DoD Maintenance Policy, Programs and Resources

FACT BOOK

2004

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OFFICE OF THE DEPUTY UNDER SECRETARY OF DEFENSE
(LOGISTICS AND MATERIEL READINESS)
3500 DEFENSE PENTAGON
WASHINGTON DC 20301-3500

ACQUISITION, TECHNOLOGY
AND LOGISTICS

Defense maintenance is big business, costing more than $59 billion annually and involving more than 680,000 military and civilian maintainers who—along with several thousand commercial firms—support approximately 300 ships, 15,000 aircraft, 900 strategic missiles, and 330,000 ground combat and tactical vehicles.

The *DoD Maintenance Fact Book* contains a broad range of information about DoD maintenance capabilities and programs that span major depots and shipyards as well as intermediate and organizational-level units throughout the world.

Also included are the winners of the 2003 and 2004 DoD maintenance awards and a recap of some of the Department's key technology and management initiatives.

David V. Pauling
Assistant Deputy Under Secretary of Defense
(Maintenance Policy, Programs and Resources)

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OSD Logistics Organization

Under Secretary of Defense
(Acquisition, Technology,
and Logistics)

Director
Defense Logistics
Agency (DLA)

Deputy Under Secretary
of Defense (Logistics and
Materiel Readiness)

ADUSD,
Transportation
Policy (TP)

ADUSD,
Supply Chain
Integration (SCI)

**ADUSD,
Maintenance Policy,
Programs & Resources
(MPP&R)**

David V. Pauling

ADUSD,
Logistics Plans
and Programs (LP&P)

ADUSD,
Logistics Systems
Management (LSM)

Mission Statement

ADUSD(MPP&R):

- Provides the functional expertise for centralized maintenance policy and management oversight for all weapon systems and military equipment, maintenance programs, and related resources within the Department of Defense. In this regard, the goals of the Office are to establish and maintain maintenance policies and programs that are managerially and technologically sound and adequately resourced to maintain the desired levels of weapon systems and military equipment readiness to accomplish the Department's missions.

- Is the principal advisor for policies and procedures for materiel readiness and sustainment support of major weapon systems and combat support equipment. The Office integrates the materiel readiness aspects of all logistics functions: Supply Chain Integration, Transportation Policy, Logistics Plans and Programs, and Logistics Systems Management (as well as Maintenance). Key goals include influencing resource allocation decisions, enhancing materiel readiness policies and procedures, providing materiel readiness oversight (by leveraging Service and DLA efforts), and initiating focused studies.

Major Initiatives
of ADUSD(MPP&R)
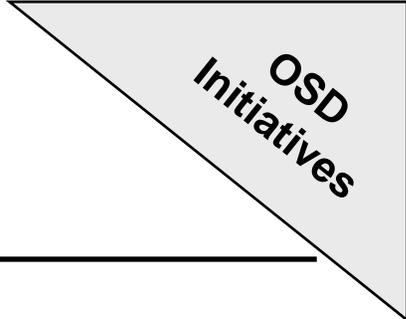
- Commercial Technology for Maintenance Activities (CTMA)

- Condition-Based Maintenance Plus (CBM+)

- Lean Maintenance

- Public-Private Partnering (PPP)

- Unique Identification (UID)

Detailed information on DoD initiatives is available at
www.acq.osd.mil/log/mppr
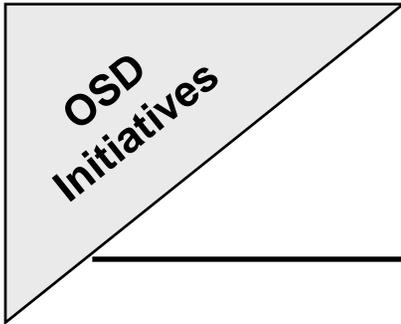
Commercial Technology for Maintenance Activities

- Description—A cooperative agreement between the National Center for Manufacturing Sciences (NCMS) and ADUSD(MPP&R) to co-sponsor technology development, deployment, and validation with DoD field and organic depot maintenance activities in partnership with NCMS member companies

- Goals
  - Transfer contemporary commercial technologies and practices to DoD maintenance activities via NCMS member companies
  - Assess the benefits of new manufacturing and repair technologies in DoD facilities by partnering with NCMS members and working with industry leaders to solve manufacturing problems through collaboration

- Key Features
  - Program identifies, develops, and funds specific projects that employ commercial technologies and best business practices to reduce costs, decrease cycle times, and improve readiness
  - DoD provides only 1/3 of the costs for CTMA projects; the remaining 2/3 is provided by DoD's industrial partners
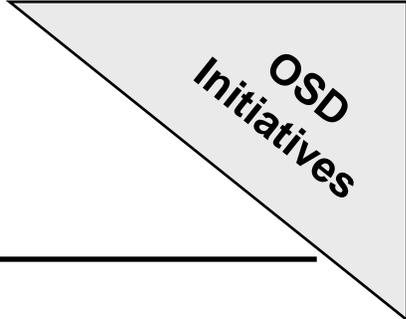
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Condition-Based Maintenance Plus

- Description—An effort to improve maintenance effectiveness and efficiency through application of technology initiatives and process improvements

- Goals
    - Optimally schedule preventive maintenance
    - Identify opportunities for predictive maintenance
    - Eliminate/minimize unplanned corrective maintenance activity

- Key Features
    - Uses interactive electronic technical manuals, portable maintenance aids, and other enabling tools and technologies
    - Implements diagnostics, sensors, and prognostic algorithms and techniques
    - Employs reliability-centered maintenance concepts and practices
    - Enables statistical and engineering analysis processes
    - Develops condition-driven maintenance plans
    - Integrates maintenance and logistics processes and reporting systems
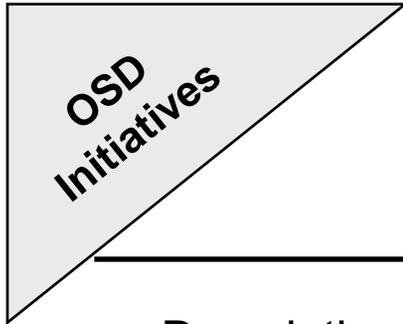
Lean Maintenance

- Description—Continuous process improvement to maximize weapon system readiness while minimizing materiel flows and in-process inventories

- Goal—Optimize reliability and cycle time while striking a reasonable balance with costs across the total life cycle value chain

- Key Features
  - Employs
    - *Lean* for eliminating all types of waste
    - *Six Sigma* (6σ) for minimizing process variation
    - *Theory of Constraints* (TOC) for alleviating process "bottlenecks"
  - Focuses on
    - strong involved leadership committing significant time and resources
    - workforce buy-in
    - education and training for all value chain participants
    - clear outcome-focused metrics that are measurable and provable
    - ambitious and continuous improvement goals across the entire value chain

Unique Identification
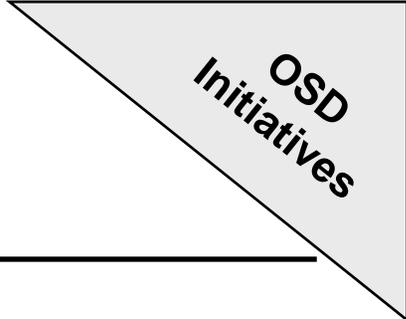
- Description—An effort to establish globally-unique and unambiguous parts identifiers
- Goals
  - Use data elements to track DoD parts
  - Ensure data integrity and quality throughout the item's life cycle
  - Support multifaceted business applications and users
  - Facilitate Serialized Item Management (SIM) per DODD 4151.18
- Key Features
  - Data integration across DoD, government, and industry systems as envisioned by the DoD Business Enterprise Architecture
  - Improved item management and accountability
  - Improved asset visibility and life-cycle management
  - Clean audit opinions on the property, plant, and equipment and operating materials and supplies portions of DoD financial statements

Depot Maintenance
Public-Private Partnering

- Description—A logistics sustainment philosophy involving cooperative partnership agreements that can include
  - program and/or system support managers
  - original equipment manufacturers and/or other private sector firms
  - service maintenance depots
- Goals
  - Make product support more responsive
  - Increase facility utilization
  - Improve depot processes and technology
  - Reduce cost of ownership
- Key Features
  - Uses public sector facilities, equipment, and employees to perform work for commercial industry
  - Establishes partnering agreements that integrate public and private sector facilities and employees

Growth Trend in
Public-Private Partnerships
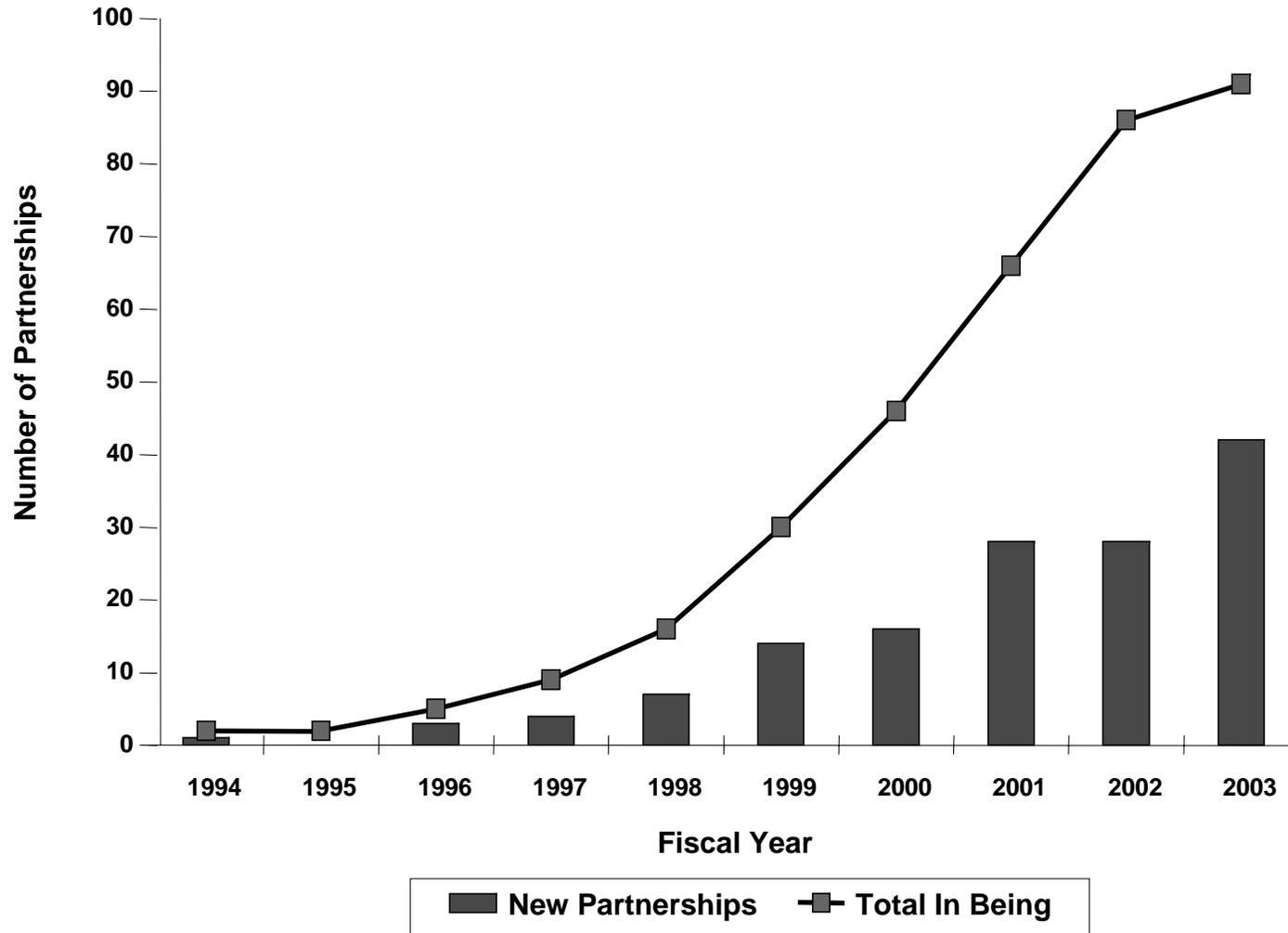
Source: DoD reports, *Public-Private Partnerships for Depot Maintenance*, July 2003 and July 2004

The Result:
Maintenance Transformation

Embedded Sensors

Integrated Data Bus

Maintenance

On-Board Diagnostics & Prognostics

Sense & Respond Logistics

Tech Support

Anticipatory Materiel

Data Transfer

Interactive Training

Maintenance

Reduced Footprints

Integrated Logistics Information

IETMs

Predictive Maintenance

RCM & Data Analysis

Portable Maintenance Aids

Production Control

Preventive Maintenance

Condition Monitoring & Reliability Analysis

UID Registry

Maintenance History Configuration Control

Battlespace Network

Linked to Warfighters

- Real-time status of equipment materiel condition
- Integrated supply/maintenance to enhance system readiness
- Asset visibility through item tracking initiatives

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Systems Supported
by DoD Maintenance

30,000
Combat Vehicles

~900 Strategic Missiles

~300 Ships

~15,000 Aircraft/Helicopters

+ 300,000 Tactical Vehicles
+ Communications/Electronics Equipment
+ Support Equipment
+ ...

National Defense PP&E is valued at ~$700 billion
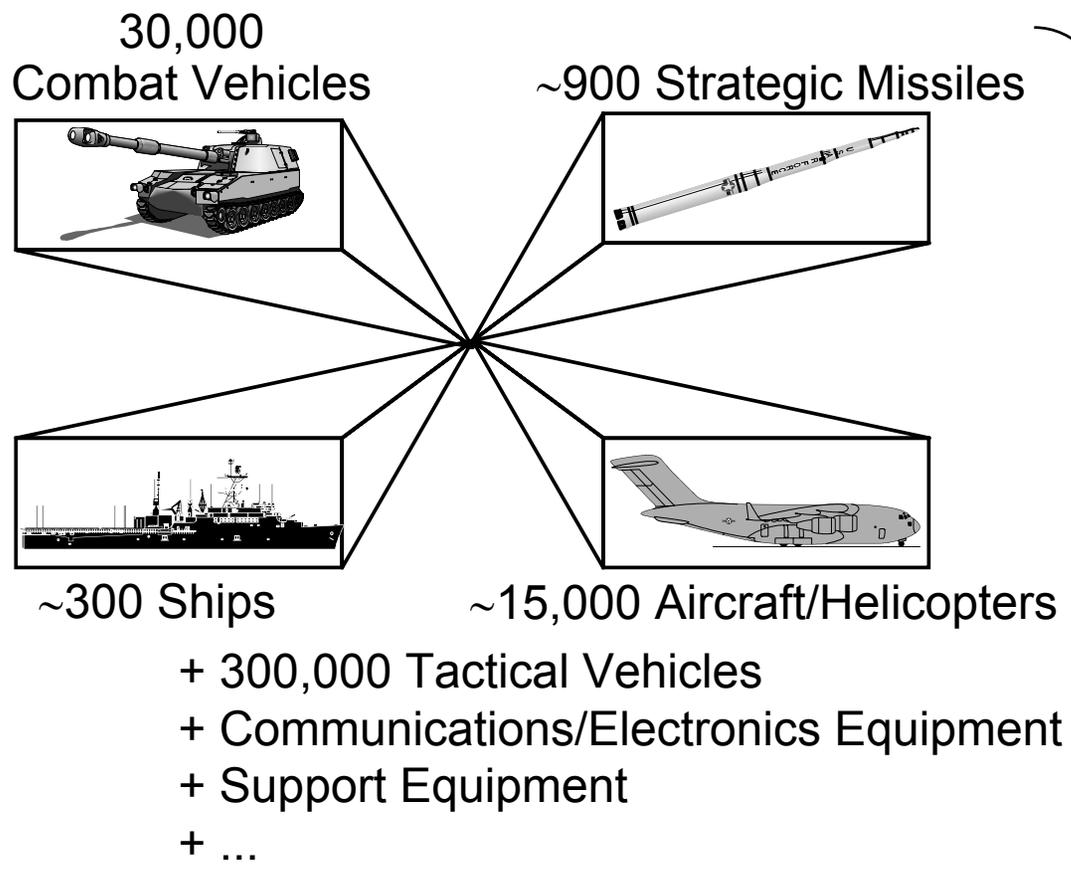
Maintained by:
- *681,000 DoD personnel*
- *Private sector companies*

Maintenance cost:
~$59 billion per year

Source: LMI analysis of DoD data

Scope
of DoD Maintenance

681,000 Maintainers

3 Million DoD Personnel

~$59 Billion

$433 Billion DoD Budget
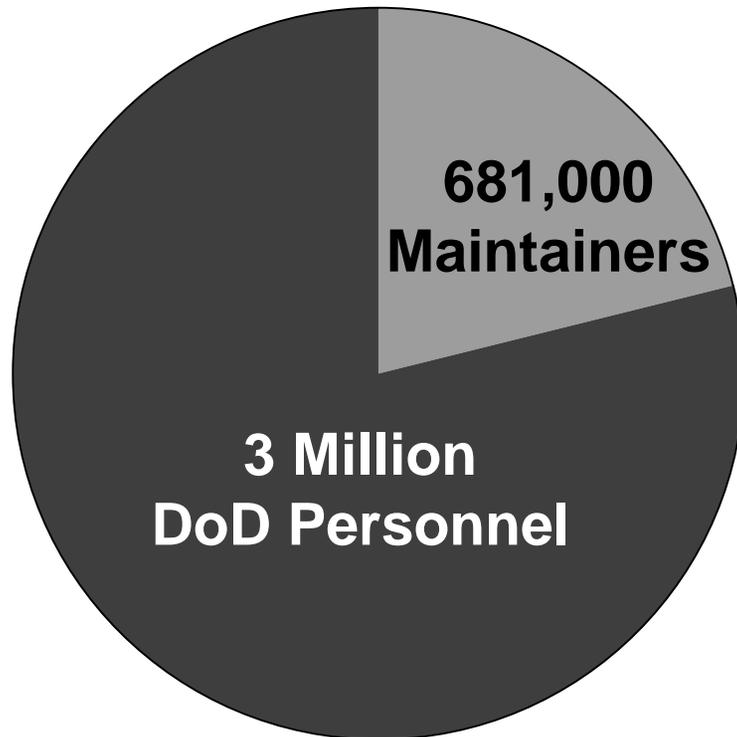
23% of DoD personnel are maintainers
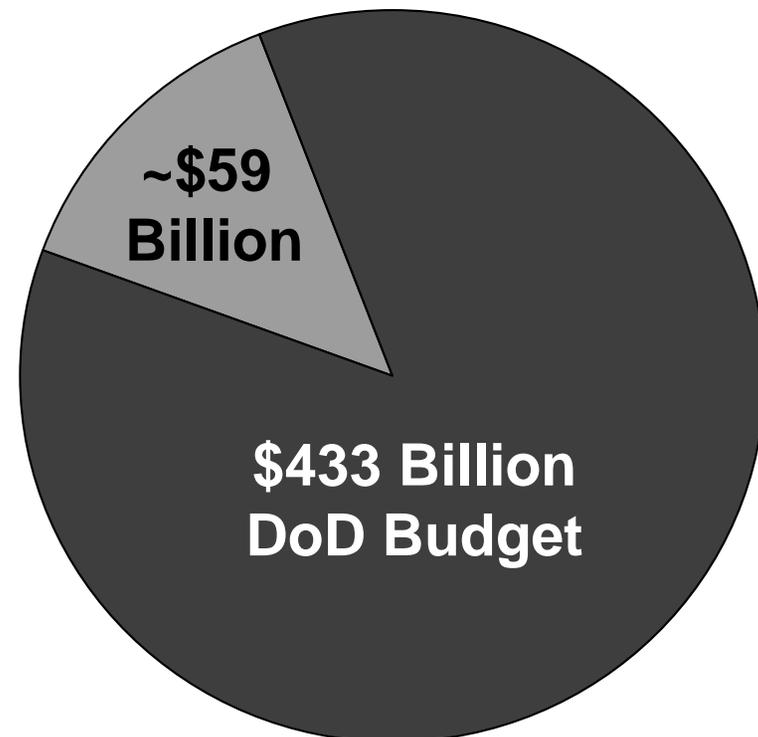
14% of DoD funding is spent on maintenance

Sources: LMI analysis of Defense Manpower Data Center data and FY2005–FY2009 President's Budget

Levels
of DoD Maintenance

Organizational   **Intermediate**   **Regional   Depot**

Increasing *volume* of maintenance

**More frequent tasks that require
less facilitization/skills**

**Less frequent tasks that require
more facilitization/skills**

Increasing *complexity* of maintenance

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Major Intermediate-Level Activities

- Army
    - 21 aviation intermediate maintenance (AVIM) companies
    - 70+ direct support/general support (DS/GS) companies
- Navy
    - 15 shore-based aircraft intermediate maintenance detachments (AIMDs)
    - 23 shipboard AIMDs
    - 7 ship/submarine intermediate maintenance facilities (IMFs)
- Air Force
    - 65 aircraft maintenance groups (MXGs)
- Marine Corps
    - 11 Marine aviation logistics squadrons (MALS)
    - 3 maintenance battalions

Data on this chart does not include National Guard and Reserve intermediate maintenance activities

Source: LMI analysis of service maintenance infrastructure data

Personnel Strength
## of Field- and Depot-Level Maintenance
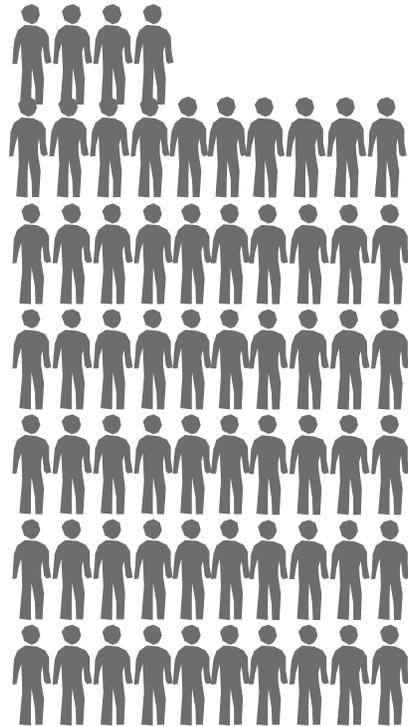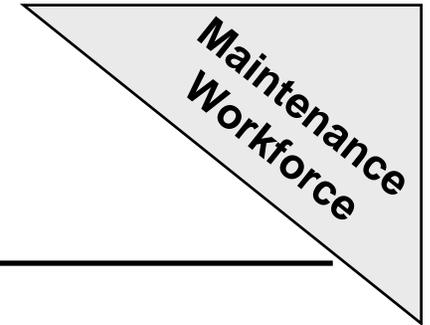
**~640,000 field-level
maintainers**

**~70,000 depot-level
personnel**

Source: LMI analysis of Defense Manpower Data Center
and Joint Depot Maintenance Activity Group data

Maintenance Personnel
Worldwide

Maintenance Workforce

Alaska 7K

CONUS 497K

Hawaii 15K

Puerto Rico Virgin Islands 4K

Central/ So. America <1K

Atlantic Fleet 47K

UK 9K

Germany 16K

Italy/Spain 5K

Other Europe 9K

Middle East Africa 1K

Japan 20K

Korea 11K

Other Asia 2K

Pacific Fleet 38K

Locations reflect home stations of units/personnel

Source: LMI analysis of Defense Manpower Data Center data

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Maintenance Personnel
by State/Territory

Alaska

523,000
Maintenance Personnel
In U.S. and Territories

■	50,000+
▨	20,000 to 50,000
▨	10,000 to <20,000
□	<10,000

Hawaii

Guam

Puerto Rico
and the
Virgin Islands

Source: LMI analysis of Defense
Manpower Data Center data

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DoD Maintainers
by Military Service

Air Force 30%

Marine Corps 7%

Navy 29%

Army 33%
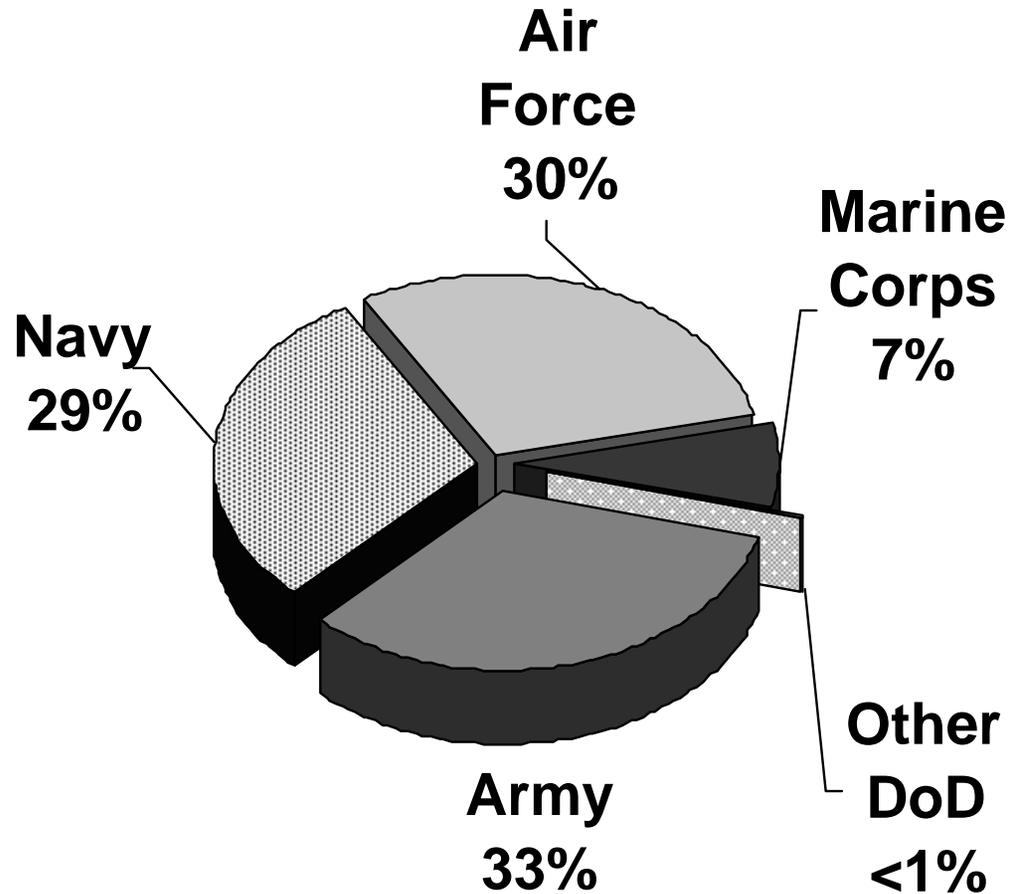
Other DoD <1%

Army	226,000
Navy	200,000
Air Force	202,000
Marine Corps	51,000
Other DoD	2,000
Total DoD Maintainers	681,000

Source: LMI analysis of Defense Manpower Data Center data

DoD Maintainers
by Personnel Category
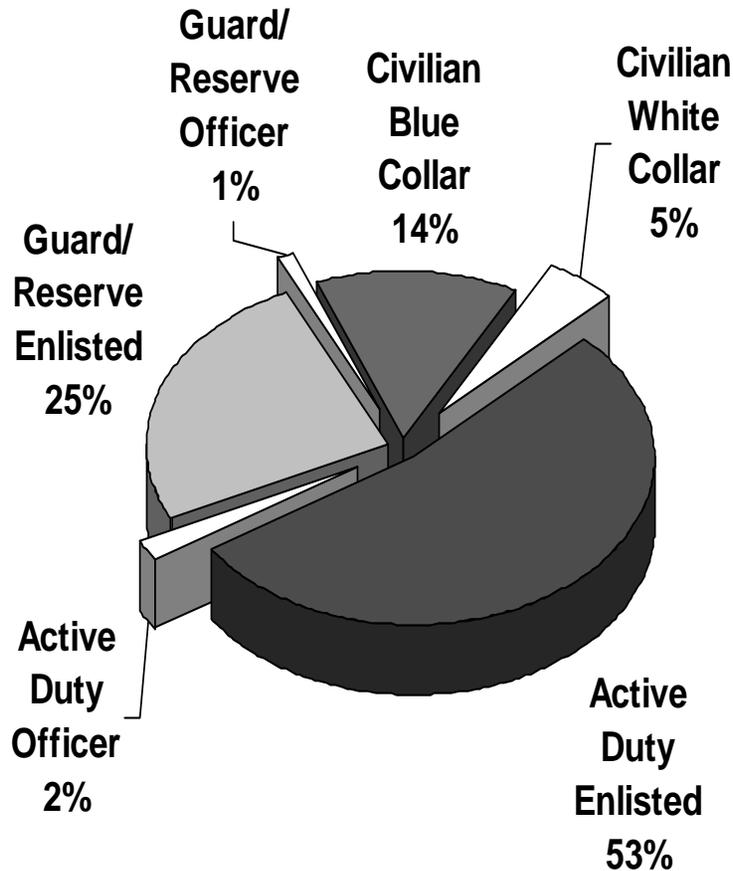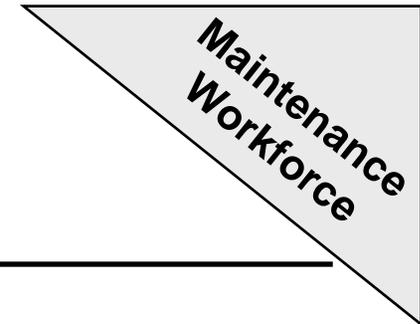
|	
Active Duty Enlisted	364,000
Active Duty Officer	13,000
Selected Reserve Enlisted	172,000
Selected Reserve Officer	7,000
Civilian Blue Collar	93,000
Civilian White Collar	32,000
Total DoD Maintainers	681,000

Source: LMI analysis of Defense Manpower Data Center data

Active Duty
Maintainers

69% **Commissioned Officer**

31% **Warrant Officer**

Officer

13,000

Enlisted
364,000

64% **Mechanical/Electrical**

27% **Electronic**

5% **Craftsworkers**

4% **Other**
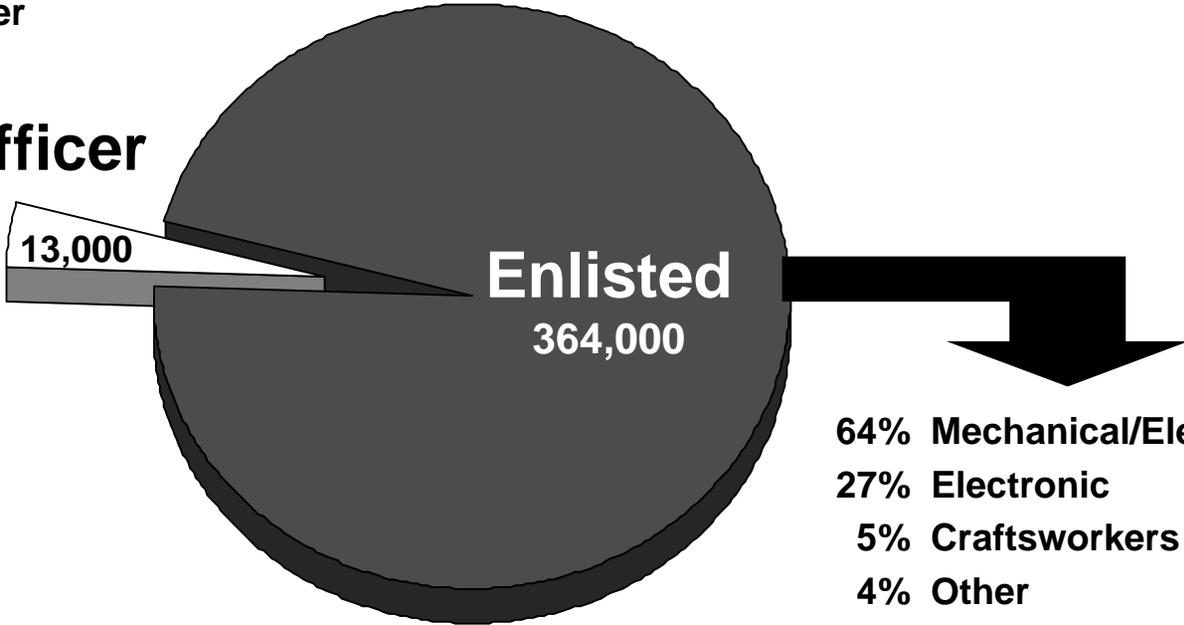
Source: LMI analysis of Defense Manpower Data Center data

National Guard & Reserve
Maintainers

63% Commissioned Officer

37% Warrant Officer

Officer

7,000

Enlisted
172,000

71% Mechanical/Electrical

19% Electronic

7% Craftsworkers
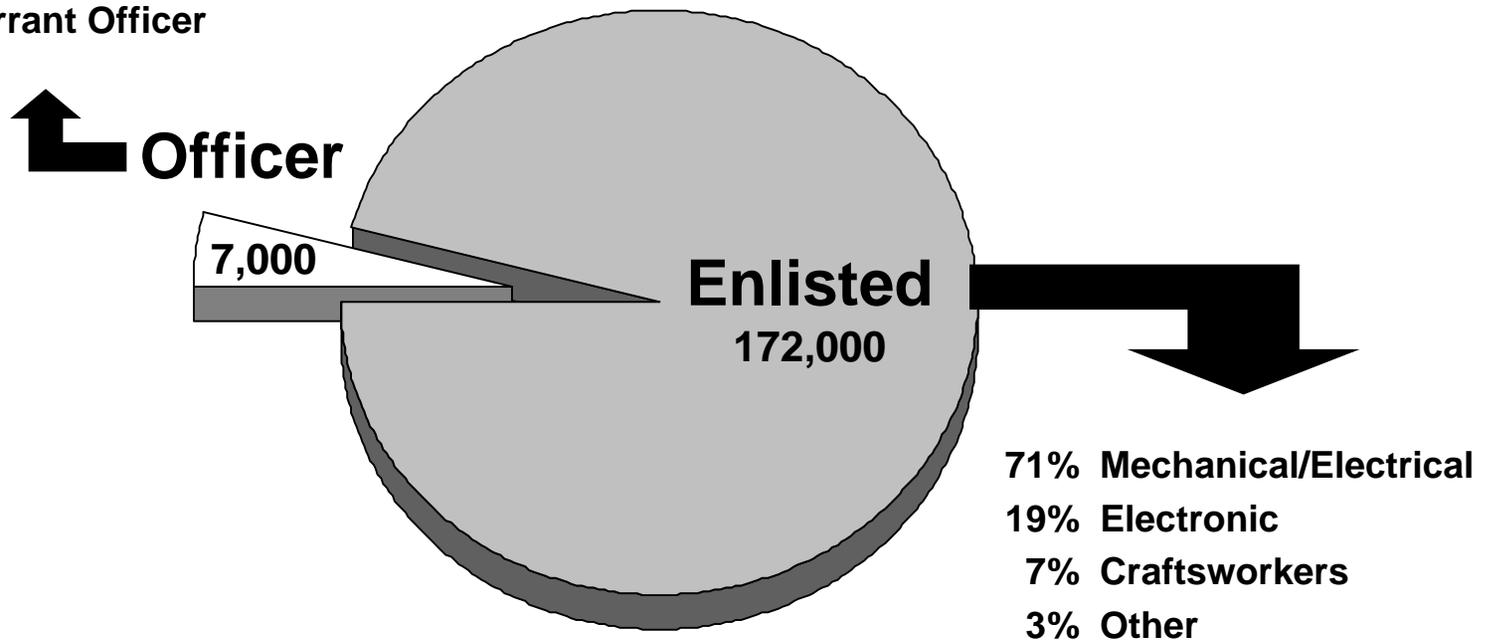
3% Other

Source: LMI analysis of Defense Manpower Data Center data

DoD Civilian
Maintainers

32% **Electrical & Electronic**

19% **Production Management**

10% **Communications & Radar**

11% **Aviation Maintenance**

28% **Other**

White Collar 32,000

Blue Collar 93,000

59% **Mechanical/ Electrical**

23% **Craftsworkers**

14% **Electronic**

4% **Other**
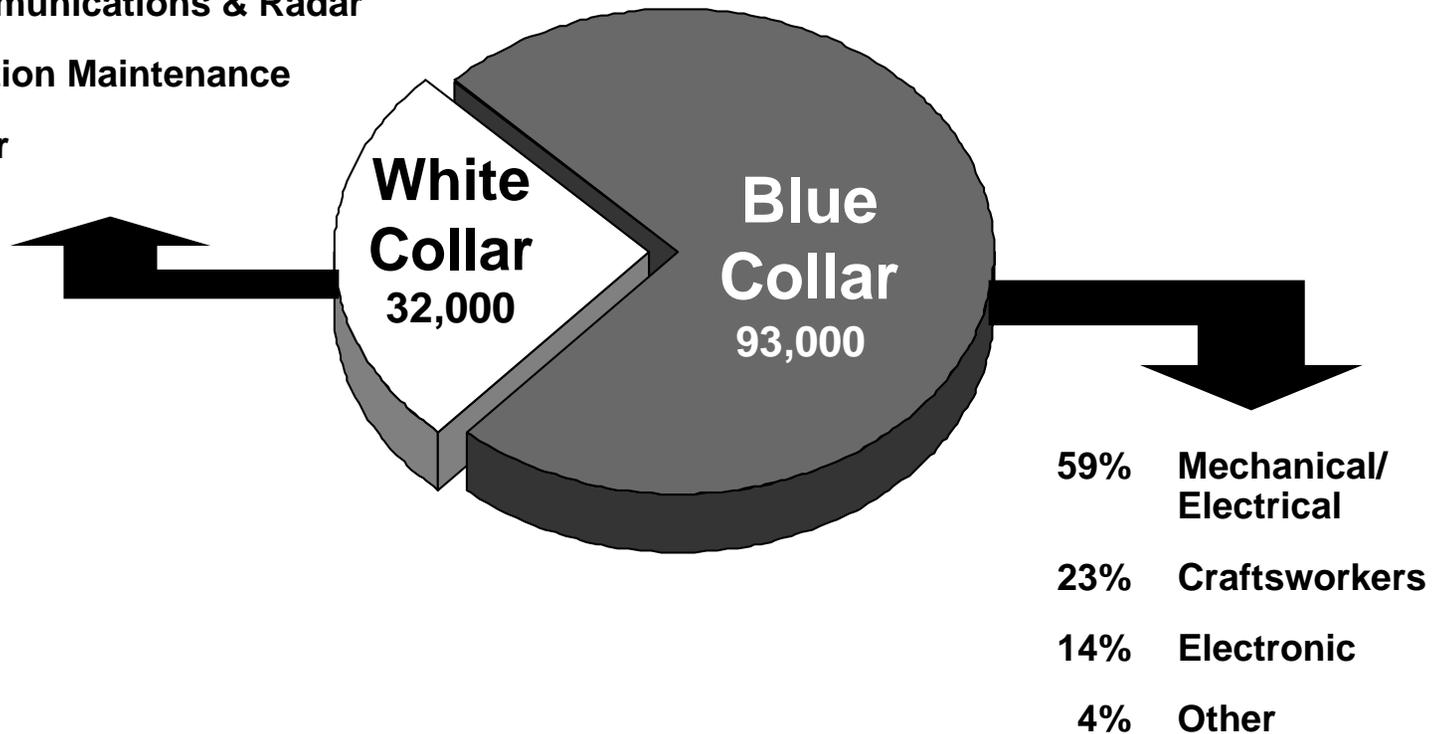
Source: LMI analysis of Defense Manpower Data Center data

Major Depot-Level Activities
by Location

NUWC Keyport
Puget Sound NSY & IMF

Portsmouth NSY

Tobyhanna AD
Letterkenny AD

Ogden ALC

NSWC Crane

Norfolk NSY

MC Barstow

Oklahoma City ALC

NAVAIR North Island

NAVAIR Cherry Point

AMARC

Anniston AD

Red River AD

Warner Robins ALC

MC Albany

NAVAIR Jacksonville

Pearl Harbor
NSY & IMF

Corpus Christi AD
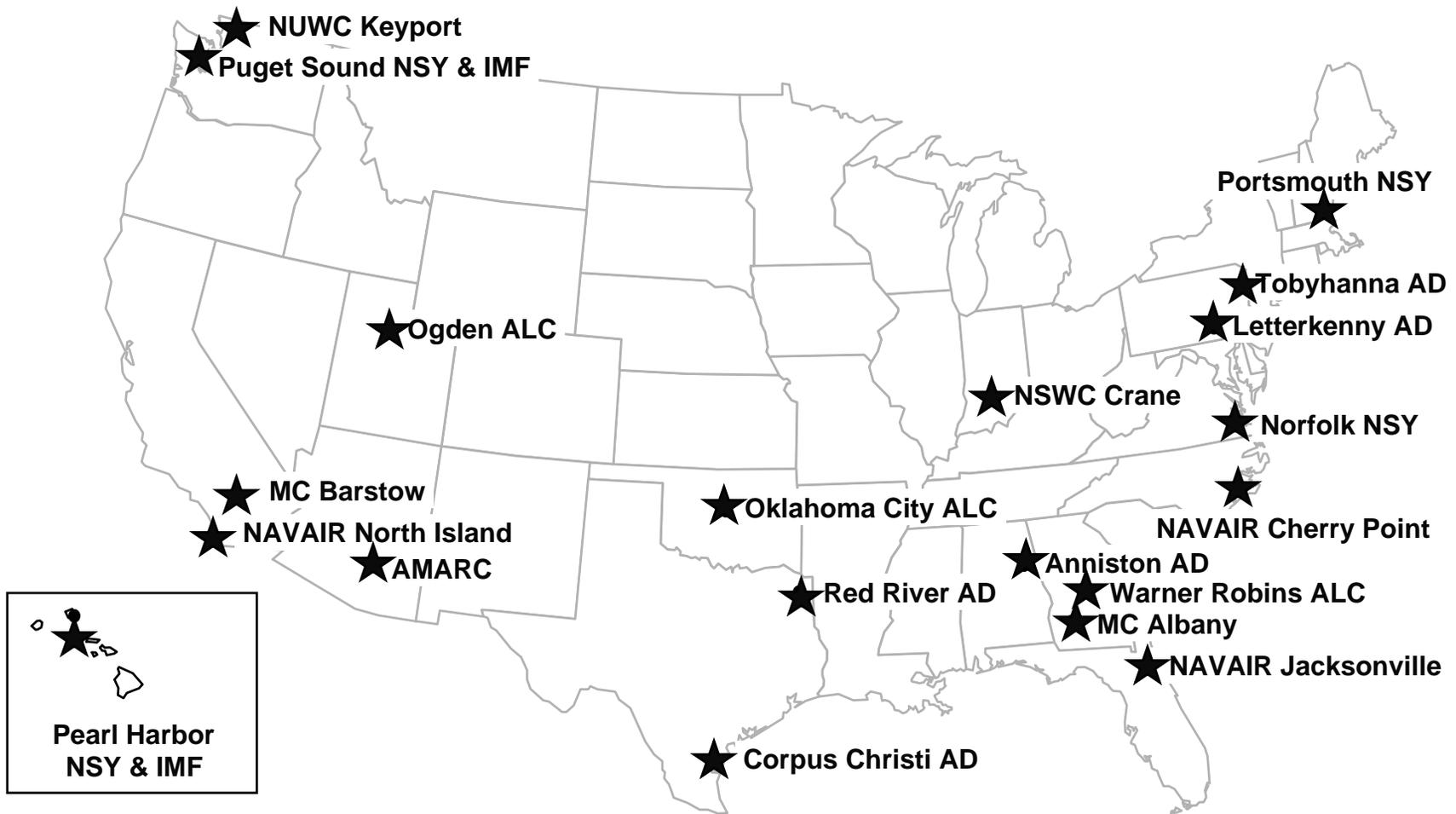
Major depot-level activities comprise depots and shipyards that employ 400 or more personnel

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Organic-Commercial Mix
of DoD Depot Maintenance Workload

Depot Maintenance

DoD-wide: 54% Organic; 46% Commercial
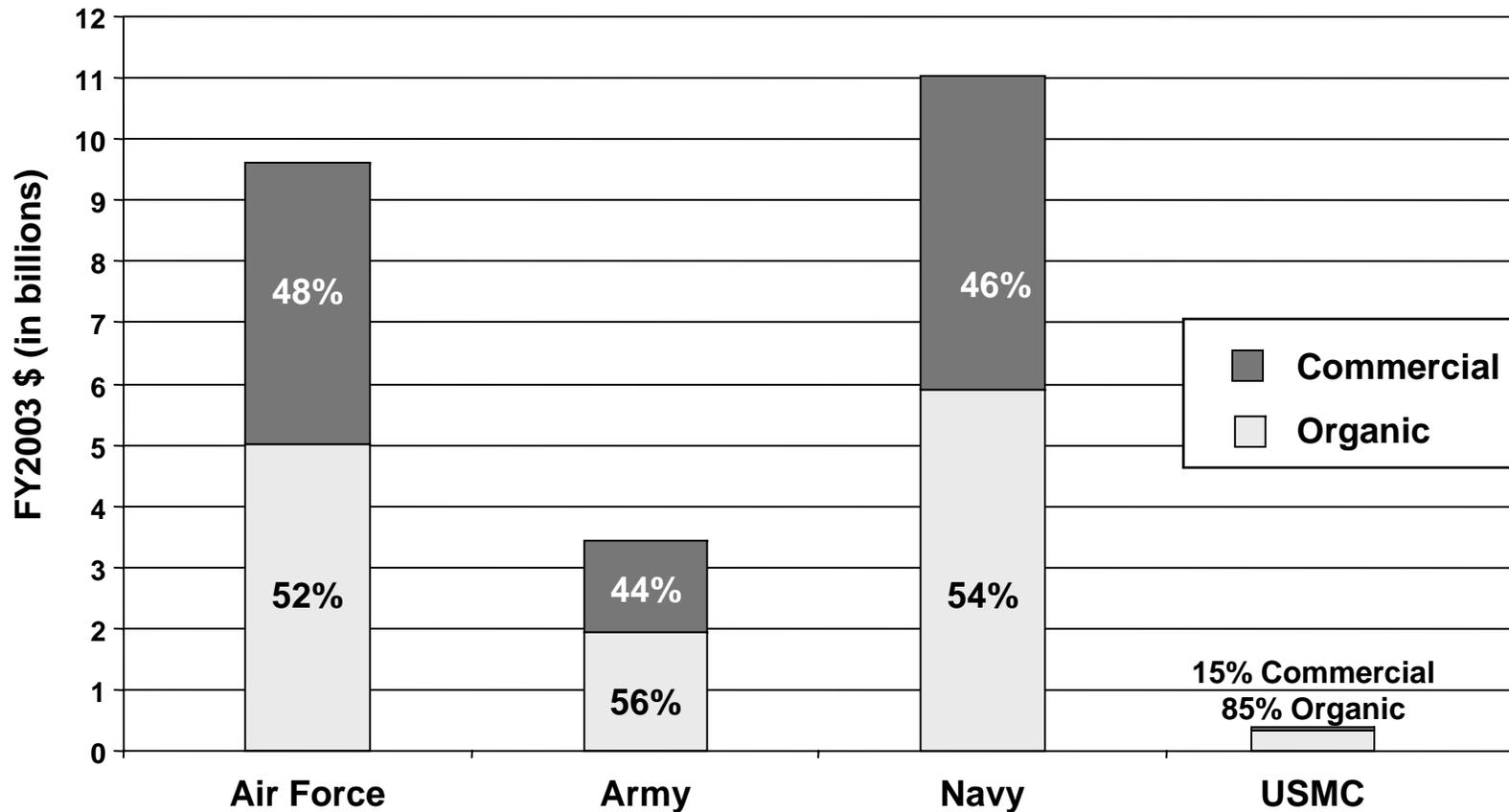
Source: USD(AT&L) *Distribution of DoD Depot Maintenance Workloads: FY2002 and FY2003,* February 2004

Workload Cost
by Major System Category

Depot Maintenance Performed by DoD Organic Depots

All Other
13%

Aircraft
48%

Ground
Systems
10%

Sea Systems
29%
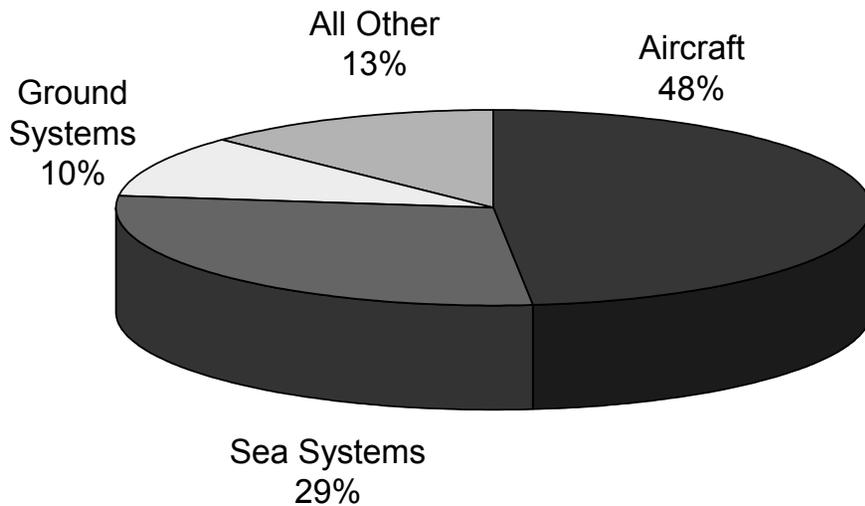
Depot Maintenance Performed by Defense Contractors
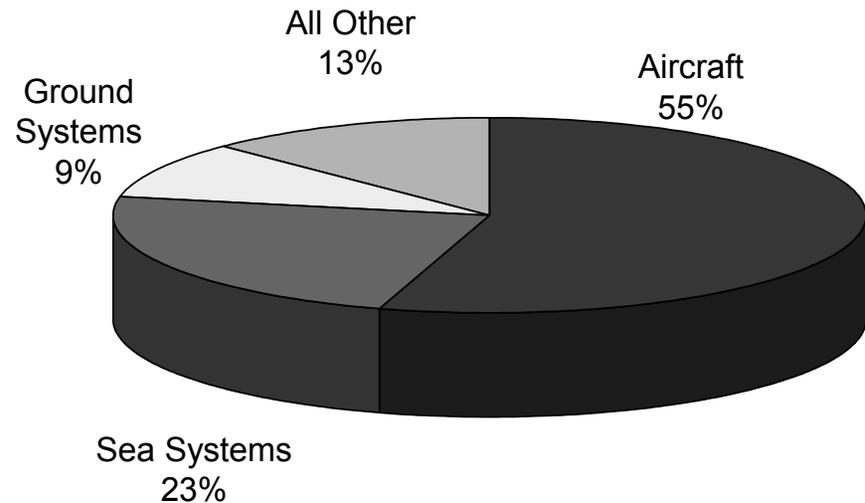
All Other
13%

Aircraft
55%

Ground
Systems
9%

Sea Systems
23%

Source: The Joint Group on Depot Maintenance, *Business Profile: FY2003–FY2009*, February 2004

Capacity Utilization
of Organic Depot Maintenance

Overall Organic Depot Capacity Utilization: ~90%
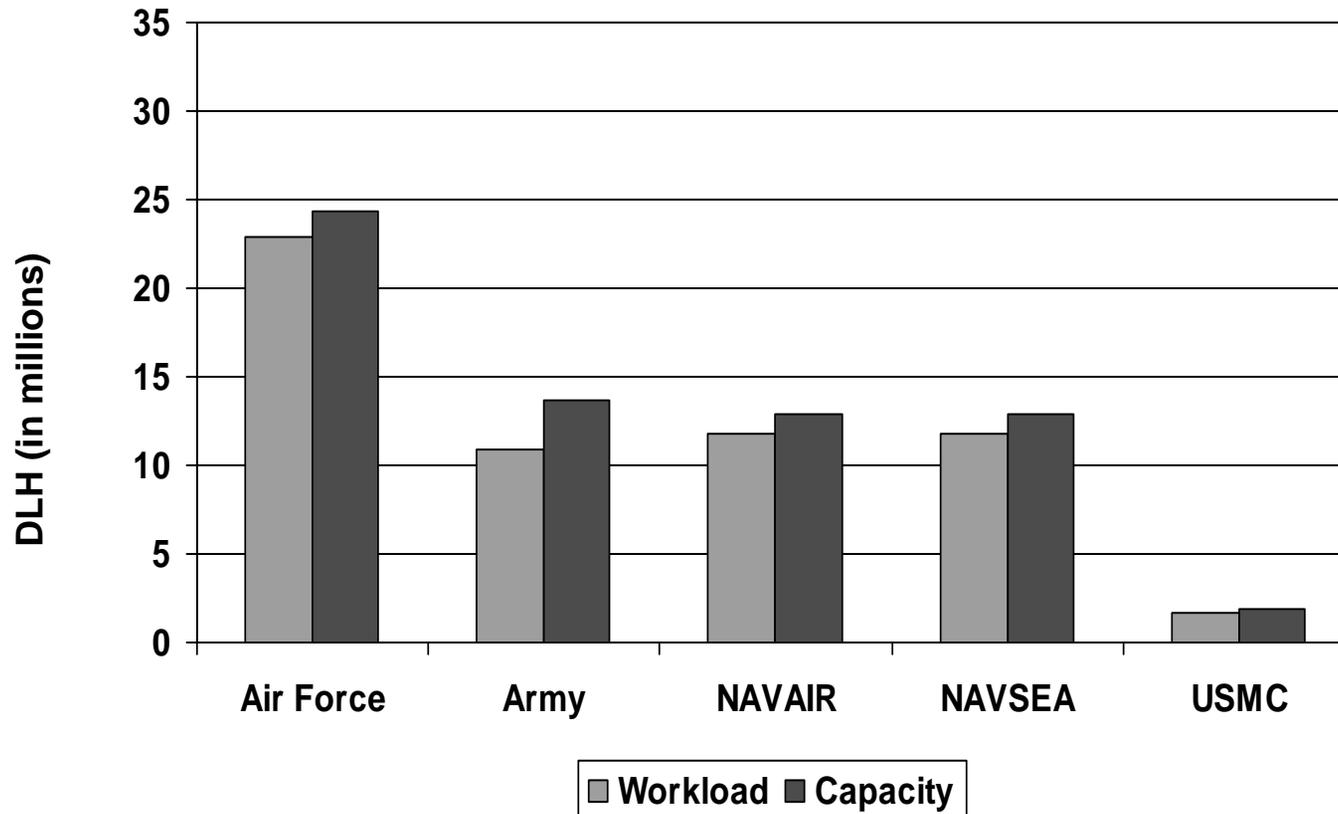
Source: The Joint Group on Depot Maintenance, *Business Profile: FY2003–FY2009*, February 2004

2003 Phoenix Award Winner
The Highest Secretary of Defense Award for
Field-Level Maintenance
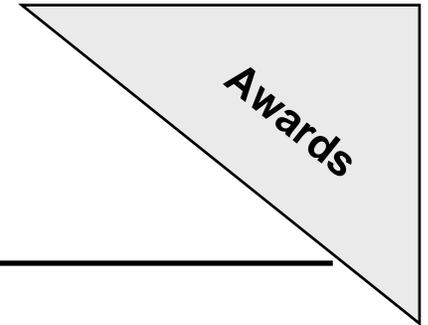
**3-7th Infantry Battalion,
3rd Infantry Division (Mechanized)
Fort Stewart, GA**
"Cottonbalers"

- Deployed for Kosovo Force Operations with 54 pieces of assigned equipment and drew 512 additional pieces of rolling stock

- Maintained an exceptionally high readiness rate of 97 percent for the year

- Executed more than 100 vehicle recovery operations on deployment in hostile environments

- Completed a rapid regeneration after deployment to accommodate training and return to full operational capability

2003 Secretary of Defense Maintenance Award Winners

- Strike Fighter Squadron Eight One (VFA-81)
  Naval Air Station, Oceana, Virginia, USN

- 74th Fighter Squadron
  Pope Air Force Base, North Carolina, USAF

- Shore Intermediate Maintenance Activity Mayport
  Naval Station, Mayport, Florida, USN

- Marine Aviation Logistics Squadron 12 (MALS-12)
  Marine Corps Air Station, Iwakuni, Japan, USMC

- 3rd Battalion, 7th Infantry Regiment, 3rd Infantry Division (Mech)
  Fort Stewart, Georgia, USA

- Marine Aviation Logistics Squadron 14 (MALS-14)
  Marine Corps Air Station, Cherry Point, North Carolina, USMC

2004 Secretary of Defense
Maintenance Award Winners
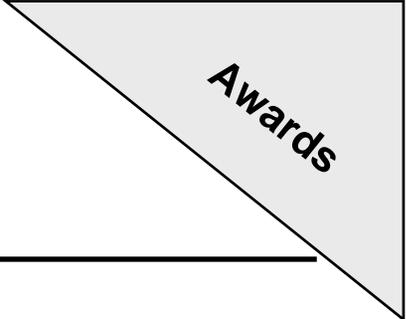
- Marine Heavy Helicopter Squadron 462
  Marine Corps Air Station Miramar, California, USMC

- 509th Munitions Squadron
  Whiteman Air Force Base, Missouri, USAF

- 3rd Military Intelligence Battalion (Aerial Exploitation)
  Camp Humphreys, Republic of Korea, USA

- Combat Service Support Battalion 10
  Marine Corps Air Ground Combat Center, Twentynine Palms,
  California, USMC

- USS ABRAHAM LINCOLN (CVN 72)
  Naval Station Everett, Washington, USN

- 27th Maintenance Group
  Cannon Air Force Base, New Mexico, USAF

Acronyms

AIMD	Aircraft Intermediate Maintenance Detachment
AFB	Air Force Base
AD	Army Depot
ADUSD(MPP&R)	Assistant Deputy Under Secretary of Defense for Maintenance Policy, Programs, and Resources
ALC	Air Logistics Center
AMARC	Aerospace Maintenance and Regeneration Center
AVIM	Aviation Intermediate Maintenance
CBM+	Condition-Based Maintenance Plus
DDMC	Defense Depot Maintenance Council
DLA	Defense Logistics Agency
DLH	Direct Labor Hour
DMDC	Defense Manpower Data Center
DoD	Department of Defense
DS/GS	Direct Support/General Support
DUSD(L&MR)	Deputy Under Secretary of Defense for Logistics and Materiel Readiness
IETM	Interactive Electronic Technical Manual
IMF	Intermediate Maintenance Facility
JDMAG	Joint Depot Maintenance Activity Group
LP&P	Logistics Plans and Programs
LSM	Logistics Systems Management
MALS	Marine Aviation Logistics Squadron

Acronyms (Cont.)
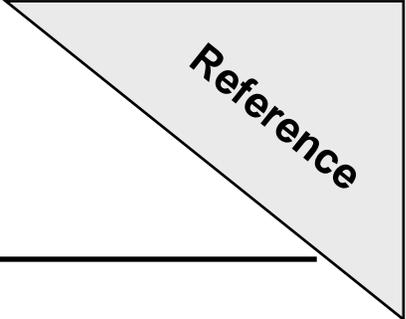
MC	Maintenance Center
MXG	Maintenance Group
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NSWC	Naval Surface Warfare Center
NSY	Naval Shipyard
NUWC	Naval Undersea Warfare Center
OSD	Office of the Secretary of Defense
PP&E	Property, Plant, and Equipment
PPP	Public-Private Partnership
RCM	Reliability-Centered Maintenance
SCI	Supply Chain Integration
SIMA	Ship Intermediate Maintenance Activity
SPAWAR	Space and Naval Warfare Systems Command
TP	Transportation Policy
TRF	Trident Refit Facility (Navy)
USA	United States Army
USAF	United States Air Force
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
USMC	United States Marine Corps
USN	United States Navy
VFA	Strike Fighter Squadron

Explanatory Notes

- As depicted on page 13, DoD maintenance is performed at several levels of complexity, ranging from the rapid removal and replacement of components to complete overhaul or rebuild of a weapon system. The following terms are used throughout the *Fact Book*:
  - **Depot-level** for the most complex and extensive work
  - **Intermediate-level** for less complex maintenance performed in operating unit back-shops, base-wide activities, or in consolidated **regional** facilities
  - **Organizational-level** for more time-sensitive work performed in the field, on the flight line, or at the equipment site
  - **Field-level** is a term signifying the combination of the organizational and intermediate levels

- All charts in this document reflect FY2003 year-end data unless otherwise noted

- An electronic version of this document, as well as other information about the responsibilities and functions of the DoD Maintenance Policy, Programs and Resources office, is located on the following website: http://www.acq.osd.mil/log/mppr.html

- This document is published for information only and does not constitute official DoD correspondence

An electronic version of the *Fact Book*, as well as other information relevant to the responsibilities and functions of DoD's Maintenance Policy, Programs and Resources office, is located on the following website: http://www.acq.osd.mil/log/mppr/