP Format 1A-1 Statistical Summary. Computed as the percent of immediate issues to total issues in the MILSTEP data base for the time period February 1979 through January 1980. Separate availabilities were computed for Stocked DB and Stocked NDB items. The data base included 1,470,776 issues for DB items and 302,469 issues for NDB items. Since the Not Stocked category represents less than 1% of the demands and since AAC J, L, H, and F items should generally not have any assets, the availability for Not Stocked items was assumed to be zero.
- C. Immediate Issue Time. A constant of one day was assumed for all immediate issues.
- D. Average Time On Backorder. Taken from MILSTEP Format 1A-1 Statistical Summary. Computation was based on the date received at Point of Entry to the Supply Action Date as recorded in the MILSTEP data base for the time period Feb-

ruary 1979 through January 1980. Only delayed issues were considered and storage site processing time was excluded. Separate times were computed for Stocked DB and Stocked NDB items. The data base included 299,962 delayed issues for DB items and 51,321 delayed issues for NDB items. Since the Not Stocked category represents less than 1% of the demands and since these items should generally have no assets, the average time on backorder was assumed to equal average leadtime. The average procurement leadtime was based on all DB items as of September 1979. Only DB items were considered since most of the NDB items had not experienced any buys in recent years and, thus, the leadtimes were not considered current. The number of buys for non-stocked items was considered too small to give a reliable average.

## AIR FORCE RESPONSE TIME MEASURE

### 1. Summary

#### A. Value of Measure

- |                         |           |
|-------------------------|-----------|
| 1. All item             | 23.1 Days |
| 2. Without stocking NDB | 28.6 Days |
| 3. NDB Contribution     | 19.2 %    |

- B. Meaning. For a dollar inventory investment of \$893 million, or 7.9% of total stocked items dollar inventory investment, stocked non-demand based items save 5.5 days or contribute to response time by 19.2%.

### II. Data Input

<u>Stockage Category</u>	<u>Annual Demands</u>	<u>Supply Availability</u>	<u>Ave. Time On B/O (In Days)</u>	<u>Response Time (In Days)</u>
Stock DB	96.4%	82.0%	88.6	16.7
Stocked NDB	1.7%	75.0%	88.6	22.8
Non-Stocked NDB	1.9%	-	347.5	347.5

### III. Definitions

- A. Stockage Demand Based. Centrally managed Air Force item not coded as insurance, numeric stockage objective, nor having an acquisition advice code of F, H, J or X.
- B. Stocked Non-Demand Based. Centrally managed Air Force item coded in the requirement systems as insurance or numeric stockage objective.
- C. Non-Stocked Non-Demand Based. Centrally procured Air Force item having an acquisition advice code of F, H, J or X. Does not include equipment items.

#### IV. Data Element Documentation

##### A. Annual Demands

1. Assumption: None
2. Sources: MILSTEP data, Stratification data, and special data bank products.
3. Procedures:
  - a. Per cent of stocked non-demand based items to total stocked items developed from data bank and stratification products.
  - b. Per cent of non-stocked to stocked developed using MILSTEP data.
4. Cautions/Concerns. Because of the inability to extract all data from one source, the per cent demands for stocked non-demand based items may be understated.

##### B. Average Time On Backorder

1. Assumptions:
  - a. Average time as backorder is the same for all stocked items
  - b. Average time on backorder of non-stocked items is equal to the average leadtime of stocked items.
2. Source:
  - a. MILSTEP data.
  - b. Stratification Products.
3. Procedure: Average time of backorders for stocked items was computed as a weighted average of backorders for the various backorder days categories. For each category the mid-point was used and weighted by the per cent of backorders in that category.
4. Caution: The average time on backorder may be overstated since a majority of Air Force requisitions which show in the 1-30 day backorder category are filled

within the Ummips standards which is less the class average of 15 days.

C. Supply Availability

1. Assumption: None.
2. Source: MILSTEP data for demand based and non-stocked. Depot Data bank products of non-demand base.
3. Extracted info from MILSTEP reports: For NDB, compared past annual demands to past stock due out.
4. Cautions: The estimated supply availability for stocked NDB, may be the low thereby causing one to over estimate average response time.

## DLA RESPONSE TIME MEASURE

### I. Summary

#### A. Value of Measure

- |                         |            |
|-------------------------|------------|
| 1. All items*           | 21.41 Days |
| 2. Without stocking NDB | 27.32 Days |
| 3. NDB Contribution     | 21.6%      |

\* DCSC, DESC, DGSC, DISC, DPSC-M

- B. Meaning. For a dollar inventory investment of \$404 million or 12.1% of the total stocked items dollar inventory investment, stocked non-demand based items save 5.91 days or response time by 21.6%.

### II. Data Input

<u>Stockage Category</u>	<u>Annual Demands</u>	<u>Supply Availability</u>	<u>Avg. Time On B/O (In Days)</u>	<u>Response Time (In Days)</u>
Stocked DE	90.8%	90.9%	82.48	8.4
Stocked NDB	2.9%	85.7%	85.75	13.1
Non-Stocked	6.2%	0*	216 *	216.0

\* Assumed figures reflecting no stock for these items

### III. Definitions

- A. Stocked Demand Based. The following DLA items were identified and classified in this category:

1. Centrally-Managed, Centrally-Stocked: items with Supply Status Code 1 or A and Item Category Code  $\neq$  B or 2.
2. Stocked, Overseas Demand: items with Supply Status Code 7 and Item Category Code  $\neq$  B or 2.
3. MAP: items with Supply Status Code 4.

4. GFM/GFP: items with Supply Status Code 8.

B. Stocked Non-Demand Based. The following DLA items were identified and classified in this category:

1. NSO: items with Supply Status Code 1, 7 or A and Item Category Code = 2.
2. Insurance: items with Supply Status Code 1, 7, or A and Item Category Code = B.

C. Non-Stocked Non-Demand Based. The following DLA items were identified and classified in this category:

1. Local Purchase: items with Supply Status Code 2.
2. Centrally Managed, Not Stocked: items with Supply Status Code 3.
3. Terminal: items with Supply Status Code 6.
4. Semi-active: items with Supply Status Code 9.

#### IV. Data Element Documentation

##### A. Annual Demands

1. Assumptions. None
2. Source. Inventory Control Point's Supply Control File September '79.
3. Procedure. For each item in Supply Category summed recurring and nonrecurring demand frequency for most recent 4 quarters (1 year).
4. Concerns/Cautions. None.

##### B. Supply Availability

1. Assumptions
  - a. For Inventory Control Points where only one availa-

bility figure was available, it was applied to stocked demand based and stocked non-demand based.

b. For non-stocked non-demand based, we assumed zero supply availability.

2. Source. Inventory Control Points, May 1980.
3. Procedure. Informal data call to inventory control points.
4. Concerns/Cautions. Figures may represent slightly different categorization of items than the one we are using.

C. Immediate Issue Time

1. Assumptions - One day

D. Average Time On Backorder

1. Assumptions
  - a. For Inventory Control Points where only one average time on backorder figure was available, it was applied to stocked demand-based and stocked non-demand based.
  - b. For non-stocked non-demand based, we assumed the average leadtime.
2. Source. Inventory Control Points, May 1980, with exception DGSC, "Selected Management Data Reports," March 1980.
3. Procedure. Informal data call to inventory control points.
4. Concerns/Cautions. Figures may represent slightly different categorization of items than the one we are using.

E. Leadtime

1. Assumptions. None

2. Source. Inventory Control Point's Supply Control File, September 79.
3. Procedure. For each item in the Supply Category assumed administration and production leadtime and averaged for category.
4. Concerns/Cautions. None

## DoD-WIDE RESPONSE TIME MEASUREMENTS

### I. Summary

#### A. Value of Measure

1. All Items	<u>21.9 days</u>
2. Not Stocking NDB Items	34.3 days
3. NDB Contribution	<u>36.2 %</u>

B. Meaning: For a total investment of \$3,535.8 million, or 13.8% of the total investment, non-demand-based (NDB) items save 12.4 days or contributes a 36.2% reduction in response time.

### II. Statistics

<u>Statistic</u>	<u>Stocked Demand Based</u>	<u>Stocked Non-Demand Based</u>	<u>Non- Stocked</u>	<u>Total</u>
Annual Demand (Units)	23,253,000	1,105,000	1,284,000	25,642,000
Percent of Total Demand	90.7%	4.3%	5.0%	100.0%
Immediate Issue Time	1	1		
 <u>Stocking NDB Items</u>				
Supply Availability	87.7%	83.5%	10.6%	83.7%
Percent of Total Backorders	68.2%	4.4%	27.4%	100.0%
Average Time on Backorder	92.5 days	88.0 days	227.0 days	129.2 days
Response Time	12.3 days	15.4 days	203.0 days	21.9 days
 <u>Not Stocking NDB Items</u>				
Supply Availability	87.7%	1.9%	10.6%	80.2%
Percent of Total Backorders	56.2%	21.3%	22.5%	100.0%
Average Time on Backorder	92.5 days	307.5 days	227.0 days	168.6 days
Response Time	12.3 days	301.7 days	203.0 days	34.3 days

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4.0 NON-DEMAND BASED STOCKAGE POLICY ISSUE PAPERS

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NDB ISSUE PAPER NO. 1

- SUBJECT: Definitions.
- DOD POLICY: DoD Instruction 4140.42 defines the universe of provisioning items into two categories -- demand based and non-demand based items. The non-demand based category is divided into two groups -- insurance and NSO with the primary consideration to be essentiality. DoD Instruction 4140.24 requires insurance category stratification based on units forecasted exclusive of provisioning and provisioning stratification.
- COMPONENT POLICY: Components have basically incorporated the definitions in DoD Instruction 4140.42 during initial provisioning; however, there appears to be a wide diversification in the application of these definitions to items.
- DISCUSSION: To insure items which were essential to operations were stocked, DoD established a category of non-demand based items in 4140.42. This categorization was developed for new items without rules for expansion to the replenishment area. For this reason, the Services have developed a variety of identification schemes from precise categorization (Army) to almost no categorization (Navy).
- RECOMMENDATION: It is recommended that the resolution of this issue by ASD(MRA&L) be as follows:
- a. Develop definitions for non-demand based items to include recognition of replenishment items which have assets on hand and with low demand.
  - b. Revise DoD Instruction 4140.42 and 4140.24 to insure consistency in terminology (e.g. currently, DoD Instructions 4140.42 and 4140.24 define insurance differently).
  - c. Recommended definitions are:
    - (1) Stocked, Demand Based. An item which has sufficient demand to be stocked on a cost effective basis as dictated by the rules developed for VSL/EOQ.
    - (2) Stocked, Non-demand based. An item which does not meet the demand based criteria but is stocked for other reasons.

- (a) Insurance. An essential item which has a "zero" inherent failure probability.
  - (b) Numeric Stockage Objective. An essential item which has a "low" inherent failure probability.
  - (c) Numeric Retention. An item which has assets on-hand or due-in but does not have a requirements objective.
- (3) Non-Stockage. An item which is not stocked in the wholesale supply systems.

NDB ISSUE PAPER NO. 2

SUBJECT: Response Time

DOD POLICY: Quarterly computation of a supply response time measure is required by DoD 4000.23-M "Military Supply and Transportation Evaluation Procedures (MILSTEP)".

COMPONENT POLICY: All components produce the response time measures required by DoD 4000.23-M, and definitions applied in computing response time appear to be fairly consistent. However, response time is generally not used as a performance measure and is not segmented for demand based and non-demand based items.

DISCUSSION: The evaluation of non-demand based stockage should be expressed relative to the performance of all stockages. Thus the need exists to segment response time for demand based and non-demand based items. The non-demand based group reviewed several measures of performance and chose the response time measure as the most appropriate since it combines supply availability and average time awaiting parts. In particular, the selected performance is the segment of response time defined in DoD 4000.23-M as "ICP Availability Determination" which extends from the date the requisition is received by the ultimate supply source to the date a material release/issue instruction is transmitted to the depot/storage site. This response time measure could be applied to all customer demands, by weapon systems, by consumable vs investment categories, by priority of requisitions, etc., and could be used to optimize the mix between the dollar investment in demand based and non-demand based inventory.

The ICP Availability Determination times currently in MILSTEP are stratified by Issue Priority Group and by CONUS or Overseas shipment. For each of the above categories, MILSTEP Format 1A provides the number of issues and the average response times for immediate issues, delayed issues, and total issues. An immediate issue is defined as one for which shipment was directed during the first pass against stock availability records. All backorders are classified as delayed issues, with one exception: in the case of the Air Force, a backorder that is issued within UMMIPS time frames is reclassified as an immediate issue.

If ICP Availability Determination time is to be the comprehensive measure used to evaluate demand based vs non-demand based stockage, additional MILSTEP summary statistics are required to show the number of issues and average response times separately for stocked demand based and stocked non-demand based items. Components/OASD should determine whether separate times are desired/required for immediate and delayed issues. Additionally, current MILSTEP exclusions such as direct vendor deliveries and response times in excess of one year should be reviewed to determine their impact on the response time measure.

RECOMMENDATION:

OASD (MRA&L) should establish the ICP Availability Determination response time as the primary wholesale supply system performance measure for both demand based and non-demand based items. OASD (MRA&L) should pursue a change to MILSTEP to include response time summaries for demand based and non-demand based items. Components should review current exclusions to determine if they distort the performance measure.

NDB ISSUE PAPER NO. 3

SUBJECT: Selection Criteria.

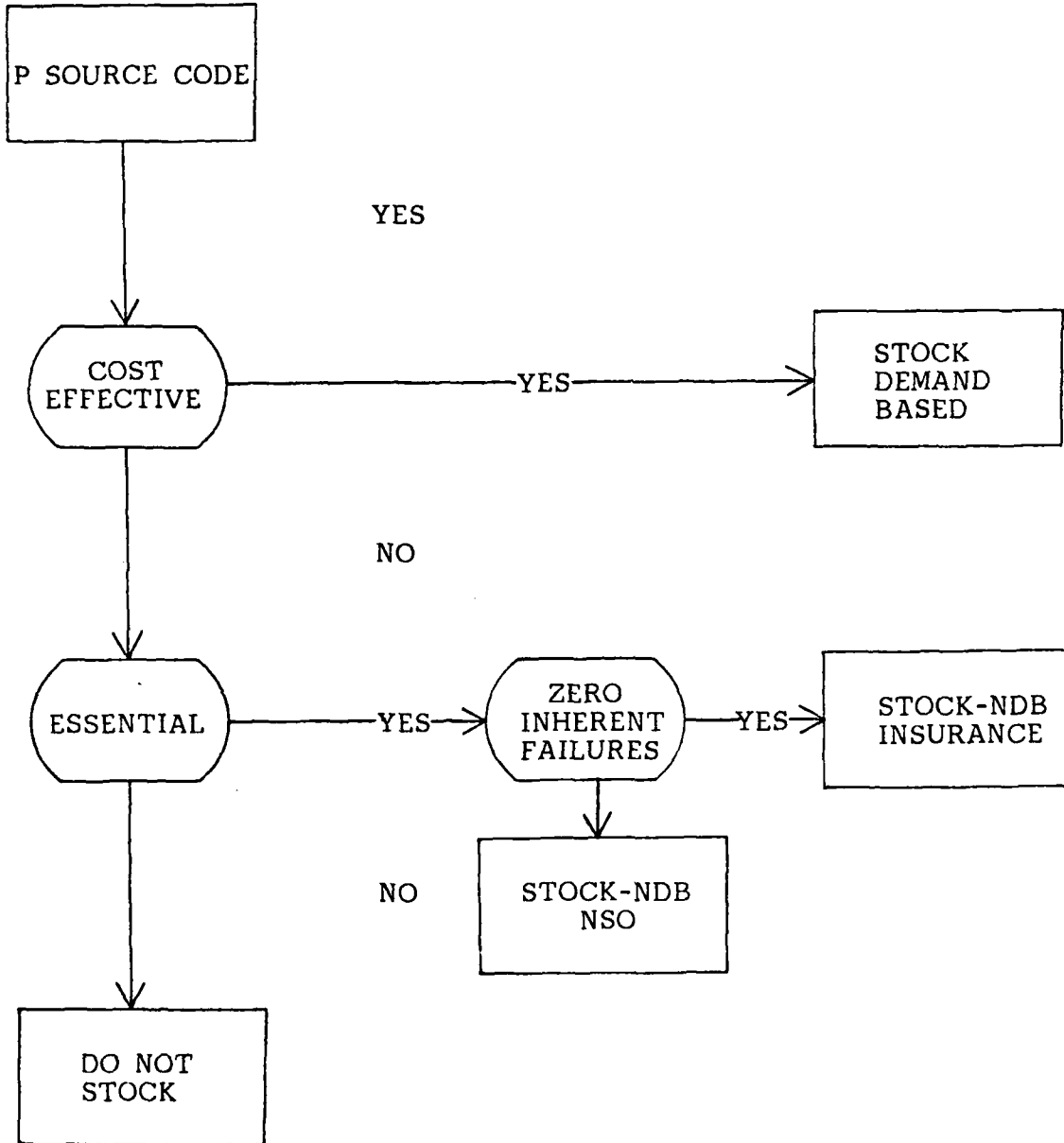
DOD POLICY: DoD Instruction 4140.42 requires DB items to have sufficient demand to be cost effective to stock. Further, NDB items are stocked based almost exclusively on essentiality. No existing DoD directives contain rules/ selection criteria for recategorization of these items after the provisioning effort.

COMPONENT POLICY: Component policy tends to expand initial provisioning item identification (DoD Instruction 4140.42) into the replenishment phase and incorporate additional low demand items into the NDB category. Each agency and DLA have developed specific rules to accomplish this. The Army uses the provisioning cost models during replenishment phase.

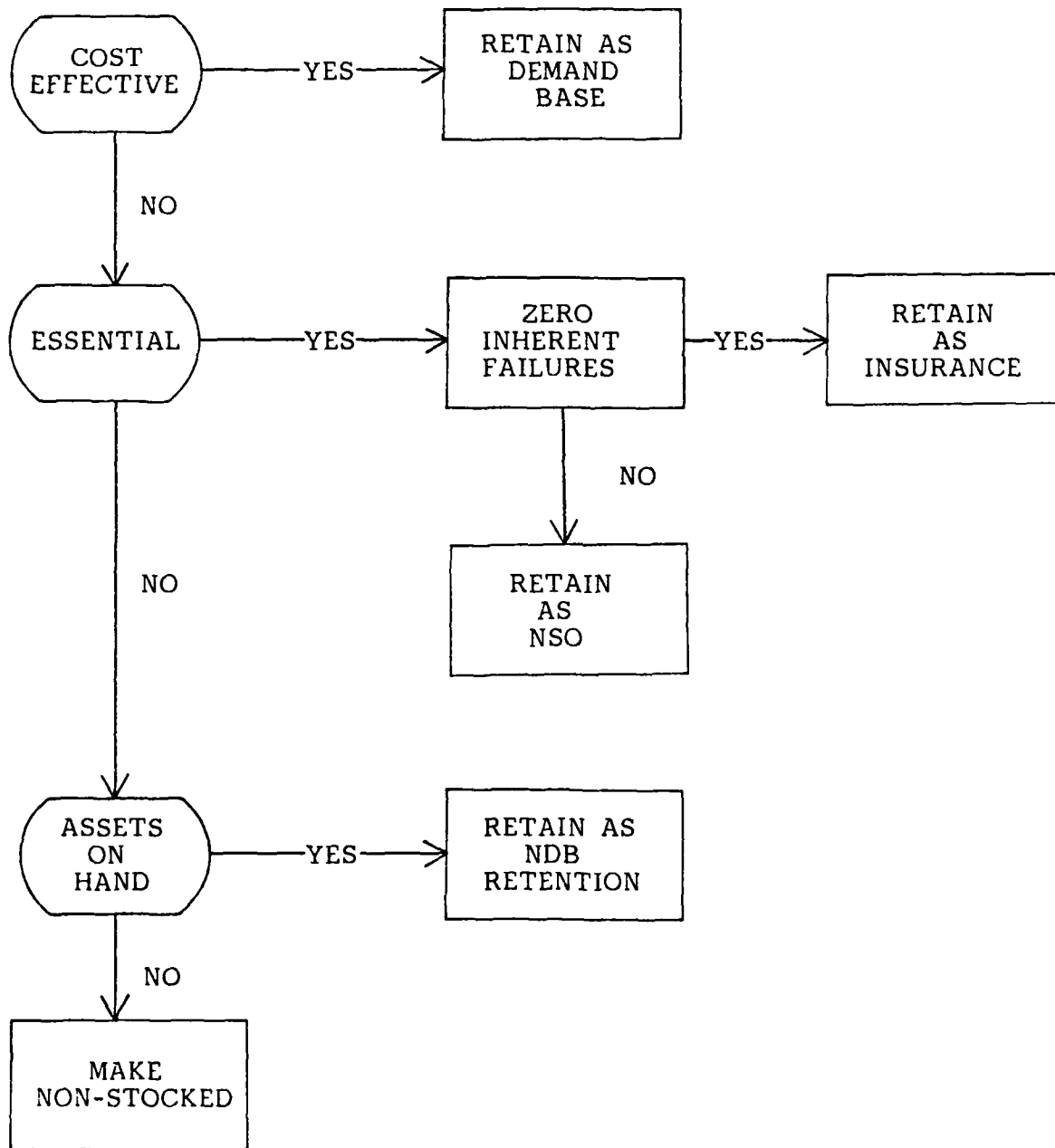
DISCUSSION: Within the selection criteria outlined in DoD Instruction 4140.42 is the element of essentiality. For our purposes, we recognize essentiality must be considered, but it requires long-term resolution for a DoD definition to be developed. An "essentially concept paper" is contained in this Annex. For this exercise, we accept current essentiality decisions by components with the key characteristic being critical to mission support. When a standard DoD essentiality scheme is developed and accepted, it should be applied in a range/ depth stockage model.

RECOMMENDATION: It is recommended that DoD implement the following flow diagrams for making determinations of which items fall into the various item categories.

PROVISIONING



REPLENISHMENT



NDB ISSUE PAPER NO. 4

- SUBJECT: Requirements Objectives.
- DOD POLICY: DoD Instruction 4140.42 specifies that levels for NDB items should be minimal. There is no existing DoD policy that requires specific forecasting techniques or level setting procedures.
- COMPONENT POLICY: Given the above situation, the DoD components have chosen various methods by which to determine the requirements objectives of NDB items. The Army employs a modified variable safety level (DoD Instruction 4140.39) process, the Navy and Air Force tend to set levels equal to a minimum replacement unit, while DLA uses a combination of rules based on price, demand, or assets.
- DISCUSSION: It has been the goal of DoD to insure initial requirements objectives were minimized as a method to reduce the risk of obsolescence and long supply associated with procuring a new system. Thus, requirements objectives for essential stocked items were also required by DoD Instruction 4140.42 to be minimal. However, there was no methodology provided to implement this goal for NDB items.
- RECOMMENDATION: It is recommended that requirements objectives for NDB items be set as follows:
- a. Insurance - will be a fixed quantity required such as a minimum replacement unit.
  - b. Numeric Stockage Objective - will be one of the following:
    - (1) a fixed quantity such as a minimum replacement unit
    - (2) VSL/EOQ using historical demand data
    - (3) VSL/EOQ using projected failures
    - (4) VSL/EOQ using a catalog average adjusted by individual item demand rates
  - c. Numeric Retention - will be zero.

NDB ISSUE PAPER NO. 5

SUBJECT: Review/Classification.

DOD POLICY: DoD Instruction 4140.42 defines three classifications. These are DB, NSO, and Insurance. While a requirement exists to review new items throughout their demand development period, no requirement exists to re-classify from DB to NSO or Insurance. Further, insurance items are to carry the source code PB. However, such distinction is not utilized because no reporting requirements specify reporting information by Insurance or NSO or DB categories.

COMPONENT POLICY: While the Navy does not have a coding system to identify demand and non-demand based items, items do migrate between these categories through different levels of computation methodology. The Army will review on a monthly basis and automatically re-classify an item from demand to non-stocked. DLA will review on a quarterly basis and automatically reclassify an item from non-demand to demand. For the Army and DLA where no automatic migration occurs, a manual review is required to make a re-classification. For the Air Force, the reclassification is totally a manual process with reviews at least annually or more if the item is in a buy, repair, excess, or termination posture.

DISCUSSION: The DoD components are not consistent in their review time frames and their classification decisions. Development of standard review and classification requirements need to be pursued with caution to insure the migration between distinctions has some value to management or supports some management objective. Also, the reviews should be as automated as possible to minimize the amount of manual effort required to accomplish the reviews.

RECOMMENDATION: It should be the objective of OASD (MRA&L) to insure periodic reviews of all categories of items are accomplished and that the reviews support clearly stated goals. The recommendation is as follows:

At the end of DDP, all items will be reviewed for consideration for migration to DB and NDB categories with the determination of whether the item should be managed as demand based, non-demand based, insurance, NSO and retention. Each demand based item will then be reviewed at least every year and each non-demand based item will be reviewed for essen-

tiality at least every six years and as a minimum as follows:

a. Insurance items - review when a demand occurs to determine whether the demand results from an inherent failure characteristic of the item.

b. Numeric Stockage Objective/Numeric Retention items stocked, review at least annually.

NDB ISSUE PAPER NO. 6

SUBJECT: Retention Levels for NDB

DOD POLICY: DoD Policy in DoD Instruction 4140.37 does not address retention levels for low demand or zero demand items.

COMPONENT POLICY: Each component has developed various rules for setting retention levels. The Army uses 10 times the reorder level for Insurance/NSO for economic retention. DLA uses 3 times an NSO requirements level modified by additive requirements for economic retention. The Navy uses a separate computation for items with less than 1 demand per year which is 2 times and operating level plus the reorder point (normally a quantity of 2). For the remaining items, the Navy uses a standard system for computing economics retention level. The Air Force does not compute an economic retention level for its Insurance/ NSO items. In regards to contingency retention, all components require manual inputs to establish retention levels.

DISCUSSION: Since the DoD components have varied policies and AMS does not specially address retention of NDB items, there is a need to recommend retention level policy for NDB items. Further, these items have normally been excluded from economic model building and the use of a number of years criteria may be meaningless due to the unreliability of demand forecast.

RECOMMENDATION: To prevent the premature disposal of items mostly considered essential, recommend OASD(MRA&L) pursue the implementation of a retention policy for NDB items. The recommended policy is: The services and DLA will have the option to establish retention levels based on an economic model or by making a conscience management decision on an item by item basis to retain assets above the AFAO requirements objective. The manager will consider economical reasons, potential usage, market availability, weapon system application, and storage capacity in deciding to retain assets. When a management decision approach is used, the retention level will normally be no greater than the on hand and due in assets and will be categorized as numeric retention stockage objective (NRSO) in the

stratification process. Assets would be applied against the requirements objectives, then the economic retention, the contingency retention, the NRSO, and finally potential DoD excess.

NDB ISSUE PAPER NO. 7

- SUBJECT: Stratification.
- DOD POLICY: DoD Instruction 4140.24 is the source for stratification procedures and requires the identification of insurance items based on a units forecast cutoff versus the essentiality aspects defined in DoD Instruction 4140.42. Existing reporting procedures do not require specific identification of NDB stockages.
- COMPONENT POLICY: Each DoD component displays NDB requirements differently. The Air Force uses the NSO, contingency retention, and potential DoD excess lines. The Army uses stock due out, NSO, procurement cycle, economic retention, contingency retention, and potential DoD excess lines. The Navy uses the insurance item stratification that summarizes data on items having four or less annual forecasted demands. DLA uses a non standard stratification for Insurance/NSO items as defined in DoD Instruction 4140.42.
- DISCUSSION: Since all DoD components stratify NDB stockage differently, a clarification/change to the stratification procedures will be required to provide DoD visibility on these stockages. Before this occurs, definitions for NDB items must be standardized with guidelines for their selection uniform among the DoD components.
- RECOMMENDATION: To provide visibility of investment in inventory classified as NDB, several actions must be taken to insure consistency among DoD components in the display of stockage. These recommendations will be implemented concurrently with all other policy issues. The recommended changes to the stratification are as follows:
- a. Eliminate the insurance stratification.
  - b. Replace current stratification summary requirements with the following:
    - (1) Demand based provisioning.
    - (2) Demand based replenishment.
    - (3) Non-demand based provisioning.
    - (4) Non-demand based replenishment. (includes non-stocked items)

c. Change the stratification (same stratification format for NDB/DB).

(1) Provide a line called Intermediate Level Stockage Objective (ILSO) to provide retail level visibility for wholesale system managers which will be above the AFAO line.

(2) Provide a line called Numeric Retention Stockage Objective (NRSO) or redefine contingency retention to allow the retention of NDB stockage. This line will be below the AFAO.

d. Placement of NDB on stratification as follows:

<u>Category</u>	<u>Where</u>
(1) Fixed level requirement objectives	NSO
(2) VSL/EOQ requirements objectives	SL, PC, PLT
(3) Retention objective	ER, CR, NRSO
(4) Retail level requirements.	ILSO

e. Change the name of the non-recurring demand line to planned/programmed requirements.

NDB ISSUE PAPER NO. 8

SUBJECT: Management

DOD POLICY: The management of NDB items is not specifically addressed in any DoD publication; however, current policy applying to reviews of buy, repair, and excess requirements tend to include these items. Also, DoD Instruction 4140.33 addresses selective management procedures and suggests using dollar value of annual demands as a criterion.

COMPONENT POLICY: Components have managed these items on an exception basis. In many cases allowing the computer to make as many decisions as possible and reducing the number of manual reviews of these items when compared to more active demand based items.

DISCUSSION: As mentioned, DoD components have managed these items consistent with their management of the demand based items, reviewing them periodically on an exception basis. However, items for which stock was on hand having low demand but not considered to be essential were also being reviewed in this manner. The Air Force had chosen to lump these items into groups for implementation of DoD Instruction 4140.33 as term of selective management.

RECOMMENDATION: The objective of the procedures herein are to minimize the Components' investment in NDB inventory while providing adequate logistics support to military operating forces. It is recommended that NDB items be managed as insurance, NSO, and stocked retention. Further, it is recommended that OASD(MRA&L) pursue the development of a response time measurement system for use in evaluating along with other indicators the performance of the total inventory system, develop procedures to stress the need to periodically review item classifications on both DB and NDB including essentiality decisions, change the stratification process to allow the non demand based inventories to be visible on the stratification products, modify reporting systems, and perhaps develop a separate DoD Instruction on non demand based stockage.

NDB ISSUE PAPER NO. 9

SUBJECT: Modeling Approach.

DOD POLICY: DoD Instruction 4140.39, "Procurement Cycles and Safety Levels of Supply for Secondary Items," defined the policy for stocked demand based items as being time-weighted, essentiality-weighted, requisition-short, and least cost. Although not explicitly stated, we believe the DoD Instruction 4140.42 perceives stocked non demand based items as being time-weighted, weapon-system-weighted, requisition-accommocated, and least-cost.

COMPONENT POLICY: The Army and Navy use a DoD Instruction 4140.39 procedure for their non-demand based items. The Air Force and DLA do not apply a time weighted, essentiality weighted requisition short model to non-demand based items.

DISCUSSION: The computation and evaluation of non-demand based stockage should be compatible with the rules applied to demand based items. There is a need for a range/depth model for non-demand based items that has a response time objective and considers weapon system essentiality, market availability and cost. Furthermore, a simulation capability is required to permit trade-off decisions which would allocate resources to minimize response times for both demand and non-demand based items on the basis of essentiality.

RECOMMENDATION: OASD(MRA&L) should proceed to accomplish the development of a total modeling approach as outlined in the attached study plan.

DoD STOCKAGE POLICY ANALYSIS

MODELING APPROACH

FOR

NON DEMAND

BASED ITEMS

Study Plan

August 31, 1980

## Table of Contents

- I. Study Objectives
  
- II. Study Approach
  - A. Evaluation of Current Methods
  
  - B. Development of recommended modeling approach including a simulation capability
  
  - C. Assessment of data requirements
  
  - D. Impact of recommended procedures on demand based items

## I. Study Objectives

The general objective of this study is the development of a compatible, consistent range/depth model to allow improved determination of requirements objectives for secondary items within the Department of Defense.

The specific objectives are to:

1. Evaluate current modeling approaches used for non-demand based items by the services and DLA.
2. Develop an implementable modeling approach for making depth decisions using cost, essentiality, market availability and a response time measure.
3. Determine data requirements and reporting information needed to measure a response time measure.
4. Develop a simulation capability that would relate response time to investment in the demand versus non-demand based items. The study will initially address secondary items classified non demand based items stocked at the wholesale level for essentiality reasons related to Weapon system support. It will include both reparable and non-reparables. However, it is suspected that the results of this study will impact the current methodology applied to demand based time. The study results will impact policy in the following:
  - a. DoD Instruction 4140.42
  - b. DoD Instruction 4140.39

## II. Study Approach

The study should be completed in four phases:

1. Evaluation of current methods.
2. Development of recommended modeling approach including a simulation capability.
3. Assessment of data requirements.
4. Impact of recommended procedure on demand based items.

Each of these four phases is discussed below:

1. Evaluation of Current Methods. The purpose of this phase is to establish a baseline from which a proposed methodology can be developed and evaluated. Data concerning the components current policies and procedures in this area will be provided from the DoD Stockage Policy Analysis Study Report. The effort will require data gathering from each component to accomplish required analysis.
2. Development of Recommended Modeling Approach. The purpose of this phase is to use information gain in the baseline analysis to develop a complete/consistent modeling approach for non-demand based items. This approach would consider essentiality, weapon system application, and market availability along with a response time measure and a total variable cost equation. This approach would be tested and compared with current procedures to determine its useability and if its application is cost effective. Additionally, as a companion to the modeling approach is a requirement to develop a simulation capability. The simulation model would allow for trade-off analysis to be conducted.

3. Assessment of Data Requirements. Upon completion of the development of a modeling approach, the data requirements will be studied to determine the following:

- a. The accessibility of the information required by the model.
- b. Reporting systems that currently produce the required information.
- c. Reporting systems that would require modification to implement the modeling approach.
- d. Impact of Recommended Procedures on Demand Based Items.  
The purpose of this phase is to insure where possible that the modeling approach applied to non-demand based items is consistent with that applied to demand based items. During this phase, any inconsistency will be determined and proposals will be made to eliminate the inconsistency.

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5.0

ESSENTIALITY FOR SECONDARY ITEMS

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TITLE

PAGE

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Essentiality Concept Paper

5-1

## ESSENTIALITY FOR SECONDARY ITEMS

The purpose of this paper is to provide a conceptual basis for the development and implementation of an item essentiality coding procedure for the wholesale requirements determination process for secondary items centrally managed by DoD Components.

Essential - "A fundamental, necessary or indispensable part, items, or principle." - American Heritage Dictionary

For many years the DoD Logistics community has recognized a need to identify and measure the relative merit or priority of maintaining stocks of a given item of supply over stocking some different item. Ordinarily, this identification of "essentiality" is based on some pre-established criteria which relates the importance of an item to the more complex assembly of which it is a part or if the item is an end item in itself, essentiality may be expressed in terms of the item's value in accomplishing its designated military mission. Measures of essentiality are often expressed in terms of a penalty to be paid if stocks of an item are not available when needed. For example: lack of a part may result in a non-mission capable condition; for end items, essentiality measures seek to quantify the contribution of the item toward satisfying a military objective such as destruction of the enemy, personnel protection, communications, surveillance, training or, in peacetime, maintaining some measurable degree of military capability - vaguely categorized as "readiness."

There is currently a widespread perception among logistics managers that the development of essentiality coding for secondary items is an area in which many efforts have been initiated in the past with few positive results. In fact, all DoD Components have developed some variation or approach to essentiality coding and in some cases are using this coding in the requirements development process. The current status of the use of essentiality coding is documented in detail in the Weapon Systems Relationship portion of this Report.

Currently the Components in varying degrees use actual or implied essentiality coding for the following purposes:

1. Selection of War Reserve Items.
2. Use of an essentiality factor in Variable Safety Level computations.
3. Prioritizing repair schedules for repairable items.
4. Applying more intensive management to selected items.
5. Selection of some items for stockage when the items do not qualify for demand based stockage.

The next logical phase of the use of essentiality would appear to be the development of uniform essentiality coding procedures. For secondary items - repairable components, minor end items and repair parts - essentiality identification and measurement is required to permit a more logical allocation of available inventory management and funding resources. The fundamental premise is that more essential items should receive a greater share of management attention and funding than less essential items. It follows that the more essential items should also have higher supply support performance objectives. An important prerequisite to the use of essentiality coding as an element of the requirements determination process is the development of the capability to obtain and use application data to establish the indentured relationship from item to assembly to end item. For the range of secondary items encompassed by the requirements determination process, the relative essentiality of each item to its next higher assembly and that assembly to an end item must be established.

To develop an essentiality coding technique for use in the computation of requirements for secondary items, it is necessary to consider three elements:

1. There must be a technique to identify and measure item essentiality. Item essentiality describes the need for an item relative to its next higher assembly. Generally, this deter-

mination requires a technical judgment by an equipment specialist capable of deciding the degree to which an item is required for operations of the assembly or end item.

2. Intermediate assemblies must be related to an end item with a military application such as a weapon system. Ordinarily, the assembly/end item relationship can be determined by establishing the relative essentiality of the several assemblies which make up an end item. This determination requires both a technical judgment regarding the degree of criticality of an assembly to the operation of an end item and an operational judgement regarding the relative importance of an assembly to the performance of the end item's mission(s). Two problems become apparent at this point. First, how should items common to more than one application be coded as to essentiality and second, how should items with no readily determinable assembly/end item relationship (e.g., Army helmets) be handled. These problems are addressed later in this paper.

3. Essentiality coding must consider mission essentiality. For purposes of secondary item requirements determination this element should probably be defined in such terms as strategic mission, tactical mission, training or other broad mission category rather than to attempt to capture the day-to-day variations of mission activity. The mission essentiality element should be used to establish the relative priority of one end item to another, recognizing that many end items may have the same level of priority. That is, it is unnecessary to separately rank each end item but rather a small number of priority groupings (5-10) may be sufficient for requirements determination purposes. Mission coding may also relate to the use of the item itself, e.g., a safety of flight item may require a high essentiality rating by virtue of its use.

To achieve a higher level of supply performance (i.e., supply availability, response time) for more essential items than for less essential items, a technique should be used in the requirements development process which allocates a higher level of resources to more essential items and measures the performance of these items based on established support objectives. In current systems this means either giving higher safety levels to more essential items or insuring some stockage levels are developed for essential items which ordinarily would not qualify for stockage on a demand basis. Current concepts usually segregate demand based items from non-demand based items. Demand based items are generally selected for stockage (range and depth) based on demand projections and/or economic trade-offs regardless of essentiality considerations. To the extent it is applied, essentiality for demand based items becomes an additional factor used to provide an incremental increase to safety levels usually on a selective basis.

For non-demand based items, current policy provides that essentiality is the primary selection criteria for determining the range of items to be stocked. Currently used depth of stockage criteria for these items, however, generally ignores essentiality considerations. This Report supports the concept that supply performance should be measured in terms of response time. This is discussed in considerable detail in other parts of the Report. If we can conclude that both essentiality and response time are primary elements of the requirements determination process for both demand and non-demand based items, then an axiom can be proposed that states:

Response time performance should be improved as essentiality increases.

The practical application of this rule would be to compute relatively higher stockage levels for more essential items. A corollary to this proposal would be that stockage level development would recognize the need to minimize response times for essential items (both demand and non-demand) and to apply constraints such as funding limits, demand deviation limits, maximum order quantities, probability of demand fac-

tors or policy guidelines to less essential items first. Response time related range/depth models should incorporate the above essentiality concepts. The result would be that both demand and non-demand based items would be assigned response time goals based on essentiality coding and thus, would compete for resources even though their stock-age models might differ.

The use of variable response time objectives based on degrees of essentiality requires that secondary item funding resources be allocated based on minimizing response times in sequence from more essential to less essential items. DoD Components have already initiated this approach to a limited degree by segmenting certain items perceived to be more essential (i.e., a higher priority weapon system or some other more essential grouping).

Resolution of the essentiality problem can be accomplished in three phases:

1. Development of an acceptable essentiality coding technique including application relationships.
2. Integration of the essentiality coding technique into performance measurement and range/depth models.
3. Implementation of the essentiality coding technique including coding of items, establishment of essentiality related performance objectives and effecting needed changes to impacted requirements determination systems.

The first phase of resolving the essentiality problem should focus on the development of the uniform essentiality code. One approach is to accept that the code to be assigned to each secondary item must comprehend the three elements discussed previously:

1. Item Essentiality

2. Intermediate Assembly Essentiality
3. Mission Essentiality

Using a three digit code permits identification of all three factors. See enclosure (1). In each case the code value(s) should reflect a range from least essential to most essential. For example, an item essentiality value of "A" might represent a most essential part without which the next higher assembly could not operate; a value of "C" might indicate a decorative or non-functional component. Items with no readily identifiable next higher assembly or end item relationship - primarily personnel support items - should be coded based on their essentiality relationship to the accomplishment of a particular mission or function. Enclosure (2) describes a "strawman" item essentiality coding technique.

The intermediate assembly essentiality value would show the impact of an assembly on the performance of the applicable end item. For example, the highest intermediate assembly essentiality value might indicate that lack/failure of the assembly would completely prevent operation of all functions of the applicable end item. The lowest intermediate assembly essentiality value might indicate that lack/failure of the assembly would not impact the operation of the end item. Interim values would indicate varying degrees of impact on end item operation. Enclosure (3) describes a "strawman" intermediate assembly essentiality coding technique.

The mission essentiality code would recognize essentiality on the basis of military mission--i.e., strategic system, safety/personal protection, etc., and the relative priority of end items within these groupings. Enclosure (4) describes a "strawman" mission essentiality coding technique. In ranking items under this coding structure the mission code would be considered first, followed by the intermediate assembly code and finally the item code.

In determining essentiality, application files must be developed which, at a minimum, show the relationship of an item to its next higher assem-

bly and the assembly to an end item application. More sophisticated application files would show the indentured relationship of an item to intermediate assemblies and ultimately to an end item and show quantities per application. If the data system is sufficiently sophisticated to show demand/usage or item population by end item, essentiality coding for the item could be segmented by these factors and multiple performance objectives established to help insure the appropriate level of support for each essentiality segment. If this segmentation is not feasible, assignment of the highest applicable priority code for item, intermediate assembly and mission elements is a practical alternative.

The second phase of the essentiality effort must be integrated with the development of the response time measurement model and the range/depth models for demand and non-demand based items. Specifically, the capability should be developed to select a range of response time objectives based on varying degrees of essentiality for a logical grouping of items. Examples of logical groupings would be: items used on a specified weapon, items in a given Federal Supply Class, items in a specific budget program or items managed by a specific Inventory Control Point. These are the same basic breakouts currently used in the variable safety level computations.

Use of essentiality in the response time models applicable to both demand and non-demand based items would have two aspects. First, in the requirements development phase, a response time objective would be established for a range of essentiality values. For example, the highest level of essentiality might require a 15 day response time objective, whereas a lesser level of essentiality might require a 25 day response time objective. Using these objectives, the range/depth requirements computations would be processed and used as the basis for budget projections. In the execution phase, available funding would be allocated to each essentiality grouping in sequence from highest to lowest level of essentiality. A simulation capability would be developed to price out proposed changes in the response time objective or to project the extent to which response times could be met based on a given funding level.

The third phase of the essentiality effort would be the implementation of secondary item requirements determination on an essentiality basis, that is, the implementation of the capabilities developed in phases 1 and 2. The coding of items for essentiality actually should begin concurrent with the development of the computational models. Additionally, development of the needed application files should begin as soon as possible after the codes are developed. The implementation phase can be accomplished on an incremental basis consistent with the building of application data, the coding of items, the implementation of response time and stockage models, and the development of response time objectives.

In the short term, it is envisioned that the several Components may have a varying degree of sophistication in the development and content of the specific essentiality codes. This fact should not be considered prejudicial to the coding effort as the purpose of establishing the essentiality codes is not to be able to make inter-Component comparisons of essentiality, but rather to measure relative essentiality within rather limited item groupings.

The implementation of the essentiality approach described in this paper appears to represent an achievable, practical and affordable effort and should satisfy the need for essentiality considerations within the secondary item requirements determination process for the foreseeable future.

SECONDARY ITEM ESSENTIALITY  
CODING

Mission Code - Describes the relative priority of end items based on assigned mission - examples: B-52, XM1, Mark 48 TORPEDO

Intermediate Assembly - Describes the relative priority of an assembly as it relates to its end item application-examples: Tank Transmission, Aircraft Fire Control System

Item Code - Describes the relative essentiality of a stock numbered, secondary item to its next higher assembly

Enclosure (1)

## ITEM CODING

The attached proposal illustrates a mechanism to establish a priority coding structure for identifying the relative essentiality of a stock numbered secondary item to its next higher assembly. Generally, the process would require a determination by a qualified technical equipment specialist in assessing the impact of a component's failure or lack of a replacement component on the operation of the next higher assembly.

Enclosure

(2)

ITEM ESSENTIALITY CODES

- A - Lack/Failure of item prevents the next higher assembly from performing any operation/function or directly impacts personnel safety.
- B - Lack/Failure of item impairs/degrades the operation of the next higher assembly or may result in future non-operation of the next higher assembly.
- C - Lack/Failure of item does not impact the operation of the next higher assembly.

## INTERMEDIATE ASSEMBLY CODING

The attached proposal illustrates a mechanism to establish a priority coding structure for identifying the relative essentiality of an assembly, subsystem or other intermediate application indenture to its applicable end item. Generally, the coding process would require a technical determination regarding the impact of the assembly on the operation of the end item and an operational determination of the impact of the assembly on the accomplishment of the mission(s) of the end item.

Enclosure (3)

INTERMEDIATE ASSEMBLY ESSENTIALITY CODES

1. - Lack/Failure of assembly/equipment prevents the designated end item from performing all wartime/peacetime missions or functions.
2. - Lack/Failure of assembly/equipment prevents the designated end item from performing any wartime mission of function.
3. - Lack/Failure of assembly/equipment impairs or degrades the designated end item from performing all wartime or peacetime missions or functions, but the end item can perform at least one mission or function.
4. - Lack/Failure of assembly/equipment prevents the designated end item from performing any peacetime/training mission or function.

## MISSION CODING

The attached proposed coding scheme would provide the mechanism to establish an end item weapon system priority coding structure for use in wholesale item requirements determination. The process would involve categorizing end items or weapons by major mission categories and within these groupings, establishing a priority sequence based on specific criteria. In practice, the mission categories - strategic, logistics, training, etc. - would be required only for purposes of facilitating priority assignments. Internally, in the requirements computation process, only the numeric values would be required to establish relative groupings of items based on mission essentiality.

Enclosure (4)

MISSION-FUNCTION CODE  
(IN ALPHABETIC SEQUENCE)

Airlift/Sealift	A
Administrative	D
Training	G
Intelligence	I
Logistics Support	L
Safety/Personnel Support/Medical	P
Research and Development	R
Strategic Weapons/Communications	S
Tactical Weapons/Communications	T

Note: These missions are listed in alphabetic order of the Mission-Function Code and do not relate to the relative priority of the missions.

MISSION-PRIORITY CODE  
(PRIORITY SEQUENCE)

1. Identifies an end item/weapon system which is a major factor in accomplishing the military objectives of the United States.
2. Identifies an end item/weapon system which directly supports or is essential to the continuing operation of a code 1 item.
3. Identifies an end item/weapon system which directly contributes to military operational capabilities but does not directly interface with enemy military forces.
4. Identifies an end item/weapon system which contributes to military operations by providing functional support/enhancement to the performance of a higher priority end item/weapon system.
5. Identifies an end item/weapon system which provides administrative support to military operations.
6. Identifies an end item/weapon system which provides non-functional, cosmetic or identification support to military operations.

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NON-DEMAND BASED LITERATURE SEARCH

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TITLE

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Literature Search

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## Non-Demand Based Stockage Policies

### Literature Search

Alrand Working Memorandum 324, "Measuring the Effects of DODI 4140.42", July 1978.

Belknap, Walter E., "To Stock or Not to Stock", Army Logistician, U.S. Army Logistics Management Center, Fort Lee, Virginia; Article, Volume 10 No. 5, September-October 1975, (LD No. 42186C\*).

Brown, George F., and Rogers, Warren F., "A Bayesian Approach to Demand Estimation and Inventory Provisioning", Center for Naval Analyses, Arlington, Virginia, July 1972, (AD 748608).

Brown, Robert G., "Intervals Between Demand Transactions", Little (Arthur D.) Inc., Cambridge, Massachusetts, July 1961, (LD No. 05842D\*).

Brown, Robert G., "Setting an Order Point Without Knowing Demand Rate", Little (Arthur D.) Inc., Cambridge, Massachusetts, June 1961, (LD No. 05842\*).

Burton, Robert W., and Jacquette, Stratton C., "Insurance Type Item Provisioning Guidelines", Navy Research Logistics Quarterly, Volume 22, No. 2, June 1975, (LD No. 34628A).

Burton, Robert W., and Jacquette, Stratton C., "Methodology for Determining Initial Provisioning of Insurance Type Items", Decision Studies Group, Palo Alto, California, November 1971, (LD No. 27678).

Compton, Henry Kenneth, "Supplies and Materials Management", H. K. Compton, London Business Books, 1968, P. 169, 173-175, 178-184.

Deemer, Robert L., "Improvement of EW/SIGINT Support", U.S. Army Logistics Management Center, Agency Report No. DAOAJ083, IRO 270, Philadelphia, Pennsylvania, July 1970, (LD No. 42180A\*).

Deemer, Robert L., "Insurance Items Stockage Policies Test", U.S. Army Logistics Management Center, Philadelphia, Pennsylvania, November 1971, (LD No. 19271CA).

Deemer, Robert L., "Insurance Items Stockage Policies", U.S. Army Logistics Management Center, Philadelphia, Pennsylvania, January 1970, (LD No. 19271C).

Deemer, Robert L., "Test of Updating Methodologies for Insurance Items", Institute of Logistics Research, U.S. Army Logistics Management Center, Fort Lee, Virginia, January 1973 (LD No. 19271CB).

Defense Audit Service, "Report on the Audit of Supply Management at the Defense Mapping Agency Aerospace Center", Agency Report No. 79-032, Project 815-126, Arlington, Virginia, December 1978, (LD No. 43189A\*).

Defense Logistics Agency, "Correlation Between Average Demand and Variability of Demand", Alexandria, Virginia, March 1964, (LD No. 06961).

Defense Logistics Agency, (Operations Research and Analysis Office), "An Economic Decision Model for Item Stockage", Alexandria, Virginia, September 1975, (LD No. 33960A\*).

Engelman, J. L., "Analysis of Proposed Initial Stocking Policies", Navy Fleet Material Support Office, Agency Report No. 118A, Mechanicsburg, Pennsylvania, December 1976, (AD A034595).

Engelman, J. L., "Analysis of Proposed Stock Range Rules", Navy Fleet Material Support Office, Agency Report No. 118, Mechanicsburg, Pennsylvania, April 1975, (LD No. 33385A\*).

Frazza, Sally, "Probabilities of Zero Demand", U.S. Army Logistics Management Center, Agency Report No. TR 78-4, Philadelphia, Pennsylvania, September 1978, (LD No. 42610A\*).

Gabriel, Ronald J. and Barkley, Robert H., "Insurance Stocking Policy for "S" Cognizance Material", Navy Fleet Material Office, Mechanicsburg, Pennsylvania, June 1962, (LD No. 28322).

Guthoehrlein, R. A., and Faiola, R. A., "Inventory Levels for Low Demand Items", Navy Fleet Material Support Office, Report 70, Mechanicsburg, Pennsylvania, September 1971, (LD No. 29130).

Haber, Sheldon E., Sitgreaves, Rosedith, and Solomon, Henry, "A Demand Prediction Technique for Items in Military Inventory Systems", The George Washington University, Washington, D.C., October 1968, (LD No. 17090A).

Haber, Sheldon E., Sitgreaves, Rosedith, "A Methodology for Estimating Expected Usage of Repair Parts With No Usage History", The George Washington University, Washington, D.C., October 1969, (AD-697311).

Hadley, G., "A Model for Procurement, Allocation, and Redistribution for Low Demand Items", Naval Research Logistics Quarterly, Office of Naval Research, Arlington, Virginia, December 1961, (LD No. 03590\*).

Herrera, C., "COSDIF" Probabilities for TACOM", U.S. Army Tank - Automotive Command, Agency Report No. 75-35, Final Report, Warren, Michigan, July 1975, (LD No. 34278A\*).

Hetrick, James C., "Reorder Point Tables Based Upon POISSON Arrivals", Little (Arthur D.) Inc., Cambridge, Massachusetts, August 1962, (LD No. 05843N\*).

Kruse, W., Karl and Kaplan, Alan J., "Comments on Simon's Two-Echelon Inventory Model", U.S. Army Logistics Management Center, Philadelphia, Pennsylvania, January 1972, (LD No. 23019A).

Lewis, Colin David, "Scientific Inventory Control", London Butterworths, 1970, Chapter 7, Inventory Queue of Slow Moving Spare Parts.

McNertney, R. L., and Engelman, J. L., "FBM Support Improvement", Navy Fleet Material Support Office, Agency Report No. 115, Mechanicsburg, Pennsylvania, March 1975, (LD No. 32862A\*).

Miles, Capt. Ross E.; Demmy, W. Steven; Genet, Russell M.; and Meitzler, Thomas D., "On the Benefit-to-Cost Ratio of Base-Level Stocking Decisions for Low Demand Items", Wright State University, College of Business Administration, Dayton, Ohio, April 1978, (LD No. 42475A\*).

Mills, LCDR H. F., "The Problem of Inventory With Low Demand", Navy Fleet Material Support Office, Mechanicsburg, Pennsylvania, November 1959, (LD No. 05337\*).

Navy Fleet Material Support Office, "A Note on Smoothing and Tracking Selection of Smoothing Constant for Stock Items with Low Demand Rates", Mechanicsburg, Pennsylvania, December 1960, (LD No. 05349\*).

Perlman, Bernard L., and Schwartz, Arnold N., "A Phased-Procurement Model for Application of F-14 Spare Parts Provisioning", Center for Naval Analysis of the University of Rochester, Arlington, Virginia, November 1972, (LD No. 29171\*).

Peters, E. L., "Evaluation of FLSIP Cosal Criteria", Navy Fleet Material Support Office, Mechanicsburg, Pennsylvania, August 1971, (LD No. 29131).

Seger, J., "A Threshold Demand Criterion for Determining Spare Part Stockage", Undated.

Simon, R. M., "Stationary Properties of a Two-Echelon Inventory Model for Low Demand Items", The Rand Corporation, Santa Monica, California, May 1969, (LD No. 23019\*).

Sitgreaves, Rosedith, "Computing the Value of the Maximum Likelihood Estimate of the Parameter of a POISSON Distribution Truncated Below One", The George Washington University, Agency Report, No. T-310, Washington, D.C., August 1975, (LD No. 34604A\*).

United Research Inc., "Low Demand Inventory Models", Boston, Massachusetts, July 1961, (LD No. 03207C\*).

United Research Inc., "Numerical Illustrations for Low Demand Inventory Models", Boston, Massachusetts, July 1961, (LD No. 03207E\*).

U.S. General Accounting Office, "Reducing Procurement of Initial Support Stocks for Navy Ships", Washington, D.C., June 1972, (LD No. 27949\*).

U.S. General Accounting Office, "Greater Use of Commercial Distribution Systems for Minor, Low-Use Supply Items Can Reduce Defense Logistics Cost", Defense Supply Agency, Washington, D.C., August 1976, (LD No. 36634A\*).

U.S. General Accounting Office, "Need to Remove More Low Cost, Low Usage Items from Inventories", Washington, D.C., March 1971, (LD No. 17109A\*).

U.S., General Accounting Office, "Substantial Savings Available by Eliminating Low Cost, Low Demand Spare Parts from Defense Supply System, Department of the Navy and the Defense Supply Agency", Washington, D.C., October 1967, (LD No. 17109\*).

Wagner, Harvey M., "Decision and Control Models in Operations Research", Yale University, School of Organization and Management, New Haven, Connecticut, February 1976, (AD-A024190).

Wright, Dalton, "Low Demand Analysis of Some Items Used Aboard USS TIRU", Navy Fleet Material Support Office, February 1961, (LD No. 29849).

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