



T&E Infrastructure The Current State of Affairs

June 6, 2000

**Honorable Philip E. Coyle
Office of the Secretary Of Defense
Director, Operational Test and Evaluation**



Bottom Line

There is a growing divergence between the requirement to support defense acquisition programs and the T&E resources available to do so

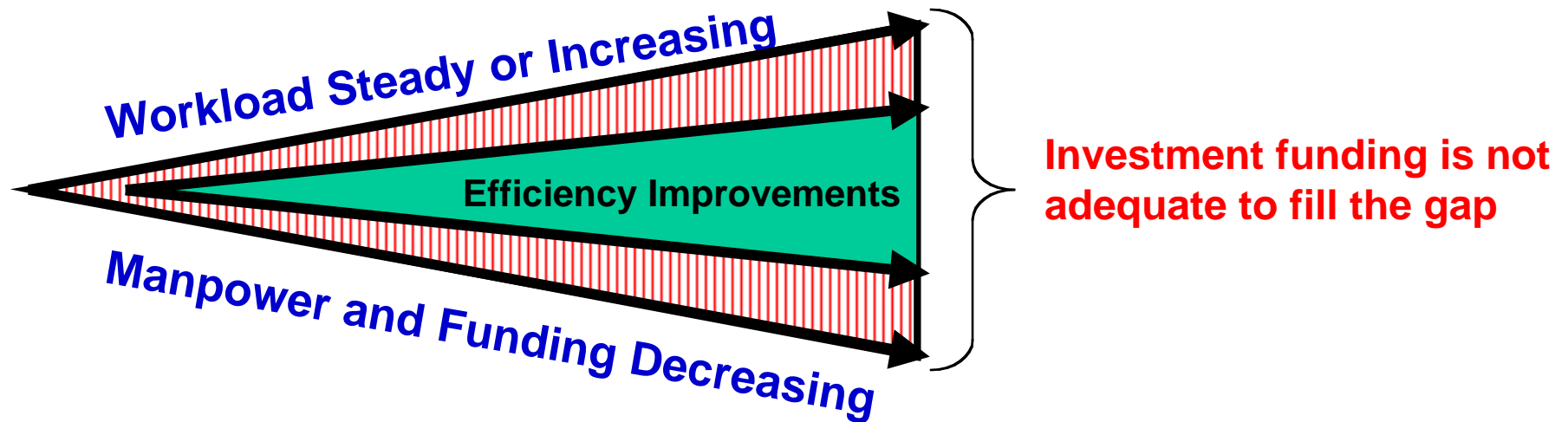


Overview

- T&E Workload
- Operational Test Agency Resources
- Major Range and Test Facility Base Resources
- T&E Investment Programs
- Observations
- Recommendations



State of the T&E Infrastructure



- T&E workload is generally steady or increasing
- Resources for test and evaluation down significantly
- T&E Centers are focused on increasing efficiency
- Investment is not keeping pace with technology
- Acquisition programs are being impacted



T&E Workload

- Modernization continues to generate significant workload
- IPTs and early involvement increase workload
- Increasing complexity of weapon systems
- Increasing scope of test programs
 - Expanded need for interoperability testing
 - Increasing demand for verifying Information Assurance (IA)
 - Increasing effort in testing for Electromagnetic Environmental Effects



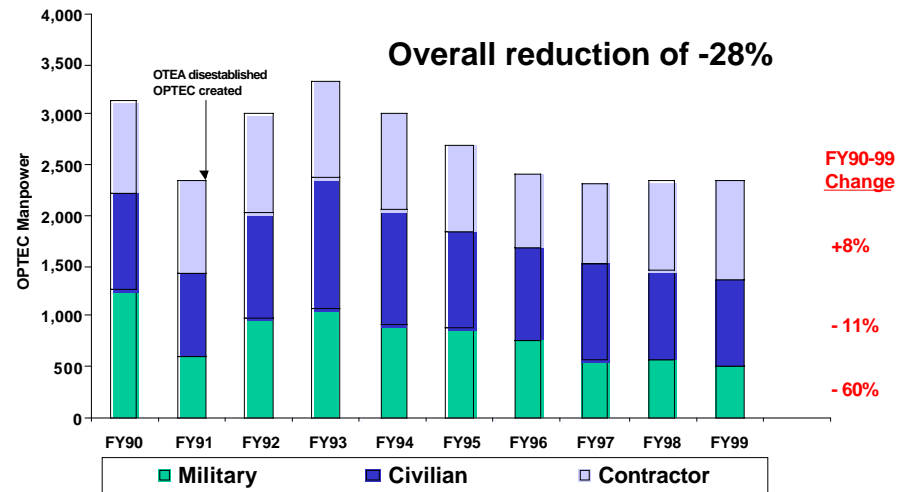
Army Operational Test and Evaluation

- Military workforce cut 60% FY90-99
- Civilian workforce cut 11% FY90-99
- Workload up 121% FY93-01
- Currently fund \$20.5 (46%) of \$44.9M required to execute ACAT II - IV operational tests, critical FY01 shortfall is \$8.7M to fund to \$29.5 (65%) execution experience level

- **Impact:**

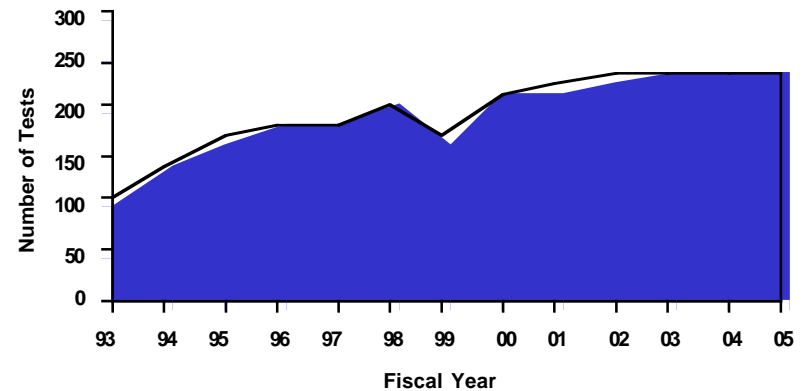
- Cannot fund 39 ACAT II - IV FY01 operational tests, critical FY01 shortfall is \$8.7M
- Cannot fund 4 FOT&E programs, critical FY01 shortfall is \$7.5M

Manpower Profile*



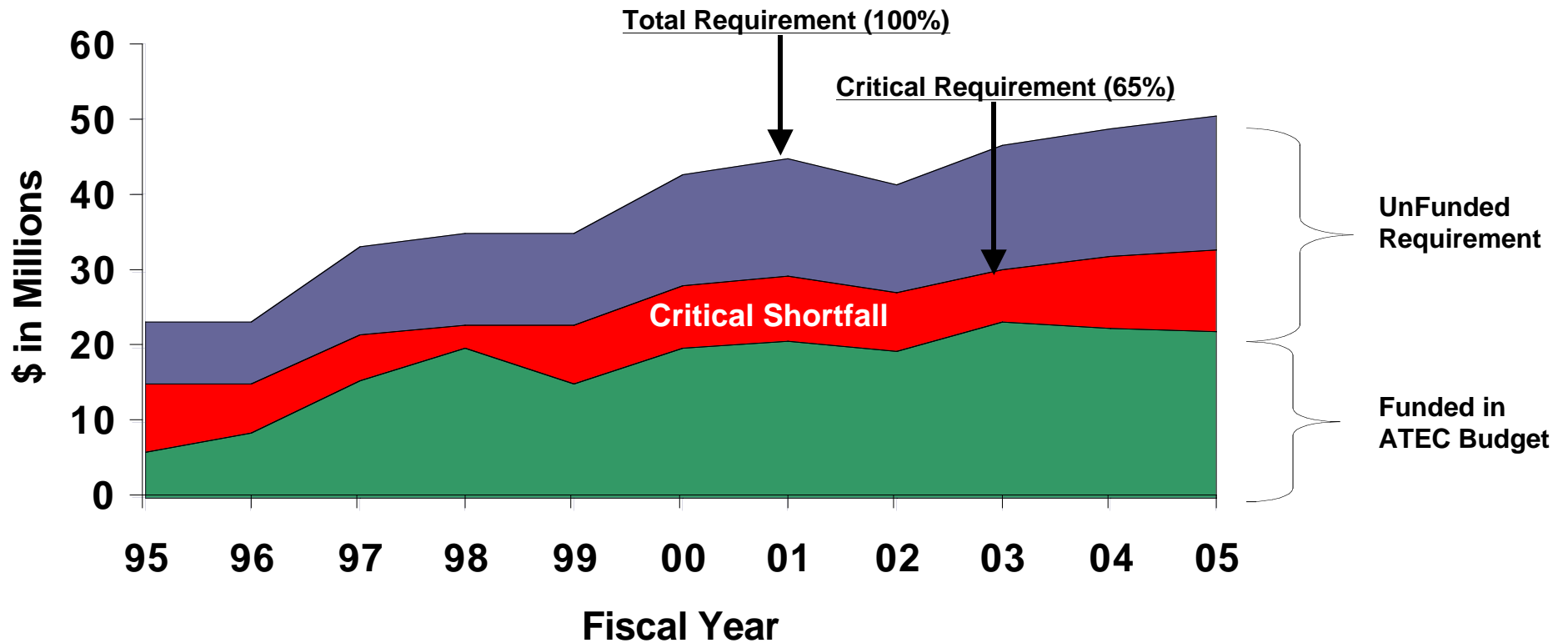
*Represents personnel on board and Includes temporary civilian employees

Workload





Army Test and Evaluation Command Initial Operational Test and Evaluation PE 0605712A D001



	<u>FY01</u>	<u>FY02</u>	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>
Critical Shortfall	\$8.7M	\$7.7M	\$7.1M	\$9.2M	\$10.9M



ATEC Funding Concerns

- **Operational Testing**—ATEC required to plan, execute, and report on over 70 operational tests between FY02-07 in support of milestone decisions
 - OT for ACAT I systems funded by acquisition programs
 - OT for ACAT II-IV is ATEC funding responsibility—current plans provide an average of only 46% of the necessary funding; a 65% level is required to execute programs ready for testing
- **Continuous Evaluation of Testing**—Army Evaluation Center responsible for operational, live-fire, and technical evaluations for over 500 acquisition programs between FY02-07 necessary to meet milestone decisions
 - Minimum adequate funding, based on experience, is 70% of total estimated requirement
 - Planned funding provides an average of only 60% of total estimated requirement



ATEC Funding Concerns (cont.)

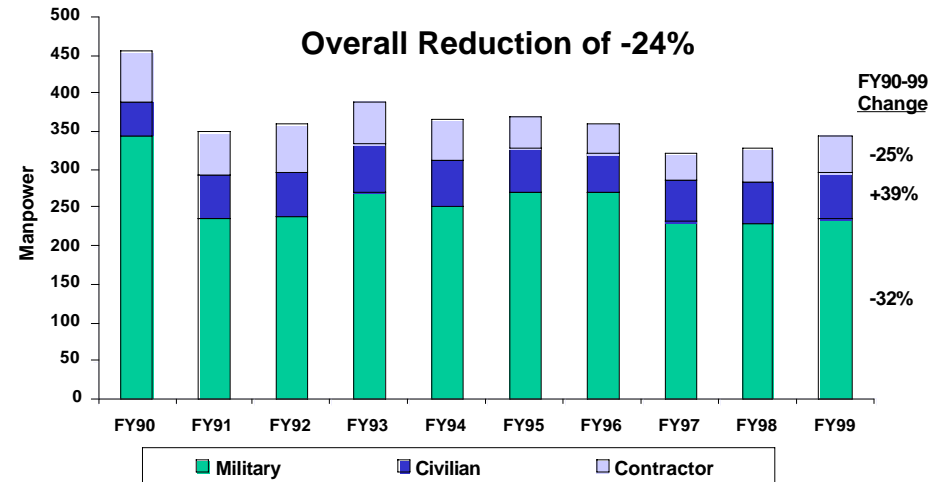
- **Test Capability and Test Facility Modernization**—the Development Test Command is responsible for conducting technical testing of Army acquisition programs, ensuring test capabilities are available and developmental test workforce and facilities are responsive to program schedules
 - Planned programs provide for a 64% testing capability in FY02-04 and 75% in FY05-07 to support test requirements of key weapons systems and technical insertions necessary to meet acquisition milestone decisions intended to support the transformation of the Army. Minimum adequate funding level based on experience is 80%
 - Current plans do not provide funding for required test facility modernization despite \$10M per year objective to begin to stem deterioration of Army test facilities



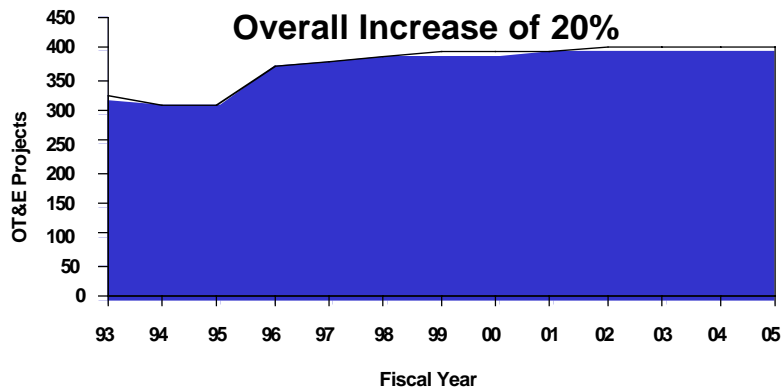
Navy Operational Test and Evaluation Command

- Workload higher than at any other time in its 55 year history
- FY01 funding down 10% from FY93
- Staffed at 60% of authorized test directors
- All operational test costs (except travel) funded by acquisition programs
- Early involvement of operational testers funded by acquisition programs that benefit or it does not tend to happen

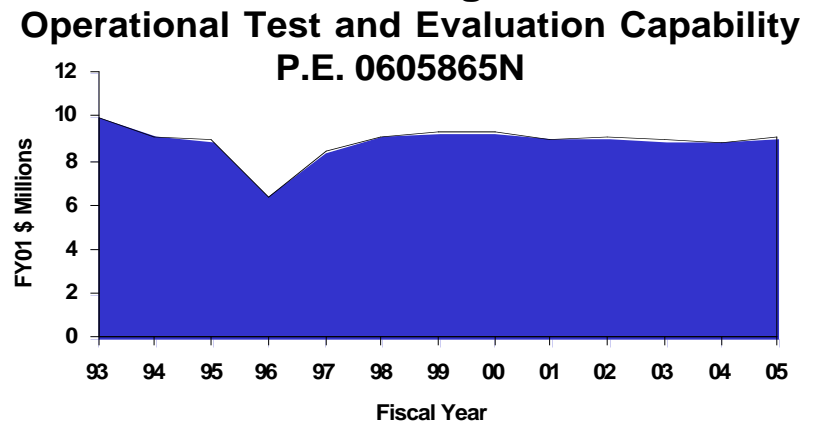
Manpower Profile



Workload



Funding

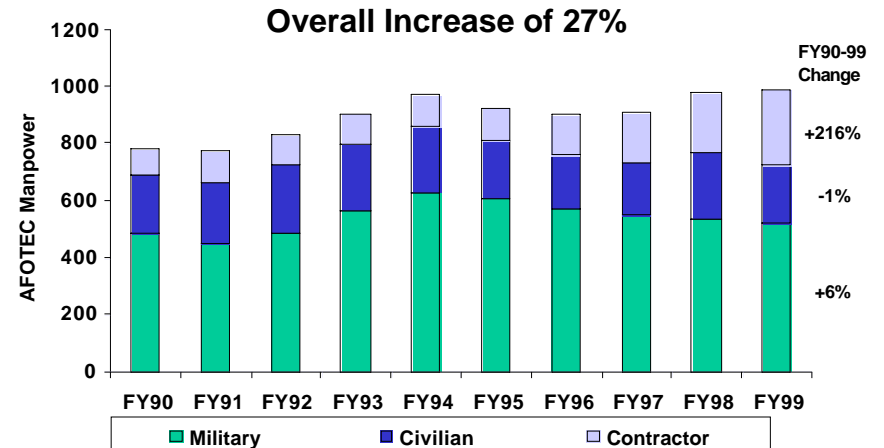




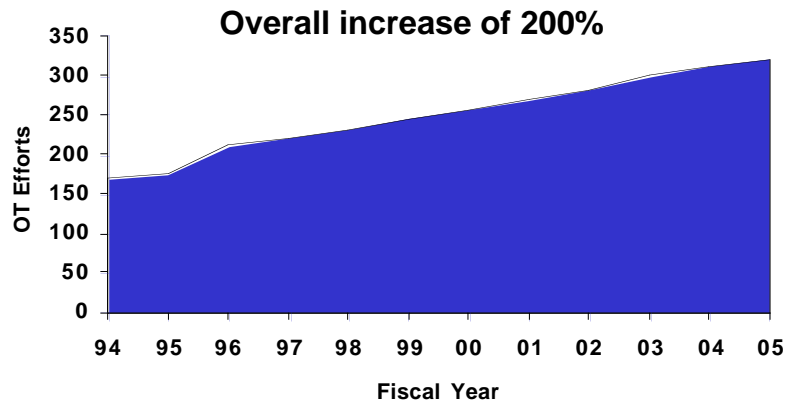
Air Force Operational Test and Evaluation Command

- FY01 budget request does not fully fund operational test requirements
- 20 of 49 test programs at risk including:
 - Milstar II
 - Advanced Strat. & Tact. IR Expendable
 - Miniature Air Launch Decoy
- **Impact:**
 - FY01 RDT&E critical shortfall is \$2.6M due to spike in range costs for OT&E programs

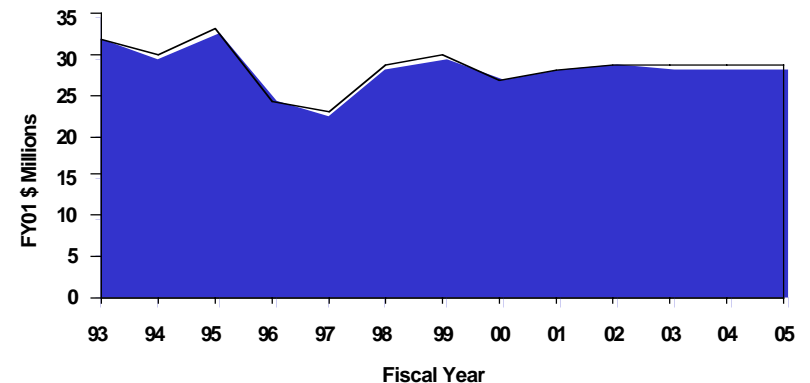
Manpower



Workload



AFOTEC Funding Initial Operational Test and Evaluation P.E. 0605712F

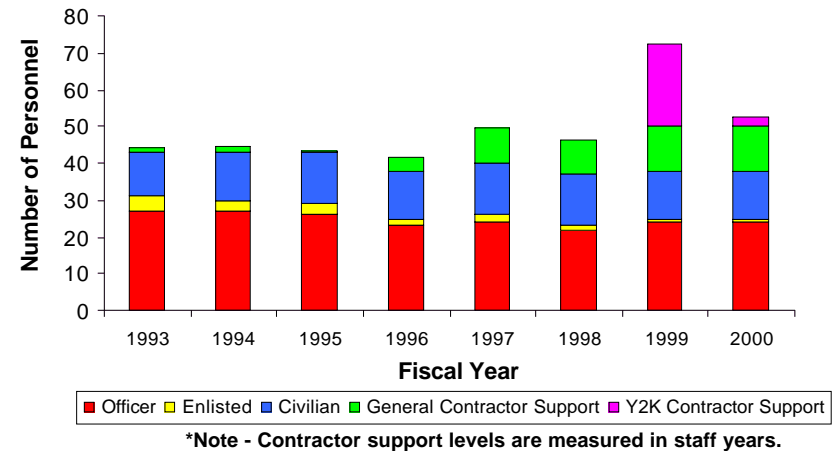




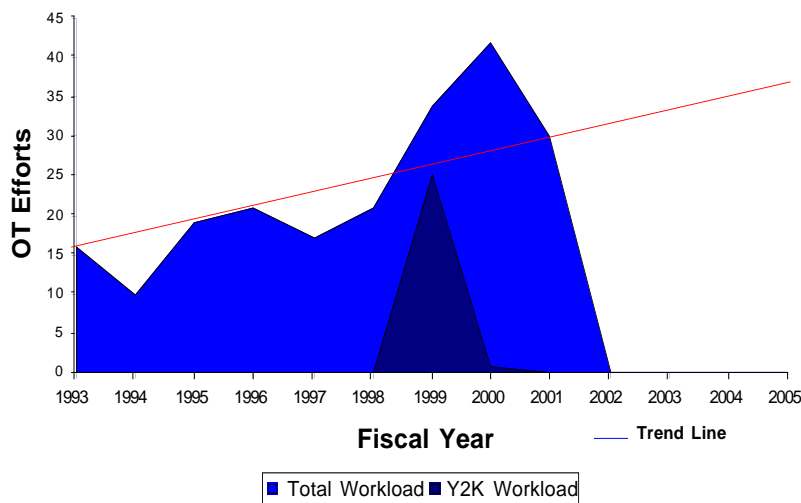
Marine Corps Operational Test and Evaluation Agency

- Decreasing personnel levels to accomplish increasing workload
- OT&E of AIS not supported until POM02
- 25 potential AIS OT programs to prioritize based on available resources
- Insufficient resources to meet NBC OT requirements

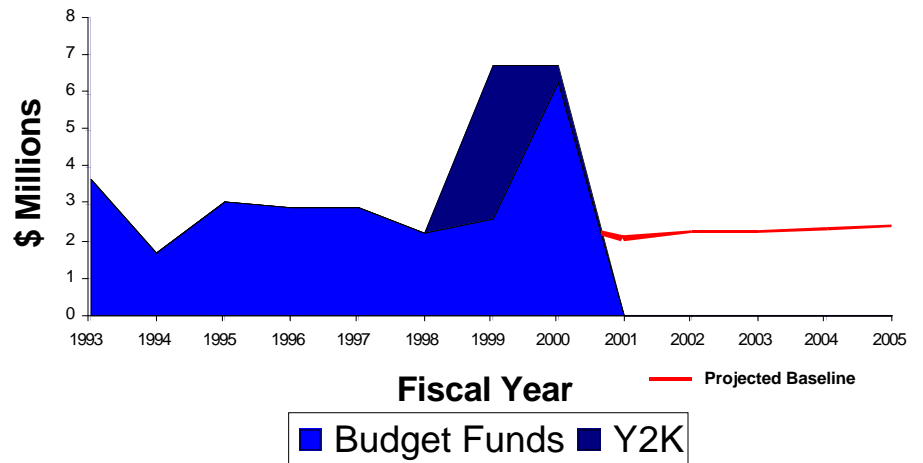
MCOTEA Manpower



MCOTEA Workload

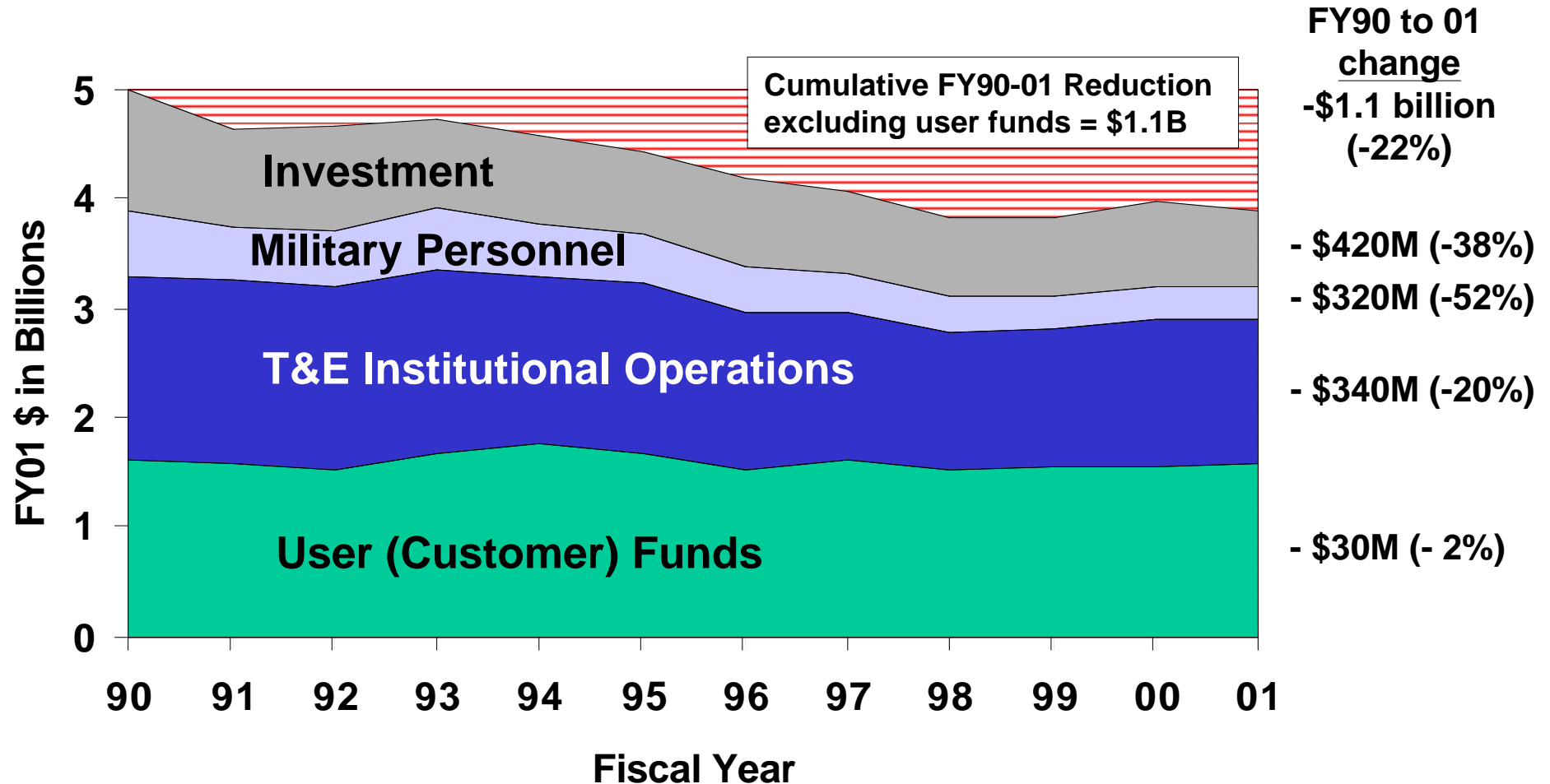


MCOTEA Funding



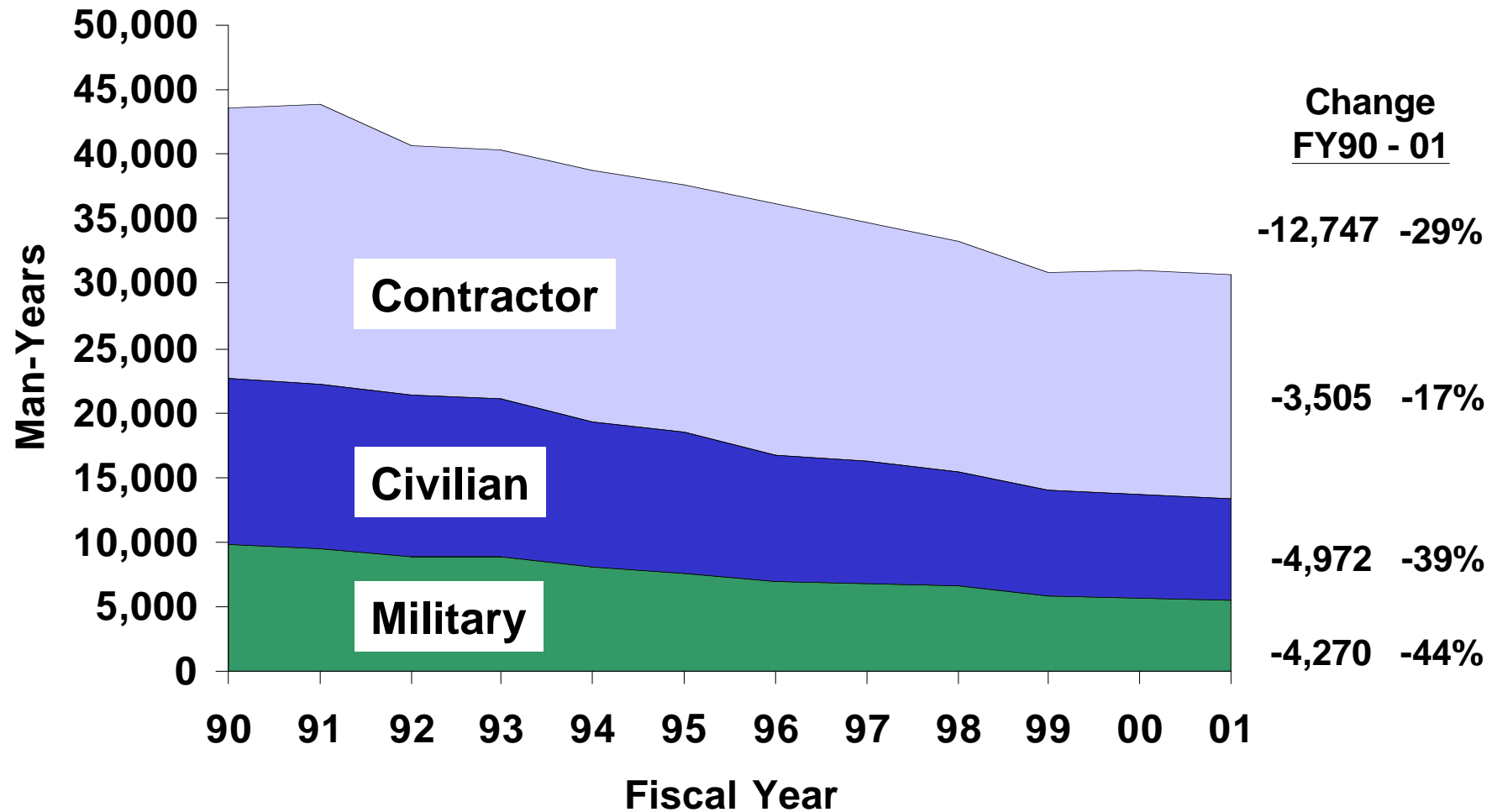


Major Range and Test Facility Base Funding Reduced Significantly



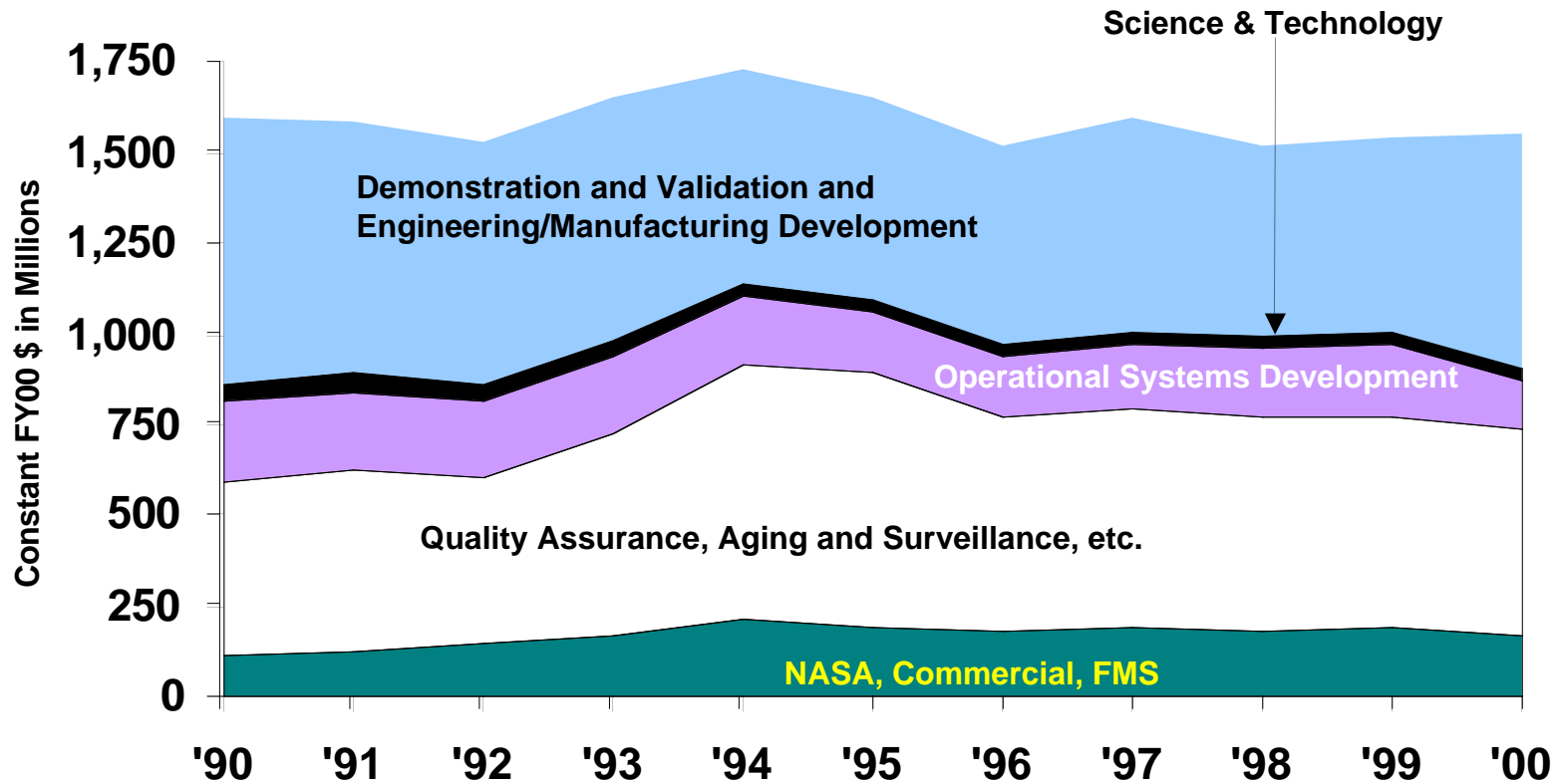


Reductions in All Elements of MRTFB Workforce





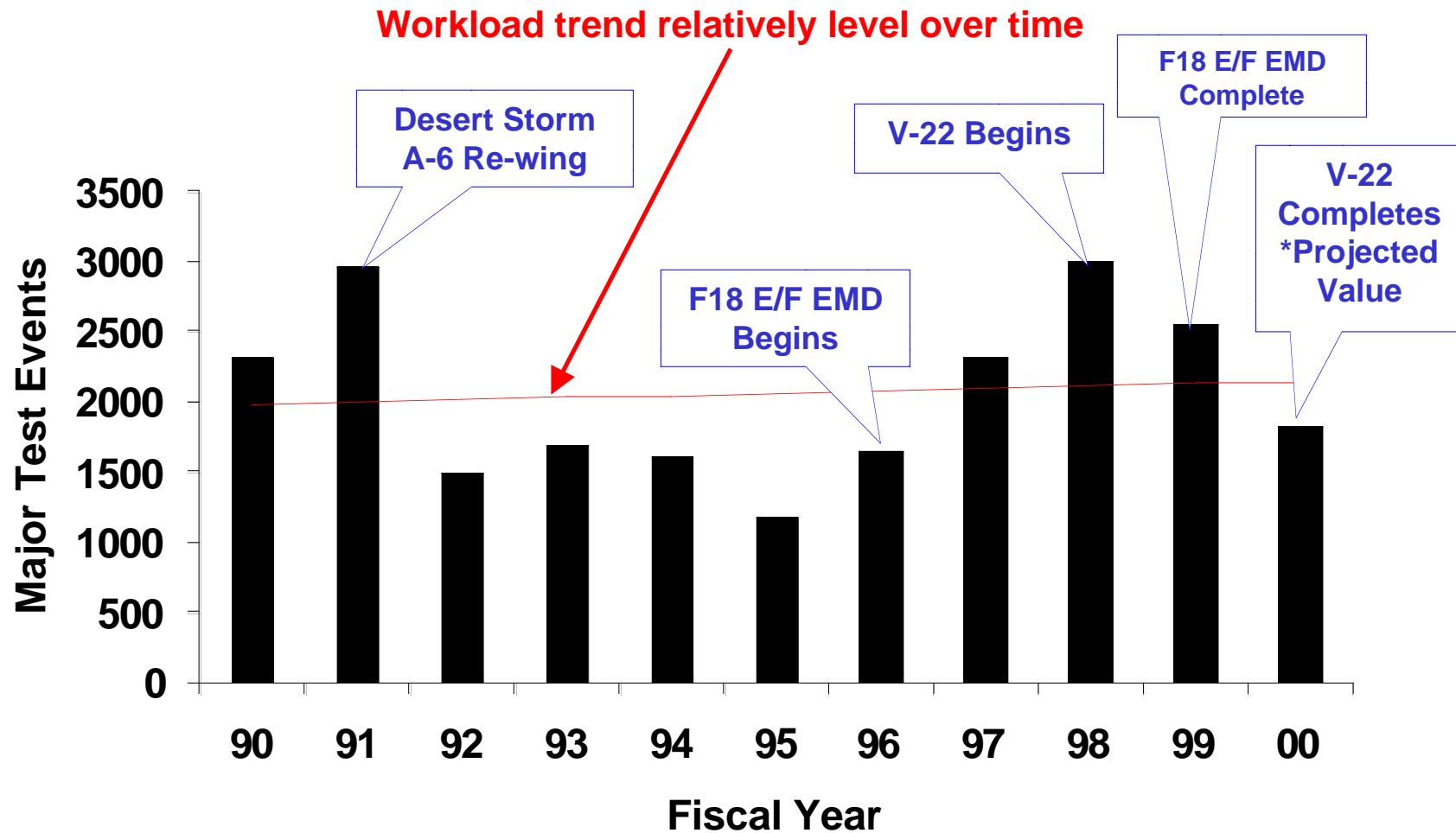
Major Range and Test Facility Base Workload Remains Steady





Fluctuating MRTFB Workload

NAWC-Aircraft Division, Open Air Range





Observations on T&E Workload

- We should encourage and expect to see shifts in workload due to changes in test processes
- The significant marginal cost is not in the test range or the capability but in the people—which have been dramatically reduced—in some cases too much
 - Reductions in people equate to reduced capacity to handle fluctuating workload
- Management at the local level is working



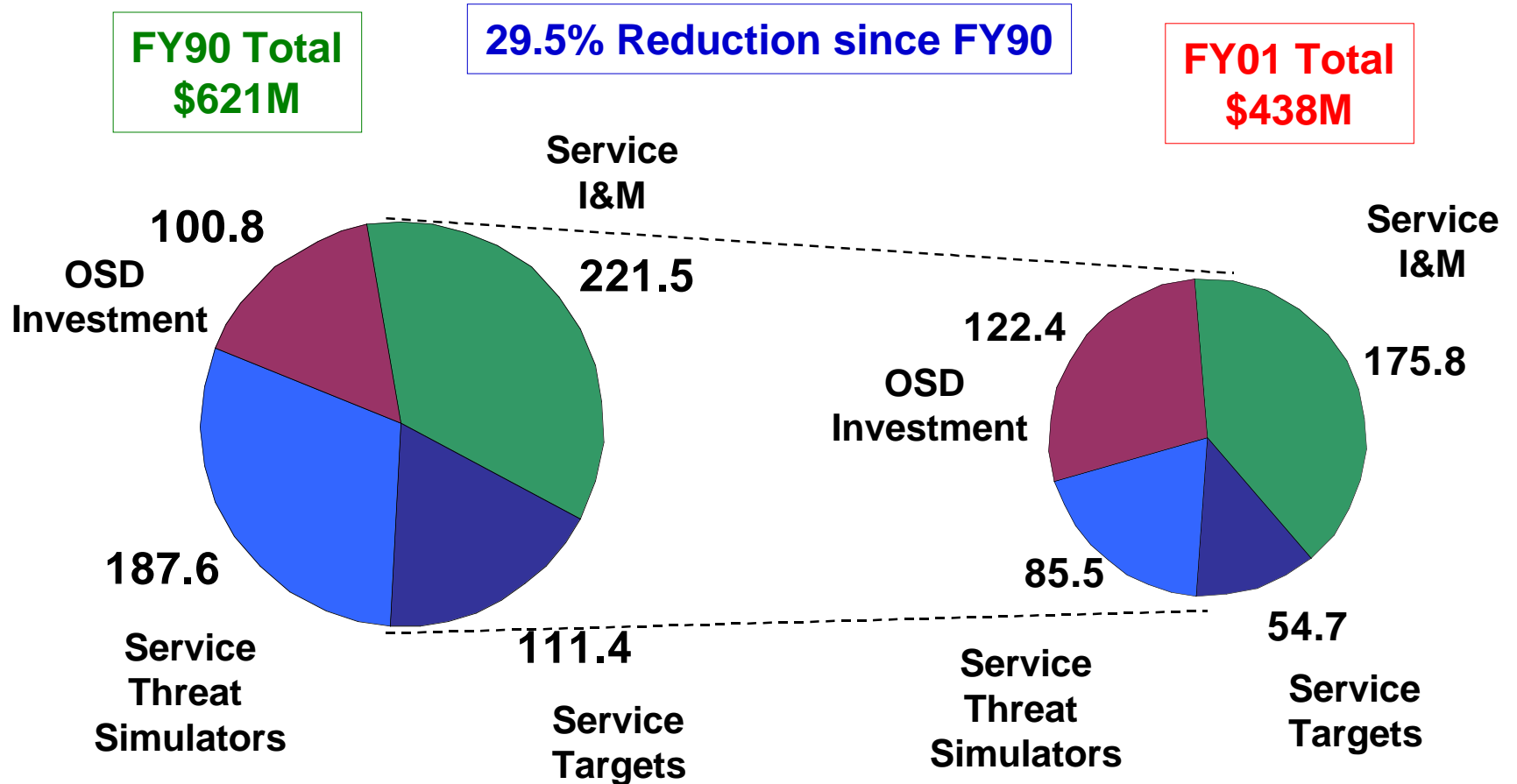
T&E Investment Program

3 Goals of T&E Investment

- Develop capability to test new, increasingly complex technologies to support technology and weapon systems development
- Re-capitalize outdated and aging T&E facilities and instrumentation
- Replace inefficient, labor-intensive T&E capabilities with modern, cost-effective capabilities to meet the needs of the 21st century



RDT&E T&E Investment Funding Reduced



*RDT&E Funding (FY01 \$)

Includes T&E Investment, Targets and Threat Simulators; excludes Military Construction and Procurement



Facilities in Poor Shape

- Inadequate O&M funding to maintain aging facilities at T&E centers
 - Structural deterioration at Kwajalein Missile Range where some facilities require safety fencing and hard hats to protect personnel from fall debris
 - Problems with roofs, electrical systems, sewers and water distribution system at Dugway Proving Ground
 - Emergency repairs required the Atlantic Undersea Test and Evaluation Center to fix leaking water supply lines



Collapsing Aviation Facility at KMR
Where safety fencing is required to protect personnel from falling debris and cave in



Automotive Facility at KMR is a mandatory hard hat area due to spalling concrete and badly corroded roof support beams



Test Capability Also Facing Maintenance and Repair Challenges

Holloman High Speed Test Track (HHSTT)

- In late FY98 and early FY99, the rail cracked in four places.
 - Three of these failures occurred due to thermal contraction and one failure occurred during a SM-2 warhead sled test.
 - A refurbishment effort is underway; however, additional funds are still required.
- Programs potentially affected include several BMDO programs, F-22, Navy's Standard Missile II seeker testing, and testing for aircraft egress system developers.

Arnold Engineering Development Center

- Due to deteriorating facilities, more frequent equipment failures impacting critical development schedules are anticipated
- Investments made to address these issues but additional funding required
- Average annual facility investment is approximately 0.5% of replacement value



Observations on T&E Investments

- Improvements in efficiency are limited by investment dollars
- DoD is underestimating the difficulty of testing new technologies
- Many of these new technologies will require improved testing capabilities

Missile Defense

Unpiloted Vehicles

Digitization

Directed Energy

Multi-spectral Stealth

Remote Sensing

Precision Location

Space Systems

Hypersonics

- Areas for future emphasis
 - Ballistic Missile Target Position Location and Telemetry Instrumentation
 - Ground test capability for air and space components
 - Distributed simulation
 - Common testing and training modeling and simulation
 - Realistic countermeasures



Observations on T&E Investment

- Major Range and Test Facility Base premise was for the Department to invest in general use facilities to preclude duplicative single use facilities at contractor sites that would cost the tax payer more over time
- Increasingly seeing acquisition programs investing in single use facilities at contractor sites
 - Programs cannot justify the incremental cost increases necessary to make capabilities generic
 - DoD will continue to pay overhead costs for such facilities on continuing and future contracts or the capabilities will disappear
- Institutional investment resources insufficient to develop the generic capabilities that would serve multiple programs over time



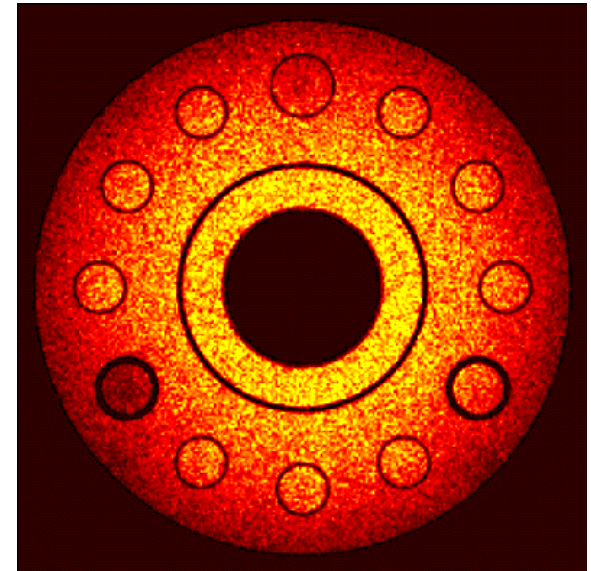
Observations on Low-Use Critical Test Capabilities

- With increased pressure on budgets, Services are less interested in financially supporting low-use capabilities that are not high priority to owning Service
 - Tunnel 9
 - Aberdeen Pulse Radiation Facility (APRF)
 - Big Crow
- Management time and effort to resolve these issues indicate a process change is required



Aberdeen Pulse Radiation Facility (APRF)

- APRF is a unique facility required for NMD and satellite testing
- APRF operates a variety of radiation sources, ranging from low to high intensities, to support radiological safety and protection for soldiers and to support radiation-effects testing on electronics
- A variety of isotopic sources are available for alpha, beta, gamma, and neutron radiation
- Contracting out security guards increased operating costs resulting in disagreement over value of the facility





Big Crow

- Airborne test platform configured as a high power standoff electronic warfare jammer, escort jammer, and self-screening jammer.
- Lack of full Army support has led to congressional interest
- Improvements are also required to increase radiated-power capability, enhance threat fidelity, increase data rates, and increase electronic data storage capacity.
- Programs affected include Patriot Advanced Concepts III, Army Tactical Command and Control System, Joint Surveillance and Target Attack Radar System, Aegis, and E-3A. Also provides support to CINCs for contingency operations.





Reflecting on Previous DSB Recommendation

“The focus of T&E should be on optimizing support to the acquisition process, not on minimizing (or even ‘optimizing’) T&E capacity”

- **Focus still on minimizing or optimizing T&E**
- **T&E resource issues affecting acquisition programs**
- **In the long-run it will cost the tax payers more**



Observations on Workforce Demographics

- Loss of military in T&E continues—lack representation from specific specialty areas
- Attempting to compensate with increase in civilian workforce made up of recently retired military—but civilian billets cut as well
- Civilian workforce demographics indicate retirement bow wave approaching and little infusion of new workers trained in recent technological advances
- Portion of workforce made up of contractors is increasing—contractors cannot represent government on IPTs



Report of the DSB Task Force on Human Resources Strategy

- Potential considerations for T&E
 - Development of professional development and career management program
 - Recruit a more age-balanced workforce and increase the leadership pool for career civil service. (Increase intern programs and vigorous college recruitment)
 - Move to a more seamless integration of active and reserve components



Recommendations

- Look at applying DSB recommendations on human resources to T&E
- Continue to track costs and utilization at test cell and test stand level
- Support core investment in institutional budgets
- Seek opportunities to further increase efficiencies recognizing that this requires new investment
- Invest in future technologies
- Consider the need for a Front End Assessment for T&E modernization



BACKUP



Management at the Local Level

- Local managers have cost visibility
 - Job order cost accounting systems in place
 - Provide cost visibility by test project, facility, and element of expense (labor, travel, utilities, fuel, supplies and materials, etc.)
- Local managers track utilization at the test facility level -- methodologies tend to be facility or capability specific
- Local managers have the flexibility to adjust
 - Move workforce from one facility to another
 - Place facilities in standby mode and mothball or close them as necessary



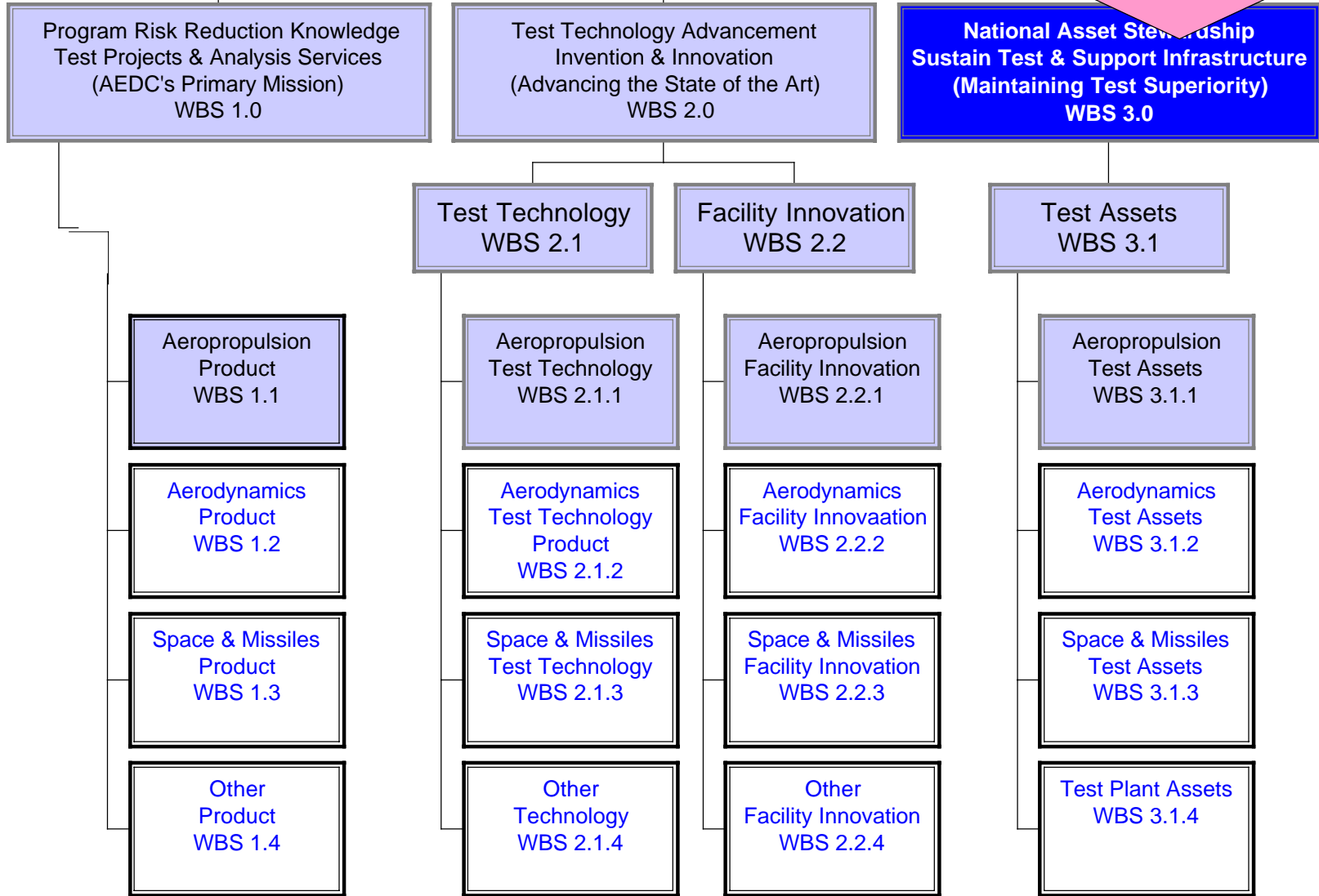
Example of Local Management

AEDC WBS Matrix

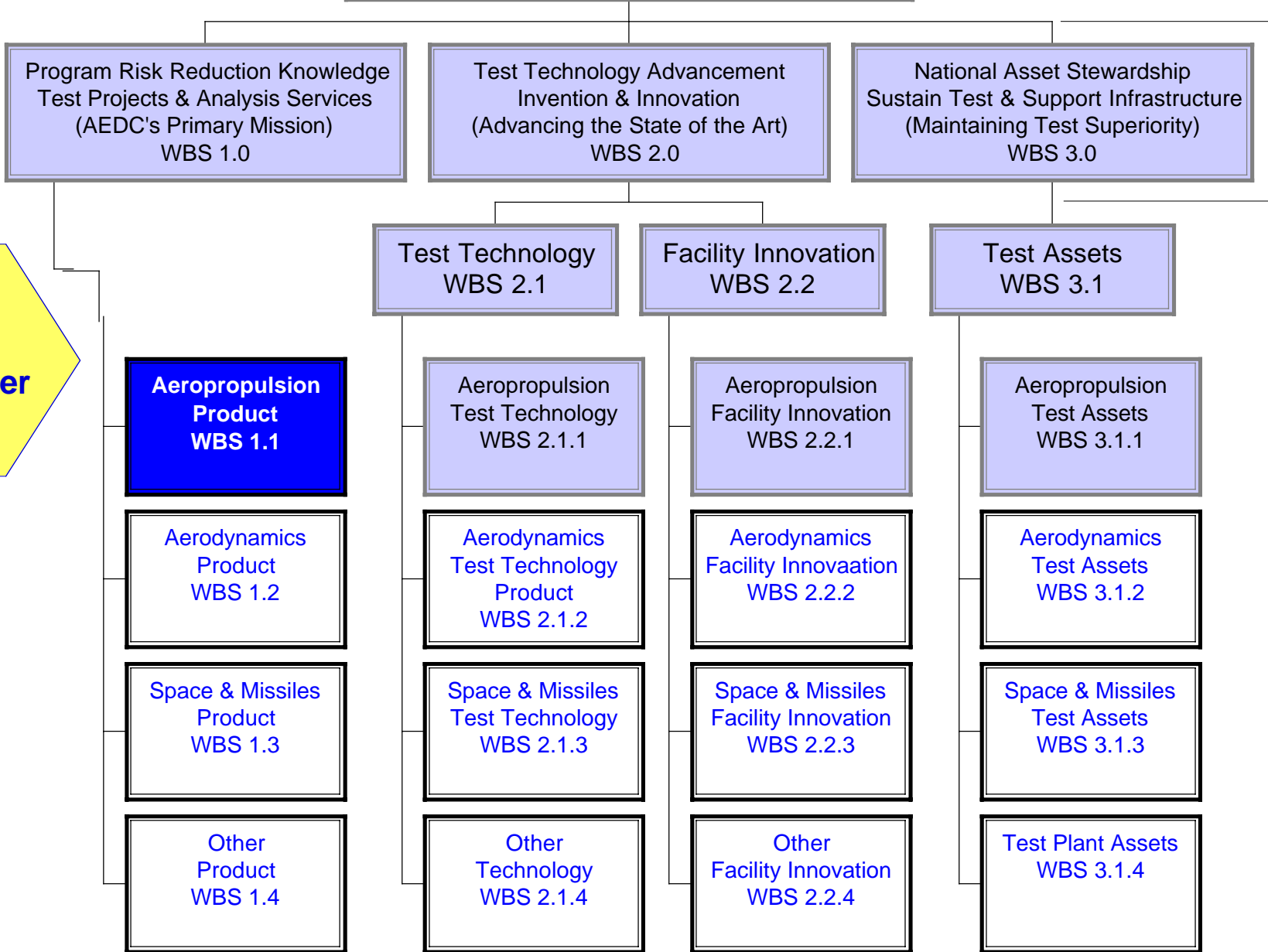
- Costs are collected and DBA is distributed vertically through the WBS for reserve capacity determination
- For customer revenue, costs are collected and RBA is distributed horizontally across the WBS
 - WBS 1.X managers are the single face to customer and will maintain a buyer relationship with 2.X and 3.X for customer projects (2.X also has some outside customers)

AEDC Enterprise Work Breakdown Structure

\$\$\$\$
Most
DBA

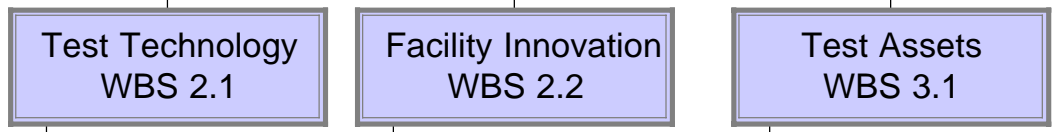
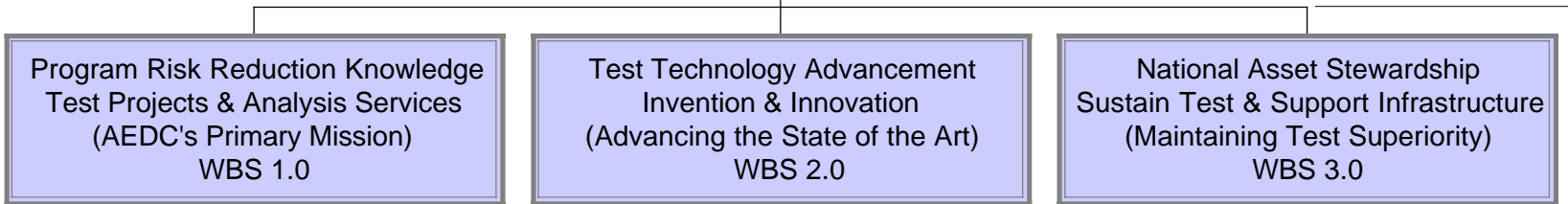


AEDC Enterprise Work Breakdown Structure

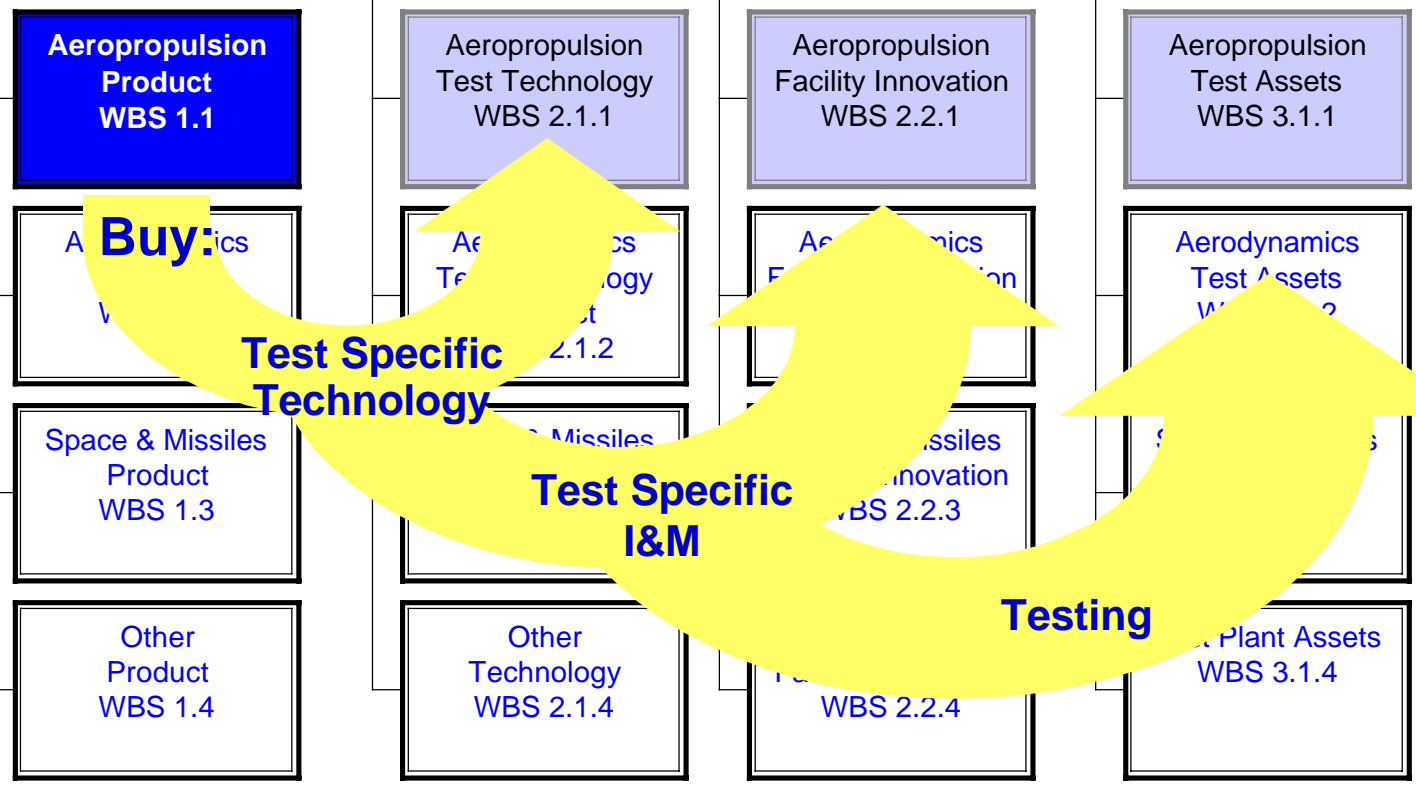


**\$\$\$
Most
Test Customer
RBA**

AEDC Enterprise Work Breakdown Structure



\$\$\$\$
Test Customer
RBA



Buy:
Test Specific Technology

Test Specific I&M

Testing