A TACOM Perspective

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C, Cost and Systems Analysis
TACOM LCMC
28 January 2009

What I'll Talk About

- Overview of TACOM and Cost & Systems Analysis
- Evolution of Cost Tools and Models
- ACEIT Usage
- Keys to a Successful ACEIT Design
- Future Direction of ACEIT at TACOM

Overview of TACOM

TACOM LCMC Vision

Providing our Warfighters with overwhelming lethality, survivability, mobility, and sustainment for battlefield dominance, now and in the future.

TACOM LCMC Mission

Develop, acquire, field, and sustain Soldier and ground systems for the Warfighter through the integration of effective and timely Acquisition, Logistics, & cutting-edge Technology.

TACOM LCMC

Core Competencies / Product Lines / Magnitude

What we do (Core Competencies)

- **Acquisition** / Program Management
- **Logistics**, Industrial Operations, and Contracting
- **Technology** – Research, Development, and Life Cycle Engineering

The Magnitude

- Over 150 Allied Countries own TACOM Equipment
- Every Army Unit has TACOM LCMC Equipment
- Approximately 3,000 Fielded End Items
- 29,000 Components

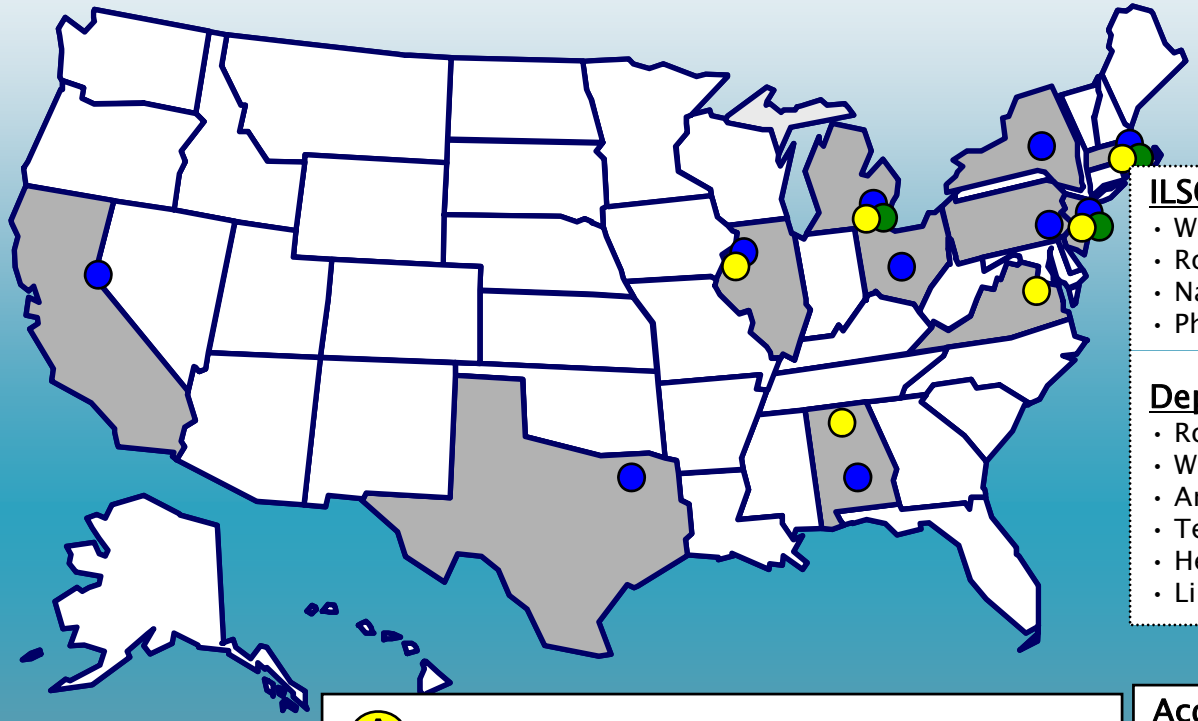
The TACOM LCMC Product Lines

- Combat Vehicles
- Trailers
- Materiel Handling Equipment
- Fuel & Water Dist Equipment
- Chemical Defense Equipment
- Howitzers
- Commercial Vehicles
- Tactical Vehicles
- Construction Equipment
- Tactical Bridges
- Armored Security Vehicle
- Route Clearing Vehicle
- Sets, Kits & Outfits
- Shop Equipment
- Large Caliber Guns
- Watercraft
- Mortars
- Aircraft Armaments
- Rail
- Fuel & Lubricant Products
- Rifles / Machine Guns
- Soldier Equipment
- Rapid Fielding Initiative
- Mine Resistant Ambush Protection

We support a diverse set of product lines through their life cycles, from combat and tactical vehicles, armaments, watercraft, fuel and water distribution equipment, to soldier / biological / chemical equipment.

TACOM LCMC

Primary Locations



A

PEO GCS
- Warren, MI (HQ)
- Picatinny, NJ
- Huntsville, AL

PEO CS&CSS
- Warren, MI (HQ)
- Rock Island, IL
- Huntsville, AL
- Natick, MA

PEO Soldier
- Fort Belvoir, VA (HQ)
- Picatinny, NJ
- Huntsville, AL

L

ILSC
- Warren, MI (HQ)
- Rock Island, IL
- Natick, MA
- Philadelphia, PA

Depots and Arsenals
- Rock Island, IL (JMTC RIA)
- Watervliet, NY (JMTC WVA)
- Anniston, AL (ANAD)
- Texarkana, TX (RRAD)
- Herlong, CA (SIAD)
- Lima, OH (JSMC LIMA)

C

Acquisition Center
- Warren, MI (HQ)
- Rock Island, IL

T

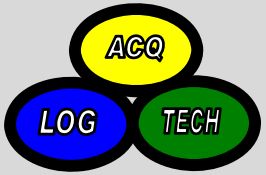
Enterprise Partners
- TARDEC – Warren, MI
- ARDEC – Picatinny, NJ
- NSRDEC – Natick, MA

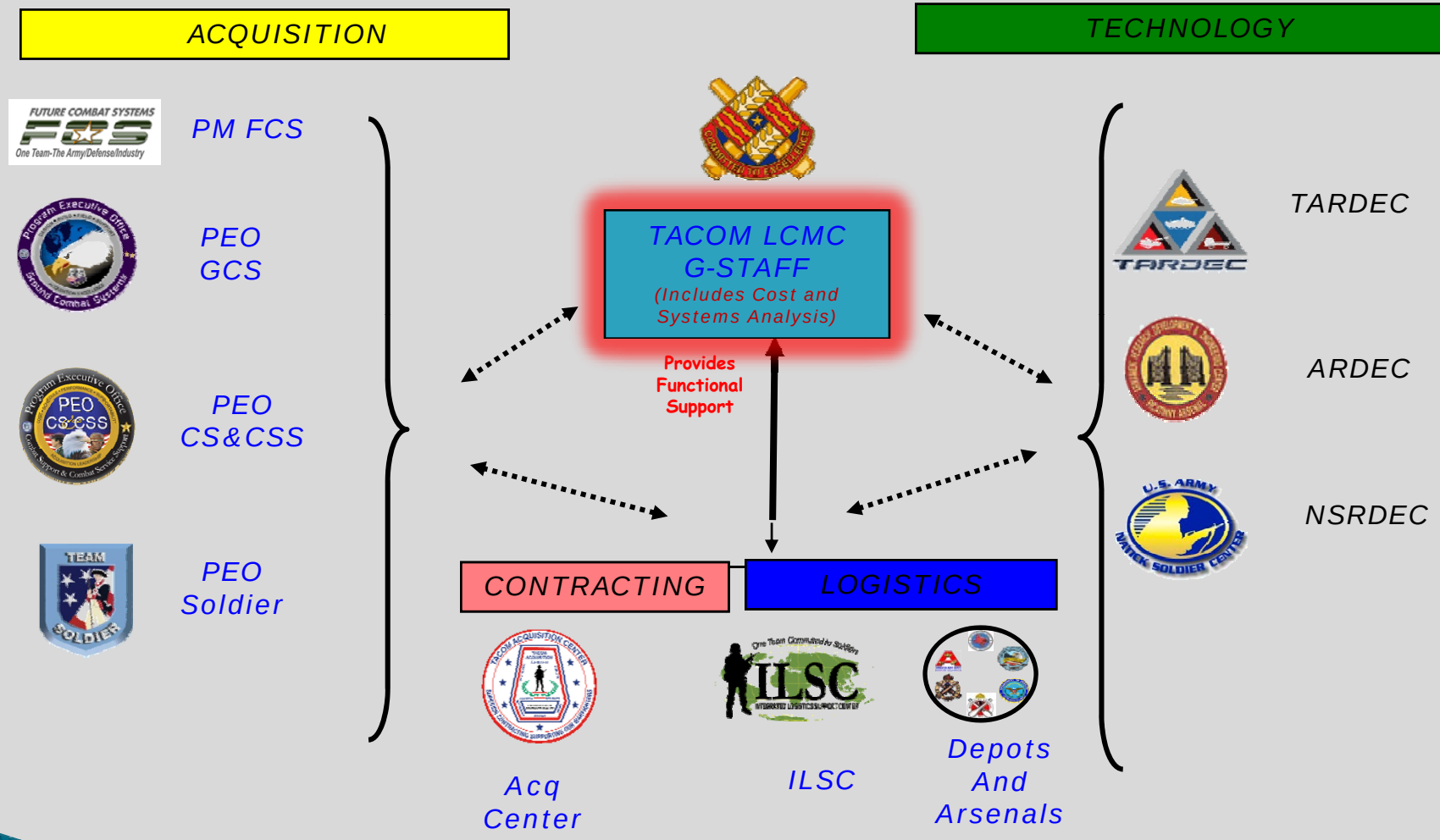
A Acquisition (PEOs)
L Logistics / Industrial Operations (ILSC)
T Technology (RDECs)

TACOM LCMC personnel are located around the world - everywhere Soldiers need us. TACOM LCMC logistics assistance representatives (LARs) are deployed to Southwest Asia as well as ILSC, RDEC, and PEO personnel.

How TACOM LCMC is Organized

Core Competencies: Acquisition, Logistics, and Technology (ALT)





(A) Acquisition represents the development, production, and fielding of system
(L) Logistics represents the logistics and sustainment support to systems.
(T) Technology represents the research, development, and engineering of systems.

G-8 Resource Management
Organizational Structure

Deputy Chief of Staff, Resource Management

Rich Bazzy
Cost & Systems Analysis

- C, Cost Analysis Tactical
- C, Cost Analysis Combat
- C, Cost Analysis FCS
- C, Systems Analysis

Matrix Cost Analysis Support

- PEO CS&CSS
  - PM FMTV
  - PM HTV
  - PM LTV
  - PM JLTV
  - PM MRAP
- PEO GCS
  - PM HBCT
  - PM SBCT
- PM FCS

- Managerial Accounting
- Customer Management
- Force Management
- Program & Budget
- Resource Automation

G8's mission is to provide financial, budgetary, manpower and cost and systems analysis support to the TACOM LCMC and the PEOs to ensure resources are available and effectively used in support the Army's soldiers

Cost and Systems Analysis Office

Our Mission

Our mission is to manage the tools and databases to support cost and systems analysis processes and to provide general independent analytical support for the Warren site of the Army Tank-Automotive and Armaments Life Cycle Management Command

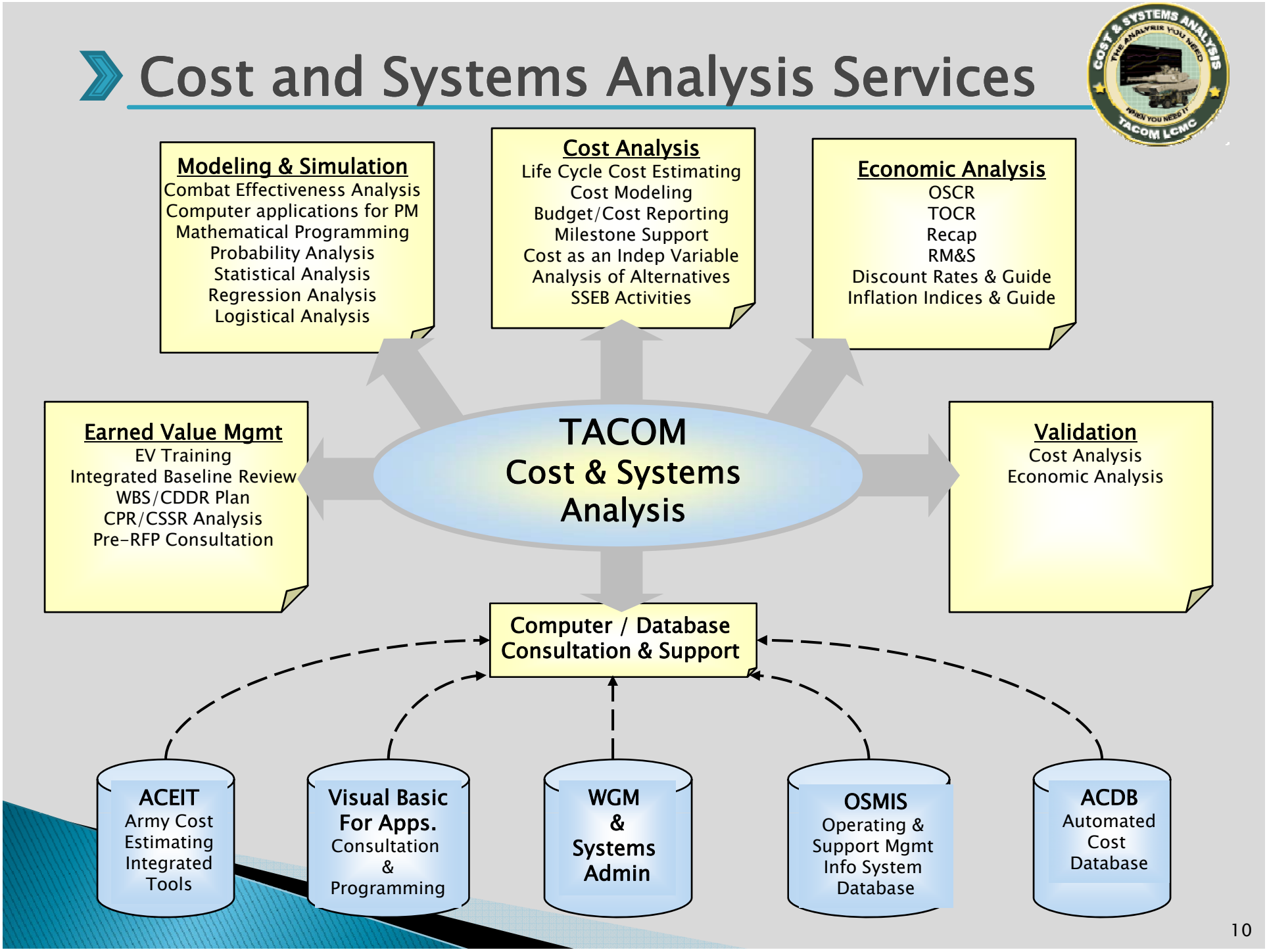
Our Goal

Our goal is to provide the analysis you need, when you need it.

Customer Focused Strategy Statement

In partnership with our customers, we provide superior analytical support and innovative solutions to the challenges they face in their programs. We anticipate and respond to their unique needs by being knowledgeable of their business and demonstrating the flexibility and determination to get the job done.

Cost and Systems Analysis Services



Cost and Systems Analysis Customers

Integrated Logistics Support Center (ILSC)

TARDEC

PM Future Combat Systems (FCS)

Joint Combat Support Systems

PEO Ground Combat Systems (GCS)

Joint Light Tactical Vehicle (JLTV)

PM Sets, Kits, Outfits & Tools (SKOT)

PM Heavy Brigade Combat Team (HBCT)

TACOM Cost & Systems Analysis

PM Light Tactical Vehicles (LTV)

PM Stryker Brigade Combat Team (SBCT)

PM Medium Tactical Vehicles (MTV)

PM Combat Engineer / Material Handling Equipment (CE-MHE)

Mine Resistant Ambush Protection

PM Heavy Tactical Vehicles (HTV)

PM Army Watercraft Systems (AWS)

PM Petroleum & Water Systems (PAWS)

PM Modular Brigade Enhancements (MBE)

PM Assured Mobility Systems (AMS)

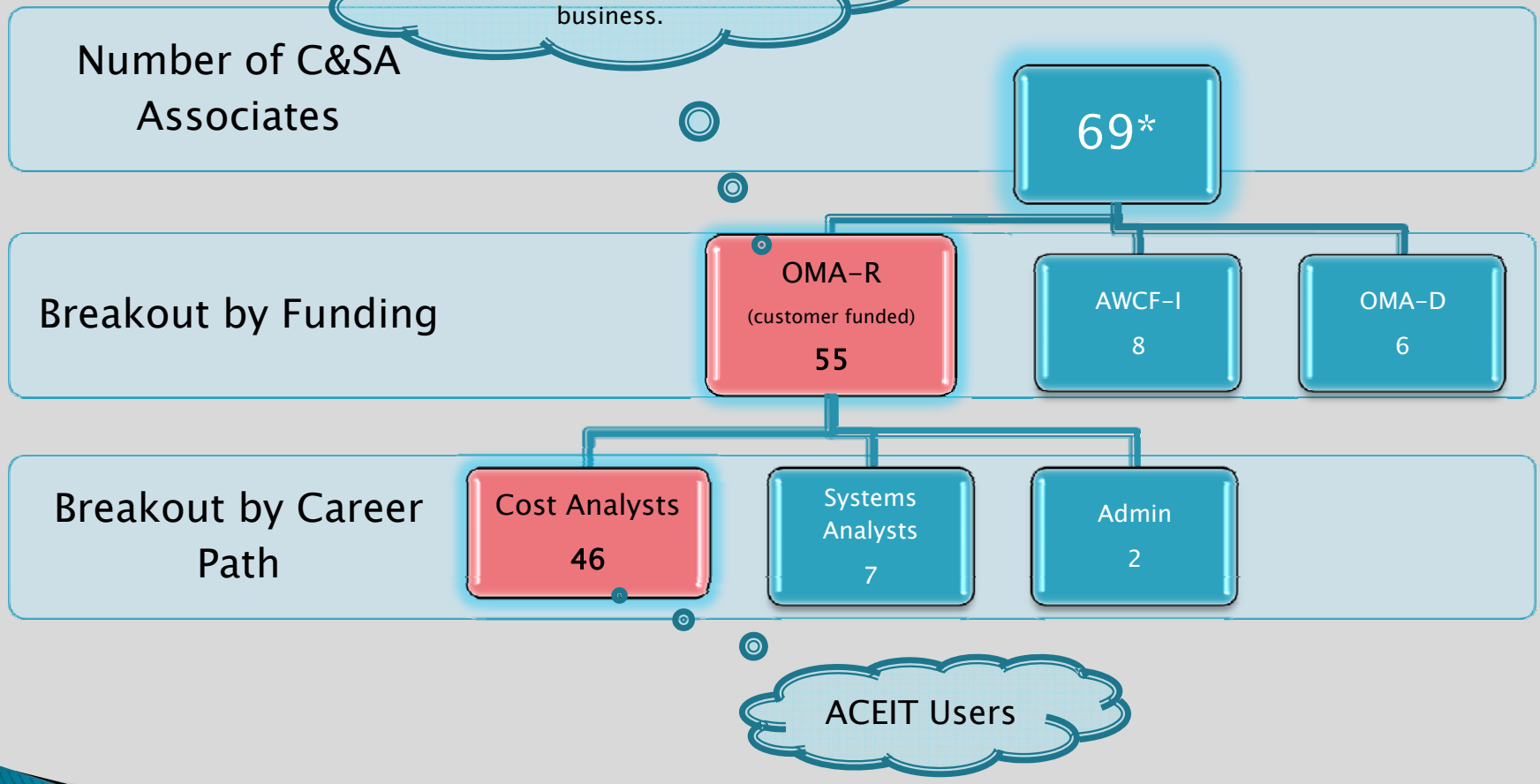
PM Bridging

Cost and Systems Analysis Workforce

As of January 14, 2009

C&SA is 80% customer funded.

Customer satisfaction drives our business.

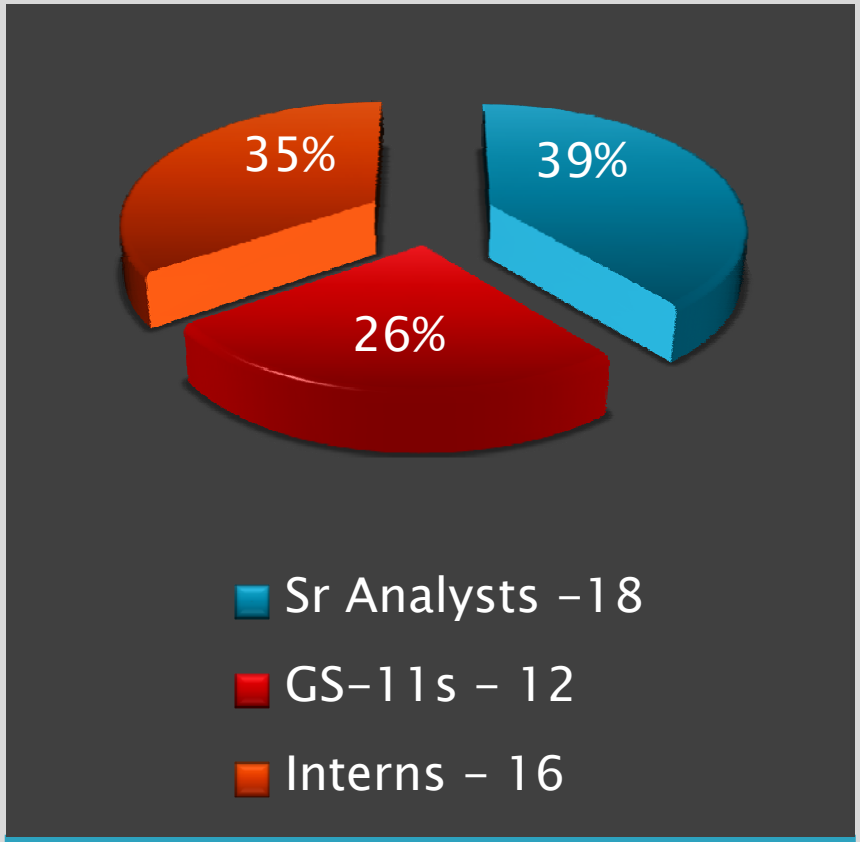


*Total on board; excludes vacancies

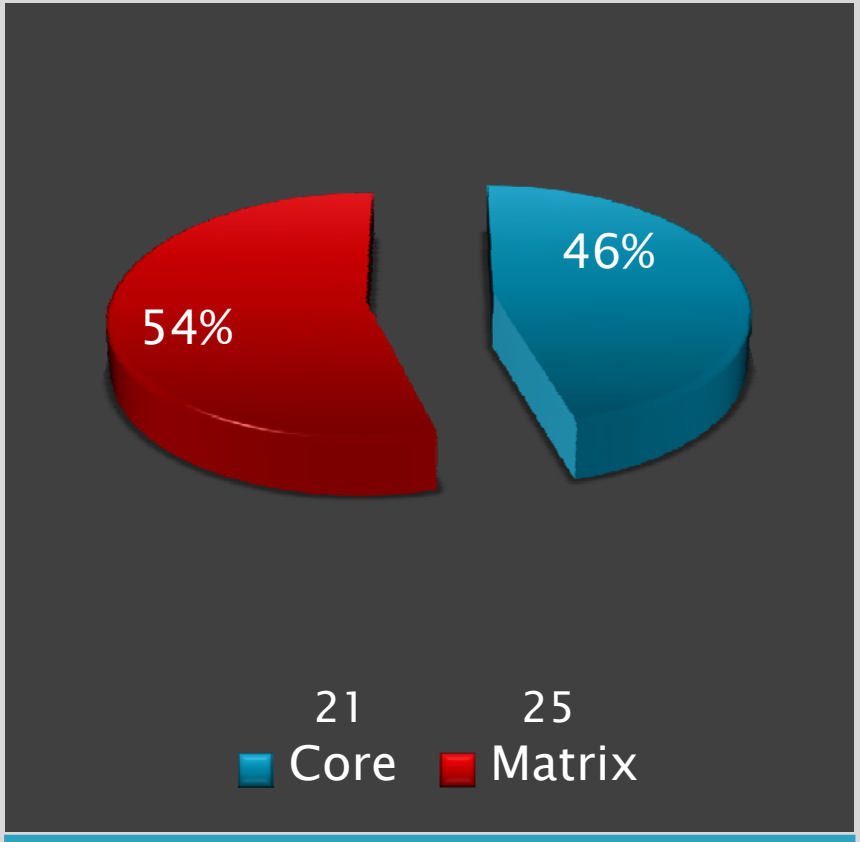
Cost Analyst Breakout

~ 46 Cost Analysts ~

As of January 14, 2009



Breakout By Grade



Breakout Core versus Matrix

Evolution of Cost Tools and Models

Factors Driving Cost Tool Evolution

The need to solve difficult problems:

- multisystem costing (e.g. AFV, HFM, Stryker, FCS)
- multiservice costing (JLTV, MRAP)
- commonality
- large, complex WBS

The need to efficiently address the costing complexities of large programs:

- system level and technology level costing
- schedule changes
- staggered programs
- cost sharing and allocation
- varied acquisition strategies

Factors Driving Cost Tool Evolution… cont.

Demands for increased analysis:

- multiple alternatives
- multiple scenarios
- optimization within budget constraints
- real-time "What-If" drills
- program, technical, cost risk

Demands for increased visibility and reporting. Must slice and dice by:

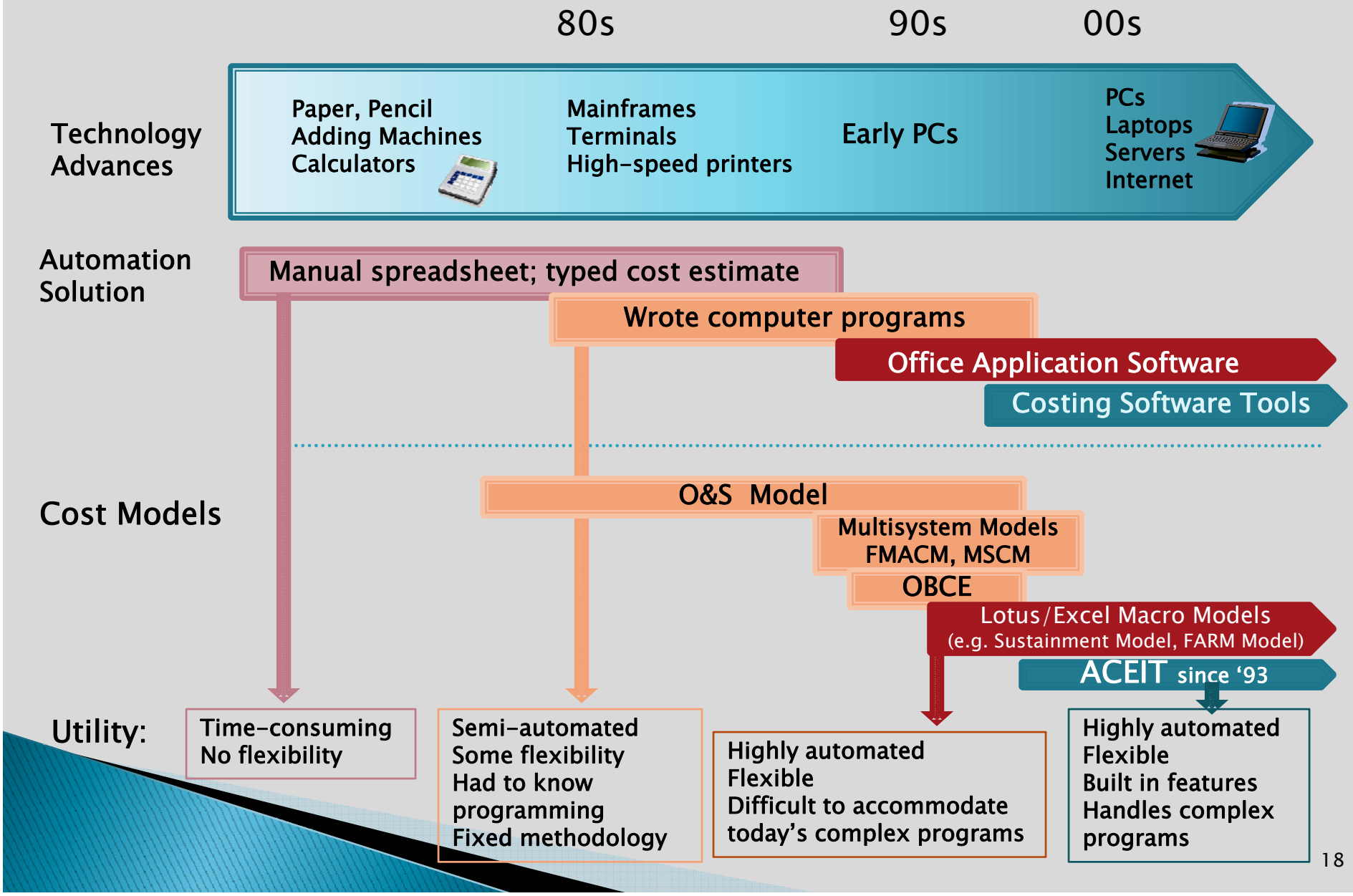
- unit cost, total cost, rollups
- by technology, vehicle, vehicle family
- by life cycle phase and CES
- by appropriation and service
- PM versus non-PM
- by theatre, Army component

Factors Driving Cost Tool Evolution… cont.

Above necessitated automated methods in order to handle voluminous details and calculations associated with:

- time- phasing of costs
- inflation, escalation of data
- assignment and allocation of costs
- more complex methodology
- linkage of schedules, data, costs between CES and phases of life cycle

Evolution of Cost Tools



MYTH:

ACEIT (automated models) enable analysts to enter a few inputs
Press F9
and **instantly get results**

FACT:

As automation **increases**
so does
Expectations

TRUTH:

Automation **cannot eliminate the human element.**
Estimating still requires **careful analysis, sound judgment, and time!**

ACEIT Usage

Current ACEIT Users

C&SA

To support:

LCCEs/ POEs
WSR, PBR
What-If Drills
Budget Drills
P Forms; R Forms

More Recent PMs

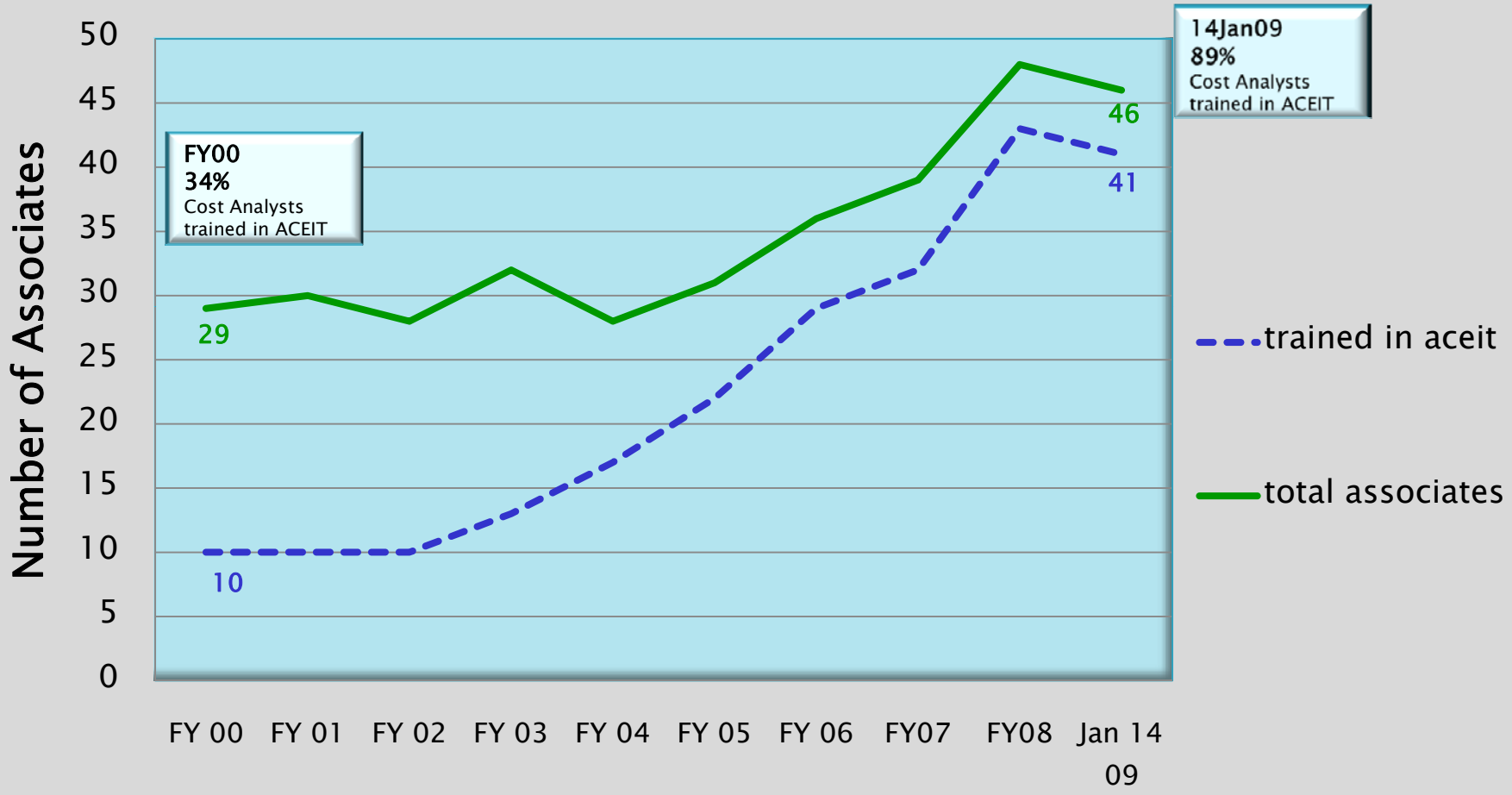
Stood Up with C&SA analysts:
e.g. Stryker, FCS, JLTV, MRAP

Uses ACEIT or combination of tools. Transition to ACEIT varies by PM.

Existing PMs

C&SA providing matrix support
e.g. Heavy Brigade, FMTV, HTV, LTV, ASV

Growth in ACEIT Users Over Time



Actions which Proliferate ACEIT Usage

- Offer annual ACEIT training for the Command. Since March 02:
  - 24 training sessions
  - 203 participants
- Encourage participation in ACEIT User's Group
- Have ACEIT POC for Command
  - disseminate information, field questions
  - provide updates, offer demonstrations
- Centralized repository of ACEIT files – facilitates sharing, updates and reference

Actions which Proliferate ACEIT Usage…cont.

- Develop C&SA Workforce:
  - 100% incoming associates trained
  - all LCCEs in ACEIT
  - initiate new ACEIT users with simple LCCEs or portion of a larger LCCE and work up to become proficient users
- Matrix support to PMs are trained in ACEIT
- Experienced ACEIT users moving in Core PM slots
- DASA-CE directed LCCEs for ACAT I/select programs be in ACEIT to support WSRs – as of Feb 06
- C&SA implemented DASA-CE directive on behalf of PEO CS&SS to insure 100% compliance

Overview of C&SA Led WSR Effort

- Identified all PEO-CS&CSS systems without ACEIT models
- Provided necessary matrix and core resources to construct fully developed ACEIT files
- Worked through resistance* and PEO CS&CSS became 100% compliant in Nov 08
- ACEIT files developed for HEMTT, HEMTT Recap, HMMWV, HMMWV Recap, PLS, ASV and FMTV
- Additionally, embedded automated rollup features in ACEIT files which:
  - crosswalk CES to PEGs to support WSR
  - crosswalk to P-Forms and R-Forms to support budget

*PM FMTV – which ultimately became one of the biggest success stories

*FMTV ACEIT Success Story

PM FMTV Excel Model

- Mgmt & Core Cost Analyst proficient In Excel
- Have FMTV POE in complex macro based Excel file
- Meets their needs

WSR req't Feb 06

- PM FMTV resistant to change & said too much effort to convert to ACEIT
- PM FMTV submitted Excel model for Feb '06 WSR; received waiver
- Resisted C&SA support & submitted Excel model for next WSR

ACEIT Model Nov 08

- PM FMTV Cost Analyst retired Feb 08
- C&SA developed ACEIT model for Nov 08 WSR
- Required 3 months and (4) C&SA matrix/core analysts

"…***one of the best ACEIT models I've seen!!***"

DASA-CE,
2008 WSR Review

Benefits of FMTV ACEIT Cost Model

ACEIT gives you the power to provide desired cost visibility ~ even for very complex systems

W/ Excel Based Model

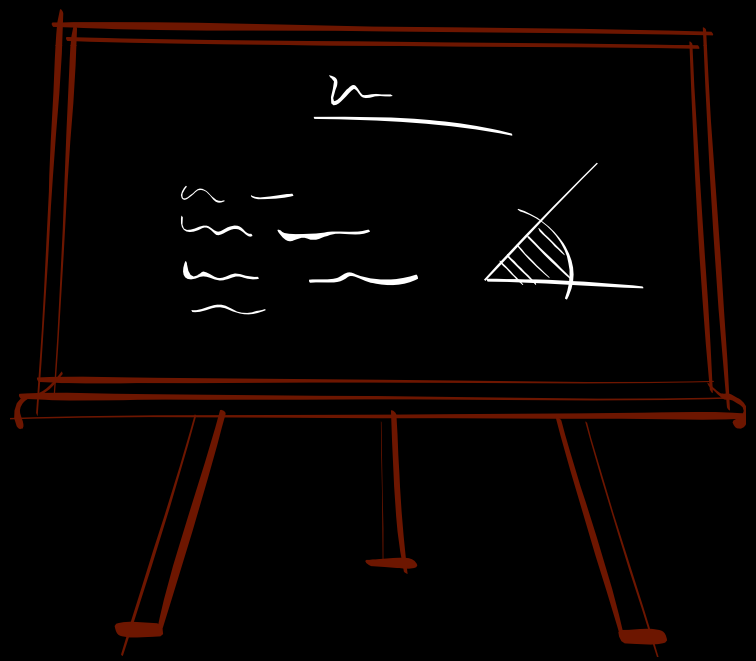
- Cost visibility by vehicle family (LMTV, MTV)
- Total fielding cost by vehicle family
- Manual built time-phasing & cost allocation
- Manual inflation adjustments
- Manual insertion of inflation factors – Annually!
- Off-line Documentation
- Separate graphics
- Greater opportunity for errors; harder to isolate errors

W/ ACEIT Model

- Cost for each model within a vehicle family (e.g. for MTV: Wrecker, Cargo, Tanker, etc)
- Fielding costs by CES for each model within a vehicle family
- Automated time-phasing & cost allocation
- "Inflation Utility" ADD-IN
- Automated indices
- Embedded Documentation
- "POST" ADD-IN
- Automation features reduces errors; easier to isolate errors

"***I get questioned almost daily on individual models and this (ACEIT) has made all the difference in the world.***" FMTV Cost Analyst
January 13, 2009

Keys to a Successful ACEIT Design



Keys to a Successful ACEIT Design

1. Pre-plan design requirements!!
2. Coordinate requirements with user, customer and team members!!

Keys to a Successful ACEIT Design

1. Plan in advance the level of detail needed

- Design your model to the lowest level of cost visibility you may need.
- Design your model to enable you to slice and dice costs all ways in which you may need to conduct analysis or summarize costs.

Level of Detail for JLTV ACEIT Model

- Factors which had to be considered:
  - Dual services
  - Multiple payloads for each service
  - Multiple variants for each payload
  - Multiple phases in Development
  - Multiple Development Contractors by RDTE phase
- ACEIT model designed to provide:
  - Total costs by Services
  - Total costs by Payload
  - Total cost by Variant or Trailer
  - Total cost by CES
    - By service
    - By payload category
      - By variant or trailer
  - Total cost by appropriation
    - By service
    - By payload category
    - By variant or trailer
  - Unit Costs
    - By payload category
      - By variant or trailer
    - By service
    - Combined services
      - By payload category
      - By vehicle or trailer

Keys to a Successful ACEIT Design

2. Design a separate "Roll-up" section within ACEIT

- Consolidates all programmed summaries in one area.
- Create summaries and/or reports for frequently asked information (e.g. PM funded versus non-PM funded costs by year; Selected Acquisition Report (SAR) costs by SAR categories).
- Avoid using a summary to feed another summary.
- Automatically produce special summaries to support other requirements.
  - CES to PEG crosswalk for WSR
  - P-Form and R-Form Rollups

Keys to a Successful ACEIT Design

3. Link together as many elements as possible so costs will automatically adjust input changes

- Link schedules to each other (e.g. production and fielding schedules).
- Link quantities to quantity dependent costs (e.g. ECO's, testing).
- Link cells that are dependent on other cells (e.g. initial spares as % of mfg cost).

Keys to a Successful ACEIT Design

4. Carefully plan your variables

- Name your variables to align with what they represent. For example
  - Put % after factors/percentage variables names, e.g. DevTool%
  - Put $ after cost variable names, e.g. Techmanual$
  - Use similar conventions for schedules, e.g. ProdSched, FldgSched, OpSched
- Coordinate variables and variable names amongst ACEIT team members in advance of model development to insure consistency and to enable file integration. For example
  - Everyone use M1083ProdSched for the M1083 production schedule
  - Everyone use same model number in variables throughout the life cycle, e.g. M1083OPTEMPO; M1083FldSched; M1083InitSpares$ (don't want someone else using 1083A1P2)
- Plan for the future; use variables, not numbers. You may think the value will never change, but they often do, e.g. use a variable, in lieu of a value for the learning curve percentage

Keys to a Successful ACEIT Design

5. Embed all your work within ACEIT rather than coordinating information between several pieces of software

- Don't enter throughputs derived from off-line spreadsheets. Embed the methodology within ACEIT.
- Don't make inflation adjustments off-line. Use "Inflation Utility" ADD-IN to automatically make adjustments.
- Produce graphics using "POST" ADD-IN rather than export to graphics package.

Keys to a Successful ACEIT Design

6. Document your estimate

- Document as you go; it's hard to go back later and do this.
- Documentation will be extremely helpful when you need to make updates, or if someone else must do so in your absence.
- Documentation is essential if project is passed on to someone else.
- Documentation is good reference for other analysts.

Keys to a Successful ACEIT Design

7. Other helpful design hints

- Keep the vehicles and components in the same order in all sections of the file, including the output section.
- Create bookmarks for frequently visited sections and uses them cautiously. Too many will make them hard to find in the dropdown menu.
- Use colors and/or rows of "****" to help distinguish different sections while scrolling through the file.

Keys to a Successful ACEIT Design

8. Helpful hints on file management

- Always preserve old files. You often find the need to review previous methodologies, techniques and results.
- Have a consistent naming convention for saving files, dates or version numbers in the file name.
- Insert a comment line on the first row of each new file to describe how it differs from the previous version.
- Use “Cases” for “what-ifs” within a single ACEIT file. This makes comparative analysis much easier.

Future Direction of ACEIT at TACOM

Where we are headed:

Use of ACEIT as the universal tool to support all cost, what-if, budgetary requirements.

- Results in greater efficiency and accuracy
- Provides tool to document program cost changes over time (audit trail)
- Provides tool to meet and exceed our goal of providing timely and accurate cost estimates

Future Plans.

- Develop process to codify the "Keys to a Successful ACEIT Design"
- Develop ACEIT model standards

We are well on the path to achieving 100% use of ACEIT…We must now work on enhancing the characteristics and structure of all future ACEIT models we create.