

Congress of the United States  
House of Representatives  
Washington, DC 20515

July 14, 2005

Mr. Philip E. Coyle III  
Commissioner  
Base Realignment and Closure Commission  
2521 South Clark Street, Suit 600  
Arlington, VA 22202

Dear Commissioner Coyle:

It was good seeing you at the Regional Hearing in Baltimore, Maryland, on July 8. I hope you found New Jersey's presentations about Fort Monmouth helpful and informative. I want to take this opportunity to follow-up on the questions you raised at the hearing, but also want to reiterate our argument that C4ISR capability would be diminished greatly, immediately, and for at least a decade by the proposed closure and move. This is independent of cost and payback calculations.

You are correct that the Department of Defense (DOD) failed to account fully for workforce transition costs, and we have attempted to capture the significant cost of recruiting and training a potential new workforce at Aberdeen Proving Ground (APG). However, in the data made available to us, the salary cost savings from closing Fort Monmouth and the salaries added for new people at Aberdeen are considered in the same manner, and not included in COBRA runs (with the exception of positions eliminated, and the pay differential that results).

Our analytical team, led by Vice Admiral (ret.) Paul Gaffney II, conducted a thorough analysis of the recruitment and training costs for reconstituting a workforce at Aberdeen. A summary of our calculations is attached. In every case, we have been conservative in our assumptions.

When we submitted our report to the BRAC Commission on July 8, we calculated the payback period to be 21 years using a "constant dollar" payback period. However, all BRAC recommendations use a "net present value" payback period. Using the "net present value" data, the payback period for moving Fort Monmouth would be 33 years. (A correction was submitted to Chairman Principi by VADM Gaffney on July 12.) As you will see, the payback period expands to 44 years when costs for reconstituting a new workforce are included.

Attached you will find a short summary of our calculations for recruitment and training costs, including our sources, assumptions, and methodology. Also attached is a more complete answer to your second question, which sought a listing of programs in use in Iraq that would be disrupted by a closure of Fort Monmouth. A complete, more digestible version will follow next week.

I hope this information is useful to you. Please do not hesitate to contact me if I can be of further assistance.

Sincerely,



Rush Holt  
Member of Congress

### Workforce Models

There are extensive studies available in the body of pertinent literature that analyze and describe recruitment, training, and lost productivity costs when an employee must be hired to backfill the "leaver," i.e., the employee who must be replaced. For example:

- "Private Sector Downsizing: Implications for DoD" by Michael L. Marshall and J. Eric Hazell (published in *The Acquisition Review Quarterly*, Spring 2000) listed several parameters that apply to replacing personnel, including advertising and marketing; recruitment, hiring, and training; overtime to personnel taking up the slack; productivity losses; and lost training for departed workers. The article concludes, "Regardless of the exact number of businesses, there is widespread agreement that *turnover costs are somewhere between high and Olympian.*"
- "The Business Cost and Impact of Employee Turnover" by William Bliss of Bliss & Associates (2000) concludes that the cost of employee turnover is at least 150% of the leaver's annual salary.
- A Price Water-House Saratoga Institute workforce replacement model cited in "It's Costly to Lose Good Employees" by J. Fitz-enz (1997) estimates that the total cost of turnover ranges from 100 to 200% of the leaver's pay and benefits.
- A workforce replacement study conducted by Kwasha Lipton (referenced in *The Acquisition Review Quarterly* Spring 2000) concludes that replacing exempt workers costs 150% of the leaver's salary, and for non-exempt workers, it costs 175% of the leaver's salary.

### Assumptions

- DoD's analysis reflects a transfer of 3,879 civilians from Fort Monmouth and 767 from Fort Belvoir to APG for a total of 4,646 civilian personnel. Of this total, history and recent polling suggest that a maximum of 20% of employees are expected to transfer to their new location. The remaining 80% (3,717 employees) would have to be hired at APG. The bulk of these employees are scientists, engineers, and highly special technical experts.
- For purposes of this analysis, 15% of the 3,717 employees are considered administrative/clerical (and therefore have lower base salaries).
- Given the differences of the functional knowledge required to develop, acquire, test and field C4ISR systems and equipments, the professional skills domain is split into two subsets; Scientists/Engineers (SE) and Acquisition/Logistics (AL).
- COBRA used a civilian salary of \$59,959, an unrealistic figure for recruiting and training senior and journey-person SE and AL personnel. Using the Bliss study as the model, we have used the salary of a GS-14/Step 5 as representative of senior employees. For journey-person (JP) employees (GS-13 and below), we have used the salary of a GS-12/Step 5. In all cases, 28.9% is applied for cost of benefits.
- We have conservatively included lost productivity costs only during the period of time the new employees are being trained. Also, we have not included any productivity impacts likely to result from an immature workforce, such as program disruptions.

### Conclusions

#### *High End of the Cost Spectrum.*

1. Recruiting Cost Factors. The Bliss study percentage of full salary (150%) was applied for senior SEs and adjusted down for JP SEs (75%), Senior AL (100%), and JP AL (75%) positions.
2. Recruiting Calculations.
  - a.  $160 \text{ SE} \times \$129,096 \text{ SALARY} \times 150\% = \$30,983,000$
  - b.  $1200 \text{ JP SE} \times \$91,866 \text{ SALARY} \times 75\% = \$82,680,000$
  - c.  $211 \text{ AL} \times \$129,096 \text{ SALARY} \times 100\% = \$27,239,000$
  - d.  $1588 \text{ JP AL} \times \$91,866 \text{ SALARY} \times 50\% = \$72,942,000$
  - e. Subtotal = \$214 M
3. Training Costs Factors. Training is conservatively estimated to be required for at least a three-year period. The assumption is that the newly hired SE employee will be in a training environment for three months of each year for three years, and for an AL employee, two months per year for three years. That is the time considered necessary to bring the newly hired individuals to a level where they are able to perform and contribute commensurately with the individuals they are replacing. Training costs are calculated as a percentage of full salary, on the assumption that training time is non-productive in the year of training.
4. Training Calculations
  - a.  $160 \text{ SE} \times \$129,096 \times .25 \times 3 = \$15,492,000$
  - b.  $1200 \text{ JP SE} \times \$91,866 \times .25 \times 3 = \$82,679,000$
  - c.  $211 \text{ AL} \times \$129,096 \times .167 \times 3 = \$13,647,000$
  - d.  $1588 \text{ JP AL} \times \$91,866 \times .167 \times 3 = \$73,087,000$
  - e. Subtotal = \$185 M
5. **Bottom Line. Based on the set of assumptions above, the high end recruiting and training cost is \$399M (\$214M for recruiting, \$185M for training).**

#### *Low End of the Cost Spectrum*

1. Recruiting Cost Factors. Drawing on other conclusions from other studies, the Bliss study percentage of full salary was adjusted significantly downward to establish a lower bounding for the range: senior SEs (75%); JP SEs (50%); senior AL (50%); JP AL (30%)
2. Recruiting Calculations.
  - a.  $160 \text{ SE} \times \$129,096 \text{ SALARY} \times 75\% = \$15,492,000$
  - b.  $1200 \text{ JP SE} \times \$91,866 \text{ SALARY} \times 50\% = \$55,120,000$
  - c.  $211 \text{ AL} \times \$129,096 \text{ SALARY} \times 50\% = \$13,620,000$
  - d.  $1588 \text{ JP AL} \times \$91,866 \text{ SALARY} \times 30\% = \$43,765,000$
  - e. Subtotal = \$128 M
3. Training Costs Factors. Again, training is conservatively estimated to be required for at least a three year period. The assumption is that the newly hired SE/AL employee will be in a training environment one month of each year for three years to bring the newly hired individuals to a level where they are able to perform and contribute commensurately with the individuals they are replacing. Training costs are calculated as a percentage of full salary, on the assumption training time is non-productive in the year of training.
4. Training Calculations
  - a.  $160 \text{ SE} \times \$129,096 \text{ Salary} \times .083 \times 3 = \$5,143,000$
  - b.  $1200 \text{ JP SE} \times \$91,866 \text{ Salary} \times .083 \times 3 = \$27,450,000$
  - c.  $211 \text{ AL} \times \$129,096 \text{ Salary} \times .083 \times 3 = \$6,783,000$
  - d.  $1588 \text{ JP AL} \times \$91,866 \text{ Salary} \times .083 \times 3 = \$36,325,000$
  - e. Subtotal = \$76 M
5. **Bottom Line. Based on the set of assumptions above, the low end recruiting and training cost is \$204M (\$128M for recruiting, \$76M for training).**

#### *Return on Investment (ROI)*

Taking the midpoint between the high estimate and low estimate, the amount of \$300M factored into the COBRA formula yields an ROI (payback) of 44 years.

**Current Fort Monmouth and Team C4ISR Support to Operation Iraqi Freedom**

**Quick Response: Aircraft Survivability.** This Team C4ISR effort provides aviators from Army and the other military services with life-saving systems. Team C4ISR develops, fields and sustains the radar warning receivers and missile warning systems found on Army, Navy, Marine Corps, Air Force, and Presidential Fleet helicopters. These systems rely on software that contains current threat information tailored to specific regions of the world. Just prior to the outbreak of hostilities in Iraq, Team C4ISR updated that software, in record time, with new threat information for Southwest Asia. The team also adapted the systems to operate better in the harsh desert environment.

**Quick Response: Guardrail Common Sensor System.** Guardrail is a theater-level airborne signals intelligence collector system. Due to geopolitical boundaries and restrictions, it was not able to function as designed in Operation Iraqi Freedom. Team C4ISR field software engineers, deployed with the system, assessed the problem and reported it to Team C4ISR at Fort Monmouth. Our engineers developed a solution and fielded it in less than a week allowing Guardrail to collect the actionable intelligence that was vital to our military success. Bottom line here is that our forces need Guardrail to locate threats so they can neutralize them. By fielding our software solution, we saved warfighter lives.

- **GUARDIAN EAGLE** is a Quick Reaction Capability (QRC) to insert into the Guardrail/Common Sensor (GR/CS) Fleet of aircraft the ability to Detect, ID and locate LPI communications. GR/CS was the only Army Tactical Airborne asset in OIF with this capability. The two battalions equipped with this capability provided unique essential information on High Value Targets in the months leading up to hostilities as well as during the actual conflict. Team C4ISR continues to work with the units to provide constant updates to this capability. This QRC was accomplished on the first two systems four months after receipt of funds. We were uniquely equipped to accomplish this because of extensive technical expertise with all the GR/CS systems gained over twenty years of designing, building and fielding these systems. Other factors that contributed to our success were our flight activity at Lakehurst NAEC and our unique location that affords us the quiet zone in the warning areas over the Atlantic for calibration, and our ability to acquire the TCDL link located on the roof of building 600 and bring the data into our labs for analysis.

**Lightweight Counter Mortar Radar Support.** The LCMR detects and locates enemy mortar firing positions rapidly and with deadly accuracy so that coalition forces can instantly destroy them. Team C4ISR managed the accelerated development of LCMR to meet urgent warfighter needs. Team C4ISR helps field the LCMR to units, provides training on its use to soldiers throughout the theater and will work to keep it running around the clock.

**FireFinder Radar System.** Firefinder tracks and locates the source of incoming mortars and rockets. The Radar rapidly became an extremely critical system in the OEF/OIF

theater, with a demand for the deployed systems to essentially be available 100% of the time to provide troop protection. Since the onset of hostilities several new capabilities have been added to the Firefinder system, through a series of new software packages. These enhanced capabilities come in direct response to the ongoing and developing threat in Iraq and Afghanistan. For example, the ability to detect mortar fire was improved by 25 percent. Of note is the new capability to provide an "early warning capability" as well as an intercept capability. Team C4ISR community has taken extraordinary measures to support the deployed systems, and to get returning systems ready for re-deployments. Daily contact with the units in theater is maintained, spare parts and maintainers have been positioned forward and intensive transportation and tracking has been implemented. Additional LARs have been sent forward, and a Telemaintenance Capability has been established to assist unit maintainers and operators in areas where transportation to the radar sites is difficult, dangerous and LAR support may be delayed. Performance of the Radars in the harsh conditions of OEF/OIF has been exceptional, thanks to the dedicated support provided by the Fort Monmouth community.

**AN/PPS-5D Man-Portable Battlefield Surveillance Radar.** PPS-5D is the US Army's Man-Portable Battlefield Surveillance Radar system used to target enemy personnel and vehicles. This Radar system played an essential role in the protection of U.S. forces at the beginning of Operation Iraqi Freedom when it was the only system available that could penetrate through a sandstorm and successfully target approaching Iraqi tanks, leading to their destruction. It was successfully used throughout Operation Iraqi Freedom (OIF) by the 82nd Airborne Division (Ft. Bragg), the 103rd MI Battalion (Ft. Stewart), the 101st Airborne Division (Ft. Campbell) and the 312th MI Battalion (Ft. Hood). The radar was an essential system used to target enemy personnel and vehicles. During the sand storm early on in the conflict, the Army was forced to remain stationary, making them vulnerable to enemy attack. The AN/PPS-5D radar proved to be the only system available that could penetrate the wind driven sand and dust to locate enemy targets. Through the sand and dust, the radar successfully targeted approaching Iraqi T-72 tanks at nearly 20km, leading to their destruction. The radar was also used for force protection and perimeter surveillance, once the coalition entered Baghdad.

**TROJAN Special Purpose Integrated Remote Intelligence Terminal (SPIRIT).** More than 20 TROJAN Special Purpose Integrated Remote Intelligence Terminal (SPIRIT) systems were deployed to U.S. Army and U.S. Marine Corps units and operational in support of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). Both the AN/TSQ-190(V) TROJAN SPIRIT II and the AN/TSQ-226(V) TROJAN SPIRIT LITE variants have been utilized to provide crucial secure communications reachback capabilities, to include near-real-time data, Unmanned Aerial Video (UAV) video, and other video, into national networks and databases to support Military Intelligence (MI), force protection, and other requirements. Over 20 systems were deployed by the US Army and US Marine Corps during height of OIF and remained operational availability rates of over 95 percent. The TROJAN Program is managed by Team C4ISR, TROJAN Systems Integration and Fielding Office (SIFO), Fort Monmouth, NJ.

**Counter-Radio Controlled Improvised Explosive Device (C-RCIED) System (WARLOCK).** Beginning in FY03, existing Shortstop Electronic Protection System (SEPS) technology was modified by Team C4ISR into several variants of an Electronic Countermeasures (ECM) system to protect convoys, warfighters, engineers, Unexploded Ordnance (UXO) squads, and VIPs from various RCIEDs. This program, a Quick Reaction effort in response to multiple Operational Needs Statements from MNC-I and CFLCC, was conducted jointly with Team C4ISR and the US Army Rapid Equipping Force (REF), and fielded nearly a thousand units within nine months in direct support of OEF/OIF. To date 1000+ systems, of varying capability and target set have been fielded and are protecting troops today.

**Improvised Explosive Device Characterization Lab.** The Lab began operation during 1QFY04 to identify the performance characteristics of remote controlled triggers used to activate improvised explosive devices. Analyses conducted by this lab identify deficiencies in existing or emerging coalition systems and are provided to Team C4ISR Countermeasures and IED detection programs for immediate action. I2WD also worked closely with the FBI's Terrorist Explosive Device Analysis Center (TEDAC) and has on site personnel at the TEDAC facility. These technicians conduct preliminary evaluations of incoming devices and prioritize the devices for analysis by the Characterization Lab.

**SIGINT Support.** Team C4ISR has provided extensive expertise in the area of Signals Intelligence (SIGINT) supporting the National Security Agency (NSA) Army Cryptologic Operations Office (ACO) and the Intelligence and Security Command (INSCOM). Team C4ISR personnel have provided specialized technical, operational, logistical and maintenance support for both OEF and OIF. We have developed and provided technology solutions known as Quick Reaction Capabilities (QRC's) in response to requests for assistance from the field to acquire, identify, collect and exploit signals of interest. Team C4ISR personnel have deployed to the field to assist with training and operation of SIGINT equipment fielded as a result of these QRCs to answer critical SIGINT needs. Personnel possessing extensive knowledge and experience in SIGINT technology and the application of this technology directly supported the Combined Forces Land Component Command and served as SIGINT Operations Officers in the Joint SIGINT/Electronic Warfare Coordination Cell.

- **Prophet.** Prophet detects, collects, and exploits conventional and modern military emitters. A secondary mission will be Electronic Warfare against selected enemy emitters to interrupt, spoof, disrupt, and/or disable target command and control nodes. Prophet is mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV), with a quick-erect seven-meter antenna mast. Prophet also has a dismounted man-pack version, which supports airborne, early entry, and urban operations. Both configurations provide intelligence support to a division, Stryker/heavy/light brigade, regiment, UA or task force. This intelligence support provides indications, warning, location, tracking, and identification of threat emitters. Prophet will cross-cue other battlefield sensors (e.g. tactical unmanned aerial vehicles, PBS2 radars, etc.) as

well as provide additional data that may confirm indications and detections from the other manned and unmanned battlefield sensors. Testimonials to PROPHET include:

- “Long-haul communication capability and data downlink need to be added to the Prophet.”
  - “Lack of TACSAT bandwidth for SIGINT hindered the ability to communicate at TS/SCI level with ground collectors.” -10th MTN OEF IBOS AAR
  - “The Prophet Hammer was the preferred SIGINT collection system available to the 4th ID.” - 4ID IBOS Way Ahead Recommendations to LTG Alexander Army G2 - 11 May ‘04
  - 101st CG states: “Prophet is invaluable”
- **PROPHET HAMMER.** Team C4ISR developed this specialized Signals Intelligence (SIGINT) and provides support to the Intelligence and Security Command (INSCOM) during Operation Iraqi Freedom by fielding PROPHET HAMMER systems, training, and providing post-deployment support to MI units. Team C4ISR engineers and intelligence specialists are still in Iraq with the same MI units providing long-term sustainment support and sustainment training.

**STARGRAZER.** This provides a previously unavailable Special Purpose Electronic Attack (SPEA) capability specifically developed and deployed in under 9 months as a Quick Reaction Capability for OEF and OIF forces. The system is composed of an “Extreme” ruggedized PC fitted with specially developed PCI based system capabilities. Additional components include multiple antenna options, an external power amplifier, and a complete power subsystem allowing the system to operate with a BB-390 battery pack, HMMWV, commercial vehicle or 110/220V AC power. Initially, Team C4ISR delivered ten (10) units to CFLCC/MNC-I OIF/OEF. The STARGRAZER system has gone through two subsequent capability upgrades to include additional capability for OEF/OIF deployed forces as well as other Team C4ISR customers supporting the Global War on Terrorism (GWOT). In addition, five (5) of these systems were recently transitioned to the Naval Central Command (NAVCENT) in support of counter narcotics patrolling. Team C4ISR continues to support STARGRAZER users by providing all necessary training and system support.

**SANDPIPER (SP).** SP is a “Leave Behind” Quick Reaction Capability (QRC) prototype consisting of a HMMWV with an Electronic Warfare (EW) system shelter, support vehicle with generator, and multiple antenna configurations.

**COUNTER ROCKET, ARTILLERY, MORTAR (C-RAM).** C-RAM utilizes the Lightweight Counter Mortar Radar (LCMR) to provide initial cueing for C-RAM “Sense and Warn” and as the first line sensor providing incoming target track to C-RAM Command and Control (C2) net for active engagement and interception.

**LYNX SYNTHETIC APERTURE RADAR.** Team C4ISR engineers have been providing technical support and training in the operation and use of the Lynx Synthetic

Aperture Radar as deployed on an IGNAT UAV by Team C4ISR. Development of techniques in change detection for the detection of small targets has been ongoing and is being utilized in the field. Complementary efforts in Change Detection are ongoing with other agencies.

**Joint Users Interoperability Communications Exercise (JUICE).** Team C4ISR received reports from Kuwait regarding the inability to make secure wireless calls through the local wireless provider. Technically, the data portion of the call (i.e. the port needed to go secure), would not work. Based upon the experience and expertise of software engineers stationed at Fort Monmouth, experimentation began immediately with several wireless systems that might provide a solution. Team C4ISR software engineers began a dialogue with the wireless provider in theater to better understand the local conditions and the exact nature of the problem. Combining the engineering expertise along with the test bed capabilities at Fort Monmouth enabled the software engineers to recreate the problem and develop and deliver the required capability. The solution enables secure wireless calls in the theater of operations to be placed; thereby enabling command and control among deployed forces.

**Combined Arms Planning and Execution Monitoring System (CAPES).** CAPES was provided to the 4th Infantry Division for use in Operation Iraqi Freedom. This unique system automates the development of detailed battle planning and provides visual situational awareness of operations during execution of battle plans. CAPES was named one of the top ten technologies in the US Army Material Command Greatest Inventions Program for 2002.

**Joint Satellite Communications Engineering Center (JSEC).** The JSEC has provided hotline and on site support to the troops in Iran and Afghanistan by responding to numerous requests for technical support.

- Over the last year the JSEC Strategic Systems Lab has responded to 75 requests for assistance from the Teleport/ STEP sites at Landstuhl & Ramstein Germany, Bahrain, Wahiawa, Hawaii, and Ft Buckner, Japan. These sites provide most of the communications to and from our troops in that area of the world. An example of the kind of response by Team C4ISR was the development of procedures and assistance in restoral of critical satcom network control.
- The JSEC Tactical Systems Lab (TSL) has provided extensive support to warfighters in both Afghanistan and Iraq. The TSL provides 24/7 Help Desk support to SMART-T and SCAMP EHF satellite communications terminals users in the field. During FY04 the Help Desks responded to approximately 200 calls and emails from users in both Afghanistan and Iraq. This level of support continues in FY05 and is expected to continue for the foreseeable future. The nature of the support includes troubleshooting issues with the operation of the terminals, communications planning, logistics and upgrades to terminals software. The TSL also assists units scheduled to deploy with equipment preparations and terminal training.

- The JSEC TSL has conducted an upgrade of software and hardware to 82 SMART-Ts deployed to SWA. The TSL has also conducted the upgrade on 23 SMART-T returned from SWA and redeployed.
- The JSEC TSL also supported urgent materiel releases of the military satellite communications Global Broadcast System (GBS) receive suites for the 101<sup>st</sup> AB, 10<sup>th</sup> Mountain Division, Stryker Brigade Combat Team (SBCT) 3 and V Corp, who are all deploying to Iraq.
- A representative from the JSEC TSL also provided on site field support to the 3<sup>rd</sup> and 5<sup>th</sup> Special Forces Group and AF Special Operations Command in Afghanistan, Uzbekistan, Oman, Pakistan and Kuwait from Feb to Apr 2002. Support provided users with Internet Protocol communications over the military satcom system known as Low Data Rate Milstar, as well as communications planning to the Region Satellite Support Center.

**Joint Network Node Capability Spiral 1 (JNTC-S).** The Joint Network Node Capability (JNTC) Spiral 1) has been fielded to the 3ID currently deployed in Iraq and will be fielded to all other Army Divisions rotating into theater. The JNTC is the main communications backbone for the deployed Warfighters. The JNTC is composed of Unit Hubs, Joint Network Nodes (JNNs), Battalion Command Post Nodes (BnCPN) and associated SATCOM KU Band Trailers. Team C4ISR Engineers directly support these systems prior to and during deployment. Team C4ISR Engineers develop initial system configurations and are on call 24/7 to help the deployed units with troubleshooting or reconfiguration. Team C4ISR engineers deploy to OEF/OIF with JNTC equipped units to assist in initial setup and configuration.

**Stryker Brigade Combat Team Systems.** Brigade Subscriber Nodes (BSNs), Network Operations Center – Vehicles (NOC-Vs) and Battlefield Video Teleconference Systems (BVTCs) have been fielded to SBCT 1, 2 and 3 and are currently deployed in Iraq with SBCT-2. Team C4ISR Engineers directly support these systems prior to and during deployment. Team C4ISR engineers designed, developed, integrated, and fabricated these systems while providing 24/7 technical support to assist with troubleshooting.

- The BSN provides secure and non-secure backbone IP switching and network services with RF data rates of up to 8 Mbps and reachback capability over Secure Mobile Anti-jam Reliable Tactical Terminal (SMART-T) and legacy satellite systems. It incorporates a legacy gatekeeper to allow one seamless global numbering plan for all subscribers whether connected to BSN or Mobile Subscriber Equipment (MSE).
- The NOC-V provides the S6 with an operational facility and an integrated means to plan, manage, monitor and control tactical systems and networks within their management domain. The NOC-V contains a Force XXI Battle Command Brigade and Below (FBCB2) suite for battlefield Situational Awareness (SA) message traffic, a Tactical Internet (TI) Manager for the Internet and TOC management, a Global

Broadcasting System (GBS) for watching worldwide news and the Armed Forces Network in the field, and radio links via Single Channel Ground and Airborne Radio System (SINCGARS), Enhanced Position Location Reporting System (EPLRS), and Near Term Digital Radio (NTDR).

- The BVTC provides support to the TOC's at all echelons down to Brigade. Despite being separated by many kilometers, the BVTC capability gives the commander and his staff the tools to plan face-to-face and coordinate activities far more effectively and quickly than before. BVTC was chosen as a critical component for the STRYKER BCTs, the JNTC-S 3<sup>rd</sup> Infantry Division (ID) effort, and the Baseband Node (BBN) program.

**High Frequency Tracker & Communicator.** The HF Tracker and Communicator is government-developed and over twenty-five copies have been distributed throughout the Army to include units in Afghanistan and Iraq. The HF Communicator is a Graphical User Interface (GUI) used to send text messages from the ground via either the AN/PRC-138 or AN/PRC-150 Harris HF radios directly to an aircraft via the Control Display Unit AN/ARC-220 Aviation HF radio platform. The HF Tracker and HF Communicator systems are credited with helping to save lives in the field. We have received positive feedback on its use and were notified about the following message: "The 68 MED Operations NCO reported a MEDIVAC aircraft was returning from a remote site when the Operations Center learned two critical casualties had been brought to the air strip after the aircraft left. (Aircraft was BLOS from both ends of flight.) Using HF-Tracker and the ARC-220 HF system he was able to direct the pilots to return and pick up the casualties. The HF Communicator sent messages and pilots took required action and the casualties were saved."

**Portable Emergency Broadband System (PEBS).** The PEBS network is designed to facilitate digital access (i.e., IP voice, video, and data) for Warfighters, First Responders, and other emergency response personnel in disaster, combat, or underground areas. Through use of easily deployable wireless repeaters or Breadcrumbs (BC), rapid setup of a reliable multi-hopping network will be achieved. Breadcrumbs are small wireless meshing bridges and access points that allow stand-alone networks to quickly organize in places where there is no standing infrastructure. BC uses ad-hoc networking technology to create a self-healing network that will offer wireless connectivity to any client within range. S&TCD equipped 33 units, including 13 Supercrumbs, 8 Breadcrumbs and 12 Wearablecrumbs, under the Rapid Equipping Force (REF) Initiative to deploy with the 3rd Bde, 3rd ID to meet its operational needs in Iraq. These units were shipped to OIF units in December 2004.

**Night Vision and Infrared.** Team C4ISR has provided a variety of specialized Image Intensification and Thermal Infrared systems that augment the capabilities of existing, fielded equipment. New hand held and robot mounted thermal sensors have been used by Soldiers conducting combat operations in Afghanistan. Wide field of view, night vision goggles have also been fielded to ground and airborne for fighting during urban

operations. Team C4ISR has already deployed over 30 different prototype and limited quantity systems that are meeting the unique mission requirements in Iraq and Afghanistan.

**Advanced Field Artillery Tactical Data System (AFATDS).** The Advanced Field Artillery Tactical Data System (AFATDS) provides Army, Navy, and Marine Corps automated fire support command, control and communications. AFATDS pairs targets to weapons to provide optimum use of fire support assets. AFATDS automates the planning, coordinating and controlling of all fire support assets (field artillery, mortars, close air support, naval gunfire, attack helicopters and offensive electronic warfare). AFATDS will perform the fire support Command, Control, and Coordination requirements at all echelons of field artillery and maneuver, from Echelons above Corps to Battery or Platoon in support of all levels of conflict.

- AFATDS is the digitized sensor to shooter link providing automated technical and tactical fire direction solutions, fire asset management tools and decision support functionality. AFATDS functions from firing platoon through Echelon above Corps. AFATDS is the fire support node of ABCS. It enhances dominant maneuver, survivability and continuity of operations for Joint Force Commander.
- AFATDS system is deployed in support of Operation Iraq Freedom/Operation Enduring Freedom (OIF/OEF). There are over 120 AFATDS systems deployed with the SBCT 2, 173rd Bde, 3rd Army, XVIII C/A, and 42 ID, as well as Contractor Logistic Support in support of deployed systems. There are FIT personnel in country to assist in operational readiness of the AFATDS system. These personnel are contractor employees, managed through a time and material contract at PM Intel and Effects. Any degradation of contractor logistic support and/or fielding support will affect the readiness of the AFATDS system, resulting in inadequate fire support.

**ABCS upgrades: Providing ABCS Synchronization and Compatibility.** ABCS (Army Battle Command System) is a System of Systems that provides the critical command and control functions for the war fighter to use in support of his mission for all of the US Army. The Army could not communicate digitally between digitized and non-digitized forces without this support. Some divisions had been modernized with ABCS systems through normal modernization, and there were others who had no digitization at all. The Army was putting together a force of both equipped and non equipped units. We were able to bring all the deploying units onto a common operational software configuration and provide system of system and joint and coalition interoperability. We have fielded over 2,500 BFT (Blue Force Tracking) systems, various quantities of the other 11 ABCS systems, 13C2V's, 3LDOC's, and A2C2S which is the CDR's TOC in the Sky, and 13 Bradley BCV to provide on the move communications capability. "This is the success story of the war." In addition, we provided a DISA Collaboration Suite to for secure voice, whiteboard, chat, FTP, and VTC capabilities and have since moved on

to developing a windows based Tactical Business Enterprise System for web based unit reporting. This activity continues today as we provide synchronization to all OIF deployments and have merged it with the Army Transformation Plan to include Modularity, JNTC, and BFT.

**Team C4ISR Special Projects Office.**

- **SPO In Theater Support.** SPO manages and assigns technical representatives for every BFA to every deploying Division and separate BDE. Our tech reps are still in the AOR with their units. We manage the tech reps from a PEO FWD location in Doha that reports back to us here at Ft Monmouth. To date we have provided technical support to over 57 combat Brigades, 9 Divisions and 3 Corps in support of OIF/OEF. We currently have 254 personnel in theater supporting the Warfighter.
- **Joint Initiatives/GWOT.** Team C4ISR has coordinated, engineered, and provided direct engineering liaison to Joint Organizations including: Joint Forces Command, the Air Force Command & Control, Intelligence Surveillance Reconnaissance Center at Langley AFB, Army Training and Doctrine Command (TRADOC) at Ft Monroe & Ft Eustis, Supreme Allied Commander - NATO Europe, Fleet Forces Command (previously CINCLANTFLEET). These relationships and participation in experimentation and prototyping has facilitated technical advancement and improved interoperability that transfers directly to the war on terrorism. Recent activities include: Improved interoperability of collaborative systems that allow units to share information across theater, integration of Net Centric web-capabilities into coalition and interagency networks (Coalition Warrior Interoperability Demonstration '05), improved Joint Targeting using Service Orient Architecture approach (Joint Rapid Architecture Environment), and JFCOM's Joint Fires Initiative. This involvement between Joint organizations and the CECOM community speeds development of needed capability and insures timely procurement and delivery to the warfighter and first-responder alike. Only through this close involvement between the warfighter on the ground and the requirements development teams and the Army C4ISR Acquisition team can the cost savings, customer support, and rapid acquisition be realized.

**Blue Force Tracking (BFT) Network Operations Cell.** Over 1,800 BFT Platforms were installed and fielded to support OIE/OEF. Ft Monmouth SPO building 2707 is the network operations Cell for the OCONUS based BFT network. This Cell monitors the health and welfare of the network as well as managing the individual BFT platforms which includes software upgrades, troubleshooting of communications. There is no other facility like this in the world that provides this capability...one that would require duplication, certification, and a formal burn in period for transition.

**Satellite Range Extension for deployed Units/Joint Network Nodes.** Team C4ISR managed the design of several range extension projects, such as a satellite networking capability that allows the 3rd Brigade 2nd ID Stryker Brigade to operate with continuous

digital connectivity using commercial technology. One such effort provided CJTF-76-needed digital and voice service to isolated elements located throughout Afghanistan, while another project was for the 1st ID while that unit was deployed in Iraq. All of these range extension projects were initiated and met within 120 days of request. This specialized knowledge is helping the SPO with the Managed Range Extension Capability Assessment for Units of Action—a special study team that worked with TRADOC and DA to recommend an appropriate communications architecture to reorganize the Army into separate and self-sufficient Units of Action to support modularity. Critical to this task has been the engineering management support provided to our program manager for tactical radio communications systems in the development, testing and initial fielding effort of Joint Network Nodes to the 3rd ID, the first Army unit to be reorganized using the Unit of Action concept.

**Life Cycle Sustainment.** Team C4ISR provides support throughout the life cycle of equipment.

- **National Inventory Control Point and the National Maintenance Point** . Fort Monmouth is responsible for acquiring, stocking, inventory management and repair of nearly half of the Army's National Stock Numbered parts and systems. The total spares acquisition and hardware repair program for the current Fiscal Year 05 is \$2.3B. *In total, in direct support of OEF/OIF since the start of the operations, they have handled nearly 600,000 requisitions from field units, both Army and other Services, and provided over \$1.6B worth of parts across the entire spectrum of C4ISR systems.* They conduct Anticipatory Logistics, which means they work with units identified for deployments to help determine their status of systems and parts on-hand and what they will need while deployed, in order to better and more quickly satisfy their needs once deployed. Team C4ISR routinely does Readiness Analysis of C4ISR system's operational status with all field units across the Army. The sustainment support provided by the Team C4ISR is literally worldwide and from “factory to foxhole”. *The scope of equipment touches essentially every weapon system platform in the Army.*
- **Reset Program.** It receives from returning units, systems that have been subjected to the severe conditions of deployment and combat environment, performs depot level maintenance and returns fully combat ready systems to those units ready for redeployments. This is typically done within 120 days. *Thus far for FY03 - 05, they have Reset over 70 different types of weapon systems, with over 5,100 incidents of system maintenance, involving about 180 Battalion level units across the Army.* This effort involves daily contact by the DA Civilian workforce with those field units, both electronically, and via on-site inspection and maintenance teams. The C4ISR systems Reset range from radios to satellite terminals, airborne sensors/countermeasure sets to Command and Control Vehicles, Radars to Generator Sets.
- **Electronic Sustainment Support Centers.** The Team C4ISR has deployed these centers with DA Civilian Managers to provide forward, in-theater maintenance in direct support of deployed forces. *There are currently 9 different sites in the theater, and they have handled nearly 71,000 repair work orders.* Equipment

supported includes not only Army and other Service Standard systems, but a wide variety of commercial automation, communication and electromechanical equipment brought to the OEF/OIF theater by deploying forces. In addition, they have forward stocked certain critical system's spare parts in theater, both Army and DLA, in order to be more responsive to unit demands for parts.

- **Logistics Assistance Support.** There have been over 400 Logistics Assistance Representative (LAR) deployment events involving over 200 DA Civilian LARs, with an average of 55 in the OEF/OIF theater at any time, providing direct hardware technical assistance on-site with units. Some LARs have deployed up to 5 times to the OEF/OIF theater. In addition, there have been 161 Field Software Engineer (FSE) deployments, with an average of 45 in the OEF/OIF theater at any time, providing direct software support on-site with units.
- **Aircraft Countermeasure Filters.** The AN/ALQ-144 Countermeasures Set protects Blackhawk, Apache and Kiowa Helicopters from hostile Infrared (IR) homing missiles by jamming the threat IR Missile System. Deployment of the helicopters to the severe desert environment resulted in dust and sand getting into the mechanical/optical sections of the transmitter and causing greatly premature failures of the system, grounding the helicopters until the system could be repaired. Team C4ISR rapidly developed, tested, and fielded over 2600 Air Filter Kits, greatly improving nearly 75 times the reliability of the AN/ALQ-144, and reducing the maintenance burden and downtime for the aircraft.

**Information Assurance:** Team C4ISR Information Assurance staff continually supports Information and Communications Security systems and operations. Their continuous attention has revealed some security vulnerabilities and they have applied corrective actions directly to field operations in Iraq and Afghanistan that resulted in preventing security compromises and loss of mission and life. Evaluation of IA Security Tools/Security Hardware used by Tactical Army - Problems encountered over a one year period average at approximately 75 problems/solutions resolved, as appropriate with vendor or NSA. Examples are In-Line Encryptors TACLANE, KG-250, GOTS Firewall Cloud shield, Secure GSM Phones, Tactical PKI, Secure PDA, Secure Wireless LAN, Secure Universal Purge Tool. Details are sensitive.

**Software Release Summary.** In support of over 200 operationally deployed C4ISR systems, we provide new software versions (i.e. capabilities) critical to the Warfighter as these releases provide necessary enhancements, improvements and corrections required for these systems. Over the last twelve months the Team C4ISR Software engineering deployed 49 software releases, eleven (11) of which were emergency releases, in support of Operation Iraqi Freedom/Operation Enduring Freedom. More than 1,200 Warfighter requirements were fulfilled with the releases of these versions. These software upgrades included critical enhancements and fixes in areas such as: force protection; navigational accuracy of aircraft; intelligence analysis capabilities to be used to combat terrorism; early strike warning capabilities for friendly troops under indirect fire and; faster and more secure satellite communications.