# Budgeting DoD Information Technologies

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September 11, 2008

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# *Department of Defense Spending for FY09*

| FY09 Spending Authorization | Billions $ |
|---|---|
| Military Personnel | $106 |
| Operations & Maintenance | $143 |
| Procurement | $99 |
| Research, Development & Testing | $75 |
| Iraq and Other Wars | $251 |
| Total FY09 Authorization | $674 |
| % of GDP | 4.7% |

# Top 15 Programs for New Weapons Use 50% of Spending

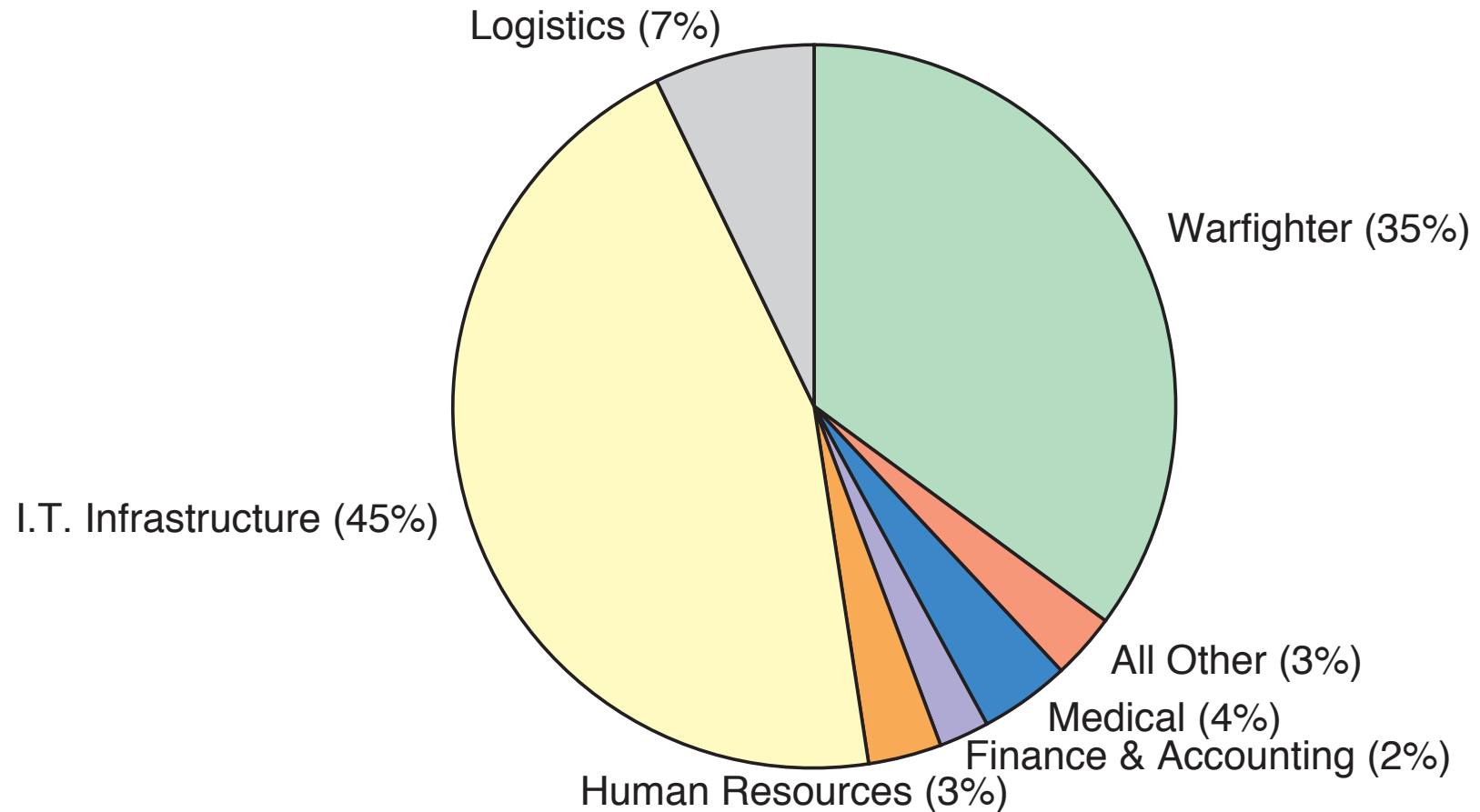| Program | 2008 Budget - $ Billions |
|---|---|
| Missile Defense | $8.8 |
| F-35 Joint Strike Fighter | $6.1 |
| F-22 Raptor | $4.6 |
| Army Future Combat System | $3.7 |
| DDG 1000 Destroyer | $3.5 |
| Carrier Replacement Program | $3.1 |
| F/A-18E/F Hornet | $2.6 |
| Virginia class submarine | $2.7 |
| V-22 Osprey | $2.6 |
| C-130 Tanker | $1.6 |
| San Antonio amphibious transport | $1.4 |
| Littoral combat ship | $1.2 |
| Stryker | $1.2 |
| Space Expendable Launch Vehicle | $1.2 |
| Space-Based Infrared System | $1.1 |
| Total Top 15 Programs | $45.4 |

# *I.T. Spending Represents a Significant Share of DoD*

| FY09 Spending Authortization Category | $ Billions |
|---|---|
| Operations & Maintenance | $143 |
| Research , Development & Testing | $75 |
| Total Non-Personnel Expense | $218 |
| I.T. Non-Personnel Expense | $33 |
| I.T. Expense/ DoD Expense | 15.1% |

*Part I*

# DoD Directions

# *Nominal\* DoD I.T. Spending (\$ Millions)*

Logistics (7%)

Warfighter (35%)

I.T. Infrastructure (45%)

All Other (3%)

Medical (4%)

Finance & Accounting (2%)

Human Resources (3%)

*Total DoD FY09 Budget: \$33,031 M*

*\* Nominal spending does not include Services labor costs, avionics, weapon electronics, intelligence*

# The Navy Spends 21% of Total I.T. Costs



7004 (21%)

11255 (34%)

Air Force

Agencies

Army

7744 (23%)

Navy

7028 (21%)
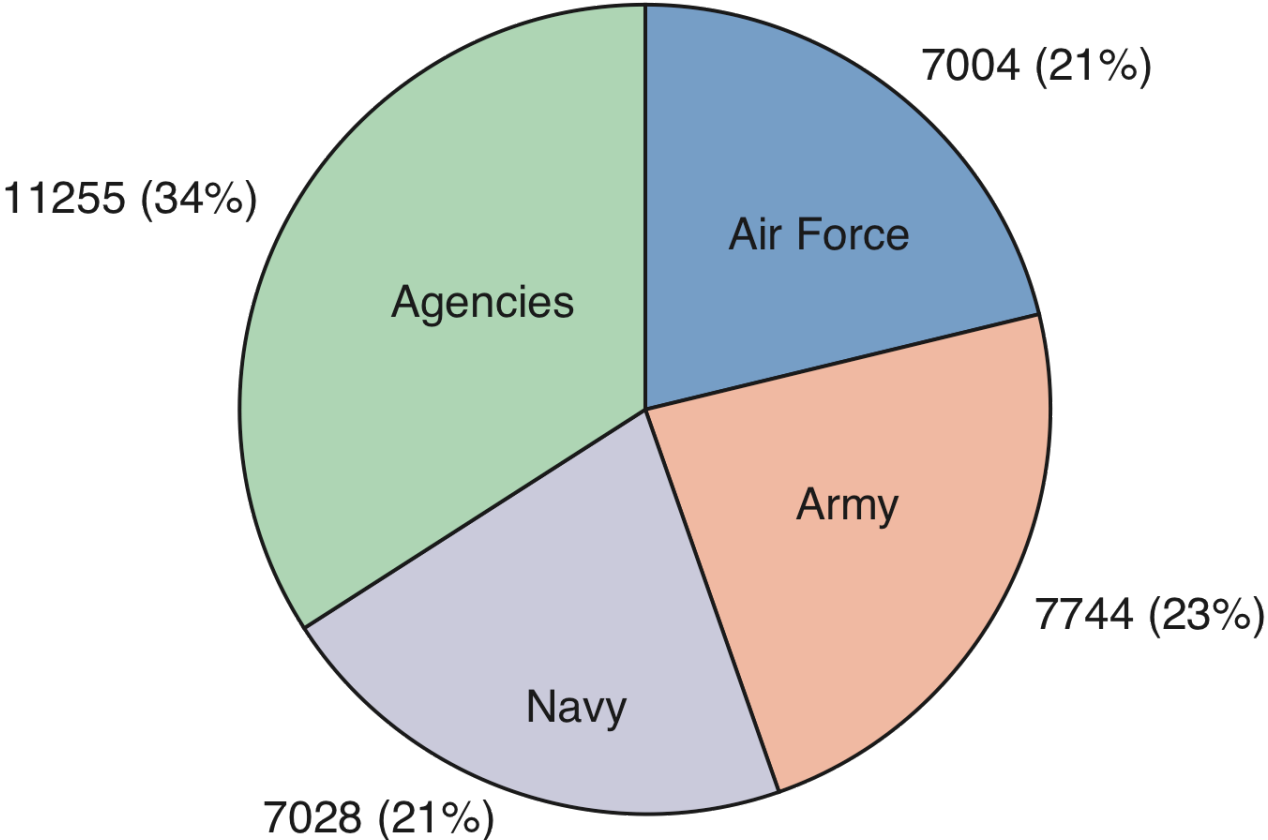
*Total DoD I.T. Spending = $ 33,032 M*

# I.T. Budgets Have Been Cut

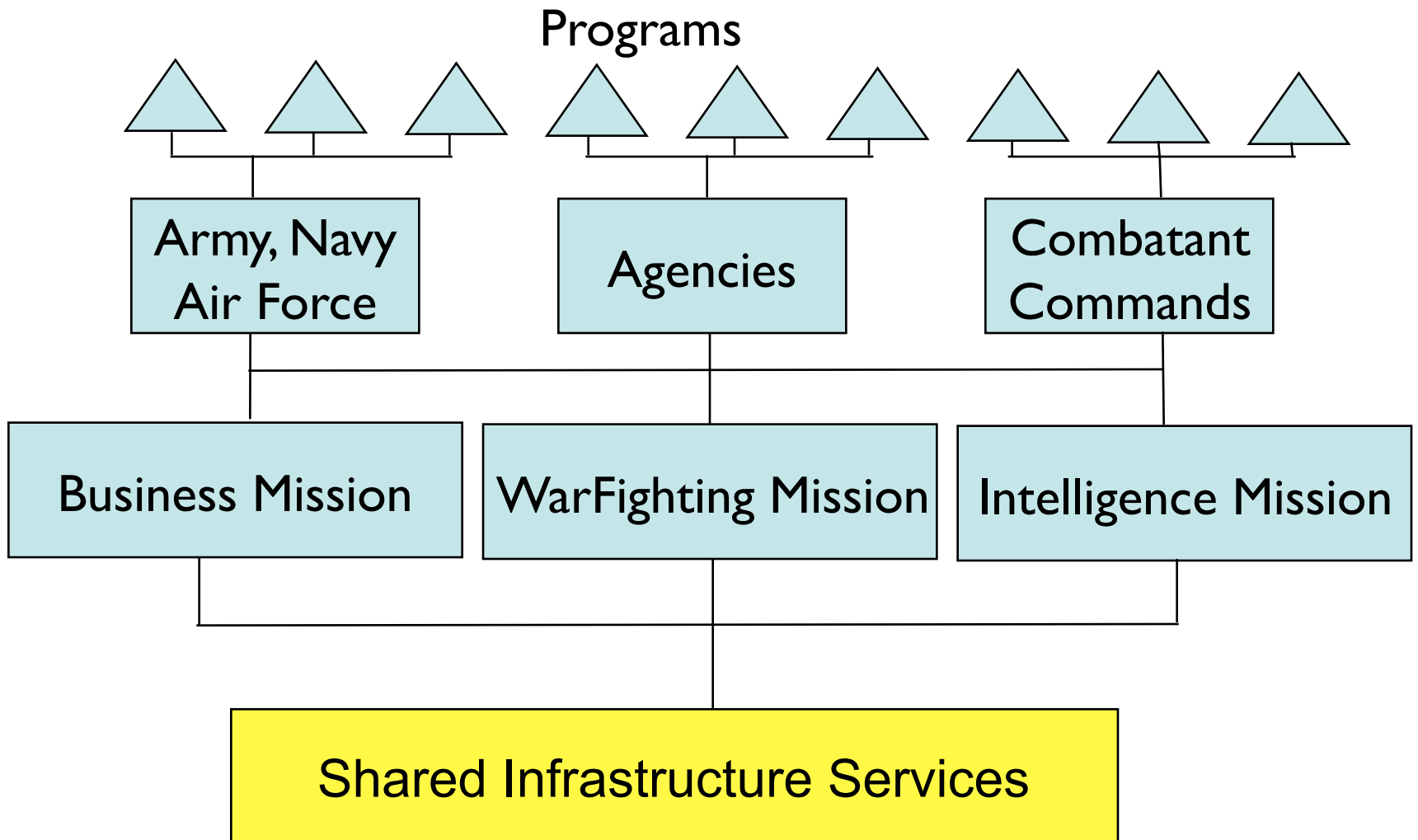| Agency - $ Millions | FY2007 | FY2008 | FY2009 | Change - FY09 over FY07 |
|---|---|---|---|---|
| Department of the Air Force | $6,822 | $6,863 | $7,004 | 2.7% |
| Department of the Army | $9,468 | $7,771 | $7,744 | -18.2% |
| Department of the Navy | $7,768 | $7,080 | $7,028 | -9.5% |
| Department of Defense Agencies | $10,326 | $10,368 | $11,256 | 9.0% |
| Department of Defense | $34,384 | $32,082 | $33,032 | -3.9% |

# *There Are Policy Directives for DoD Net-Centric I.T.*

- Office of the DoD Chief Information Officer has issued the DoD Information Enterprise Architecture on April 11, 2008

- The Architecture is guided by the following policies:
  - Net-Centric Data Strategy (May 2003)
  - Net-Centric Services Strategy (May 2007)
  - Information Sharing Strategy (May 2007)
  - Information Assurance Policies (October 2002)
  - Computing Infrastructure Strategy (March 2007)
  - Telecommunications Policies (June 2004)
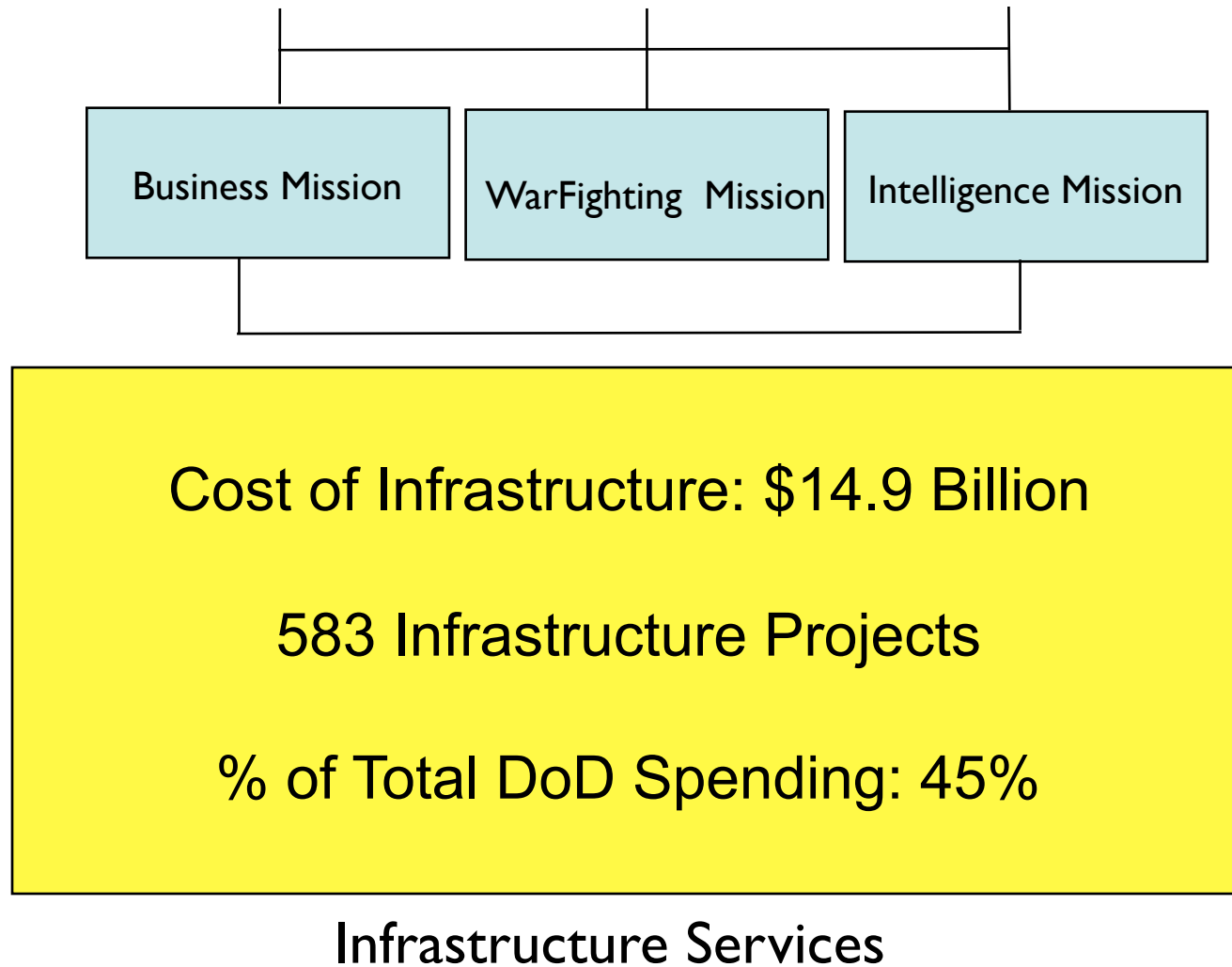  - NetOps Strategy (October 2007)
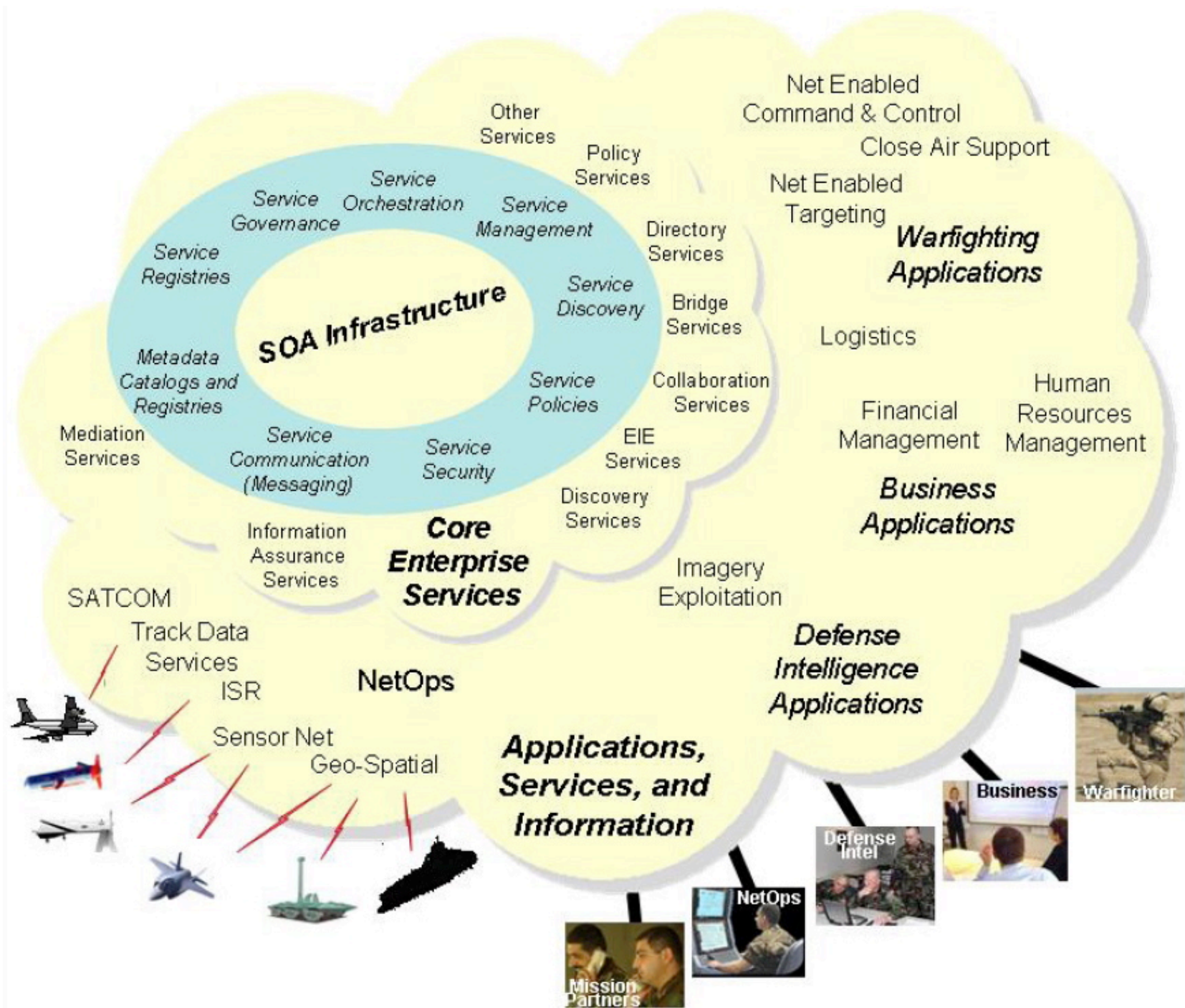
# There is a Global Information Grid (GIG) Vision



**Applications, Services, and Information**

**Warfighting**
- Net-Enabled Command & Control
- Logistics
- Close Air Support
- Dynamic Planning
- Training
- Sensor Data
- Battlespace Awareness

**Defense Intel.**
- Geospatial
- Imagery Exploitation
- Weather
- Distribution Mgt
- Modeling & Simulation

**Business**
- Financial Mgt
- ERP
- Human Resources Mgt
- Material Service
- Medical Records

**Core Enterprise Services (CES) Infrastructure**

| IA | Discovery | Policy | Directory | Mediation | Collaboration | Other Services |

**Computing Infrastructure**

Grid Computing and Storage Resources

Distributed — Centralized

Thin Client μDevices — Embedded Computing — Regional

**Communications Infrastructure**

- Managed Spectrum
- High Assurance Black Core
- Ubiquitous Transport
- Meshed Networks
- Tactical Mobile

# Plan for Information Management in DoD

Programs

Army, Navy Air Force

Agencies

Combatant Commands

Business Mission

WarFighting Mission

Intelligence Mission

Shared Infrastructure Services

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## *FY09 Status of I.T. Infrastructure*

| Business Mission | WarFighting  Mission | Intelligence Mission |
|---|---|---|

**Cost of Infrastructure: $14.9 Billion**

**583 Infrastructure Projects**
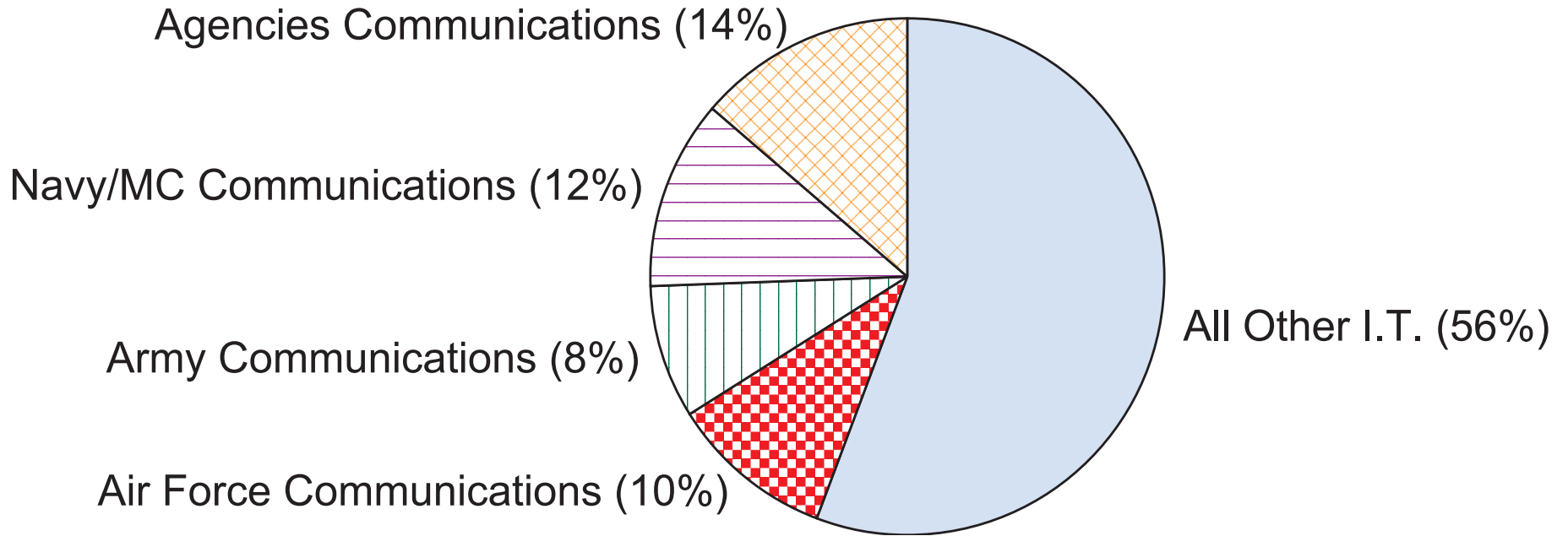
**% of Total DoD Spending: 45%**

Infrastructure Services

# *Top 10 Projects Mostly for Support of Infrastructure*

| Component | Investment Title | FY2009 I.T. spending - $ Millions | Service Type |
|-----------|------------------|-----------------------------------|--------------|
| Navy | NAVY MARINE CORPS INTRANET | $1,610 | Infrastructure |
| Agencies | DEFENSE INFORMATION SYSTEM NETWORK | $1,518 | Infrastructure |
| Agencies | Non-DISN Telecomm | $901 | Infrastructure |
| Agencies | DEFENSE ENTERPRISE COMPUTING CENTERS | $740 | Infrastructure |
| Army | WARFIGHTER INFORMATION NETWORK-TACTICAL | $616 | Warfare |
| Army | NETWORK ENTERPRISE TECHNOLOGY COMMAND | $453 | Infrastructure |
| Agencies | PROTECT INFORMATION | $437 | Infrastructure |
| Army | BASE LEVEL COMMUNICATION INFRASTRUCTURE | $392 | Infrastructure |
| Air Force | Combat Information Transport System | $342 | Warfare |
| Air Force | Tactical Data Link System | $327 | Warfare |
| | Top 10 Projects - 22.2% of total; 82.5% for Infrastructure | $7,335 | |
| | Next 1,980 Projects - 77.7% of total | $25,697 | |
| | Total FY09 DoD | $33,032 | |

# *77.3% of Projects Account for Only 7.2% of Spending*

| % of Projects | FY09 Projects | Range in Project Budgets - $ Millions | Total Budget - $ Millions | % of Budget |
|---|---|---|---|---|
| 0.5% | Top 10 Projects | $327 to  $1,610 | $7,335 | 22.2% |
| 3.0% | 60 Projects | $100 to $327 | $10,958 | 33.2% |
| 19.1% | 381 Projects | $10 to $100 | $12,356 | 37.4% |
| 77.3% | 1,539 Projects | <$10 | $2,383 | 7.2% |
| | Total - 1,990 Projects for DoD | 0 to 1,610 | $33,032 | |

# 172 Networks  Account for Most of the Infrastructure Cost

Agencies Communications (14%)

Navy/MC Communications (12%)

Army Communications (8%)

Air Force Communications (10%)

All Other I.T. (56%)

*Total Cost of Communications = $13.3 Billion*

## *Current Integration Programs*

- NCES – (Net-Centric Enterprise Services) - $90 M
  - Collaboration
  - Content and Data Discovery
  - Portal (AKO/DKO Portal)
  - SOA Foundation Tools
- NECC – (Net-Enabled Command) - $'s Unknown
  - To Replace GCCS now costing $465 M

*Part II*

# Agency Spending

## *Who are the Agencies?*

- Defense Information Systems Agency (DISA)
- Defense Finance and Accounting Service (DFAS)
- Defense Logistics Agency (DLA)
- Business Transformation Agency (BTA)
- Defense Commissary Agency (DeCA)
- TRICARE Military Health System
- Defense Manpower Data Center (DMDC)
- Defense Technical Information Center (DTIC)
- Defense Contract Audit Agency (DCAA)
- Defense Security Services (DSS)
- Washington Headquarters Services
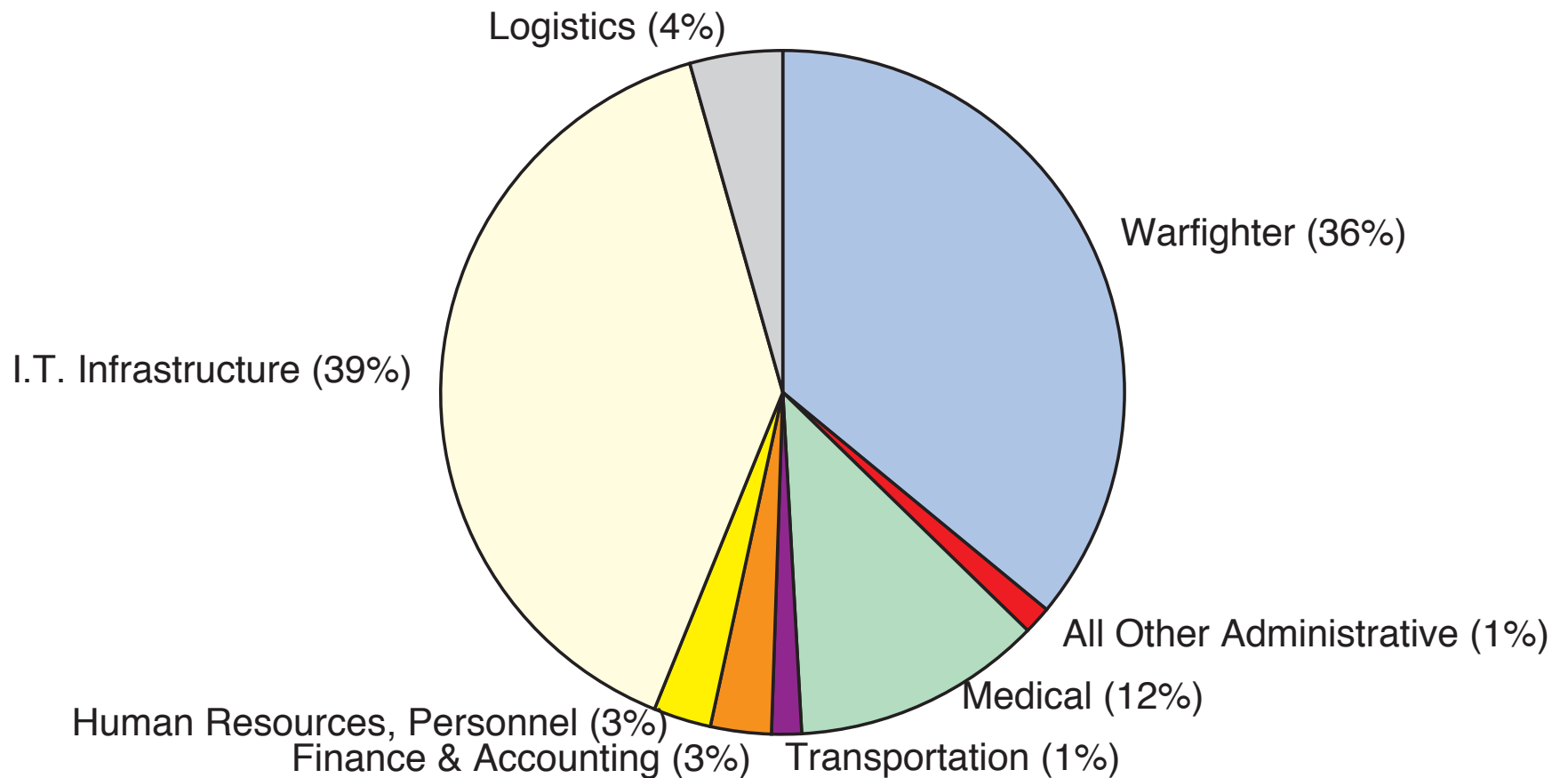
# *Agencies Have a Large Share of I.T. Spending*

| FY2009 ($M) | Development/ Modernization/ Enhancement | Operations & Maintenance |
|:---:|:---:|:---:|
| Air Force | $2,440.0 | $4,564.2 |
| Army | $4,241.2 | $3,502.7 |
| Navy | $2,076.6 | $4,951.5 |
| Agencies | $3,187.2 | $8,068.6 |
| Total | $11,945.0 | $21,087.0 |

*Does not include costs of Military and Civilian Employees*
*Does not include costs of DIA, NGA, NRO, NSA, etc.*
*Does not include avionics, weapon electronics, shipboard electronics*

# Agencies Spend More on Infrastructure than on Warfighters

Logistics (4%)

Warfighter (36%)

I.T. Infrastructure (39%)

All Other Administrative (1%)

Medical (12%)

Human Resources, Personnel (3%)

Finance & Accounting (3%)

Transportation (1%)

*Total Agency Spending:$11,256 M*

## *Comparison of Tooth-to-Tail Ratios*

| FY09 Budgets - $M | Warfighter | I.T. Infrastructure | Tooth/Tail Ratio |
|---|---|---|---|
| Air Force | $3,214 | $3,044 | 105.6% |
| Navy | $1,504 | $4,339 | 34.7% |
| Army | $2,834 | $3,114 | 91.0% |
| Agencies | $4,047 | $4,444 | 91.1% |
| DoD | $11,598 | $14,941 | 77.6% |
| | | | |
| % of FY09 Spending | 35.1% | 45.2% | |

## *Distribution of Project Costs*

| FY09 Budgets - $M | No of Warfare Projects | No of Infrastructure Projects | Average Budget for Warfare Projects | Average Budget for Infrastructure Projects |
|---|---|---|---|---|
| Air Force | 61 | 147 | $52.7 | $21.1 |
| Navy | 59 | 272 | $25.5 | $15.9* |
| Army | 54 | 40 | $52.5 | $76.0 |
| Agencies | 61 | 124 | $66.3 | $35.6 |

\* Median Value for Navy Infrastructure Projects = $767,000

# *Is this the Way to Get Information Warfare Capabilities?*

| $ Billions | FY05 | FY06 | FY07 |
|---|---|---|---|
| Total DoD I.T. Spending | $28.7 | $29.9 | $30.4 |
| DoD Spending on Contractors | $21.1 | $22.6 | $24.1 |
| % of I.T. Spending Contracted Out | 73.5% | 75.6% | 79.3% |

*Part III*

# Governance Issues

# *What is the Total I.T. Spending for the Services?**

**Services Nominal I.T.
≈ $7 Billion**

Uniformed &
Civilian
Manpower
≈ $1.5 Billion

Agency
Projects
For the
Services
≈ $4 to 5 Billion

Intelligence
Projects
For the
Services
$???
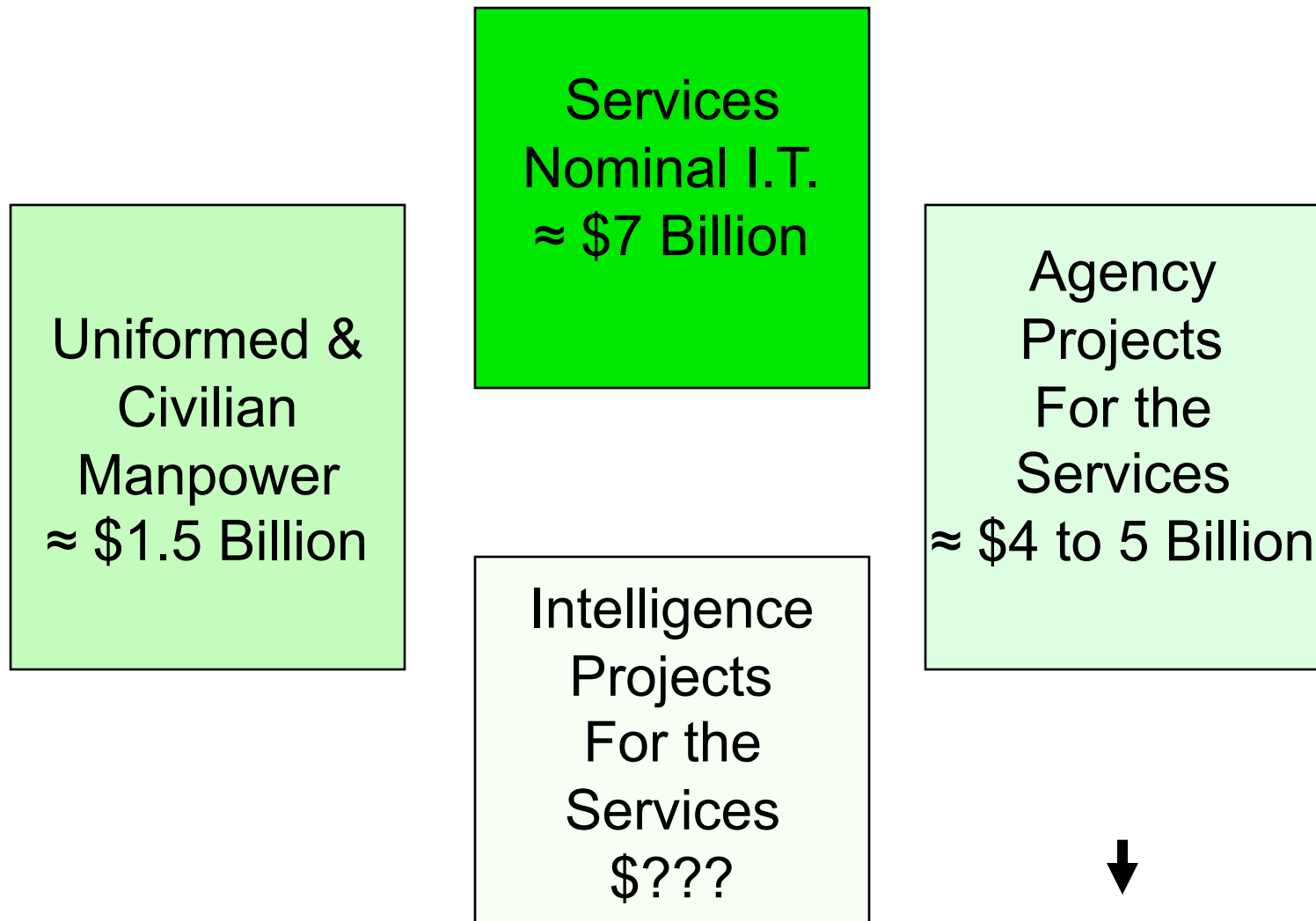
*Excludes Avionics, Weapons, Electronic Warfare*

# *Improve Tier Accountability and Federation Governance*

| Tier: Business | Tier: Warfare | Tier: Intelligence |
|:---:|:---:|:---:|
| Enterprise | Enterprise | Enterprise |
| Component | Component | Component |
| Program | Program | Program |

Federated Integration
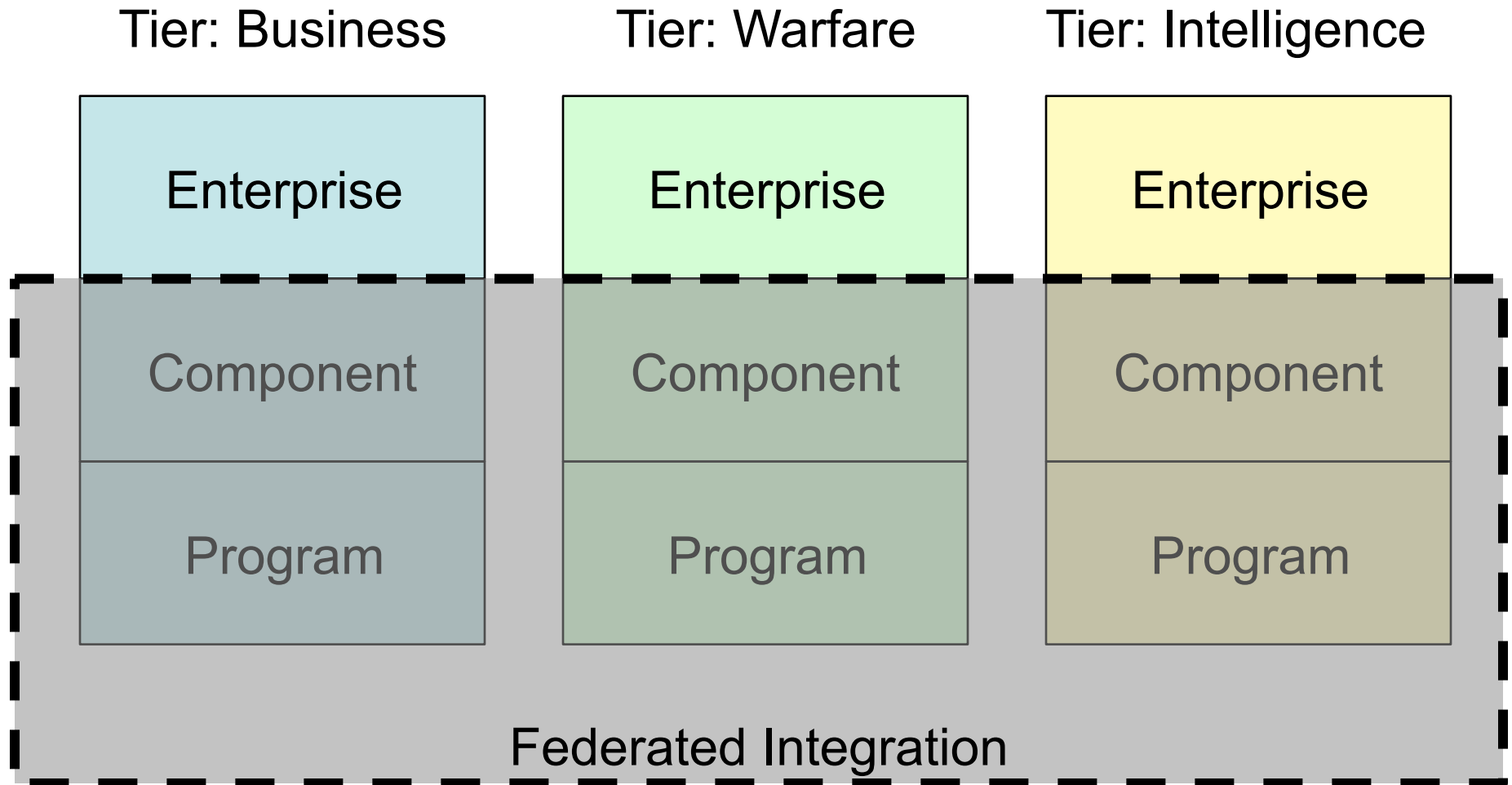
*Part IV*

# Business Management Issues

# *DoD & Services Have Now a Chief Management Officer*

The Office of the Secretary of Defense is composed of the following:

- Deputy Secretary of Defense (Chief Management Officer).
- Under Secretary of Defense for Acquisition, Technology, and Logistics.
- Under Secretary of Defense for Policy.
- Under Secretary of Defense (Comptroller).
- Under Secretary of Defense for Personnel and Readiness.
- Under Secretary of Defense for Intelligence.
- **Deputy Chief Management Officer.**
- Director of Defense Research and Engineering.
- Assistant Secretaries of Defense.

The Office of Army, Navy & Air Force Secretaries:

- **Under Secretary and Chief Management Officer**

## *Designated Functions of the Chief Management Officer*

- Planning and budgeting, including performance measurement.

- Acquisition.

- Logistics.

- Facilities, installations, and environment.

- Financial management.

- Human resources and personnel.

- Management of information resources, including information technology, networks, and telecommunications functions related to above.

# *Many Incompatible  Business Management Systems*

| DoD Investment Review Boards | Air Force | Army | Navy | Agencies | Business Management Systems |
|---|---|---|---|---|---|
| Finance | 67 | 161 | 148 | 107 | 483 |
| Personnel | 164 | 320 | 174 | 134 | 792 |
| Logistics | 780 | 730 | 406 | 169 | 2,085 |
| Property | 71 | 122 | 44 | 17 | 254 |
| Other | 65 | 0 | 26 | 12 | 103 |
| Total | 1,147 | 1,333 | 798 | 439 | 3,717 |

# The JTRS Case Study*

* Based on GAO Report 08-877, August 2008

# *What is JTRS (Joint Tactical Radio System)?*

- The Joint Tactical Radio is a voice-and-data radio to replace all existing radios by the U.S. military after 2010.

- Mission Needs Statement (in 1997) specifies JTRS as a software-defined radio that will work with all existing military and civilian radios. It includes integrated encryption and Wideband Networking to create mobile networks.

- This functionality is built upon the Software Communications Architecture (SCA) that tells designers how hardware and software is interoperable.

## *What Will JTRS Replace?* *(Partial List)*

- Soldier Radio Waveform (SRW)
- Single Channel Ground Air Radio System (SINCGARS)
- HAVE QUICK II military aircraft radio, 225-400 MHz, AM, frequency hopping
- UHF SATCOM, 225-400 MHz, MIL-STD-188-181, -182, -183 and -184 protocols
- Enhanced Position Location Reporting System (EPLRS), 420-450
- Wideband Networking Waveform (WNW)
- Link-4A, -11B, - 16, -22/TADIL tactical data links, 960-1215 MHz+
- VHF-AM civilian Air Traffic Control, 108-137 MHz, 25
- High Frequency (HF) - Independent Side Band (ISB), 1.5-30 MHz
- VHF/UHF-FM Land Mobile Radio (LMR), low-band 25-54 MHz, mid-band 72-76 MHz
- Anti-jam Tactical UHF Radio for NATO (SATURN), 225-400 MHz PSK Anti-jam
- Identification Friend or Foe (IFF), includes Mark X & XII/
- Digital Wideband Transmission System (DWTS) Shipboard 1350-1850 MHz
- Soldier Radio & Wireless Local Area Network (WLAN), 1.755-1.850
- Cellular telephone & PCS, includes NSA/NIST Type 1 through 4 COMSEC (SCIP)
- Mobile Satellite Service (MSS), includes both VHF and UHF MSS bands
- Integrated Broadcast Service Module (IBS-M)
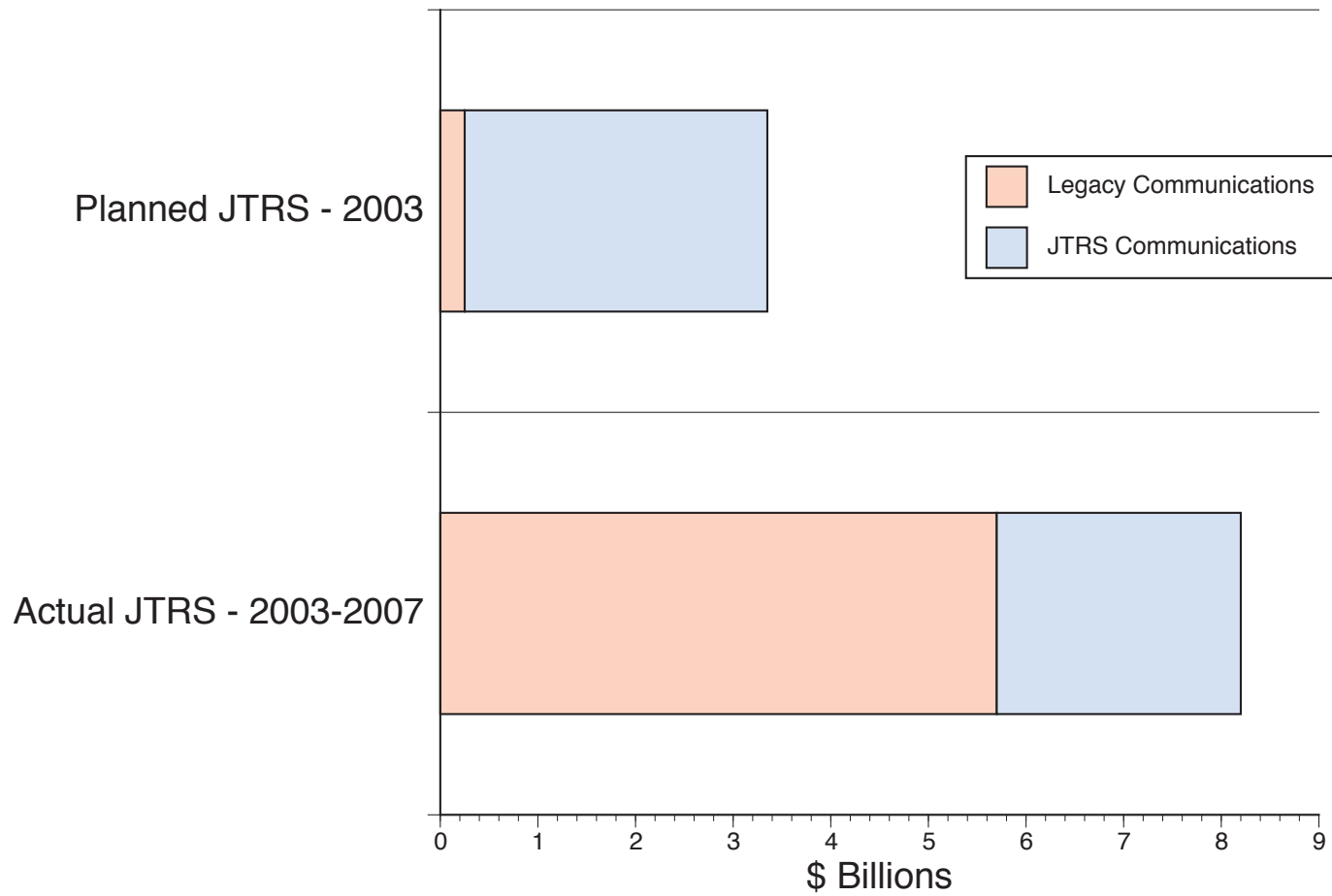- BOWMAN, the UK Tri-Service HF, VHF and UHF tactical communications system.

# An Example of Communications Proliferation
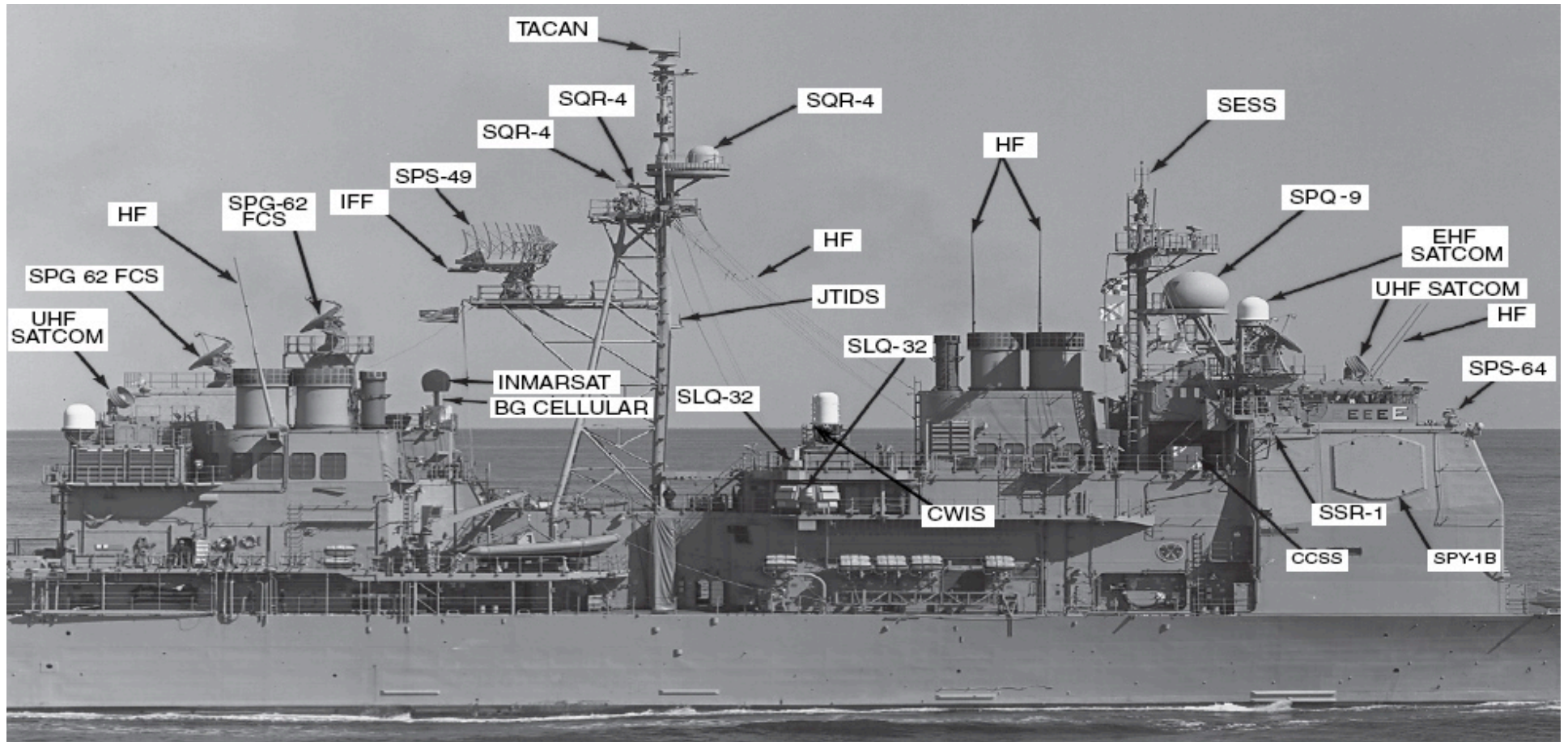
## *Limitations of Existing Systems*

- Survivability and lethality in warfare is dependent on smaller, highly mobile, joint forces that rely on communications.

- DOD's existing tactical radio systems lack the necessary to support the mobility and interoperability by the armed forces.

- Existing radios were designed with exclusive architectures and can only interoperate with like radios. Functions are governed by their hardware components, operating at low to medium data rates and cannot support voice, data, and video.

- Existing radios have many unique components and parts that require specialized support and complex logistics.

*Planned and Actual Spending for Tactical Radios*

Planned JTRS - 2003

Actual JTRS - 2003-2007

Legacy Communications

JTRS Communications

0   1   2   3   4   5   6   7   8   9

$ Billions

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# *JTRS Time Line*

- 1997 JTRS Development Program Starts
- 2002 Program Approved. Each service can build own version, but must be "interoperable".
- 2003 – 2007 $1 billion for development, $2 billion for procurement
- 2003 – 2007 Plan: $<0.5 billion for legacy networks

- 2003 – 2007 Actual: $5.7 billion for legacy networks, $2.5 billion for development.

- Fielding of first JTRS radios projected for 2010.  Cost unknown.

# Some JTRS Funding from Supplemental Appropriations?

| Component | Project | FY07 Development - $Million | FY08 Development - $Million | FY09 Development - $Million |
|---|---|---|---|---|
| Navy | JTRS - NETWORK ENTERPRISE DOMAIN | $221.5 | $248.6 | $242.3 |
| Navy | JTRS - AIRBORNE, MARITIME AND FIXED | $56.8 | $106.9 | $203.8 |
| Navy | JTRS - GROUND MOBILE RADIOS | $202.9 | $231.6 | $196.3 |
| Navy | JTRS - HANDHELD, MANPACK, SMALL FIT | $132.9 | $168.4 | $164.8 |
| Army | JTRS Aviation Tactical Communication | $54.4 | $62.1 | $64.4 |
| Navy | JTRS MULTIFUNCTIONAL DISTRIBUTION | $159.9 | $80.1 | $27.4 |
| Agencies | JTRS - ENHANCED MBITR | $20.2 | $19.0 | $17.8 |
| Air Force | JTRS MULTIFUNCTIONAL DISTRIBUTION | $0.0 | $9.3 | $16.2 |
| Army | JTRS MULTIFUNCTIONAL INFORMATION | $3.1 | $31.8 | $8.6 |
| Total DoD I.T. Funding | | $851.7 | $957.7 | $941.6 |

## *Current Issues with JTRS*

- Including Research, Engineering & Testing JTRS has so far spent $12 billion. Larger legacy investments to data raise the question whether JTRS is affordable as initially proposed.

- Changes in requirements have raised technology hurdles, size and power constraints, and security architecture keep increasing the costs to complete JTRS replacement plans.

- A legacy vehicle radio costs about $20,000, while its more capable JTRS replacement is estimated to cost up to >10 times more, while complexity keeps increasing as deployment schedule is delayed.

- Accelerated installation of legacy systems make it difficult for JTRS to retire prematurely a relatively young inventory of legacy radios.

- Procurement quantities for JTRS radios have been reduced.

# *JTRS Procurement Quantities*

| | Initial Procurement Quantities (Milestone B) | Current Procurement Quantities (2008) | Change in JTRS Quantities |
|---|---|---|---|
| Ground Mobile Radios+ Other | 108,086 | 97,552 | -9.7% |
| Handheld Radios | 328,514 | 96,551 | -70.6% |

## *JTRS Case Study Observations*

- U.S. military forces' communications and networking systems currently lack the interoperability and capacity to access and share real-time information and operate effectively as a joint force.

- Since its inception, the JTRS development effort has experienced unmanageable expectations.

- As a consequence the military services acquired non-JTRS communications solutions, such as software defined commercial radios.

# *An Example of a Software Defined Commercial Radio*



Interoperability Solved

All Bands.

All Modes.

Full Encryption.

Same Size.

One Radio.

| All Bands | 136-869 MHz (136-174, 380-520, 700, 800 MHz) |
| All Modes | P25 Conventional and Trunked, Analog |
| Full Encryption | DES, AES, OTAR |
| Same Size | Equal in size and weight to a single-band portable |

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*Part VI*

# Summary

## *Summary*

- DoD I.T. is not as yet net-centric or data-centric.
- DoD I.T. cannot as yet function as a unified operation.
- For future progress:
  - Networks should be interoperable.
  - A data dictionary must reduce costs of collaboration.
  - Data centers must be linked for reliability.
  - Must reduce the costs of the infrastructure.
  - Business, warfare and intelligence must share architectures and applications.