

*Affordability of the Objective Force*

**Meeting 26-27 June 2002**

Senior Advisory Group  
**Future Combat Systems**

## Report to Congress by Office of the Secretary of Defense June 2002

### Army Acquisition (RDT&E + Procurement) Projected to 2019

#### OBJECTIVE FORCE

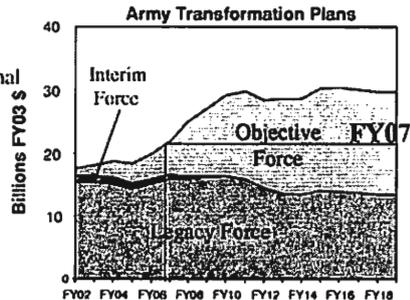
- FCS plus 15 other transformational programs

#### INTERIM FORCE

- 6 IBCTs

#### LEGACY FORCE

- Heavy: 6 AC divisions, 2 NG divisions, 8 NG brigades
- Light: 4 AC divisions, 4 NG divisions, 7 NG brigades



Army is pursuing three force investment programs. None of the three is fully funded

“Meeting these projections would require a steep increase in funding (a ‘bow wave’) in the future. This will pose significant management challenges for DoD if it is to stay within forecast budget levels.”

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## Start Objective Force Transition Now!

- **Army can afford FCS, but only if it changes its accustomed policies, organizations, and tactics**
  - E.g., personnel policy; TRADOC focus; C2 TTP; indirect fire support
  - **These lie well outside the “acquisition lane”**
- **FCS, as presently described by TRADOC and defined by AMSAA is platform-centric, vice “network-centric”**
  - Funding priority is on lethality and survivability vice C4ISR, and vehicular development lags C4ISR and FCS PGMs
  - Only modest reductions in personnel, weight, and cube are foreseen
  - ABCS convergence with FCS remains unclear
  - 155mm cannons and 120mm mortars continue to impede strategic deployment and operational; tactical 3D mobility, especially for crossing obstacles in stride, appears unachievable
  - Land Warrior(LW) and OFW are not incorporated into FCS
- **FCS C4ISR and NetFires are critical to the entire Objective Force, not just FCS; both can be accelerated by diverting to RDA \$O&S for outmoded systems and practices**

## **Four Proposals for OF Maneuver UoA That<sup>2</sup> Can Generate \$O&S for FCS RDA**

- 1. Individual Replacements will be dysfunctional in the UoA of the Objective Force : Unit Managed Readiness will be essential, and the UoA require more, smaller, stabilized battalions**
- 2. TRADOC must move leader development into the UoA vice reliance on resident courses in its schools**
- 3. TOCs within the UoA must evolve into virtual command centers that support commanders through distributed networks**
- 4. UoA must have superior C4ISR and precise weapons.**

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Our propensity has been to view FCS as a Science and Technology program, and to evaluate it within the confines of that construct. But the implications of FCS-like technologies transcend prospects for novel, better materiel: they can transform the Army's fundamental concepts for accomplishing its mission under Title X, USC: "sustained combat on land."

- Personnel policies that engender instability in units of the combat arms
- Those schools that it has long treasured as "seed corn," the methods and means for assuring cohorts of future leaders
- Its doctrinal Deliberate Decision-Making Process, and the operations centers designed to support that process
- Cannons and mortars for delivering fires for destruction, neutralization, and suppression.

The following charts (1) commend modernizing each of the foregoing, and (2) Identify funds to underwrite the modernization.

*1. Unit Managed Readiness (UMR)*

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**TRADOC's O&O for OF Unit of Action**

DRAFT 6/11/02 V.9

**“Unit of Action (UoA) soldiers and leaders are trained, before alert, ready to execute any mission in the spectrum of military operations...Early experimentation has provided insights [that] leader development and materiel are perhaps the two most challenging categories. Small unit leaders at the squad, platoon, and company levels must lead in unpredictable and complex situations while employing a far greater array of advanced weaponry and information systems than their predecessors. These leaders must have the skills and resources necessary to lead soldiers successfully in this new dynamic environment.”**

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One lesson of the recent combat in Afghanistan is the power that can be exerted by small, dispersed, well-led teams of American soldiers operating in formidable terrain against a wily and capable enemy. These were not "average Americans," but Army Special Forces units that understand the value of prolonged tenure, development of an expeditionary mind-set, and stressful training that emphasizes the unexpected, encourages unconventional adaptation to tactical circumstance, and fosters mutual trust and cohesion. These units cultivate their own leaders.

An obvious answer is alter the Individual Replacement System (IRS), which maintains keeps units at authorized strength by assigning individuals to replace any reassigned individual. This matching of face to space was the practice of the Army throughout the wars of the 20th Century, and became more "efficient" as the personnel system was automated. It performed well in short wars: e.g., Just Cause and Desert Storm —the latter a campaign fought with IRS suspended (stop-loss rules). But in long wars like Korea and Vietnam, IRS led to systematic depletion of cohesion and loss of corporate memory, first through infusion of individuals through rotation into the theater, and then through migration of "short-timers" to safer, softer jobs within units. The first casualty of such IRS rotation schemes is competent leadership at the small-unit level.

The underlying logic of the IRS is equity for the individual, that it, assuring even-handed distribution of both "desirable" and "undesirable" tours of duty, and equal opportunity for advancement. In the Objective Force, the first consideration ought to be equity for the unit, and the foremost need for readiness with a combat arms unit is a cadre of well-trained, competent and confident officers and NCOs.

**1. Unit Managed Readiness (UMR)**

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**OF Requires Shift to Unit Managed Readiness**

- Personnel turbulence detracts from unit readiness despite the best efforts of the Army's long-standing individual replacement system. 32%/year... 64% 2 yrs ... 96% in 3 yrs
- High PERSTEMPO, even more than OPTEMPO or DEPTEMPO, is a major blow to morale.
- Austerely-manned combat arms of the Objective Force, with many unmanned platforms, if they are to see, understand, and act first, must be well-practiced, cross-trained, cohesive teams.
- Were combat arms battalions in Korea rotated on six-month tours, time in units in the US would be extended to nearly three years. Hence, the Army must move to implement unit rotations for all forward-deployments, including USAREUR. This will save SO&S ~ \$370 million in annual PCS costs.
- In the Objective Force, a three-year stabilized battalion could be reported with a low readiness rating during its a fill cycle of 1 to 3 months, followed by a rapid up-ramp to top readiness within 18 months. Unit would continue to advance thereafter: Unit Managed Readiness (UMR) to C1++.
- UMR is for maneuver Units of Action. Priority should go to stabilizing the UoA cadre — officers and NCOs — and to developing leaders while in UoA.

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The present Individual Replacement System (IRS) eviscerates training. The IRS will be dysfunctional for the Objective Force, and must give way to UMR for more, smaller combat arms battalions.

The fielding of the A64 helicopter system offers an exemplar for the Objective Force: battalions built from scratch to maintain, support and fight a networked, unprecedented, system of systems.

TRADOC has already commenced to deal with low density, high-technology MOS: soldiers are to be trained only for first assignment, relying on distance learning for subsequent jobs. It has also demonstrated that it can educate captains with unit-mentored distance learning. In fact TRADOC has recently announced to Army commanders that it intends to replace episodic institutional training, plus self-development that has neither structure nor incentives, with TRADOC-managed information age modalities: **unit-mentored, wholly accountable, job- and task-specific, career-long distance learning.**

What is proposed for the Objective Force is managing readiness like the other services, aiming at three years of coherent leadership and bonding within the combat arms:

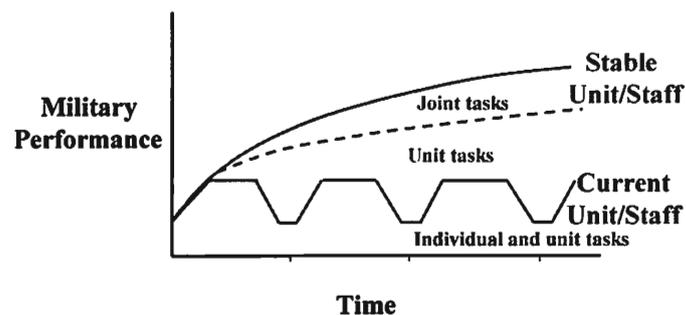
<b>Mo in Cycle</b>	<b>1-3</b>	<b>4-12</b>	<b>13-18</b>	<b>19-24</b>	<b>24-36</b>
<b>Unit Focus</b>	<b>fill</b>	<b>team tng</b>	<b>ARTEP CTC</b>	<b>o'seas: intense tng</b>	<b>Readiness Exs, Indiv tng/ed</b>
<b>Pers R Rating</b>	<b>4</b>	<b>3-2</b>	<b>2-1</b>	<b>1</b>	<b>1</b>

### 1. Unit Managed Readiness (UMR) 5

- **Implement a UMR program-- unit rather than individual replacements for readiness among Combat Arms Battalions deployed overseas.**
- **Commence with converting Korea to UMR, based on 6 month rotations of combat arms battalions.**
- **Then extend the concept, converting saved \$O&S into RDA for Objective Force**

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### Impact of Stabilization on Military Performance



The diagram, drawn from a study prepared this past spring for ASD Chu by John Tillson of IDA, illustrates that stability can be a mainstay of service-specific preparedness, and a major contributor to joint readiness.

**1. Unit Managed Readiness (UMR)**

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**Savings**

- Savings accrue from differential between individual PCS moves and unit deployments to Korea
- Un-costed efficiencies will accrue from 2d order PCS impacts and avoided separations.

	<b>TOTAL</b>
- SO&S attributed to Individual Replacements*.....	\$400mil/yr
+ Savings from Unit Managed Readiness (UMR).....	\$370mil/yr
- Cost to Implement UMR#.....	\$30mil/yr
<b>Potential NET SAVINGS (15 years/ '02 constant dollars)</b>	<b>\$5.5 billion</b>

\* Cost data from 1999 study by ODCSOPS and USAPERSCOM.

# Cost estimates based on moving pers by contract air + 1 MILVAN/Co by sea

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The cost data shown are derived from an Army Staff study of unit rotations to Korea in the late 90's. That study did not attempt to cost the secondary or tertiary effects of PERSCOM's effort to keep units in Korea filled to authorized levels using the Individual Replacement System. Nor did the study consider rotating combat arms units to USAREUR, or other locations.

The SAG consulted with the commander of USAPERSCOM at the time of the '99 ARSTAFF study [Major General Thomas Garrett, USA (Retired)] who reported that during his time in office, replacements for Korea were his principal concern, and that meeting requirements for Korea engendered a number of other serious difficulties, such as declination of command assignments, low reenlistment rates, and family distress. The study was supervised by then-ADCSPER Major General John LeMoyne, the current DA G-1, who was also consulted.

Both Generals Garrett and LeMoyne agreed that rotating battalions to USAREUR would obviate significant annual expenditures for family support, but pointed out that there would be an offsetting significant impact on basing within the United States for which cost estimates were not available.

## 2. Unit-Based Leader Development 7

### TRADOC Seeks New-Venue Leader Development

- **Leader training is not synchronized with the Army's personnel system: most leaders receive TRADOC training in a course after a duty assignment for which the course was designed.**
- **PCS for leader development is (1) expensive, and (2) disruptive to units, and (3) ignores a role for unit leadership.**
- **Unit Managed Readiness will support TRADOC's conducting distributed learning in units for leaders and prospective commanders; UMR goes hand-in-glove with Unit-Based Leader development.**

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TRADOC believes that it must support leader development in the UoA vice reliance on resident courses in its schools, and coordinate delivery of its courses with the plans of the unit chain of command, and the unit's OPTEMPO and DEPTMPO.

**“The development of leaders for the UoA will primarily occur during operational assignments. These assignments play an important role in our leader development process by providing the soldier the opportunity to translate theory into practice...It is in the unit where the leader gains knowledge that is grounded in experience, and where this knowledge can become truly internalized...”**

**Operational units have built-in structures for mentoring, coaching, counseling, teaching, and training leaders. Through experiential training and by observing noncommissioned officers, officers, and warrant officers utilizing their leadership skills in realistic training exercises, the UoA will develop its required leaders. Leaders learn the conduct of war by fighting, maneuvering, supporting, and sustaining their unit in a field training environment. They learn the technical, tactical, and leadership requirements of the next major career phase through successive assignments in a unit where experiential training is the norm. .”** UoA O&O 6-11-02

## **2. Unit-Based Leader Development**

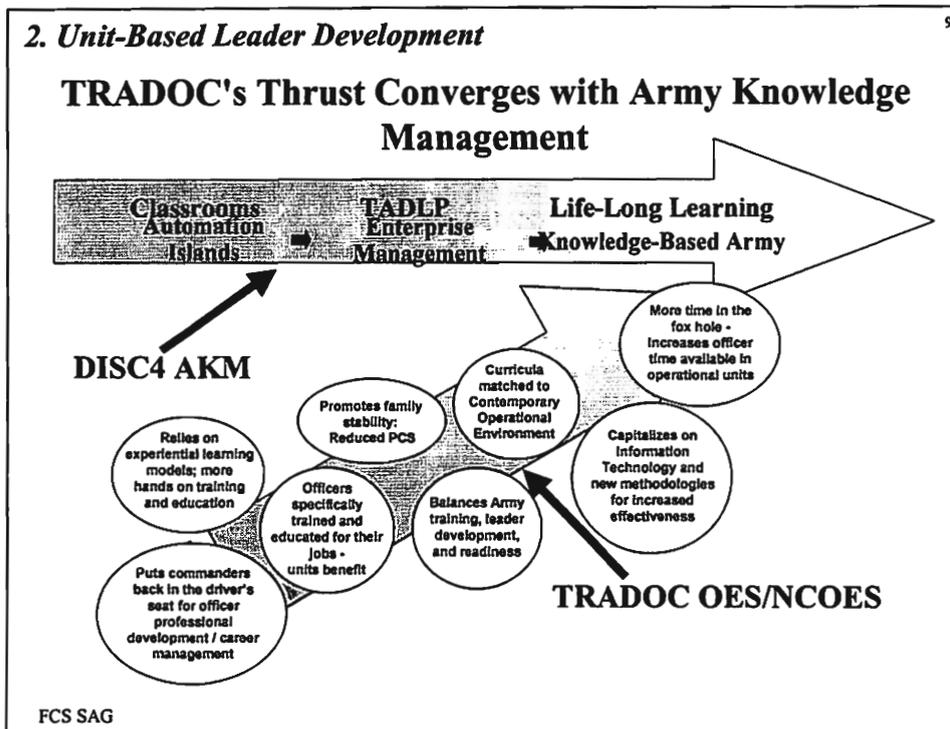
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- **TRADOC has a constructive plan for Unit-based Leader Development based on the The Army Distributed Learning Program's (TADLP) video-instruction plus short (~2-3 weeks) TDY.**
- **ASB Reports in 1997 and 2000 pointed out that TADLP:**
  - **Chose technology that confined access to brick/mortar "digital training centers", which drives costs and reduces access**
  - **Hence TADLP has high overhead in buildings, personnel, and communications**
- **In contrast, best commercial practices for distributed learning emphasize collaborative web-based instruction.**

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**"The principal portion of the ADLP transforms some Resident Learning (RL) into a synchronous Distance Learning (DL) setting with a heavy emphasis on remote classrooms. Traditional classroom teaching is transferred to remote sites by technologies such as VTT (two-way video and audio or data transmission). To do this, wide bandwidth networks and associated hardware are needed. Remote classrooms with high-end enablers are very expensive. The plan leans heavily on VTT, robust electronic networks, and electronic training platforms. While 42% of the total cost of the plan, \$840 million, is projected for networks and other hardware over the 13-year funding profile, only 32% is allocated for course conversion. The remaining funds are designated for personnel, and operations and maintenance (O&M). The current draft of the ADLP is based on a traditional RL framework that is transformed to a synchronous DL remote classroom mode....ASB 1997**

Bob Scales, CEO of Walden University (subdivision of Sylvan Learning) heads a for-profit university that provides accredited Distance Learning for 5000 students, most of whom have full-time jobs, and most of whom are minorities. General Scales reports that he knows no exception to the rule that video-based instruction is neither cost-efficient nor educationally effective. Commercial firms launched on the premises of TADLP have invariably failed. Best commercial practice is to rely primarily on the internet. Walden U. also emphasizes small, mentored group instruction that focus each student on problems related to his or her work environment, and that use evaluation techniques involving mentor, employer, and peers. Scales believes that were the Army to design its courseware to commercial standards, and emulate Walden's methods for administering courses, it could significantly reduce the costs of TADLP, eliminate its dependence upon "digital classrooms" and deliver quality instructions in unit whenever and wherever the student or his mentor may choose.



This diagram portrays a neat congruence in the end states sought within the Army that promise to change fundamentally the ways and means for developing more effective commissioned and noncommissioned officers.

The first thrust, portrayed by the upper arrow, is the Army Knowledge Management plan (AKM), led by the DICS4, which envisions life-long learning enabled by pervasive access to the worldwide web throughout the Army.

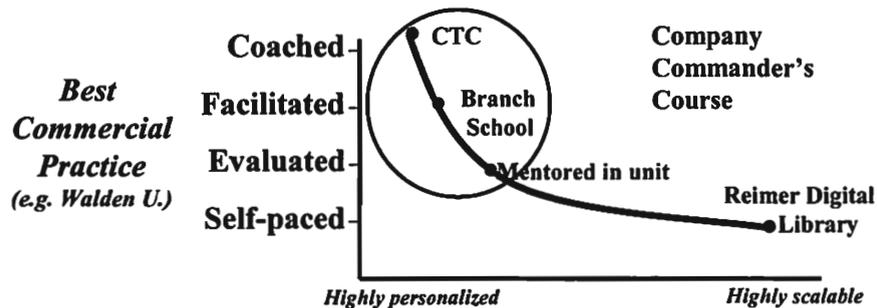
TRADOC's thrust, portrayed by the broad, diagonal arrow, also aims at life long learning by converting the courses it presently teaches in its schools to Distributed Learning, with the advantages portrayed by the "bubbles." Properly designed and administered, the Officer Education System (OES) and the Noncommissioned Officer Education System (NCOES), delivered mainly over the internet, could become a mainstay of readiness in combat arms units of the Objective Force.

## 2. Unit-Based Leader Development

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### DL Course Design: Two Choices

1. The Army Distributed Learning Program: video-instruction in distributed classrooms + TDY at TRADOC school/CTC
2. Collaborative Web-based instruction + TDY at TRADOC school/CTC



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This chart depicts two broad choices facing the Army today: Either continuing with TADLP in its present modalities, employing "digital classrooms" and video-instruction, or adopting "best commercial practices," such as those developed by Walden University.

The diagram is used by Walden U. to illustrate that its course designs aim at (1) small groups, (2) a strong component of mentoring, and (3) emphasis on evaluation and certification. General Scale' staff is now working with the syllabus for TRADOC's proposed Company Commander's Course with the aim of providing a first order approximation of costs and time required to design the course to their standards.

The Army Research Institute for the Social and Behavioral Sciences (ARI) has conducted experiments with teaching portions of the Armor Advance Course at Fort Hood, employing the faculty of TRADOCs school at Fort Knox. The experiment demonstrated that collaboration in small groups, properly mentored, can teach as well as resident instruction, and offers many advantages for unit readiness in terms of assuring continuing availability of its leaders.

**2. Unit-Based Leader Development**

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- **Implement TRADOC's proposal for unit-based leader development -- mentored, structured group distance learning in a unit plus TDY at school vice PCS residence**
- **Commence by replacing branch Advance Course and CAS3 with Combat Arms Command Course for company command designees**
  - Compare cost effectiveness of ADLP video-instruction with internet-only courses, based on best business practices (e.g., Walden U.)
  - Proliferate based on results
- **Convert saved SO&S into RDA for Objective Force; data below are for ADLP video-instruction in distributed classrooms**

	<u>TOTAL</u>
- \$O&S attributed to current OES, NCOES.....	\$2,460 mil/yr
+ Savings from Unit-Based Leader Development.....	\$430 mil/yr
- Cost to Implement UBLD.....	\$ 75 mil/yr
<b>Potential NET SAVINGS(15 years/ 02' constant dollars)</b>	<b>\$1.13 Billion</b>

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The funding shown in the box are savings claimed by TRADOC for the TADLP. They do not represent any saving from "best commercial practices," General Scales has stated that Walden U.'s approach would save up to 50% more than the TADLP projections.

3. *Virtual Command Centers*

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## **TOC Means “Target of Choice”**

### **Avoiding Decapitation in Objective Force Units**

**Acquisition of the ABCS "digitized TOC" continues despite TRADOC's decision to equip the Objective Force with "virtual command centers"**

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- **Commercial satellite multi-spectral imagery can now be purchased from vendors in the U.S., Germany, Australia, Japan, France, ROK, Russia, India, China, Brazil, and Taiwan. Multi-spectral sensors are also available for aircraft.**
- **Multi-spectral technology is not yet perfected, but is moving rapidly toward high probability of detection and low false alarm rate, with distinct prospects for automated classification and targeting.**
- **A panchromatic image of one HMMWV can detect the vehicle with one pixel, but requires 24 pixels for classification.**
- **In a hyper spectral image, the spectral signature of a HMMWV —information that detects, classifies, and even identifies material — is present in one pixel.**
- **Tests have been conducted with one actual and decoy HMMWVs in high background clutter in which the spectral signature unerringly identified the real HMMWV.**

**Source: OSD DDR&E**

**“The UoA Commander is the key tactical decision maker in a battlespace. To make appropriate and decisive battlespace decisions, the commander must have access to accurate, timely information and be able to take advantage of accurate systems and detailed battlespace analysis. This type of analysis is currently provided only at static tactical operation centers (TOC). The UoA will not have traditional static Command Posts (CP) or TOCs. Virtual command centers will support operations through a distributed network. The commander-focused and commander-driven environment is the hallmark of the network and information empowered UoA, bringing situational awareness of the total environment, friendly and enemy, to the commander, where and when he needs it, in a manner that is intuitively understood...” [ TRADOC's UoA O&O, 6/11/2002]**

### 3. Virtual Command Centers

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#### Toward Virtual Command Centers

• The 8th Inf Div (Mech) had "virtual command centers" in 1979-1980: CPs in dispersed cells at each echelon, internettted with small mm-wave radios carrying the multi-channel area comms plus fax and color TV. This austerey manned configuration was demonstrated to be more effective for C2, more survivable, and much more mobile.

•The Army is now spending over \$100 million per division for ABCS TOCs: canvas shelters erected among vehicles, with large numbers of computers, displays, radios and antennae, and powered by many generators.

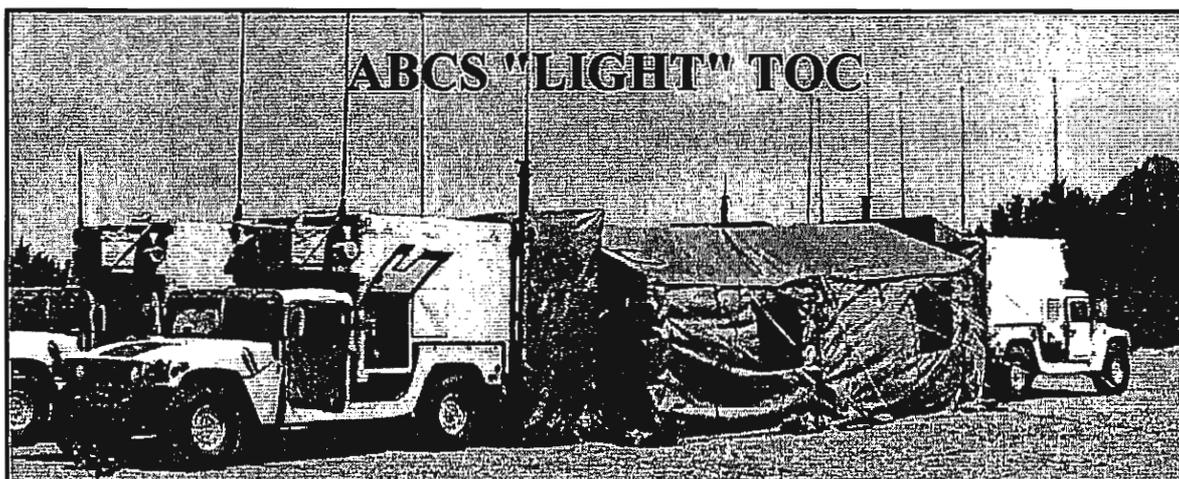
•These TOCs present distinctive signatures— a major MASINT/DSP target— and invite decapitation.

•TRADOC states that the Objective Force will operate with "virtual command centers." vice "traditional static Command Posts (CP) or TOCs."

• The current force is being equipped with LOS mm wave radios (BCIS) that could enable it to operate with distributed "virtual command centers" ~~in the Army~~ fashion as did 8 ID.

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ABCS TOC requires 10-70 personnel (depending on echelon), including highly-trained specialists in erecting, displacing, and maintaining the equipment. Such facilities will be inappropriate for the Objective Force: too heavy, too immobile, too vulnerable, too many people.



### 3. Virtual Command Centers

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## TOCs are Wrong-Minded

- Experiments with FCS —e.g., MBBL, DARPA-CECOM — indicate that a team < 5 is sufficient for OF C2
- The doctrinal decision-making process is too time consuming and laborious for OF C2:

- Planning time almost always exceeds plan's operational relevance
- Nine-step process involving commander-staff interaction

Circumstance	No. Courses of Action	Planning Time
Deliberate	3	16-24 hours
Combat	2	10-16 hours
Quick	1	< 10 hours

- DARPA's Command Post of the Future (CPOF) program has explored these issues, and will field in Stryker Brigades collaborative planning tools appropriate for the Objective Force

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Lt. Col. Dan Bolger learned during JRTC 94-7 that his TOC was "...a poor excuse for a command post despite having all the proper items and men. Bad as it was at operating, its survivability promised to be even more problematic. Slow to move, obvious with its unique tents and forest of radio antennas and parked Humvees, the TOC offered a wonderful opportunity to the [OPFOR]..."#

That experience led Bolger to reorganize for JRTC 95-10 as follows:

- TOC: Store the TOC materiel and re-mission TOC personnel
- Use instead small, distributed cells
  - Two 1 Humvee Tac CP's, each headed by Major\*
    - One for C2 12 hours on/12 off
    - Other resting or planning
  - One for Log, one for Pers
  - Commander positioned himself for max advantage
  - OpsNCO with each Company, reporting locus and status

DARPA's CPOF offers a portable wireless "Battle Board" for commander-to-commander collaboration, combining terrain analysis with plots of tactical dispositions that can be tailored to individual preferences for planning or execution, and have been shown to facilitate rapid adaptation to changing situations.

# Bolger, D.P. The Battle for Hunger Hill. Presidio Press, Novato, CA. 1997. 166-177.

\*Cf., BDM Mgt Serv Corp. Battle Tracking in Brigade and Battalion Tactical Operations Centers, Fort Polk, LA, Dec. 1993, I-2, I-3. Bolger, op.cit. 251, 254. "Compared with TOCs on absolute terms, tactical CPs received very high marks."

### 3. *Virtual Command Centers*

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## Moving ABCS Toward the Objective Force

- **Terminate the current ABCS TOCs program after fielding those for III Corps and 25 ID.**
- **Refocus funding for TOCs to accelerate evolution from current ABCS designs to virtual command centers**
  - Adopt for ABCS a "virtual command center," initially interconnecting cells with BCIS; consider CECOM's "agile commander" and TRADOC's MMBBL designs
  - Capitalize upon DARPA's CPOF and FCS C2 experiments
  - Replace BCIS with electronically steerable antennae, JTRS and WIN-T as these become available.
- **To evolve ABCS into C2 for the Objective Force, the Army ought to aim at dispersion, distribution, downsizing, and/or deletion.**

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A "virtual command center" ought to embody one or more of the following characteristics:

Dispersion entails spreading a TOC over a larger area to make its components easier to hide and harder to find. Dispersal requires a broad-band wireless LAN. The experience of 8ID two decades ago showed that "digitization" is not a prerequisite for dispersal, and that virtually any TOC can (and should) be dispersed. In a dispersed TOC, staff briefings are on demand, and all staff sections can "eavesdrop" on the transactions among commanders.

The question obtrudes whether dispersal is dysfunctional for teamwork, depriving staff members of contact with others, and denying them periodic updates on unit operations. After Action reviews in 8ID established that the technologies adopted for dispersion actually improved teamwork, broadened contacts, and improved staff understanding of both the commander's intent and the division's performance.

Distribution is dispersal of cells over longer distances, plus reorganization to allow commanders to operate forward supported by functional staff groups or cells to the rear. The latter can include a personal representative of each supported commander. If reliable, robust and fast communications are provided, this arrangement could potentially facilitate networking.

Downsizing requires personnel factors that reflect the information age, and are aimed at minimum manning of whatever C<sup>2</sup> architecture may be adopted.

Deletion implies technology that obviates the need for certain TOCs, particularly those that now perform CS and CSS functions that can be automated. [E.g., replacing tube artillery FDCs with on-vehicle fire control, as in HIMARS, or fielding PGM systems like NetFires that do not require specialized fire control or dedicated logistic support.

**3. Virtual Command Centers**

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**Potential Savings**

TOCs	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
TOCs Program	0	115	117	120	122	124	127	130	132	135	137	140	143	146	149
Investment	0	35	36	38	37	37	38	39	40	40	41	42	43	44	45
Savings	0	80	82	84	85	87	89	91	92	95	98	98	100	102	104
<b>Total Savings</b>	<b>1285</b>														

- Figures in \$million
- Annual Savings based on a Division Set per year fielding schedule
- First eight year Div Set replacements (FY 04-12) are Active Component, Remaining years (FY13-17) are Reserve Component Div Sets
- Investment cost based on a 30% re-investment for "virtual command centers"

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The investment shown is calculated to provide for (1) mobile platforms capable of performing command and control on the move; (2) a secure, broad-band wireless LAN to assure the commander connectivity with his supporting staff cells, and inter-communication among those cells; (3) tools to facilitate among combatants collaborative planning and analyses, drawing upon all sources of intelligence, fires, and logistical support; (4) networks that enable well-teamed, adaptive execution to "see first, understand first, act first, finish decisively."

#### 4. Superior C4ISR and precise weapons

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### Fire Support Must be Modernized

- The Objective Force requires Networked Fires "...the triad of relevant sensors, effects capabilities and battle command that enables dynamic on-demand fires and effects to achieve the commander's tactical and operational objectives..." TRADOC UoA O&O, 11 June 2002.
- Organic howitzers, trucks and ammunition constitute 40% of weight of current heavy division, 74% of weight of current airborne division. Neither division can sustain itself with enough ammo for 3 days of combat
  - Heavy division's Divarty tonnage exceeds capacity of entire airlift fleet of C-5s and C-17s. Abn division's tonnage would require 60% of all C-5s (126), or 84% of all C-17s (120)
  - Heavy division can lift only 71% of its 155mm ammo, and only 34% of its 120mm mortar ammo. Airborne division can lift only 13% of its 105mm ammunition, and only 68% of its mortar ammo
  - Adding a Corps Truck Bn would require an additional 53 C-17 sorties
- FCS NetFires lethality is greater per round and per pound
  - 8-15 pallets of NetFires achieves lethality equivalent to 3-155mm Bns (even with Excaliber) with <12% ammo weight, and < 2% of deployed equipment weight
  - One Medium Transport Co. of 48 PLS trucks, lifting 96 pallets of ready-to-fire NetFires, needs one-third the number of aircraft for 3 M109A6 battalions, but would provide 6 times more firepower, at a \$O&S cost of \$100 million per annum less than the artillery.

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There are some 448 force structure units equipped with artillery howitzers or infantry mortars. These are authorized 76,696 spaces, and require operating funds of \$2.755 billion per year [AC artillery \$1.6B, RC 0.8B; AC mortars \$0.35B, RC \$0.09B]. As these data, derived from CEAC models, show, the Army's fires operating system is expensive in terms of \$O&S.

What these figures do not show is the substantial infrastructure necessary within the CSS structure to sustain the fires operating —the "tail" part of the fires system. The AC portion consists of 5000 trucks; the RC 10,000 trucks.

There are more cost effective rocket systems available today that can supplant cannon artillery and engender O&S savings in the POM period (next five years). Even more effective PGM weapon systems are being developed, but these will not be available, even with acceleration, before 2007. If decisions to alter the Fires operating system in the cannon artillery and mortar areas are made immediately, the Army can save substantial O&S costs starting in 2003.

Further saving can proceed by redistributing excess trucks. Our study convinced us that the proposed procurement of 14,000 new FMTV trucks, scheduled for March 03, should be cancelled, which would free \$2000 million to pursue transition to the Objective Force.

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**4. Superior C4ISR and precise weapons**

**Fire Support Modernization Can Pay for Itself**

- There are 10 battalion-equivalents of M109A3 howitzers within the Total Army -aging, maintenance-expensive, manpower-intensive systems that necessitate many trucks. An MRLS or HIMARS battery has the range, accuracy, and effectiveness that exceeds a Paladin battalion. Replacing ARNG M109 units with MLRS in FY 03 and FY04 could purge the system of obsolete equipment and generate annual \$O&S savings > \$100million.
- The Army needs a fire support design for the Objective Force:
  - The maturity of NetFires warrants consideration of retiring M109A6 battalions and relying on a networked system of MRLS, HIMARS, and NetFires in their stead.
  - Similarly, mini-NetFires (AMMPGM) should be considered for mortar units
- Alternative force designs deserve user trials, and these should take place in FY 07, when many of the components of the FCS C4ISR/Fires systems will be available
- By commencing replacement of Paladin and redistributing associated trucks instead of buying new trucks, the Army can save \$O&S to underwrite user trials in FY 07 .

FCS SAG

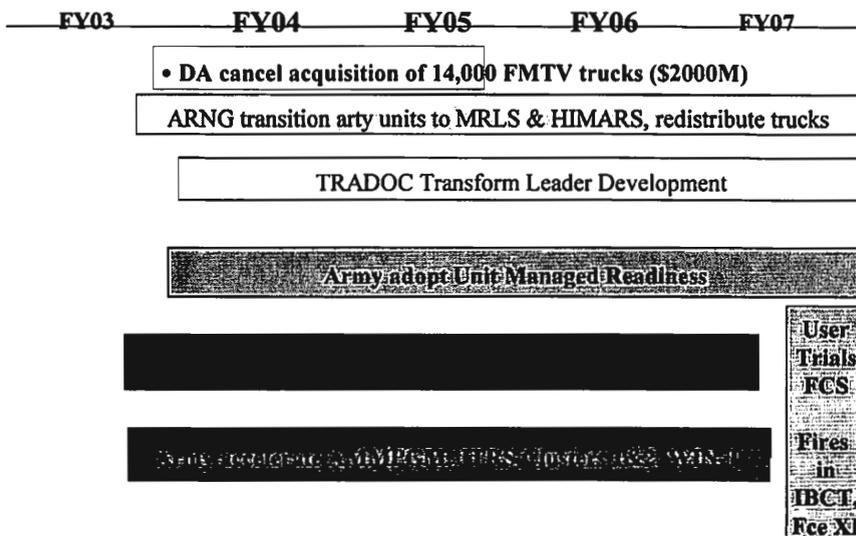
Using the CEAC FORCES model, we analyzed MRLS replacing the following:

**FY03**  
 5 M109A3 Bns ARNG  
 Freed: 2725 pers, 495 trucks  
 \$O&S saved \$20.9M\*

**FY04**  
 3 M109A3 Bns ARNG  
 7 M109A3 Sep. Btrys ARNG  
 6 M109A6 Bns ARNG  
 Freed: 5035 pers, 724 trucks  
 \$O&S saved \$61.2 M\*

\*no MPA included

The conversions to accurate and lethal rockets would enable redistribution of 7760 personnel spaces and 1289 trucks in the first two FY. We then extended our analysis into later FY according to this scheme:



4. *Superior C4ISR/Fires*

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**C4ISR/Fires: 1st Steps To Objective Force**

- **C4ISR and PGM technology is evolving faster than that for platforms; by FY 07 there could be available for field experiments:**
  - A-160 robotic rotorcraft with an integrated GMTI-SAR-IFSAR and communications payload
  - IUGS and Digital Radio Frequency Tags (DRaFT)
  - Early versions or emulations of JTRS and WIN-T
  - Land Warrior as a precursor for Objective Force Warrior
  - NetFires and Mini-NetFires
- **As spiral developments, Army should fund programmatic accelerations toward user trials with the foregoing materiel—including networking HIMARS with PGM— in FY 07 using units from IBCT, III Corps, a LID and Fort Sill.**
- **Our analyses indicate that SO&S savings could fund trials and RDA thereafter:**

Description (\$M)	FY03-07	FY03-17
Unit Managed Readiness	1401	5422
Unit-Based Leader Development	1463	6559
Evolution of ABCS TOCs	331	1285
Artillery and Mortar Modernization	1562	17936
Cancellation of FMTV Acquisition	2000	2000
	6757	33202

FCS SAG

### Focus FCS on System Elements That Can Make a Real Transformational Difference

1. **Use the Big Five methodology to cut the ground vehicle FCS fleet by two-thirds — 6 at the most — for an FCS Block 0 (see ff.)**
2. **Give primacy to C4ISR/precision missiles capability for FCS. Evaluate in user trials in FY07. Plan to transition these capabilities into the IBCT and legacy forces to expedite their transformation into the Objective Force.**
3. **Use existing and working M-I-T-L simulations at Knox, CECOM, IDA JAWP and netted AH-64. Defer use of JVB+ improvements to JANUS and JPSD for one year.**
4. **Fund and execute existing CECOM and DARPA experiments, and undertake to create a “CDEC” at Fort Polk.**
5. **Develop and employ expanded MOE, particularly those that relate performance and hardware/software to “qualities of first”**

# FCS Block 0

Properly accelerated FCS systems can produce versions of its C4ISR, and fires for FY 07 user trials. The foregoing charts have illustrated that both the accelerations and the trials can be financed from efficiencies that also enhance unit readiness in the current force, and condition mindsets for transition to the Objective Force. But how shall the Army approach FCS FUE?

The FCS force as now defined has some 15 different ground platforms, about ten new fire support systems, and C4ISR with more than a dozen air and ground components. These circumstances are similar to those the Army faced in the early 1970s: approximately 17 major systems and their subsystems were in various stages of development and competition. To achieve modernization, coherence, and affordability, the Army leadership of that day gave priority to its “Big Five” (later “Big 7”), deferred some systems, and cancelled a number of major programs. Similar focus and prioritization is needed today. We recommend an FCS Block 0.

FCS capabilities to see, decide, and act first will derive from its C4ISR, which must receive primary consideration. Highly responsive precision fires (long range and line-of-sight) are next, along with efficient suppression, balanced manpower, and related CSS. A limited number of unique combat platforms follow. The remaining CSS and other support platforms should be deferred for later spiral insertion, and available surrogate trucks used ad interim in their place. Hence, reduce the number of unique platforms to be included in FCS Block 1 to a single digit number, and cut the number of FCS weapons, and CSS elements to a similarly manageable and affordable number.

Give managerial and funding primacy to the FCS C4ISR system. Critical elements of the C4ISR system are as follows: (1) sensor platforms, including A-160, Shadow, OAV, robotic scouts and IUGS; (2) Sensors, including GMTI, SAR and FOPEN radars, projectable, internetted, unattended ground sensors, including elint, acoustic, seismic, thermal and EO/IR sensors; (3) communications, including digital radio frequency tags (DRaFT), WIN-T, and JTRS clusters 1 and 2 with appropriate expansion in physical, architectural software and ESA domains; (4) networking and automation of rocketry and PGM systems under development—the RF systems used in the fire control networking must be compatible with JTRS, but need not necessarily be comprised of the same RF equipment or be constrained by programmatic activities in the JTRS program; and, (5) C2 displays and decision aids to assist command on the move within a virtual command center.

# Managing \$O&S Savings

In the aftermath of Desert Storm, the Army turned its attention to future wars, and to technologies that should be developed to preserve the U.S. military advantage. Prominent was an opportunity to "Own the Night" through fielding of 2d Generation FLIR. The Chief of Staff of the Army, General Gordon Sullivan, and his TRADOC commander, General Frederick Franks, perceived that FLIR technology opened an opportunity, but recognized that capitalizing upon it would require integration across several functional and branch stovepipes. In particular, while many program managers for weapon systems and platforms had plans to use 2d Gen FLIR, no common approach to development or procurement had been defined, and some programs were well ahead of others. Coordination was clearly needed.

Accordingly, CSA set up a Special Task Force headed by Major General Jerry White, the Commandant of the Infantry School and Chief of Infantry, and appointed as his Deputy Director George Singley, the SES who directed the Army's Science and Technology program [Singley carried both responsibilities for the 6 months that the Task Force was in operation.] The Task Force was directed by CSA to develop a total analysis of 2d Gen FLIR, to include trade-offs, analyses of alternatives, ILSP, threat assessments, draft RFPs, and appropriate insertions into the POM. It was also charged with the technical, operational, and system architectures, and with total program management.

The Task Force operated for 6 months at Fort Benning with a core of 30 personnel, and sometime use of another 70. The CSA tasker authorized the TF Director to inquire into, and to change at will, programmatic funding for any platform on which 2d Gen FLIR might be employed [i.e., major systems such as TOW, Bradley, Abrams, and AAH and numerous lesser programs], Not all PEOs and PMs were pleased with the Task Force's decisions, but all eventually complied.

What the Task Force did was to adopt a technical architecture calling for an A kit and a B kit, assigning to the platform PM responsibility for the former, but charging him to develop the A kit to mate with the generic B kit, defined by the Task Force, and separately developed.

In the current context, we believe that CSA has already designated Lt. General Riggs as head of a Special Task Force, and that General Riggs should have the authority to allocate such additional funds as may be generated by efficiencies with \$O&S to facilitate transition to the Objective Force.

We recommend that CSA provide General Riggs an addition tasking authorizing him to determine when and how such funds are to be used.