

LONG-TERM EQUIPMENT REPAIR COSTS

REPORT TO THE CONGRESS



**Office of the Secretary of Defense
September 2006**

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	3
PURPOSE OF THE REPORT	5
Congressional Request.....	5
SCOPE AND NATURE OF THE PROBLEM	6
Operational Tempo.....	6
Harsh Environment.....	8
Equipment Densities.....	9
NEAR-TERM ACTIONS	11
Maintenance of Equipment in the Combat Theater.....	11
Repair of Returning Equipment at Maintenance Depots and the Unit Level.....	12
Recapitalization of Selected Vehicle Fleets.....	20
LONGER-TERM ACTIONS	24
Reset of Future Units.....	24
Unexecuted Requirements.....	25
Prepositioned Equipment.....	27
THEATER PROVIDED EQUIPMENT (TPE)	28
Army Theater Provided Equipment.....	28
Marine Corps Theater Provided Equipment.....	28
APPENDIX 1: GLOSSARY	31

EXECUTIVE SUMMARY

This report responds to a request from the House Committee on Appropriations in the House Report 109-388 (Making Emergency Supplemental Appropriations for the Fiscal Year Ending September 30, 2006, and For Other Purposes), page 14, for detailed equipment Reset cost estimates for the repair and replacement of equipment used in Iraq and Afghanistan under the programs known as Army and Marine Corps "Reset".

Equipment is used at much higher rates in combat operations than it is in routine peacetime missions. In Iraq and Afghanistan, for example, usage rates have run two to twelve times higher than comparable peacetime rates. Equipment is also employed in harsher environments and in more demanding ways in combat missions. All of these factors act to increase the maintenance requirement and replacement cost beyond what is typically budgeted.

The Department of Defense is committed to maintaining combat forces in a high state of readiness at all times. This includes repair or replacement of equipment used in deployments so that forces can be ready to meet future contingency operations. The three main elements of equipment Reset consist of:¹

1. Repairing, at field or depot level, all equipment in or returning from the theater
2. Replacing combat losses and maintenance "washouts"
3. Recapitalizing selected vehicle fleets to restore damage due to excessive wear²

These Reset activities are funded primarily in supplemental legislation as they are generated as a result of contingency operations. Supplemental funds also go to maintaining equipment in theater. Though not expressly a part of Reset, all maintenance efforts in theater act to reduce the total cost of repair for equipment once it returns from theater.

The emergency supplemental funds requested in FY 2005 and FY 2006 cover the majority of work in those fiscal years to repair or replace equipment used in Iraq and Afghanistan. The Department has longer-term plans in place for equipment repair and replacement initiatives that cannot be executed immediately. These plans are as follows:

- Theater provided equipment pools (or stay-behind equipment), created to support high availability rates and reduce transportation costs, are Reset as needed or when the pace of operations allows. Once the equipment comes back to the United States, it will be repaired through existing Reset processes, as described in the body of this report.
- Some equipment losses, mostly older fixed and rotary wing aircraft, cannot be replaced because the systems are no longer being produced. For such systems, the Department has new development and/or acquisition programs under way.

¹ See Appendix 1 for definitions of key terms.

² Recapitalization completely rebuilds a piece of equipment to zero miles/zero hours, with upgraded capability when feasible and appropriate.

- Prepositioned equipment sets will be replenished when the pace of operations allows. The configuration of these equipment sets may change in response to future needs.

The data in this report is current as of July 24, 2006—except as otherwise noted. It is consistent with recent congressional testimony by the Secretary of Defense, Chairman of the Joint Chiefs of Staff, Chief of Staff of the Army, and Commandant of the Marine Corps on the subject of Reset. Tables 13, 14, and 15 provide summary-level data related to previous funding, current planned expenditures, and projected future costs for Reset; other relevant data is presented throughout the report. Future Reset costs will continue to change over time as battle losses and equipment Reset requirements continue to accrue.

In order to arrive at a consistent definition of Reset costs, the Office of the Secretary of Defense convened a meeting with Service representatives in September 2006. The DoD-approved definition of Reset costs will be used in the preparation of the FY 2007 and subsequent GWOT Supplemental funding requests.

PURPOSE OF THE REPORT

Congressional Request

In its report on the Defense Department's FY 2006 emergency supplemental appropriations budget request, the House Appropriations Committee expressed concern about how the Department will reset equipment currently being used in operations in Iraq and Afghanistan. To obtain the Department of Defense's perspective on the issue, the Committee directed the Office of the Secretary of the Defense to provide the congressional defense committees with detailed equipment reset cost estimates for the Army and Marine Corps. In calling for the report, the Committee stated:³

The Department of Defense requested approximately \$8,000,000,000 for repairing and replacing equipment used in Iraq and Afghanistan under the programs known as Army and Marine Corps "reset". The Committee recommends a total of \$8,900,000,000 for these programs.

The Committee is concerned that the Department has failed to provide the Congress with a comprehensive reset plan to serve as context for its recommendations. Reports indicate that the Army and Marine Corps equipment repair and reconstitution costs associated with the Global War on Terror will amount to multiple billions of dollars over the next several years. So that these costs may be adequately reviewed in the future, the Committee directs the Office of the Secretary of Defense to provide the congressional defense committees with detailed equipment reset cost estimates for the Army and Marine Corps. This report should itemize funding allocated to reset programs from previous appropriations and estimate future costs anticipated over the next three years. The Committee directs that this report be submitted not later than May 1, 2006.

In a letter sent to the Chairman, House Committee on Appropriations dated May 1, 2006, the Under Secretary of Defense for Acquisition, Technology, and Logistics, Mr. Kenneth J. Krieg, notified the Chairman that the report would be completed by August 2006. Based upon recent testimony of the Army and Marine Corps, the report was delayed to September to ensure fidelity of the figures presented.

³ House Committee on Appropriations, *Making Emergency Supplemental Appropriations for the Fiscal Year ending September 30, 2006 and for other Purposes, Report 109-388* (March 13, 2006), pp. 14.

SCOPE AND NATURE OF THE PROBLEM

Operations in Iraq and Afghanistan are placing demands on ground force equipment far beyond what is typically experienced during training or home station operations.⁴ Some of these demands arise from higher usage rates, others from the rigors of extended operations in a harsh environment. These higher demands increase maintenance requirements for equipment employed in the theater and do not end when units and equipment redeploy to home station. Actions in theater result in a requirement for maintenance and supply/resupply actions following operations to ensure the nation has a ready and reliable military force.

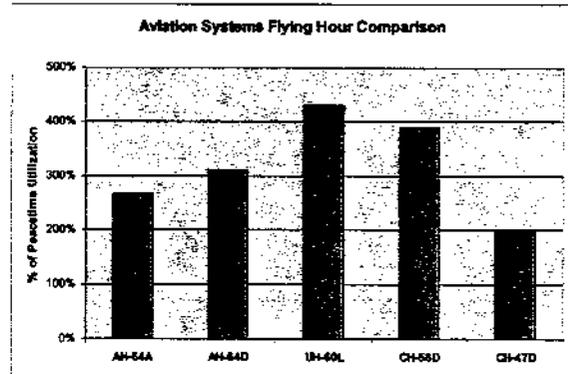
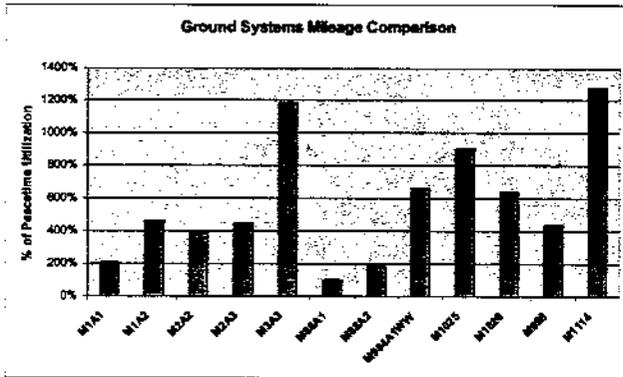
Operational Tempo

Army:

Equipment is used at a much higher rate in combat operations than it is in routine peacetime activities. In Operation Iraqi Freedom (OIF) for example, crews are driving tanks in excess of 4,000 miles per year—five times more than programmed annual usage rates of 800 miles. Army helicopters are experiencing usage rates roughly two to three times programmed rates. Our truck fleet is experiencing some of the most pronounced problems of excessive wear, operating at five to six times programmed rates. Table 1 shows the utilization rates for a representative subset of equipment in units of miles driven or hours flown per month. Assessments of the effects of utilization rates on combat systems are ongoing. Current indications are that maintenance and reset actions are keeping pace with operational tempo.

⁴ Consistent with standard DoD definitions, ground force equipment includes rotary-wing aircraft but not fixed-wing systems, even though the two types of aircraft are employed jointly in combat operations. Accordingly, data on aviation systems presented in this report apply to rotary-wing aircraft only.

Table 1: Comparison of Peacetime and GWOT Usage of Selected Army Ground and Aviation Systems (% of Historical Peacetime Usage) As of 21 April 2006



Category	Model	Density in AOR	GWOT Usage (Miles per Month)	Historical Average Monthly Usage
Abrams	M1A1	571	138	67
	M1A2		307	67
Bradley	M2A2	616	270	70
	M2A3		313	70
	M3A3		827	70
M88	M88A1	186	32	32
	M88A2		42	23
HEMTT Wrecker	M984A1WW	344	1,277	194
HMMWV	M1025	15,000	1,602	178
	M1026		1,602	251
	M998		872	201
	M1114		8,624	2,550

Category	Model	Density in AOR	GWOT Usage (Hours per Month)	FY06 Peacetime (Average Flying Hours)
Apache	AH-64A	24	34.5	13
	AH-64D	96	40.2	
Blackhawk	UH-60L	277	55.6	
CH-58	CH-58D	60	50.3	
Chinook	CH-47D	67	26.1	

Marine Corps:

As with the Army, the Marine Corps is experiencing a large relative increase in vehicle activity, with operational tempos ranging from two to five times the peacetime rates. Actual monthly mileage and flying-hour data for these systems are provided in Table 2.

Table 2: Absolute Increases in Utilization for Selected Marine Corps Systems Employed in OIF

Category	Usage		Optempo Ratio
	Pre OIF	OIF	
HMMWV	183	550	3.0
MTVR	500	2000	4.0
LVS	375	1500	4.0
AAV	83	417	5.0
Rotary-Wing Aircraft	18	41	2.2
KC-130	43	83	1.9

Note: Usage rates for ground vehicles are expressed in miles per month. For aircraft, the rates reflect flying hours per month.

Harsh Environment

In addition to being operated at higher rates, equipment is used under extreme conditions in combat operations. First, the very nature of warfare places stress on equipment. Whether evading enemy fire, surviving improvised explosive devices (IEDs), or engaging enemy forces in direct combat, equipment is being used under arduous conditions. The damage resulting from combat operations, coupled with the reduced time available for comprehensive maintenance, leads to an accumulation of wear and tear on equipment.

The harsh desert environment in Iraq and Afghanistan—including both the terrain and climate—also causes equipment damage, further increasing maintenance requirements. Parts such as turbine engines for aircraft and tanks tend to fail more often when operating under harsh conditions. Moreover, the wear on these subsystems steadily diminishes their ability to be rebuilt or reused, ultimately increasing replacement and maintenance costs.

Another contributor to equipment stress is the practice of adding armor to unarmored trucks. Because of the extra weight and the need in some cases to shift loads (in ways for which the vehicles were not designed), greater stress is placed on the tires, suspensions, frames, and power trains of these systems. During Reset, older systems are replaced with new models designed to accept and carry armor.

For the near term, the Army has implemented special procedures, called Delayed Desert Damage (3D), to mitigate some of the effects of the combat environment. The Marine Corps has developed similar procedures. As operations continue, maintenance lessons learned are being applied to Reset, continually improving the process and expanding the scope (as in 3D) to recover damage caused by combat operations.

Equipment Densities

The scope of maintenance efforts depends not only on operational tempos and operating environments, but also upon the amount of equipment employed in operations referred to as the equipment density in theater. For the Army, equipment quantities in Iraq vary by type of system, ranging from 12 percent of the total fleet for medium tactical wheeled vehicles to 15 percent for Stryker combat vehicles to 25 percent for light tactical vehicles. Overall, the Army has about 20 percent of its total fleet assets engaged in Iraq.

Approximately 30 percent of all Marine Corps ground equipment and 25 percent of aviation assets are being used in OIF/OEF (compared to approximately 13 percent of active Marine forces deployed). Much of this equipment is not rotating out of theater with each force rotation; hence it is being used on a near continuous basis at operating tempos that far exceed normal peacetime use.

Tables 3 and 4 provide breakouts of equipment densities by commodity for the Army and Marine Corps. The table differentiates between equipment that will rotate in and out of theater with the units and equipment that remain in theater to provide a ready pool of equipment for units to use in operations in theater.

**Table 3: Equipment Density in OIF – Army
As of 21 April 2006**

Category of Equipment	Annual Unit Equipment Rotation	Theater Equipment	Total
Aircraft	615	6	621
Missiles	4,150	110	4,260
Tracked Vehicles	6,837	462	7,299
Wheeled Vehicles	42,562	14,881	57,443
Communications/Electronics	94,034	34,625	128,659
Small Arms	88,606	7,299	95,905
Misc Support Equipment	51,856	221,934	273,790
Stryker Vehicle	312	0	312
Total	288,972	279,317	568,289

Table 4: Equipment Density in OIF – Marine Corps

Category of Equipment	Annual Unit Equipment Rotation	Theater Equipment	Total
AH-1W	0	27	27
UH-1N	0	15	15
CH-46E	0	24	24
CH-53E	0	12	12
CH-53D	0	10	10
AV-8B	10	0	10
F/A-18D	12	0	12
F/A-18C	12	0	12
EA-6B	5	0	5
KC-130J	6	0	6
Missiles	0	0	0
Combat Vehicles	134	145	279
Wheeled Vehicles	61	5,343	5,404
Communications/Electronics	51	19,670	19,721
Ordnance/Small Arms	60,656	7,320	67,976
Engineer/Support Equipment	1,850	2,742	4,592
Total	62,752	35,220	97,972

NEAR-TERM ACTIONS

Maintenance of Equipment in the Combat Theater

Maintenance systems are deployed to theaters along with combat forces to ensure that combatant commanders and their forces have reliable, safe, and ready equipment. The higher equipment usage rates in combat theaters increase operating costs above peacetime levels. In developing supplemental funding requests, the Department estimates these additional costs based on experience both in previous contingencies and in current operations.

Equipment in use in theater can be divided into two categories: equipment that will rotate out with units at the end of their deployment, referred to as unit equipment, and; equipment that will stay in theater for use by units as they rotate into theater, referred to as theater provided equipment (TPE). All units strive to maintain equipment in mission capable condition—that is equipment that is effective and safe to operate. When operations allow, equipment receives the maintenance care and attention it needs.

TPE has been created to save on transportation costs and simplify rotation logistics. The Army and Marine Corps are maintaining these equipment pools in theater to support combat operations by having a ready source of capable equipment. TPE was created from prepositioned stocks or by holding equipment in theater—creating home-station shortfalls. Theater provided equipment pools are managed by the Army Materiel Command and the Commander, Marine Forces Central Command. The equipment is receiving routine maintenance necessary to keep it in working order (mission capable). The longer equipment operates in theater without a rotation, the more extensive the damage to the equipment will be, increasing the final Reset bill.

The Army and Marine Corp have initiated several maintenance efforts to reduce stress on equipment while in theater. The Army has enhanced maintenance capabilities in the theater at facilities in Kuwait to reduce equipment repair times and allow more complex repairs to be done locally. These adaptations also include providing contractor augmentation to unit-level maintenance operations in order to accommodate the higher maintenance workload.

Similarly, the Marine Corps is adapting its maintenance system by employing teams with key depot-level skills in the combat theater to perform some particularly complex repairs on ground equipment. However, all scheduled depot-level maintenance continues to be performed in the United States.

Also, as part of its effort to enhance in-theater maintenance activities, the Marine Corps has established a Sustainment Technical Assistance Team (STAT) in Iraq to expand the kinds of aircraft maintenance that can be done. This will increase aircraft readiness and availability in the theater, while reducing post-deployment maintenance time when the aircraft ultimately return to home base.

Repair of Returning Equipment at Maintenance Depots and the Unit Level

Army:

In general, the maintenance process is structured in tiers, starting with preventive maintenance checks by equipment operators at the unit level and ending with major overhauls at the depot level. When a fault is discovered during maintenance inspections or operations, repair work is initiated to classify and correct it. Inspection checklists and technical manuals are used to manage the flow of maintenance; they define where, when, and who performs the work based upon the complexity of a repair.

Army Reset Programs. "Reset" includes a series of actions taken to restore unit equipment to desired levels of combat capability after returning from contingency operations. The Reset process brings unit equipment to full combat-ready condition. Reset actions include repair of equipment and replacement of equipment lost to combat operations or worn to the point of being uneconomically repairable. Reset also includes recapitalization of equipment where feasible and necessary.

Field Level Reset is defined as work performed to correct equipment faults within the Field Level of maintenance (work that is done by Soldier mechanics at what we previously called Organizational and Direct Support maintenance), as laid out in Technical Manual (TM) maintenance allocation charts for their echelon of maintenance. Field Level Reset work is executed by the Major Commands (MACOMs), and is done with Soldier labor, augmented by contractor labor as required. This work is performed on or near the installation where the equipment is stationed. The scope of work at this level involves bringing a piece of equipment back up to TM 10/20 standards, eliminating the effects of Delayed Desert Damage (3D), and performing services required. Table 5 is a listing of FY 2006/07 requirements for field level Reset of unit equipment.

**Table 5: Army FY 2006/07 Requirements for Field Level Reset of Unit Equipment
As of 24 July 2006**

Category	FY06 Qty	FY06 (\$M)	FY07 Qty	FY07 (\$M)
Aircraft, aircraft materiel	625	1.3	446	5.5
Ammunition, weapons, and tracked combat vehicles, special weapons	75206	59.5	262,226	224
Aviation Special Technical Inspection and Repair	601	673	515	624
Combat Vehicles	1,843	202	3,655	430
Mobility, Tactical, and Support Vehicles, Vehicular Components	47,859	886.3	42,698	1,170
Communications and Electronics Equipment	58,644	71	294,204	320
Communications Security	5		20,826	24
Ground Forces Support Materiel	20,597	13.3	155,157	120
Missiles, Missile Materiel	748	0.7	2,474	8
Stryker	283	37.1	317	53
Other	3,180	994.9	130,028	914
Total	209,591	\$2,939	912,546	\$3,893

National Level Reset is defined as work performed to correct equipment faults that are above the Field Level of maintenance—that is, above organizational (ORG) and direct support (DS)—as laid out in Technical Manual maintenance allocation charts. National Level Reset is orchestrated by Army Materiel Command (AMC). As the executive agent, AMC is responsible for defining the standard of Reset and managing the work performed by a host of organizations including: AMC managed facilities (depots/arsenals/forward-deployed bases), contractors, and installation-level maintenance activities. The AMC Life Cycle Management Centers (LCMCs) develop strategies for National Level maintenance in coordination with their Program Executive Office (PEO)/Program Manager (PM) partners and the Installation Management Agency (IMA) for work done by an installation's Directorate of Logistics (DOL). National Level Reset is also conducted on equipment which exceeds Field Level Reset capability because of the complexity of work to be performed. Certain types of equipment, due to their inherent complexity, will automatically be done at the National Level of maintenance. AMC has published a list of equipment which is treated in this manner. The Aviation Special Technical Inspection and Repair (STIR) and the Generator Reset programs are examples. Table 6 is a listing of FY 2006/07 requirements for national level Reset of unit equipment.

**Table 6: Army FY 2006/07 Requirements for National Level Reset of unit equipment
As of 24 July 2006**

Category	FY06 Qty	FY06 (\$M)	FY07 Qty	FY07 (\$M)
Artillery	116	14	125	71
Aviation	14	92	30	213
C4ISR	52,975	273	64,993	700
Combat Vehicles	1,919	1,143	2,089	2,094
Missile	3,237	121	5,239	313
Small Arms	12,428	23	17,494	38
Stryker	29	15	231	78
Support Equipment	6,707	277	17,093	253
Wheeled Vehicles	4,111	337	2,848	265
Total	81,536	\$2,295	110,142	\$4,024

Note: There may be some deviation in totals due to rounding.

Marine Corps:

Marine Corps Maintenance and Recovery Programs—Marine Corps Reset. The Marine Corps equipment recovery process generally parallels the Army process. Unit equipment returning from combat theaters is evaluated and then transported to either a maintenance depot or the equipment's home station for repair.

The majority of the initial Marine Corps' non-aviation equipment used in OIF/OEF has come from maritime prepositioned sets. This equipment is handled differently from unit equipment. Recovery of prepositioned equipment is conducted at the Marine Corps' Blount Island facility in Jacksonville, Florida. Equipment needing only unit-level maintenance is repaired by contractors at Blount Island. Equipment in need of more complex repairs is sent to depot-level facilities. After the repairs are completed, the equipment is returned to the afloat prepositioning sets.

Follow-on equipment replacement and augmentation was provided from Marine Corps Prepositioning Program – Norway (MCPN) and by redistributing equipment from non-deployed units and home stations.

Because most of its deployed equipment will remain in use in the theater, the Marine Corps has sent only a limited number of items back to the United States for repair during FY 2006. This equipment undergoes the recovery procedures described above. Recovery of the remainder of equipment will be accomplished when operational demands allow the items to be returned to the United States.

The Marine Corps restores prepositioned equipment (i.e., the bulk of equipment in theater) to a level of maintenance known in technical terms as (Condition) Code A. Units restore their own equipment to “mission capable” status.

The only standard for Marine Corps aircraft is “fully mission capable.” Marine Corps aviation policy requires that all critical maintenance work be done as problems occur. Moreover, the policy limits the accumulation of minor maintenance deficiencies to a specified level. When an aircraft reaches its maximum allowable number of minor deficiencies—whether in a combat theater or at home station—it is removed from the flight schedule and repaired. Upon returning from combat theaters, Marine Corps aircraft are put through a reconstitution process involving a detailed inspection, repair of identified discrepancies, and deep cleaning of the aircraft to remove sand, dust, and dirt.

The entire Reset requirement cannot be executed in one fiscal year due to industrial base limitations for new production. However, resetting the force can be executed with two years of funding for ground equipment and is phased accordingly. Due to the long lead times and industrial limits, aviation assets require additional phasing from FY 2008 through FY 2012. Beyond the two-year Reset window, however, the Marine Corps will still require funding for ongoing operations in Iraq, as shown in Tables 7, 8 and 9. The total operational requirement is dependent upon operations in theater, equipment utilization, and in-theater conditions.

Table 7: Summary of Marine Corps Executable Reset Costs for FY 2006-2007 (Overall in \$M)

	Reset Requirement	FY 2006	FY 2007	Remaining Reset Requirement
Ground	8,969	4,484	3,841	644
Aviation	2,674	567	239	1,868
Total	11,643	5,051	4,080	2,512

Table 8: Summary of Marine Corps Unconstrained Reset Requirements for FY 2006-2007 (Detailed)

Commodity	Quantity	Proc Cost (\$M)	O&M Cost (\$M)
KC-130J	2	\$135.1	
MV-22 ²	5	\$384.0	
CH-53E AMARC Restoration	3	\$2.9	\$14.0
Weapons (Hellfire)*	932	\$93.2	
H-1 Sustainment*	N/A	\$57.4	
CH-46E Sustainment*	N/A	\$44.0	\$14.4
CH-53E Sustainment*	N/A	\$59.1	\$10.2
KC-130 Sustainment*	N/A	\$28.7	\$7.3
AV-8B Sustainment	N/A	\$15.2	
F/A-18 Sustainment*	N/A	\$40.0	
EA-6B Sustainment	N/A	\$8.1	\$1.5
PIONEER (WPN)	N/A	\$10.0	
MATCAL Sustainment	N/A		\$9.4
Depot Maintenance*	N/A	\$29.4	\$125.8
Missiles	3,074	\$542.3	\$15.0
Combat Vehicles*	922	\$474.7	\$255.7
Wheeled Vehicles	12,631	\$2,116.1	\$53.8
Communications/Electronics	512,718	\$2,860.3	\$22.8
Ordnance/Small Arms	113,206	\$549.6	\$18.4
Engineer/Support Equipment	240,232	\$1,445.2	\$24.3
Individual Combat Equipment*	2,201,708		\$594.7
Total	3,085,433	\$8,895.3	\$1,167.3
*Includes valid FY2006-2007 requirements unexecutable due to production constraints			

Table 9: Specific Examples of Marine Corps Reset Costs

	QTY	Cost (\$M)
Wheeled Vehicles		
ITV	647	51.8
HMMWV	6,338	760.6
MTRV	2,477	425.1
Light/medium truck	1,250	380.0
Armor Kits	1,018	349.4
Communications/Electronics		
Radios and Equipment	66,167	1,026.7
Night Vision	154,406	277.2
Ordnance/Small Arms		
Ammunition	39,828,317	288.3
Small Arms	99,481	279.7
Aviation		
AH-1Z	40	272.0
MV-22 Inventory Recovery (New Aircraft)	8	552.0
MV-22 Inventory Recovery (Modifications)	8	197.0
PIONEER (WPN)	N/A	7.0
CH-46E Sustainment	N/A	274.0
CH-53E IMDS	N/A	28.4
Depot Maintenance (OMN)	N/A	81.2
Depot Maintenance (APN)	N/A	29.4

Special Procedures for Operations in a Harsh Environment. Included in the Army's Reset process for ground vehicles is an extra set of maintenance procedures outlined in Technical Bulletin (TB) 43-0221-2, known as Delayed Desert Damage (3D). These procedures, which are based on lessons learned from the 1991 Gulf War, address damage resulting from operations in a desert environment. In combination, the 3D procedures ensure future readiness and reduce future maintenance costs by exposing and repairing equipment wear and damage that might otherwise not be visible. For example, for a HEMTT (heavy truck), 3D involves disassembly and inspection of the following items for sand and dirt contamination: brake system, axle, transmission, slack adjuster mechanism, cooling system, alternator, and engine. At the unit level, these tasks add 230 man-hours of work and cost \$39,000 per vehicle (FY 2006 dollars). All vehicles receive 3D checks at the unit level, as specified in TB 43-0221-1 3D.

If equipment goes to a depot-level facility, more extensive 3D procedures are applied. These procedures are tailored to the requirements of specific types of ground systems. For a HEMTT, the process entails the mandatory replacement of severely worn items: batteries, tires, wiring harness, electrical gauges, filters, and seals. The 3D package on a HEMTT also includes a partial rebuild with disassembly to frame rails and an overhaul of all major assemblies—engine, transaxle, transmission assembly, axles, crane, and winches. The Marine Corps is applying the Army's 3D protocols, when appropriate, as part of its equipment recovery process.

The Army aviation equivalent of 3D is called Special Technical Inspection and Repair (STIR). STIR is designed to return systems to pre-deployment condition by eliminating desert-induced damage. The STIR package, unlike routine maintenance, entails removal of all electronic boxes and instrument control panels, inspection for sand intrusion, and cleaning as necessary. In addition, STIR includes the routine maintenance tasks of inspecting for parts failure, testing and adjusting controls, repairing damage, and incorporating approved modifications.

As an illustration: The cost of STIR for an AH-64 attack helicopter is \$1 million, with an increased workload of 200+ maintenance tasks/actions. The cost of STIR for a CH-47 cargo helicopter is \$1.7 million, with an increased workload of 250+ maintenance tasks/actions.

Continuing Assessments. As equipment returns from the theater and goes through the Reset and recovery processes, it is likely that maintenance trends will emerge and a new set of protocols, similar to the current 3D and STIR, will be established to repair damage specific to OIF and OEF. Systemic problems particular to these operations might include damage resulting from the added stress incurred by up-armored equipment or from the operation of tracked vehicles in urban areas. As part of its ongoing effort to assess stress on equipment, the Department will continue to analyze maintenance trends, determine whether unusual wear patterns exist, and explore how best to fix problems that are identified.

Replacement of Combat Losses and Maintenance Washouts

Army:

The Army is replacing or has replaced over 900 major end items in FY 2005 and 2006 through new procurement using supplemental appropriations, with additional equipment being purchased for modularity and specific force protection issues. This replaced equipment ranges from Apache helicopters to ground combat vehicles (such as Abrams tanks and Bradley fighting vehicles) to wheeled vehicles (such as the Stryker and tactical wheeled vehicles), as shown in Table 10. The cost of these replacements is over \$1.9 billion. This equipment was either lost in battle or damaged so severely that it was uneconomical to repair. As the Army replaces these vehicles, it is buying modernized equipment, capable of performing on today's and tomorrow's battlefield. As the Army continues to conduct operations in Iraq and Afghanistan, it anticipates equipment losses that will continue until hostilities cease and units are redeployed. Requests for replacement of losses in FY 2006 and prior years have been limited to crucial systems. The Army absorbed losses with current budgeted procurement programs or stocks on hand where it could do so. The Army's ability to absorb future losses has now been diminished and will become more untenable in the future as any previously excess equipment is now being utilized and units return with less than their full complement of equipment. Summary of significant losses is as follows:

**Table 10: Summary of Army FY 2005-2006 Losses
As of 21 April 2006**

	Battle Losses	Funded Replacements to Date
Apache	43	26
Blackhawk	26	8
Chinook	18	1
OH-58D/ARH	29	0
Tanks	18	0
Bradleys	74	0
Stryker	21	16
HMMWV (all models)	1058	568
FMTV	187	51
FHTV	44	29
ASV	9	0
FOX	2	2
ADAM Cells	1	0
Avengers	2	0

Marine Corps:

Resetting Marine Corps equipment through replacement or repair is based on an economic analysis of each piece of equipment. It is more economical to replace an asset when the repair cost (including transportation from/to theater) exceeds 50 percent of the replacement cost. There are some exceptions, however, as in some cases where no existing production line or viable alternative exists. In these cases the asset is repaired at a cost exceeding the 50 percent criteria (i.e., M1A1 Tank). As with the Army, the Marine Corps replaces outdated equipment with the most capable replacement technology available.

The Marine Corps replacement approach is necessitated by the limited inventory of critical equipment in support of GWOT operations. The Marine Corps lacks sufficient equipment density to rotate assets into and out of theater and sustain combat operations. Currently a rotating pool of assets is being created in theater which will shift emphasis from replacement to depot-level repair. A summary of Marine Corps contingency losses is shown in Table 11.

**Table 11: Summary of Marine Corps Contingency Losses
(March 2003-July 2006)**

Commodity	Total Quantity	Quantity still needed	Cost (\$M)
AH-1W	7	7	\$153.0
UH-1N	5	5	\$133.0
CH-46E	4	4	\$284.0
Missiles	1,484	-	-
Combat Vehicles	214	64	\$60.7
Wheeled Vehicles	1,605	613	\$58.5
Communications/Electronics	1,199	798	\$6.3
Ordnance/Small Arms	2,564	1,380	\$7.6
Engineer/ Support Equipment	1,059	485	\$12.5
Total	8,141	3,356	\$715.6

Recapitalization of Selected Vehicle Fleets

The actions described in previous sections of this report constitute a comprehensive approach to providing U.S. forces with ready and capable equipment even in the midst of a conflict. These actions will: keep equipment in the combat theater in operating order; fix equipment returning from the theater; replace combat losses, and, eliminate equipment that is not worth repairing. However, to further reduce the risk of equipment deterioration, the Department has taken additional actions.

RECAP is the *rebuild* and/or *systemic upgrade* of currently fielded systems to ensure operational readiness and a zero time/zero mile status. Objectives include extending service life,

reducing Operations and Support (O&S) costs, improving system reliability, and enhancing capability. RECAP is also conducted to account for damage/stress on vehicles due to the higher OPTEMPO and harsh environment in theater. RECAP can be further subdivided into rebuild programs, which return equipment to original design specifications with required upgrade due to obsolescence of subcomponents, and upgrade programs, where capability is significantly enhanced. RECAP occurs at the National Level of Maintenance and is done either in an AMC depot/arsenal, by contractor (usually the Original Equipment Manufacturer), or by a partnership of the two.

Army:

The Army initiated RECAP programs in 2002 for seventeen critical current force systems. These systems were aging, and would all reach their half life (average fleet age over ½ of the design life) by 2010, and would be in the Army inventory until 2025. The Army can expect these fleets to provide the needed capability until a future system of vehicles is developed and acquired by investing in intensive rebuild and upgrade programs, enhancing life expectancy, and inserting technology. The main reasons for implementing RECAP were to increase readiness, decrease O&S costs as vehicles aged, and to modernize fleets to ensure our weapon systems remain capable of defeating any adversary.

In 2003, the average age of the Abrams tank fleet was over 14 years. These tanks have a design life of 20 years, with the expectation of operating slightly over 800 miles a year. In OIF, these tanks are driving in excess of 4,000 miles per year, often on hard surfaces, as opposed to cross country, for which they were designed. A recent RAND study detailed the effect of age on parts failure in equipment fleets. An analysis conducted in 2004 showed that the effective increase in aging of vehicles deployed to the theater for one year resulted in five years of wear and tear. The resulting stress on the vehicles decreases the remaining useful life. The AMC and PM Combat Systems have designed, through lessons learned, a National Level Reset program for units re-deploying in FY 2006 to ensure returning tanks are restored. The Army has implemented increases in RECAP programs to restore the useful life of the fleet, while countering the debilitating effects on the equipment that has already returned. The RECAP program provides additional Depot Level Maintenance and includes both RECAP Rebuild and RECAP Upgrades to equipment to reverse excessive wear due to the higher OPTEMPO and harsh environment in GWOT. Army's FY 2006 Supplemental RECAP requirements follow in Table 12.

**Table 12: FY2006 Supplemental RECAP Requirements – Army
As of 24 July 2006**

Recapitalization	FY 06 Requirement (\$M)
RECAP Rebuild	305.0
RECAP Upgrade	4,935.0
Total	\$5,240.0

Marine Corps:

USMC has conducted extensive rebuild on three mission critical systems to increase readiness, extend service life expectancy, and decrease maintenance costs. Specifically, the M1A1 Tank is repaired by the Army at Anniston Army Depot, thus receiving the same level of repair as Army assets. Moreover, USMC Tanks are being outfitted with a Firepower Enhancement System, which will increase the tank crew's ability to detect, recognize, and identify targets. The Amphibious Assault Vehicle (AAV) recently completed an intensive rebuild to upgrade the Reliability Availability and Maintainability/Rebuild to Standard (RAM/RS). Lastly the Light Armored Vehicle (LAV) is undergoing a Service Life Extension Program (SLEP) that, in conjunction with depot rebuild, will drastically improve performance and longevity. In addition, USMC rebuilds specified Principal End Items (PEI) as a matter of policy and based on the equipment's damage/degradation.

Active production lines to replace legacy aircraft lost in support of the Global War on Terror are in some cases no longer operational and so wherever possible the Marine Corps must transition to the planned replacement aircraft to maintain adequate inventory levels and near term operational availability. Thus, the Marine Corps is pursuing a Reset strategy for restoration of war reserve aircraft and, where available, accelerated upgrade of pre-production aircraft to the current baseline configuration in order to maintain required operating force inventories. For example, the Marine Corps will need to purchase additional MV-22s as the medium assault replacement for the CH-46 in order to offset combat losses and ensure that the transition schedule meets operational demand. The MV-22s identified to Reset the force will help sustain a stand-up schedule that positions the medium-lift force to meet operational timelines.

The CH-53E AMARC program identified 7 aircraft in war reserve storage that are capable of restoration. Three aircraft were fully funded for restoration via FY05 Supplemental (\$20.2M), 2 were fully funded via FY06 Supplemental (\$16.9M). The 2 remaining aircraft will cost \$25.9M to restore and funding will be requested in the FY 2007 Supplemental.

While the UH-1Y is a new build program, the AH-1Z is a remanufacture (REMAN) program. REMAN requires AH-1W aircraft to be removed from the operating force inventory for 2 years, which will cause temporary shortages of operationally available aircraft (17 aircraft below PAA by FY10). A limited AH-1Z new build program of 40 aircraft will mitigate the future AH-1 shortfall during an extremely low deployment turn-around ratio for the HMLA community.

Table 13 is a summary of FY 2006 Army and Marine Corps Reset costs.

Table 13: Summary of FY 2006 and 2007 Army and Marine Corps Reset Costs (\$M)

Core Reset	Sub-category	FY 2006	FY 2007	FY 2006	FY 2007	Total
		Army Funded	Army Requirement	Marine Corps	Marine Corps	
Repair	Field Maintenance	\$2,500	\$3,900	\$399 ^a	\$485 ^a	\$7,284 ^a
	Depot Maintenance	\$2,200	\$4,000	\$107	\$57	\$6,364
	Additional Depot Maintenance (due to excessive wear)	\$2,045	\$3,600	\$305	\$457	\$6,407
	Pre-Positioned Stocks	\$900	\$800	\$144	\$0	\$1,844
Replace	Combat Losses / Equipment Replacement ^b	\$934	\$4,800	\$4,495	\$3,566	\$13,795
Totals		\$8,579	\$17,100	\$5,051	\$4,080	\$34,810 ^a

^a USMC field maintenance estimates are a recurring Cost of War and not included in Marine Corps Resetting the Force estimates.

^b Includes only washout equipment replacement for USMC; Combat losses included in Cost of War estimates.

Note 1: Army data as of July 24, 2006.

Note 2: There may be some deviation in totals due to rounding.

LONGER-TERM ACTIONS

In accordance with generally accepted budgeting practices, emergency supplemental requests include funding only for immediate requirements resulting from contingency operations. Residual needs will be fulfilled through longer-term actions which fall into four general categories:

- Reset of the last units to rotate out of theater
- Repair and replacement of previously unexecuted requirements
- Reconstitution of prepositioned equipment sets
- Reset of theater provided equipment

Reset of Future Units

Ideally, supplemental funds will pay for current year operations in theater and Reset activities to repair damage incurred as a result of the previous year's contingency operations. For example, a unit enters theater in FY2006. FY2006 supplemental provides operations and maintenance funds to support the unit while engaged in combat operations. The unit's equipment accumulates damage during the FY2006 operations. Upon return in FY2007, the unit requires additional supplemental funds to repair the damage accumulated during the previous year's operations. Tables 13 and 14 show a summary of Army and Marine Corps Reset requirements from FY 2002 through FY 2009. Further, to maximize use of scarce resources and preclude peaks and valleys in depot operations, the Department constrains Reset funding.

Table 14: Summary of FY 2002-FY 2009 Army Reset Requirements (\$M)

(\$B)	Previous Execution				FY 06			Projected Requirements		
	FY 02	FY 03	FY 04	FY 05	FY 06 Requirement	FY 06 Funded	FY 06 Unfunded	FY 07 Requirement	FY 08 Requirement	FY 09 Requirement
Field Level	0.6	1.8	1.9	1.7	2.9	2.5	0.4	3.9	3.3	3.3
Depot Level	0.0	0.5	1.4	1.7	2.3	2.2	0.1	4.0	4.2	4.9
Army Pre-Positioned Stock	0.0	0.0	0.0	0.0	1.4	0.9	0.5	0.8	0.5	0.5
Ammunition Repair	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
RECAP Rebuild	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0		
RECAP Upgrade	0.0	0.0	0.0	1.7	4.9	2.0	2.9	3.6	3.3	3.0
Replacement*	0.0	0.0	0.0	1.5	1.5	0.9	0.6	4.8	1.7	1.8
Total	\$0.6	\$2.4	\$3.3	\$6.6	\$13.5	\$8.6	\$4.9	\$17.1	\$13.0	\$13.5

* For FYs 2007-2009, Army Replacement represents the sum of Battle Losses (\$2.1, \$1.2, and \$1.6 billion) and Reserve Component Equipment Replacement (\$2.7, \$0.5, and \$0.2 billion) respectively.

Note 1: Army data as of July 24, 2006.

Note 2: There may be some deviation in totals due to rounding.

Table 15: Summary of FY 2004-FY 2009 Marine Corps Reset Requirements (\$M)

Subcategory	Previous Execution		FY 06			Projected Requirements		
	FY 04	FY 05	FY 06 Requirement	FY 06 Funded	FY 06 Unfunded	FY 07 Requirement	FY 08 Requirement	FY 09 Requirement
Field Maintenance Repair	0.00	0.00	0.40	0.40	0.00	0.48	0.49	0.51
Depot Maintenance Repair	0.00	0.00	0.11	0.11	0.00	0.06	0.10	0.08
Additional Depot Maintenance Repair (due to excessive wear)	0.00	0.00	0.31	0.31	0.00	0.46	0.24	0.26
Combat Losses/ Equipment Replacement	0.00	0.00	5.97	4.64	1.33	3.57	0.51	0.34
Total	0.00	0.00	6.39	5.06	1.33	4.09	0.85	0.68

* USMC field maintenance estimates are a recurring Cost of War and not included in Marine Corps Resetting the Force estimates.

Note: There may be some deviation in totals due to rounding

Determining the funding level for reconstitution to be requested in an emergency supplemental is influenced by several factors that include: the estimated ramp-up and insertion capacity at repair facilities; the amount of equipment backlogged awaiting repair/replacement; the scope and complexity of the work to be undertaken; the amount of reconstitution work already financed with prior year and annual baseline funds; and most importantly, the equipment requirement manifested for the next force deployment rotation. Furthermore, when crafting a recapitalization plan, it is important to balance the need to recapitalize rapidly (to quickly repair/replace equipment), with the need to constrain the increase in industrial production capacity, to avoid creating more capacity than is sustainable in the long run, which would lead to disruptive reductions in excess capacity in a post reconstitution period.

Unexecuted Requirements

Determining the funding level for reconstitution to be requested in an emergency supplemental is influenced by several factors that include: the estimated ramp-up and insertion capacity at repair facilities; the amount of equipment backlogged awaiting repair/replacement; the scope and complexity of the work to be undertaken; the amount of reconstitution work already financed with prior year and annual baseline funds; and most importantly, the equipment requirement manifested for the next force deployment rotation. Furthermore, when crafting a recapitalization plan, it is important to balance the need to recapitalize rapidly (to quickly repair/replace equipment), with the need to constrain the increase in industrial production capacity in order to avoid creating more capacity than is sustainable in the long run, which would lead to disruptive reductions in excess capacity in a post reconstitution period.

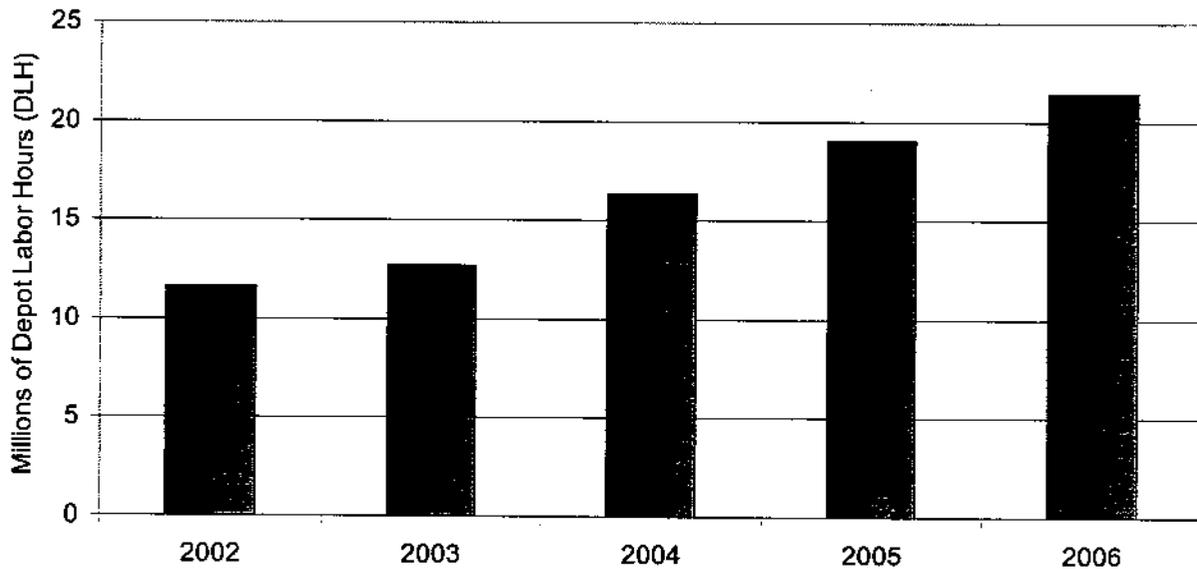
To balance recapitalization requirements and funding, the Department has crafted an equitable plan given known constraints. Working within these balances, it was possible to defer a portion (\$4.9 billion) of the reconstitution requirement.

Everything possible is done to quickly and efficiently Reset equipment returning from combat operations:

Equipment Availability: Some equipment is being used by units in the theater and will return to the home stations with these units in FY 2006. This equipment will go through the Reset process at that time. In addition, a large amount of equipment is being held in the theater as a rotational pool for deploying units and will remain there for the long term to support operations. The Army and Marine Corps are performing unit-level maintenance to keep this equipment operational. Once hostilities cease, the equipment will become available for assessment and Reset activities. Costs and timing are difficult to forecast at this time. Some equipment may be scrapped, some may be turned over to the Iraqi security forces (if authorized by law), and the rest will be returned home. Funds for maintenance of equipment returning in future years will be requested at the appropriate time.

Depot Capacity: OIF/OEF, recapitalization, and modularity have caused a surge in the depot-level workload above customary peacetime levels, and the organic depots have postured to meet this demand (see Table 15). The Army and Marine Corps have accommodated the increased workload requirements through the use of continuous process improvements, multiple shifts, hiring additional personnel and opening new lines. However, most of the primary lines of repair (Abrams, Bradleys, HMMWVs, etc.) remain on single-shift operations. Further workload increases are possible through additional ramping-up, public-private partnerships, and contracts with civilian firms. Depot capacity therefore is not expected to be a constraint on the execution of Army and Marine Corps maintenance requirements.

Table 15 Change in Army Depot Man-hour/Utilization in Response to OIF/OEF



Note: DLH = depot labor hours (planned FY 2006 DLHs).

Prepositioned Equipment

Army:

As provided in prewar planning, both the Army and Marine Corps drew upon pre-positioned equipment stocks to sustain initial combat operations in Iraq. Over time, and as operations permit, those stocks are being replenished.

The Army used equipment and/or stocks from all five of its prepositioned sets for operations in Afghanistan and Iraq. Portions of APS-2 (Europe) have been transferred to APS-3 (Afloat stocks). Reset cost is the expense of returning equipment and stocks to their condition prior to employment in combat. Reconfiguration cost is the expense of transforming sets to new organizational configurations.

Marine Corps:

Eleven Maritime Prepositioning Force (MPF) vessels from across all three Maritime Prepositioning Force Squadrons (MPSRON) were downloaded and utilized in theater during initial OIF operations. Upon conclusion of initial operations, the USMC immediately reconstituted two MPSRONs to meet threats and potential contingencies in other areas of the world. This reconstitution was conducted both in theater and using organic facilities in Jacksonville, Florida.

The Marine Corps deliberately Reset MPSRONs 1 and 3 and reached 98-100% attainment to both MPSRONs between 2003 and 2005. MPSRON 1 completed a full MPF Maintenance Cycle (MMC) July 2004 thru July 2005. MPSRON 2 reached 100% attainment of all classes of supply, save certain major end items, during its MMC July 2005 to July 2006. Certain major end item shortfalls are a result of OIF/OEF equipment requirements and availability from the manufacturer. All end item shortfalls will be Reset during the squadron's next MMC February 2008 to February 2009.

Equipment from MCPP-N was used in support of GWOT operations and to Reset other USMC shortfalls with higher operational priority. MCPP-N will be Reset as soon as practicable in consonance with USMC operational priorities.

THEATER PROVIDED EQUIPMENT (TPE)

Army Theater Provided Equipment

Army TPE consists of approximately 280,000 items of equipment that have been either: (1) purchased and remains in theater for issue to units as they rotate; (2) equipment which was originally deployed with units and left in theater for follow on forces after those units depart, or; (3) equipment from Army prepositioned stocks. This equipment is valued at over \$7B, consisting of over 27,000 wheeled vehicles valued at over \$3B, over 600 track vehicles valued in excess of \$250M, and communication, electronics, force protection, and support items valued over \$2.75B. The equipment in theater provided stocks consists mainly of items crucial for force protection, including vehicles that have had armor added to them, or that were purchased specifically with armor applied as well as command and control items. This equipment remains in theater and is only replaced when repairs must be made that cannot be accomplished in theater. As forces drawdown, this equipment will be repaired and returned to units to meet Army needs. Current estimates are that 15 percent of this equipment will require replacement, and that the remaining 85 percent will require depot-level repair. The Army will assess the feasibility of initiating programs for systems without depot programs versus replacement of items. This equipment will be vital to Army forces in the future and thus requires Reset. There are shortages in critical weapon systems key to maintaining future capability; therefore Resetting this equipment and putting it back into Army units is critical to preserving readiness.

In FY 2006, the Army commenced retrograding equipment needing repair or that is excess to theater needs. The cost for this in FY 2007 is estimated to be \$0.5B. This retrograde will continue, as allowed and required. Army TPE will become a more significant issue in the future. The length of the contingency is a determining factor, as longer use equates to increased wear and tear and higher repair and replacement costs.

The Army will continue to develop estimates as the equipment disposition is known and Reset decisions and strategies are developed in order to properly calculate Reset requirements. Funding for Reset of TPE is not requested until the retrograde is planned.

Marine Corps Theater Provided Equipment

GWOT operations have increased the requirement for Marine Corps equipment in several ways. First, GWOT operations require increased densities of certain equipment essential to the warfighter in theater. Marine Corps stay-behind equipment includes materiel procured to provide capabilities required for the successful prosecution of counterinsurgency and stability operations associated with the OIF and OEF missions. These capabilities are identified through the receipt of "Urgent Universal Need Statements" generated by the Operating Forces in the theater, as well as information obtained through directed data collection efforts conducted by the Marine Corps Center for Lessons Learned.

To date, the equipment procured to provide the additional required capabilities includes a wide range of items, across multiple warfighting functions, and sourced from existing Marine Corps assets and supplemental funding. Some examples:

- **Force Protection:** Within the Counter-IED construct of Prevent/Predict, Detect, Neutralize, and Mitigate, equipment procured includes the Biometric Automated Toolset, the Family of Imaging Systems (Backscatter Van and Rapiscan), Man Transportable Robotic Systems, Counter Radio Controlled IED Electronic Warfare (CREW), up-armored vehicles, and Enhanced Small Arms Protective Inserts.
- **Intelligence:** The adaptive, human-intensive counter-insurgency environment has generated the demand for a variety of specific tactical-level capabilities. These include Counterintelligence/Human Intelligence Equipment Program to enable "best practice" battlefield techniques developed by Commanders to address increasing requirements for CI/HUMINT operations, Tactical Concealed Video System to provide actionable intelligence for targeting and situational awareness, M22 BRITE to provide an encrypted, satellite communication system for use by deployed units in remote and austere locations, and the Communications Emitter Sensing and Attacking System to provide Marine Corps signal intelligence units a mobile platform with which to rapidly and cooperatively detect, disrupt, and deny threat communications.
- **Logistics:** The mission requirements of OIF and OEF require additional motor transport capabilities to ensure effective operations in the particular threat environment associated with the theater. These include new fire suppression systems, turret gunner restraint systems, vehicle intercom systems, a transparent armored gunner's shield, fuel fire protection, and systems to enable rapid debarkation for combat action. The environment also calls for additional engineering capabilities, to include bridge boat trailers, a mine roller system, ditch digging machines, a dust abatement system for landing zones, and additional generators for increased electrical power requirements. The Marine Corps has also procured additional medical capabilities for use in this environment, to include vehicle medical kits, hypothermia prevention systems (for helicopter transport of wounded), panel-mounted first aid kits for aircraft, upgrades to medical stores, and additional training for medical personnel and Marines.
- **Fire and Maneuver:** The Marine Corps has developed a Distributed Operations capability to provide significantly enhanced combat power to the infantry units that are directly engaged with enemy forces on a daily basis in the OIF and OEF environments. Materiel capabilities procured to provide this enhanced capability comprise a suite of equipment for the individual rifleman that includes improved targeting, firepower, and personal protection. Capabilities procured for small units will provide additional crew served weapons, vehicles for enhanced mobility, and enhanced command and control equipment.

Secondly, combat losses represent realized attrition experienced within Iraq, Afghanistan, and the Horn of Africa. Attrited equipment is replaced one-for-one with the most current capability available. For example, older variants of HMMWVs destroyed in Iraq will be replaced with the most current variants (M1114 or M1151/52).

Thirdly, after prepositioning assets, equipment from Marine Corps units in the United States was used to augment forces in theater. It is critical to replenish home station equipment for proper training and the maintenance of adequate readiness to engage in future conflicts. Based on Commandant of the Marine Corps established priorities, the Marine Corps will meet the most critical needs through distribution of new and repaired equipment. Ultimately, all equipment removed from home stations will be backfilled, requiring supplemental funding.

A critical component of the Marine Corps Reset plan is the planned rotation of Principle End Items (PEI) for maintenance in theater. Marine Forces Central Command and Marine Corps Logistics Command have developed a policy for theater PEI rotation. Rotation for 1,167 PEIs is currently being executed. Deadlined items are being shipped back for CONUS depot repair. The rotation's purpose is to mitigate the long term effects of stress on equipment from extended use in theater. It will serve to manage the high numbers in the anticipated surge by scheduling and executing depot maintenance early on selected PEIs.

APPENDIX 1: GLOSSARY

10/20 Standard (Army): The level of maintenance specified by the 10/20 level technical manuals. This standard requires that all routine maintenance be executed and all shortcomings and deficiencies, large and small, be repaired.

Accelerated Aging: The reduction in a piece of equipment's useful lifetime when it is used at high OPTEMPO and under extreme conditions. Studies are ongoing to determine the extent to which this is occurring. Recap and replacement by new procurement are methods used to reduce the fleet average age and compensate for accelerated aging.

Army Prepositioned Stocks (APS): Materiel organized into sets and placed at or near the point of planned use to reduce reaction time and to ensure timely support of a force during the initial phases of an operation.

Code A (Marine Corps): An equipment condition where there is a majority of useable life remaining on all major components. Equipment is in like-new condition, but not considered to have zero miles/zero hours.

Delayed Desert Damage (3D-Army): The additional maintenance actions performed on ground systems to mitigate the effects of operations in a desert environment. These actions, listed in TB 43-0221-1, are based on lessons learned from Operation Desert Storm.

Depot Maintenance: The highest level of maintenance activity, where the most complex maintenance work is done, from overhaul of components to complete rebuilds. Depots (government owned facilities) or contractors perform depot maintenance. These activities are funded with Operations and Maintenance appropriations. Depot maintenance is performed to sustain equipment throughout its life cycle.

Fully Mission Capable (FMC): An equipment condition where there are no critical maintenance deficiencies as outlined in the technical manuals and instructions, and no safety deficiencies (such as broken windshields or bald tires). For example, a truck with a minor shortcoming such as a small oil leak would be fully mission capable. A truck with a deficiency such as a hole in its oil pan would be non-mission capable or deadlined. Unit commanders have the authority to supersede the technical manuals and declare a system FMC even though it has a non-mission capable deficiency. The Marine Corps' equivalent term is "mission capable".

Inspect and Repair Only as Necessary (IROAN) (Marine Corps) – equipment is comprehensively inspected (bumper to bumper) and repaired, as required. Faulty components are replaced with new or rebuilt components. This process returns the item to Condition Code B. In some cases, IROAN identified damage/degradation may indicate that equipment qualifies for a complete rebuild.

Marine Corps Prepositioned Force Equipment (MPF): The Marine equivalent of the Army's APS, but with equipment located aboard ship. MPF is composed of 16 ships divided into three

Squadrons (MPSRONS). MPSRON-1 is located in the Mediterranean Sea, MPSRON-2 at Diego Garcia and MPSRON-3 at Guam. Each MPSRON has the equipment for a MAGTF of over 17,000 Marines and 30 days of sustainment. Each squadron has the added capability of providing an expeditionary airfield, a fleet hospital, and the equipment for a Seabee battalion. Each ship carries all classes of supply to include fuel and water.

The Modular Force (Modularity): The Army's initiative to restructure the operational force (active and reserve) into independent brigade combat teams, which are self-contained, rapidly deployable, and easily combined to form a combat force tailored for specific operations. Modularity changes the force from a division-centric to a brigade-centric force. This initiative also includes expanding the force by 10 brigades, with a future decision to expand by an additional five brigades. New procurement and recapitalization are used to fill shortfalls in equipment when creating these modular Brigades.

Non-mission Capable (NMC): Equipment temporarily deemed unfit to use because of maintenance or safety deficiencies. Also known as deadlined.

Principle End Item (PEI) Rotation (Marine Corps) – plan intended to rotate (replace) degraded/deadlined/destroyed equipment in theater with new or completely serviceable equipment. Replaced PEIs are then inducted to maintenance depot for IROAN.

Recapitalization (RECAP-Army): The complete rebuild of currently fielded systems to a like-new condition. The objectives of the RECAP process include: extending service life, reducing operating and support costs, enhancing capability, and improving system reliability, maintainability, safety, and efficiency. RECAP can be further subdivided into REBUILD (Overhaul, Age = "0"), funded with Operations and Maintenance appropriations, and UPGRADE (Overhaul, Age = "0", and increased capability) funded with procurement appropriations.

Rebuild (Marine Corps) – complete break-down (stripping) and rebuild to like-new condition.

Recapitalization (RECAP-Marine Corps) – Complete replacement of an item through new procurement.

Recovery (Marine Corps): Maintenance conducted to restore all equipment that participated in GWOT to its pre GWOT condition. For MPF equipment, the recovery process returns equipment to condition Code A -- a like new, but not zero age state. All other equipment is restored to "mission capable" status. This is the Marine Corps' equivalent to the Army's Reset process.

Repair: To restore to sound condition after damage or injury.

Reset (Army): A series of actions to restore units to a desired level of combat capability after returning from contingency operations. For equipment, these actions consist of cleaning, inspecting, and repairing, as well as replacing battle losses, wash outs and obsolete systems. Work is conducted in accordance with applicable Army maintenance standards (10/20 or 3D

(delayed desert damage)), and aviation Special Technical Inspection and Repair Standards (STIR)). The Marine Corps equivalent term is recovery.

Reset (Marine Corps) – those actions needed to restore the Operating Force combat capability commensurate to a pre-GWOT level. To ensure the stabilization of operations in theater, USMC made an institutional decision to rotate unit personnel, but leave equipment in place, rotating selected PEIs based on operational and combat attrition requirements. Reset is accomplished by a mix of repair (field and depot level) and replacement of equipment based on best economic analysis.

Special Technical Inspection and Repair (STIR-Army): Additional maintenance actions performed on aviation systems to mitigate the effects of operations in a desert environment.

Stay Behind Equipment – equipment designated to remain in theater for use by follow-on Marine Corps forces.

Stress on Equipment: A general term for damage or wear resulting from sustained use of equipment at levels significantly above normal peacetime rates or routine use outside of the equipment's normal operating parameters (e.g., heavier loads from added armor, harsh desert environment). The equivalent Marine Corps term is **Demand on Equipment**.

Sustainment Technical Assistance Team (STAT- Marine Corps' Aviation): A contractor field team (CFT) deployed to the combat theater that performs in-depth cleaning and inspection of aircraft, as well as organization and intermediate level maintenance. The intent of this effort is to keep the aircraft in optimal material condition and to maintain aircraft availability until the next scheduled depot-level event.

Theater Provided Equipment (TPE) (Marine Corps Definition) – equipment provided to Marine Corps in theater, primarily by the U.S. Army. USMC has no doctrinal equivalent to TPE. TPE is not formally loaded to Marine Corps records, but is accounted for manually in theater.

Unit Level Maintenance: Maintenance performed by operational units in motor pools, by specialized maintenance support units, and by DoD civilians and contractors at installation maintenance facilities. Tasks include cleaning, lubricating, adjusting, inspecting, diagnosing, and removing/replacing parts and components. These maintenance activities include both organizational and intermediate maintenance levels.

Washout: Equipment that is not economical to repair, as defined by a Maintenance Expenditure Limit, and is removed from the inventory. The Army publishes *Maintenance Expenditure Limits* (MEL) for each type of equipment in their technical bulletins. The USMC sets a flat MEL at 65 percent of new procurement costs for all equipment.