



Community Rebuttal
to the
2005 BRAC Recommendation to:

Close Fort Monmouth
and its Fort Belvoir
Elements
and
Re-create a Land C4ISR
Center

July 8, 2005



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PREFACE

The concept of integrated C4ISR is difficult to understand especially when considering how military C4ISR systems fit together; how the technology becomes available for systems in development; how the systems are developed and provided to the field and how the systems are sustained in the field. Fort Monmouth's mission covers all of these aspects. The following definitions are provided to aid the reader in better understanding this rebuttal report.

The second part of this preface summarizes the BRAC selection criteria and indicates in "red" those areas where those criteria were violated regarding Fort Monmouth and its subordinate elements at Fort Belvoir.

Fundamental Definitions:

Land In this document the term "Land" relates principally to the U.S. Army (Active, Reserve and National Guard), but it also includes all land warfighters: Marines, Special Operations Forces, Coalition Forces and may include (especially these days) police and emergency units at home and in peacekeeping duties abroad.

C4ISR Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance, technologies, systems, fielded equipment, and sustained equipment.

RDAT&E Research, Development, Acquisition, Test & Evaluation.
In this report and in DOD BRAC deliberations RDAT&E is defined in three parts for analysis sake:

R: basic research; applied research and advanced technology development.

D&A: systems development and demonstration (SDD), systems modification; experimentation and concept demonstration; product and in-service life cycle support and acquisition (the actual procurement and production of systems).

T&E: In DOD Budget jargon and in DOD BRAC deliberations T&E is and was specifically limited to formal Developmental T&E (DT&E) and formal Operational T&E (OT&E). T&E used in DOD BRAC deliberations is that formal scored T&E required before final acquisition decisions are made for major systems. Other more general kinds of testing, not used in DOD BRAC analyses calculations, are: component testing, prototyping, initial



demonstrations and experimentation, and other laboratory and field trials with and without operational forces.

Sustainment and Logistics

This is a collective phrase to describe all the functions, and the dollars associated therewith, necessary to support a C4ISR system once produced. It can mean, for example, field support to the warfighter with technical trouble shooting or upgrades as the threat changes, supporting conversion of Army battalions to a new C4ISR capability before re-deploying, and operating an inventory control point for components logistics, etc.

BRAC Selection Criteria -- The DOD BRAC recommendation deviated from the approved selection criteria throughout DOD deliberations and in the final DOD BRAC recommendation to close Fort Monmouth. The selection criteria are summarized below:

DOD Selection Criteria (red relates to substantial deviation)

Military Value

1. Current and future mission capabilities and impact on operational readiness of the DOD total force, including impact on joint warfighting, training and readiness.
2. Availability and condition of land, facilities and associated airspace (including areas suitable for maneuver by ground, naval and air forces) ...
3. The ability to accommodate contingency, mobilization, surge....
4. The cost of operations and manpower implications.

Other Considerations

5. The extent and timing of potential costs and savings, including the number of years,...
6. Economic impact on communities....
7. The ability of the infrastructure ... to support forces, missions and personnel.
8. The environmental impact....

Summary of Substantial Deviations from BRAC Selection Criteria

The Department of Defense (DOD) substantially deviated from the Base Realignment and Closure (BRAC) selection criteria (see the red highlights in the Selection Criteria section of the Preface) and developed recommendations to close Fort Monmouth, NJ, and re-create a Land C4ISR Center that was based in flawed logic, assumptions and data. Each of these deviations will be discussed further in the Main Report.

- **Criterion 1: The Secretary of Defense deviated substantially from BRAC selection criterion 1 by not considering the impact on “current or future mission capabilities” or “operational readiness” that will be caused by significant C4ISR workforce losses and resultant, unacceptable, Army and Joint C4ISR program disruption.**
 - o BRAC history relative to relocation of technical civilian workforces, large and small, indicates that very few employees choose to relocate. A June 2005 professional “Harris Poll” survey conducted at Fort Monmouth indicates that only 20% of the employees will choose to move.
 - o When one reviews retirement eligibility and considers the expected time to fill several thousand vacant technical positions, one concludes that the Army Land C4ISR workforce will be less than 50% capable of executing its mission during the period 2007-2011. The reduced workforce capability is due to a combination of not being able to fill all the vacant positions during the period and an inability to fully clear, certify and train the employees who have been able to be hired during the period.
 - o Unacceptable disruptions to development, acquisition and sustainment of Army and Joint programs will occur over the 2007-2011 period, thereby adversely affecting current and future mission capabilities. From experience in previous BRAC moves, one notes that the best, most senior and most employable people will start to leave Fort Monmouth for other New Jersey opportunities immediately, thereby adversely affecting Fort Monmouth’s widely recognized critical support to the Iraqi war – “operational readiness” will be risked as evolving threat response, field technical support and logistics efficiencies are degraded by losses in the workforce.
 - o The DOD BRAC T-JCSG determined mission-related Military Values in appropriate technology areas. Fort Monmouth scored the highest, and first in the Army, in its C4ISR mission relevant areas; Aberdeen scored lowest. This data is also presented in the Army BRAC recommendation volume (Volume III, Tab1).



- **Criterion 1: The Secretary of Defense deviated substantially from BRAC selection criterion 1 by neither considering the “impact on Joint warfighting” nor current access to or the future opportunities for Joint C4ISR program development, demonstrations or experimentation at the nearby Joint Base (Dix, Lakehurst, McGuire – hereinafter referred to as the “DLM Joint Base”), and by removing existing Joint access by recommending a relocation to a base (Aberdeen) without Joint or C4ISR capability or plans.**

- **Criterion 2: The Secretary of Defense deviated substantially from BRAC selection criterion 2 by not considering current “availability of airspace” over the nearby DLM Joint Base or existing access to “ground, naval and air maneuver space available” at the Joint Base and in the nearby, offshore, military operating area (designated: W-107). DOD BRAC deliberations include no reference to the DLM airspace or other maneuver space, and DOD BRAC analysts did not visit the existing capability at the DLM Joint Base.**
 - o Fort Monmouth currently has access to and uses airspace in the DLM Joint Base area and in military operating area W-107. The Fort Monmouth aviation C4ISR research and development program and its employees and aircraft are located at the DLM Joint Base. Fort Monmouth invested in C4ISR instrumentation at the DLM Joint Base ranges for demonstrations and experimentation, and established robust communications among the ranges and between the ranges and Fort Monmouth and then on to the rest of DOD and appropriate industry partners through a Fort Monmouth communications hub. The DLM Joint Base has several runways, other technical test capabilities, access to ground forces continually, and is 45 miles from W-107 where naval operators and supersonic aircraft can easily join in Joint C4ISR experiments

- **Criterion 4: The Secretary of Defense deviated substantially from BRAC selection criterion 4 by not accurately estimating “cost to relocate or the cost of operations” in the DOD BRAC recommendation.**
 - o One time costs were significantly understated and recurring savings were significantly overstated. Summary follows; details pertaining to corrected DOD BRAC costs and savings are presented in the Main Report and Cost Annex:
 - DOD BRAC data understated total space needs by over 800,000 sq. ft. at Aberdeen resulting in increased MILCON costs. DOD inputs also improperly characterize that amount of refurbishment, vice new Military Construction; that will increase costs. Total new MILCON costs: \$474M.



- DOD BRAC COBRA inputs understate the requirement to install robust intra-base communications linkages for the C4ISR mission.
 - DOD BRAC COBRA inputs and BRAC data calls inaccurately describe the magnitude of specialty laboratories/facilities that will need to be reconstructed. Added cost: \$151M.
 - DOD BRAC COBRA inputs do not address several special facilities that will need to be duplicated (not moved) for a period of time to guarantee continuity of operations. Added costs from \$102M to \$342M.
 - DOD BRAC COBRA inputs considerably underestimate costs to create new hangar space and ramp space for fixed wing, helicopter, lighter than air (aerostat and blimp) aircraft storage, maintenance, mission preparation and staging. Added cost: \$60M.
 - DOD BRAC COBRA inputs do not include costs for “authorized personnel “over strength positions.”
 - DOD BRAC COBRA inputs do not include mission support services recurring costs, which reduce annual savings. There were also other Base Operations Support errors that further reduce recurring savings
 - Not included in COBRA calculations, but a real cost to the Army and the taxpayer, is the \$300M it will cost to reconstitute 3000 jobs lost in DOD recommended move. Contractor moves will also, eventually, affect costs to complete the mission.
- **Criterion 4: The Secretary of Defense deviated substantially from BRAC selection criterion 4 by neither discussing the probable “manpower implications” caused by the loss of thousands of cleared civilian, technical and/or acquisition certified employees who will not move from New Jersey to Maryland nor including in the DOD recommendation of the costs and risks involved in reconstituting such a workforce.**
- Neither the DOD recommendation, supporting recommendations from Army and T-JCSG deliberations nor background information released by DOD mention the probable loss of 80% of the professional workforce, calculate the “cost to operations” to replace that workforce, calculate the time to reconstitute a cleared and acquisition certified workforce or comment on its impact on current war-related and high priority C4ISR transformation projects in development. “Manpower implications” associated with the loss of intellectual capital are never discussed in the DOD BRAC records or in DOD’s recommendation. Historical BRAC data show that technical civilian workforces, large and small, do not relocate (less than 20% on average). A current Harris Poll survey indicates only 20% of Fort Monmouth’s employees will move.
 - Reconstitution of any technical workforce in the areas most important to DOD is difficult by DOD’s own admission in Congressional testimony, and other



briefings and workshops as late as April 25, 2005, yet DOD never mentions the scientist and engineer supply crisis in its BRAC deliberations.

- **Criterion 5: The Secretary of Defense deviated substantially from BRAC selection criterion 5 by inaccurately estimating “costs and annual savings” thereby significantly underestimating the “payback period.”** Further, the DOD recommendation did not discuss probable (and historic) lags in filling critical civilian positions or the timely completion of new, highly technical facilities. Fort Monmouth used a COBRA expert consultant to re-run the COBRA model with corrected input data; a summary follows:
 - o Corrected COBRA results are:
 - One time costs: \$1.5B
 - Recurring savings \$74M/year
 - Payback Period 21 years
 - o Additional costs:
 - When one considers data from a signed DD form 1391 prepared by West Point-affiliated facilities experts in June 2005 to formally estimate military construction costs for a move of the Military Academy Prep School to West Point from Fort Monmouth, one finds an increase of \$202M in costs.
 - When one includes the costs to reconstitute the lost workforce (not a COBRA cost, but a real cost to the Army) one must add a minimum of \$300M
 - Relocation and establishment of supporting contractors (personnel costs only) , while not an explicit cost, is a cost that will be imbedded in contractor billing. Add \$152M.
 - New one time real costs = \$ 1.99B. Payback period = greater than 21 years.
 - o Time lag:
 - A civilian professional is not required to declare his/her commitment to re-locate when the final BRAC decision is made; he/she needs only make that decision shortly before the position is actually scheduled to move (likely in the 2007-2008 timeframe). Therefore, initiation of hiring actions for expected vacancies cannot start early. One can safely estimate that by the time a civilian professional decides not to move in the 2007- 2008 timeframe, it will take an average of two years to arrange for a trained and cleared replacement ... it will take even longer to earn required acquisition certifications. A likely “personnel timing lag” affecting thousands of positions was not considered or discussed in released BRAC material.

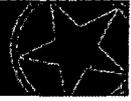


- Historically, one also finds that similar lags occur due to the time it takes to establish new technical facilities (laboratories, chambers, SCIFs, satellite ground stations, etc.). This occurred in BRAC 1993 when interim sites were set up in Rockville, Maryland and Newark, Delaware because BRAC closures were completed on time, but new facilities at Adelphi and Aberdeen were not ready to accept the full workforce. Duplicate costs for facilities and double relocations of people resulted. Since Aberdeen has admittedly (in conversations with Congressional visitors on July 1, 2005) very limited capability to absorb other than administrative workers in its current WWII-era facilities, considerable new and complicated construction will be required.

- **Criterion 7: The Secretary of Defense deviated substantially from BRAC selection criterion 7 by not adequately considering the “[in]ability of the receiving base to support mission ... or personnel needs.”**

- No available data released by DOD or information collected on Congressional or other visits to Aberdeen indicate that Aberdeen has the ability or plans to meet Fort Monmouth/Belvoir needs – in fact, one notes that Aberdeen officials stated to Congressional visitors (July 1, 2005) that it was not consulted by the Army about its ability to assume host responsibilities for the land C4ISR mission.
- The receiving base is not likely to be able to afford or meet the existing standards afforded by Fort Monmouth and its DLM Joint Base partner. In some cases additional funds will be required; in other cases, like ready access to troops in training, ranges and airspace, matching capability cannot be guaranteed even with additional funding. Specific areas of concern follow:
 - new laboratory facilities of adequate capacity/capability,
 - ground satellite control station facilities,
 - C4ISR instrumented ranges,
 - robust intra-facility communications/IT connectivity,
 - C4ISR aircraft housing and ramp space,
 - access to troops for demonstrations and experimentation,
 - ground, air and naval maneuver space for Joint demonstrations and experimentations, or
 - the ability to hire thousands of cleared employees in time to avoid unacceptable C4ISR program disruption.

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Discussion and Recommendation

Discussion:

The DOD recommendation does not preserve or enhance military value. It is a serious mistake that will, rather, degrade military value.

The result of the DOD BRAC military value evaluation conducted in the major technical areas and functions relevant to the C4ISR mission are startling in light of the ultimate decision to close the installation. Fort Monmouth was ranked:

- **1st Army Information Systems Technology - Development and Acquisition;**
- **1st Army Information Systems Technology - Research;**
- **1st Army Sensors, Electronics and Electronic Warfare - Development and Acquisition,**

and

- **3rd Army Sensors, Electronics and Electronic Warfare - Research.**

In all of these critical functional areas, Fort Monmouth was ranked above (in some cases 300% - 400% above) the proposed site for the organization's re-location (Aberdeen Proving Ground).

If the DoD BRAC recommendation is implemented, the intellectual capital that produces these outstanding ratings will be lost and not recovered for 10 years based on experience with similar moves over the past 25 years. Secretary of the Army Harvey, in testimony before the BRAC Commission on May 19, 2005, cited 26% as the percentage of Fort Monmouth personnel who could be expected to re-locate. That is too optimistic, and surprisingly it is considerably more dismal that the 75% relocation standard used by DOD in COBRA.

Actual experience in re-locating a technical organization from Fort Monmouth to Maryland (and in other moves within Army C4ISR over the last 25 years) indicates that the percentage will be less than 20% and mission failure is a very real prospect. History indicates that the personnel lost will be the most experienced, highly trained personnel in the C4ISR field. Moreover, the employees lost will be the same experienced personnel the organization would have relied upon to train the next generation of C4ISR professionals. It will take many years to re-construct the organization effectively (if it can ever really be re-constructed) during which time there will be catastrophic mission failure across almost all key transformational programs.

The percentage of systems experts and senior leaders re-locating to Aberdeen would most likely be even lower than our 20% estimate, since this group is older and has more years of service than the overall work force. The average age of the organization's systems experts and senior leaders is 48.3; their average years-of-service is 20.5. While experience at Fort Monmouth has been that employees, on average, work until age 61, a BRAC re-location will likely cause a wave of retirements that would otherwise not have occurred.

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The requirement to hire at least 80% of the technical and acquisition work force (approximately 3000 vacancies) will seriously degrade the Army C4ISR program and hurt the soldier for a decade. That estimate is based not only on the amount of time it takes to develop a systems expert (six to nine years for employees hired directly from or shortly after college; four to six years for employees hired in mid-career), but also on the amount of time it will take to hire about 3000 new employees.

DOD is currently struggling to hire qualified engineers and scientists who can obtain a security clearance, both because the talent pool is running dry and because “baby boomers” are expected to continue to retire in record numbers. One cites the *Federal Times*, 7 February 2005, “The Hardest Jobs to Fill,” and testimony before the House and Senate by the Director, Defense Research and Engineering (DDR&E) in 2004 and briefings by the DDR&E as late as April 25, 2005.

The Army does not have a contingency plan to mitigate the disastrous effect the DOD BRAC recommendation will have on a technical workforce and its current and future Army and Joint C4ISR programs, and most importantly, has not identified any legitimate benefit that would result from the recommendation that might conceivably offset that profoundly negative impact.

In his testimony before the Commission, Secretary Harvey stated that the activities on Fort Monmouth are strictly “R&D” and “Strategic”, and that moving them and sustaining a loss of personnel of 74% would not have immediate impact on the warfighter. He is mistaken: new funding increases to support the war, regular travel by Fort Monmouth engineers to the war, and shifting priorities to counter evolving threats like Improvised Explosive Devices (IED) indicate a deep involvement in immediate “tactical” challenges. Further, he failed to take into account the full spectrum of missions from technology generation, to system development, to production and fielding, and to sustainment as more than 50% of the Army’s National Stock Number (NSN) items currently in the field are acquired, managed and sustained through Fort Monmouth.

Fort Monmouth is inextricably engaged in supporting the deployed force in Iraq, Afghanistan and around the world. It performs critical functions in equipping divisions and brigades which are “modularizing” and/or are preparing to re-deploy. The impact of what Fort Monmouth does to develop, acquire, field and sustain critically needed C4ISR systems to enhance operational effectiveness and maximize the safety of our Warfighters has immediate, real time consequences while they are in the field. Fort Monmouth is also integral to transformation to the future force as it provides half of the critical technologies necessary to make the Future Combat Systems (FCS) a reality. It is more than just FCS. Fort Monmouth is substantially involved in every Army program; and the programs support weapons systems that increasingly integrate with each other. These programs are part of the Army’s approved roadmaps for transformation and key milestones are already laid out well beyond 2011. While these are “strategic” in that they are not programs being delivered today, they are none-the-less planned, approved and will rely on Fort Monmouth and its intellectual capability to play a critical role.



The Land C4ISR Center exists today at Fort Monmouth, to move it will destroy a workforce and result in unacceptable program disruption.

Credibility is tested.

Secretary Harvey's testimony also stated that Fort Monmouth lacked test ranges suitable for "maneuver", thereby implying that Aberdeen would help the situation. Simply he was wrong. Formal C4ISR testing is done at places like the Electronic Proving Ground in Arizona and at large maneuver bases like Fort Irwin. Aberdeen is not now and has never been a C4ISR test site. The nearby DLM Joint Base is perfect for demonstration and experimentation testing because of its ranges, troop availability and airspace. Aberdeen cannot match this capability. The Secretary was incorrect in his understanding of formal or informal C4ISR testing and wrong in implying that C4ISR would improve by moving to Aberdeen to gain T&E efficiencies.

Aberdeen is not a better equipped facility. The highly specialized laboratories and engineering and test facilities needed for the C4ISR mission exist on or near Fort Monmouth, not Aberdeen. Aberdeen's facilities are generally inadequate (Source: 2004 Army Installation Status Report).

It appears that the DOD recommendation to close Fort Monmouth was arrived at before any analysis was conducted. On more than one occasion (e.g. on April 1st and again on April 5th) in T-JCSG minutes, one of the "Close out Checklist" items for the Army representative to the T-JCSG was: "Ensure Tech [Scenario] 35R is knitted with Monmouth closure for real good picture." "Tech 35R" refers to a scenario that would move C4ISR expertise to Aberdeen. The appearance this repeated checklist item creates is that the objective of T-JCSG (at least in April 2005) was less focused on mission effectiveness, and more focused on creating a "real good picture" that would support closing Fort Monmouth. This shows precisely the sort of "preordained" decision that Senators Collins and Lieberman recently directed GAO officials to evaluate. Although it may be merely the result of an extraordinarily poor choice of words, one has yet to find a similar entry related to other closure or realignment recommendations. Additionally, by April 2005, one would have thought that the relevant data supporting the proposed recommendations would have been firmly established, and there would have been no need to create a "real good picture" for closing a major installation and relocating the Army's premier C4ISR organization. The facts should have spoken for themselves.

The Main Report, Section 5, provides corrected costs and savings derived from that DOD data that has been released to date. Costs and savings change very significantly: Costs grow by \$700M, savings shrinking by \$69M/year and the payback period stretches by a decade. Credibility in the DOD/Army data and calculations has become a real concern.

To punctuate that point:

- The United States Military Academy Preparatory School (MAPS), which is recommended for re-location to West Point recently completed \$25M in upgrades to its facilities on Fort Monmouth. The recommended re-location of MAPS and the closure

makes that expenditure wasteful; recent improvements are not referenced in release DOD material.

- West Point recently (June 2005) completed a DD Form 1391 which updates the DOD's BRAC MILCON estimates for the MAPS move; it calculates MILCON costs to be in \$227M or an order of magnitude higher than the \$22M cited in the DOD BRAC recommendation.

Credibility is also an issue within T-JCSG deliberations. While its goals and philosophies appeared, on review of the released DOD BRAC information, to wander, it consistently "led off" with closing Fort Monmouth.

The T-JCSG was inconsistent in its use of military value calculations. A comprehensive critique of T-JCSG inconsistencies is found in Issue Paper #12-28-04-01.

After months of discussion about the Land C4ISR center, it avoided any detail rationale in its report (BRAC Report Volume 12) or in its briefing to the BRAC Commission staff (BRAC Commission DCN 3031). Further, BRAC Commission DCN3031 recounts a discussion the T-JCSG had with the BRAC Commission on June 1, 2005. While it does not specifically mention Fort Monmouth, it does mention: "because of political reasons, "taken off the table, " "up front decisions " – credibility in the T-JCSG is a concern.

Greybeard Warnings, ignored

The DOD BRAC recommendation to move the existing Land C4ISR capability to Aberdeen is precisely the kind of scenario that General Ronald Fogleman (USAF Ret.) and former 1995 BRAC Commission Chairman Alan Dixon warned against in their 2 May 2005 *Defense News* editorial entitled "*Measuring BRAC - Weigh High Tech Aptitude Before Shutting Doors.*" They observed that, if the United States is to succeed in the Global War on Terrorism, it must continue to develop a nimbler, smarter, more technologically advanced military infrastructure.

In their view, a key feature of the current BRAC considerations must be to ensure that Secretary of Defense Rumsfeld's goal of reconfiguring the "current infrastructure into one in which operational capacity maximizes both war-fighting capacity and efficiency", is accomplished. To achieve those objectives, this current BRAC round needs to be guided by:

- "Improving 'Jointness' among the Services.
- Risk to mission interruption. At many bases, the process of closing a base is nearly as simple as packing assets and reassigning military personnel. But for technical acquisition facilities, research and development labs and other nontraditional bases, moving the mission is much more complex. These bases have developed deep roots with neighboring universities, research institutions and high tech work forces. In many cases, the experienced engineers and

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scientists will not follow the mission to other regions, which may not have the intellectual resources or critical mass of skilled workers to continue the critical research and development work.”

Dixon and Fogleman went on to conclude that the Pentagon should look for opportunities to co-locate synergistic military operations from other services, as a means of supporting the needed military transformation. This appears not to have been done in the case of the C4ISR mission being performed at Fort Monmouth.

Homeland Security and Other Federal Agency Tenants

Homeland Security is a critical consideration that was not considered in the DOD BRAC by the recommendation. More specifically a BRAC policy directive (USD(ATL) memo of 10 Dec 2004) included reference to technology sharing as an area to consider during BRAC deliberations.

- The C4ISR activities at Fort Monmouth have played a significant role in Homeland Security, beginning with their immediate support of the efforts in response to the terrorist attack on the World Trade Center on 11 September 2001. Its proximity to New York City has caused the installation to be designated a “Continuity of Operations Point” by FEMA and the Corps of Engineers. Further, primarily through the use of Cooperative Research and Development Agreements, Fort Monmouth is assisting the City of New York, the National Guard Bureau, the Port Authority of New York/New Jersey, Army Corps of Engineers, and the State of New Jersey by bringing intelligence and electronic warfare expertise to bear in meeting homeland security challenges.

Fort Monmouth is home to a Veterans Administration Health Facility that handles in excess of 10,000 patient visits annually. It also houses a FEMA Region II And USACOE Continuity of Operations Points (which have been used several times since establishment). Further, Fort Monmouth is home to the Federal Bureau of Investigation’s (FBI’s) Northeast Regional Data Processing Center, a secured facility employing 120 personnel. The impact of the recommendation does not appear to have been fully considered during BRAC deliberations.

New Jersey Science and Engineering Workforce

Finally, BRAC criterion 7 tests whether the receiving site is able to meet the mission and support the people being moved. Demographics generally favor New Jersey, especially in the area of intellectual capital of the surrounding area. Data drawn from Federal statistics indicate that area surrounding Fort Monmouth significantly surpasses similar areas surrounding Aberdeen in education, workforce quality and measures of science and technology quantity/quality (Sources: Studies completed by the John J. Heldrich Center for Workforce Development in January, May and June 2005).

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- **Reject the DOD BRAC recommendation to close Fort Monmouth and move it and its Fort Belvoir elements to Aberdeen for substantially deviating from the BRAC selection criteria.**
- **Retain existing Army C4ISR activities in place, at Fort Monmouth and Fort Belvoir.**
- **“Realign with enclave” the Fort Monmouth installation and organizationally align it with the DLM Joint Base to enhance Jointness and capitalize on potential overhead efficiencies.**
 - **Assign the Fort Monmouth Garrison to the Joint Base Commander.**
 - **Deliberately, over time, and cooperatively between the Fort Monmouth C4ISR Commander and the Joint Base Commander take steps to shed excess facilities and property in accordance with mission needs and good business principles.**
- **Recommend that the Secretary of Defense consider establishing a Joint C4ISR headquarters within the DLM Joint Base- Fort Monmouth complex in order to capitalize on extant Joint capabilities and C4ISR technical talents.**
- **Should there be a BRAC Commission desire to relocate any C4ISR organization, that organization(s) should be moved to the center of mass, the Fort Monmouth-DLM Joint Base complex.**
- **Do not move the Military Academy Prep School in view of new “cost to move” data.**

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Main Report Synopsis

Introduction.

This report will demonstrate that the DOD BRAC recommendation to close Ft. Monmouth and move its C4ISR efforts, along with its activities at Fort Belvoir, to Aberdeen Proving Ground is flawed. The resultant large loss of intellectual capital and disruption to major programs supporting warfighters now and in the future will negatively impact the C4ISR capability that is central to Army and Joint readiness.

One is concerned that military value scores for technical C4ISR areas were inappropriately considered since the DOD recommendation moves the highest scoring C4ISR functions at Fort Monmouth to the lowest C4ISR scoring base at Aberdeen.

Moving the several billion dollar and highest C4ISR technical military value scoring Fort Monmouth to the less than \$10M of C4ISR funding and the lowest C4ISR military value scoring organization in the Army (Aberdeen Proving Ground) is akin to "moving the mountain to Mohammed."

Section 1. Military Value

Technical Military Value was weighted inconsistently in BRAC formulation processes. In the case of Fort Monmouth, High Technical Military Value was moved to a low Technical Military Value base. Military Value for Installations (MVI) used by the Army had only two of 40 contributing attributes that had even slight relevance to C4ISR or to the final BRAC recommendation which purportedly is to improve Land C4ISR RDAT&E. It is noteworthy that high technical military value single purpose Army installations like Picatinny and Detroit were not moved for MVI reasons. Finally, the Army never considered Fort Monmouth's historic ties to Fort Dix, Lakehurst or McGuire AFB in developing the MVI scores. Had it done so Fort Monmouth would have scored among the highest in the Army.

"Current Capacity" was used in the T-JCSG process; yet it was not current (FY01-03 only). "Future Capacity," an important factor for the rapidly changing C4ISR environment, was mentioned, but evidence of its use is missing. One can only suspect that future capacity calculations would show a capacity deficit, thereby negating the need for any C4ISR base closure.

The Army started the BRAC process with an entering argument of excess capacity. In RDT&E, Army showed an approximately 62% excess based on a people/square foot algorithm. Navy using a different algorithm (based on work years) had virtually no

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excess. These results are too different. The algorithms are too different. The inconsistency was never questioned.

Section 2. The Loss of Intellectual Capital.

The loss of a highly skilled workforce of this quality and quantity has never been experienced in DoD and certainly not in Industry; it is unique in this BRAC.

To displace over 5000 government personnel plus approximately 4000 contractor support personnel to a location without C4ISR foundation and without a C4ISR skilled workforce to absorb some of the losses will create unacceptable disruption in important C4ISR programs.

The BRAC analyses use 75% relocation as a standard for calculations — from historical analysis, technical workforces in previous BRACs moved at a rate less than 20%. A June 2005 Harris Poll indicates that only 20% of the Fort Monmouth will move.

The technical workforce supply, upon which the DOD relies, is in crisis by DOD's own admission in Congressional testimony and briefings right up through April 2005. While the loss of thousands of scientists and engineers and certified acquisition officials in this BRAC move will cause unacceptable program disruption, the unlikely ability to reconstitute such a large and talented workforce in a useful timeframe is an equally serious problem.

Costs to reconstitute the lost workforce will be significant (calculated to be \$300M).

Section 3. Program Disruption

The BRAC recommendation to close Fort Monmouth and re-create it at Aberdeen risks: (1) serious current program disruption affecting support to an ongoing war and (2) an ability to deliver on priority approved and scheduled Army and Joint C4ISR programs. Particularly at risk are programs with major development, experimentation, test and acquisition milestones in the period 2007 -2011. Several examples are provided in the main report.

The loss of cleared, certified, trained, experienced DOD civilian personnel will accelerate as Fort Monmouth approaches its nominal closing date. Replacement hiring will be slow to gain momentum due to current crisis in the supply of clearable scientists and engineers in America. The Army will experience a major technical "personnel time gap" in the last half of this decade. One can conservatively estimate that the workforce will be less than 50% capable (i.e., a combination of unfilled positions, newly-hired employees not cleared and/or certified, and new employees not be adequately trained).



Likewise, facilities complexity and historical evidence indicates that re-creation of many technical facilities will encounter design, cost, build and outfitting delays thereby preventing timely decommissioning of facilities at Fort Monmouth and incurring extra costs. When new hires can be found, but adequate facilities are not ready to accept them at Aberdeen, then the Army risks disruption again.

Section 4. Analysis of RDA and T&E Integration

Examination of the BRAC processes in the Army and within the T-JCSG shows that there was a breakdown in philosophy about integration of R with D&A and with T&E. In the end, after many attempts, the final DOD BRAC recommendation did not move R, moved the huge D&A segment to a place with virtually no C4ISR capability, and never consolidated T&E with RDA, even though the DOD and Army incorrectly claimed efficiencies by collocating RDA with T&E at Aberdeen – a base with no C4ISR T&E capability now or planned. In fact, the Army's designated center for C4I T&E is the Electronic Proving Ground at Fort Huachuca, AZ. No multi-functional integration was accomplished. Certainly collocation of RDA with T&E should never have been attempted, but to claim it was achieved is simply wrong.

Section 5. Cost Credibility

Criteria 4 and 5 demand reasonable cost benefit in BRAC recommendations. Assumptions made and data used in the DOD recommendation regarding Fort Monmouth/Belvoir defy credibility: costs are underestimated by \$700M, recurring savings overestimated by \$69M, bringing the payback period to 21 years.

Military construction and refurbishment estimates for both Fort Monmouth and the Night Vision Lab at Fort Belvoir omitted large areas or did not consider costs to rebuild existing specialized facilities.

Costs for several Fort Monmouth special capabilities slated to be relocated were not properly estimated (e.g., the satellite ground station cluster).

Over the past several years Fort Monmouth has invested in instrumented C4ISR ranges, inter-range high bandwidth connectivity and high bandwidth connectivity from the ranges to Fort Monmouth and then onward to other portals in DOD. These costs were not considered. Nor were costs to connect on-base C4ISR facilities at modern (and existing) standards

Costs were not well estimated in setting up an aviation C4ISR capability at Aberdeen's Phillips Field. Fort Monmouth's flight capability at nearby Lakehurst has significantly more ramp and hangar space than that available at Phillips. One time costs for Aviation related MILCON are underestimated. Recurring-costs (not calculated herein) associated



with conducting R&D flight operations in distant areas void of the FAA Chesapeake Sector's airspace constraints may be significant.

Base operations support (BOS) costs estimated by the DOD for Aberdeen after Fort Monmouth moves are understated in that customer unique mission support services costs, above basic facilities services, were not calculated. There were several other BOS errors, all of which contributed greatly to reducing estimated annual savings.

The Main Report provides calculations based on conservative assumptions and national research on relocating/reconstituting workforces. A conservative estimate is that it costs between 75% and 100% (depending on pay grade, skill level, certification level) of an annual employee's salary to recruit, relocate and clear a replacement employee. One also adds costs in lost time while a new employee is trained to a level of average productivity (three year average). These costs are not included in DOD BRAC deliberations. Costs to the Army and taxpayer will be \$300M, if the lost workforce can be re-constituted at all.

There are certain to be program disruptions as already discussed. The disruption costs cannot be quantified by those preparing this report, but one must note that the potential for such disruptions was not part of the record of BRAC discussions released by the DOD. Costs in terms of time or security were also not discussed in DOD BRAC deliberations.

Section 6. Existing and Future Joint Opportunity Lost.

Fort Monmouth is about 23 miles from the Dix/Lakehurst/McGuire (DLM) Joint Base. It uses that base now for Army and Joint demonstrations, experiments, aircraft operations and other RDA tasks. It is in discussions currently to use that Joint Base for more Joint events in the future.

The DOD BRAC recommendation neither mentioned nor considered the current or future opportunity offered by Fort Monmouth's proximity to the DLM Joint Base. BRAC deliberators did not visit the Joint Base. The DOD BRAC recommendation reveals no plan for future Joint C4ISR at Aberdeen. There is no Joint opportunity at Aberdeen in any technical discipline related to C4ISR.

The DOD BRAC recommendation moves Army and Land C4ISR away from Joint opportunities; a substantial deviation from Selection Criterion 1.

Section 7. Maneuver Space and Airspace were ignored.

BRAC Criterion 2 directs consideration be given to airspace and maneuver for ground, naval and air forces. Scenarios leading up to the DOD BRAC recommendation and the



DOD BRAC recommendation itself do not consider the ground maneuver space at Fort Dix; better maneuver space than Aberdeen because it is instrumented for C4ISR events. They do not consider airspace available over the DLM Joint Base or the nearby air and sea-space in military operating area, W-107. They do not consider the restricted nature of airspace in and around the FAA Chesapeake Sector. They do not consider the restricted sea-space in the northern reaches of Chesapeake Bay.

Scenarios seemed simply to assume that because vehicles and ordnance are tested at Aberdeen, that it would be a better maneuver space than Fort Monmouth's access to the DLM Joint Base. Further, the Aberdeen recommendation never discusses Joint maneuver space, because it is not possible there. Finally, the DLM Joint Base is nearly equal in size to the usable maneuver space at Aberdeen. The second highest priority BRAC selection criterion was ignored.

Section 8. Other Concerns with the BRAC Recommendation that Detract from Credibility.

There are a number of issues that challenge the credibility of the BRAC recommendation. They are mentioned below :

8.1. Homeland Defense/Security

DOD policy (USD(ATL) BRAC policy directive of 10 December 2004) directed that effects on homeland defense and support for civil operations be considered in BRAC recommendations, including sharing of technology. DOD BRAC records, that were released, do not discuss sharing technology that will support civil operations in the case of Fort Monmouth. This is strange in view of its close proximity to the "911 Commission's" top priority (New York City), Congressional testimony referring to Fort Monmouth by a "911 Commissioner" Lehman on August 3, 2004, and a August 19, 2004 National Research Council report which cited the Army's C4ISR technology as most relevant to critical homeland security interoperability needs.

8.2. Demographic Inaccuracies.

DOD BRAC demographic analyses miscalculated medical services per patient ratios for the Monmouth/Ocean counties area, when it inaccurately used an 11million population for the Monmouth/Ocean area. Monmouth/Ocean have better health access than the Aberdeen (Harford/Cecil) area.

New Jersey K-12 and higher education metrics are better than Maryland and Ocean/Monmouth counties exceed Harford/Cecil in nearly every metric. One doubts the DOD BRAC estimates that Aberdeen has a teacher student ratio that depicts there being more teachers than students.



Appendices to main report, prepared by the Rutgers University John J. Heldrich Center, based on publicly available national data, present a more comprehensive and accurate picture of comparative demographics.

8.3 Non-DOD Federal Tenants.

The cost savings or return on investment from the proposed closure or realignment of military installations shall take into account the effect of the proposed closure or realignment on the costs of any other activity of the Department of Defense or any other Federal agency that may be required to assume responsibility for activities at the military installations. Non-DOD tenants at Fort Monmouth were not noted in written decisions. While costs associated with Non-DOD tenants were not included in COBRA calculations per DOD policy, one cannot deny that there will additional costs to the Federal government (not DOD) by closing a base around a non-DOD tenant. Those costs should somehow be considered.

The presence on Fort Monmouth of the Veterans Administration Health Facility, which handles over 10,000 patient visits annually, is not addressed. The report also overlooked the presence of FEMA Region II's Continuity of Operations Point and the Northeast Region Corps of Engineers, Continuity of Operations Point and the FBI Northeast Regional Data Center. How the increased costs to these agencies caused by the closure of Fort Monmouth were taken into account in accordance with Section 2913 (e) of the BRAC Statute is unclear.

8.4. Inconsistencies between the Army C4ISR Center recommendation and those of the Navy and USAF.

The Army seemed worried about the dedicated use of a base for the C4ISR function; Navy and the USAF were not. They retain their dedicated C4ISR-use bases in BRAC 2005. The T-JCSG scrutinized Service C4ISR centers over many months; they left the Air and Maritime centers alone, but recommended moving the Land C4ISR center to a base without C4ISR capability in order to achieve a (unexplained in released DOD documents) technical synergy. Both Navy and USAF C4ISR centers retain workforce stability, access to high tech partners outside the gate, and avoid C4ISR program disruption.

Neither the Navy nor USAF considered sending its C4ISR center of mass centers to unrelated centers with no C4ISR capability to satisfy base operations business efficiency theories.

8.5. T-JCSG did Not Explain its Recommendations on the Land C4ISR Center.



Despite months of scenarios, military value/judgment "calculations," briefings and recommendations to higher committees, in the end, the T-JCSG chose not to explain the rationale for re-creating the Land C4ISR center at Aberdeen. It is missing from the May 13, 2005 DOD BRAC Report (Volume XII) and from the June 1, 2005 briefing by the T-JCSG deputy to the BRAC Commission staff (DCN 3031). One can only speculate why there is virtually no T-JCSG detail on the Land C4ISR center, after so many months of deliberations and intermediate recommendations/approvals, and when one considers that Maritime and Air C4ISR were discussed in detail.

9.0 Conclusions and Recommendation

Conclusions:

- *The BRAC recommendation substantially deviated from selection criteria and the recommendation to close Fort Monmouth and move its C4ISR efforts along with its subordinate activities at Fort Belvoir to Aberdeen Proving Ground (APG) is flawed. The resultant loss of intellectual capital and disruption to major programs supporting the Warfighter now and in the future is an unacceptable risk to capabilities that are central to the Army and Joint C4ISR.*
- *Considering the magnitude of the programs being executed by Fort Monmouth and its Fort Belvoir components and the absence of any C4ISR capability at Aberdeen, it is inconceivable that the Army did not calculate or mention the tremendous impact a move of this magnitude will have on our current and future C4ISR needs and, hence, our Warfighter capability. This information, inexplicably, did not impact the Military Value and Military Judgment considerations or the cost considerations in the BRAC recommendation.*
- *The BRAC recommendation did not co-locate R (Adelphi) with D&A. There is no relevant or sizeable R or D&A at Aberdeen. Moving Fort Monmouth to Aberdeen and Fort Belvoir to Aberdeen does not achieve RDA integration. It simply moves Fort Monmouth/Belvoir RD&A to a new place, without C4ISR capability, for \$1.5B in costs. The end result of the BRAC recommendation is to move the bulk of the people doing C4ISR work and currently integrating technology, development, production, fielding, and sustainment to a location which has no C4ISR capability and infrastructure; at **Considerable Expense and unacceptable risk to current and future missions.***
- *Fort Monmouth has conducted significant joint experiments; more are scheduled and can be expanded to provide meaningful opportunities to link Army ground units (current and future) with other Joint activities and headquarters. This is an opportunity that the DOD BRAC process did not examine or mention. The current DOD BRAC recommendation would remove Army C4ISR from this Joint*



opportunity and move to a locale where no Joint opportunity or future promise exists.

Recommendations:

- **Reject the DOD BRAC recommendation for substantially deviating from the BRAC selection criteria.**
- **Retain all existing Army C4ISR activities, in place, at Fort Monmouth and Fort Belvoir.**
- **“Realign with enclave” the Fort Monmouth installation and organizationally align it with the DLM Joint Base to enhance Jointness and capitalize on potential overhead efficiencies.**
 - **Assign the Fort Monmouth Garrison to the Joint Base Commander.**
 - **Deliberately, over time, and cooperatively between the Fort Monmouth C4ISR Commander and the Joint Base Commander take steps to shed excess facilities and property in accordance with mission needs and good business principles.**
- **Recommend that the Secretary of Defense consider establishing a Joint C4ISR headquarters within the DLM Joint Base- Fort Monmouth complex in order to capitalize on extant Joint capabilities and C4ISR technical talents.**
- **Should there be a BRAC Commission desire to relocate any C4ISR organization, that organization(s) should be moved to the center of mass, the Fort Monmouth-DLM Joint Base complex.**
- **Do not move the Military Academy Prep School in view of new “cost to move” data.**



MAIN REPORT FORT MONMOUTH

**and its
Fort Belvoir
C4ISR Elements**

**MAIN REPORT TABLE OF CONTENTS****INTRODUCTION**

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- 2.0 **THE LOSS OF INTELLECTUAL CAPITAL**
 - Deviation from Criteria 1,4,7
- 3.0 **PROGRAM DISRUPTION CAUSED BY BRAC RELOCATION**
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 - 8.5 **T-JCSG Omissions Of Discussion Of Land C4ISR In Its Report**
- 9.0 **CONCLUSIONS AND RECOMMENDATION**



1.0 INTRODUCTION

The report will show that the BRAC recommendation substantially deviated from selection criteria and that the recommendation to close Fort Monmouth and move its C4ISR efforts along with its subordinate activities at Fort Belvoir to Aberdeen Proving Ground (APG) is flawed. The resultant loss of intellectual capital and disruption to major programs supporting the Warfighter now and in the future will have an unacceptable impact on capabilities that are central to the Army and Joint C4ISR.

For every conflict the United States has been involved in, Fort Monmouth, New Jersey and its subordinate activities at Fort Belvoir have been instrumental in providing the Joint Services critical communications, command and control, intelligence, surveillance, and reconnaissance (C4ISR) equipments and capabilities. *C4ISR is most complex for the Army and is the "glue" that integrates our Joint Forces on today's modern battlefield.*

The Army has many pieces, at many echelons, moving at different speeds and some of those pieces are in hot combat with C4ISR equipment hosted on a variety of combat platforms. More importantly, though, is that all C4ISR, while important and complex for each Service, must eventually connect to the land forces — the term "land forces" here principally means the U.S. Army, but also includes Marines, Special Operations Forces, and Coalition Forces and police units.

It is critical to inter-connect land forces who are fighting in close/direct quarters with the enemy, who are taking ground, who are occupying land, who are in dangerous urban peacekeeping/peacemaking roles and who are often carrying out those roles with coalition military, paramilitary and/or civil organizations. Connecting to land forces is *THE "end game" in C4ISR*. In everything but strategic deterrence, it is supporting land forces who win by defeating the enemy and controlling their territory that is the toughest issue for our military to face.

Equipping and sustaining our forces is the mission currently performed at Fort Monmouth and one in which they excelled, most recently in providing rapid responses to critical field requirements for both Iraq and Afghanistan.

The relevance of Fort Monmouth is evident from the breadth and depth of their critical C4ISR mission to day-to-day operations, and the number of dollars being invested in Fort Monmouth managed and/or executed programs. One notes that funds (Army mission funds and funds from others for C4ISR work) have grown to well over \$5B annually – larger than any other Army C4ISR entity by more than an order of magnitude. Further, the responsiveness of Fort Monmouth in rapidly providing critical capabilities to our Joint Deployed Forces distinguishes it from other DOD organizations and demonstrates the criticality of these contributions in enabling the Warfighter during war and stabilization operations.

The Fort Monmouth elements have many significant contributions to: Iraq and Afghanistan field requirements especially in responding to the continually evolving threat; expediting delivery of capability to units rotating to Iraq/Afghanistan; and expediting the incorporation of new capabilities into modular units being formed as part

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of Transformation. The significance of these products are amplified, not just because of their capability, but also because Fort Monmouth's staff and their support contractors typically do the training support and remain with the products until they are fully integrated within the gaining units and throughout their life cycle.

Fort Monmouth's products and services range from the battlespace through strategic to sustaining base and cover: strategic and tactical communications to enable Joint interactions; battle command capabilities to enable decisive actions; combat identification to reduce fratricide; multi spectral sensors that allow our forces to know/see the enemy; intelligence systems that can "listen" to enemy communications; mine detection capabilities that can find anti-personnel and anti-tank mines; jammers against improvised explosive devices (a threat that continually changes); and artillery/mortar locating systems to bring counter fire to enemy weapons. *All were responses to Coalition requirements; all were provided rapidly; all were deployed with support staff; all were highly effective; all have application to Army and Joint Transformation; all show the professionalism and competence of Fort Monmouth's C4ISR staff in supporting the Joint Warfighter and all are being supported in the field today.*

In BRAC's Military Value (MV) analysis, the capabilities described above received top scores but were "weighted" as less important and therefore not given adequate emphasis in many BRAC scenarios. In fact, there is evidence in BRAC records that the weightings were adjusted in favor of basic research capabilities thereby awarding some organizations with higher scores. MV should be judged, at least equally, on rapidly providing technology and systems to the Warfighter, and on basic and applied research that still requires considerable time to mature. Bottom-line: Fort Monmouth's MV technical score, in its prime mission areas, were unequalled within in the Army.

One of the most significant capabilities at Fort Monmouth is a community of technologists, systems developers, and system deployers/sustainers working to ensure that fielded products are responsive to the Army and Joint requirements and can be upgraded with the latest technology (keeps the systems mission capable during the life cycle) to meet the evolving threat. That community includes thousands of government employees, and a nearly equal number of local highly skilled partners in high technology firms. It is a proper and continually changing mix between Government "smart buyers" and those in the marketplace who are leveraging commercial information technology advances that allows for rapid response and best access to technology.

In many cases the Research, Development, and Engineering personnel transition from technology development to system development, work in direct support of a PEO/PM, or ensure short term programs are focused on PEO/PM needs. In addition these



military oriented C4ISR experts adapt commercial products for military use thereby shortening the lead-time to get products in the field.

The Army's Life Cycle Commodity Command concept (Figure 1) recognizes the value of better linkages among the various product development phases and across product-lines. This is especially true for C4ISR systems because the challenge is to ensure that C4ISR equipments are interrelated and interoperable.

Teams Of Technologists; Systems Developers & Sustainers Responding To Real Warfighter Needs---One Team, One Location; One Focus

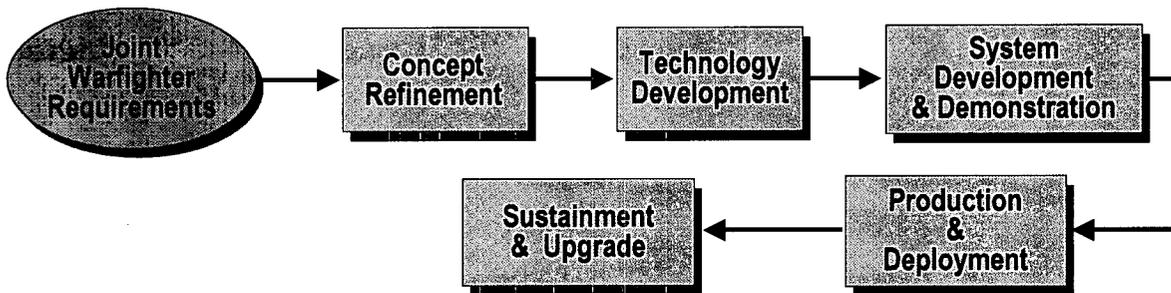


Figure 1: Integration of Technology and Systems

Many Fort Monmouth engineers have considerable experience and years of training across the product domains and are in an excellent position to understand how best to integrate capabilities. Fort Monmouth has fielded a large number of C4ISR products over the last ten years, but more importantly it has kept those products current with technology capability upgrades, software upgrades for new evolving threats, and modernization through spares — all fielded in the shortest time possible. This is made possible by the team focus across the development life cycle where technologists find solutions to upgrade existing products or develop backward compatible capabilities and where there collocated partners in the acquisition community accept these technological improvements and integrate them into system development programs.

Fort Monmouth with a substantial applied research (6.2) and advanced technology development (6.3) program is the “bridge” to bring maturing technology out of labs and universities into multi-billion dollar applied development and production efforts with which it is collocated so that land C4ISR needs can be met in a timely manner.

The linkage between applied research and advanced technology development programs to systems development, production and sustainment efforts is not adequately recognized in the “military judgments” that override raw military value technology scores.

The following sections of this report will deal with:

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- Military Value and how that criteria was applied to Fort Monmouth across the Military Value Installation and Military Value Technical areas.
- Inadequate attention to the loss of intellectual capital and the resultant impact that has on current and future land and Joint C4ISR capability. Assuming an artificially high number of people will move to Aberdeen has cost, time and capability/national security impacts that will be described in detail. Less than 20% of the technical and acquisition certified workforce will move and the impact of “rebuilding” a workforce where most need clearances, acquisition certifications and C4ISR experience, is and will create an unacceptable risk that will take a decade or more to correct — it will have long term implications to our C4ISR capability and to the Warfighter.
- Claimed linkage of C4ISR RDA and T&E at Aberdeen is not created with the BRAC recommendation. Aberdeen has a very limited C4ISR capability, and no C4ISR test capability. It is recognized that Aberdeen has no C4ISR T&E capability (T-JCSG defined T&E as formal Developmental and Operational Testing only) and that Army C4ISR formal test ground is at Fort Huachuca. It was not recognized that Joint C4ISR experimentation at the Joint Base of Fort Dix, McGuire AFB, and Navy Lakehurst offers more existing and future opportunity to conduct Joint demonstrations and experiments than any scenario considered. Fort Monmouth’s investment in and proximity to the DLM Joint Base for field Army and Joint demonstrations and experimentation was not addressed.
- No attention was given to the disruption of programs within the BRAC window nor were program delays, increased costs, and impact on the Warfighter discussed. We will examine several programs of record being executed in the BRAC window and discuss the implications of losing critical workforce within this time period.
- Cost issues that include missed cost estimates for: facilities; cost to move and reinstall sophisticated equipment; cost of aviation requirements for R&D evaluation; and recruitment and training of a new workforce. Cost estimation errors will add significant funding requirements for the move and will lengthen unacceptably the pay back period.
- Selection criteria put a high premium on maneuver space: ground, air and naval. The maneuver space, especially its Joint opportunity in the central NJ area was not adequately considered. Of specific concern, because it was not addressed, is current, close proximity access to airspace for C4ISR flight missions, instrumented land C4ISR ranges; access to space for C4ISR demonstrations and nearby offshore dedicated (W-107) sea space and supersonic airspace
- Absence of any Joint recommendations in the BRAC report and the opportunity to significantly increase Joint Experimentation at the Fort Dix; Lakehurst Naval Air Engineering Center and McGuire AFB Joint Base (DLM Joint Base). We will show a significant number of Joint experiments already accomplished and the potential to utilize this DLM Joint Base as a conduit for extended experimentation.

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In consideration of the importance of Fort Monmouth/Belvoir C4ISR mission to the Transformational concept of Network Centric Warfare, we must keep in mind the Pentagon's Office of Force Transformation definition of Network Centric Warfare (NCW):

"NCW represents a powerful set of warfighter concepts and associated military capabilities that allow warfighters to take full advantage of all available information and bring all available assets to bear in a rapid and flexible manner. The tenets of NCW are:

- *A robustly networked force improves information sharing.*
- *Information sharing enhances the quality of information and shared situational awareness.*
- *Shared situational awareness enables collaboration and self-synchronization and enables sustainability and speed of command.*
- *These, in turn, dramatically increase mission effectiveness."*

This quote is consistent with the life cycle mission of Fort Monmouth and its Fort Belvoir elements, has been proven in capabilities provided to the Warfighter, and is an integral part of their current/future programs.



2.0 MILITARY VALUE: Deviation from the #1 Criteria

The first four BRAC selection criteria focus on military value. In the BRAC deliberative process, DOD attempted to quantify military value. Each DOD BRAC entity chose a different method. The Army developed a military value for an installation; optimizing the running of a base. The T-JCSG took a higher road and focused on technical mission. The results of each are reviewed in this section, since they present differing views of the “value” of a capability.

The T-JCSG briefed the BRAC Commission on June 1, 2005 and stated that it used “intellectual capital center of mass” as critical to DoD technology needs, as one of its criteria—we will show Fort Monmouth/Belvoir is the center of mass and that the T-JCSG did not follow its philosophy.

We will further show that DOD should consider the capabilities of the highest ranked C4ISR organization (Fort Monmouth) and the Joint Base of Fort Dix, Lakehurst Naval Air Engineering Station, and McGuire AFB. This combination meets all of the MV Installation Criteria and creates an opportunity to implement true Joint Experimentation that answers the original and main requirement for BRAC.

Military Value of the Technical Mission (T-JCSG model).

The T-JCSG organized its scoring by the research (R) category and development and acquisition (D&A) category. Within those functional areas were two technical areas appropriate to C4ISR: “information systems” and “sensors.” Scores were derived by the T-JCSG using this taxonomy and later displayed by the Army in its final BRAC recommendation. Figure 2 below shows this tabulation:

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Info Sys Technology - D&A			Info Sys Technology - Research		
Location	Military Value Score	Ranking	Location	Military Value Score	Ranking
Ft. Monmouth	0.4845	1	Ft. Monmouth	0.4574	1
CECOM San Diego	0.2933	2(t)	Aberdeen	0.2864	2
Ft. Lewis	0.2933	2(t)	Adelphi	0.2563	3
Redstone	0.2330	4	Walter Reed	0.1527	4
Ft. Belvoir	0.2268	5	Ft. Belvoir	0.0744	5

Sensors, Electronics & EW - D&A			Sensors, Electronics & EW - Research		
Location	Military Value Score	Ranking	Location	Military Value Score	Ranking
Ft. Monmouth	0.4337	1	Adelphi	0.5018	1
Redstone	0.3402	2	Ft. Belvoir	0.3972	2
Ft. Belvoir	0.2524	3	Ft. Monmouth	0.3392	3
Aberdeen	0.2250	4	Redstone	0.2378	4
Warner Robins	0.2247	5	Aberdeen	0.1748	5

From 09-May-05 DoD Recommendation Supporting Information, Ft. Monmouth

Figure 2: T-JCSG Military Value Scores

Figure 2 clearly shows that in R+D&A, in the C4ISR mission area, Fort Monmouth is the preeminent Army facility.

One also notes from the table that Aberdeen received some interesting scores. For example, in the area of information systems research, ARL Aberdeen scored higher than the designated and parent ARL center for C4ISR research in Adelphi. When one examines the very small number of people at ARL Aberdeen involved in C4ISR (approximately 30) and very small average annual size of its C4ISR programs (<\$8M) one concludes that the score is misleading and that potentially someone could incorrectly conclude that other assets at Aberdeen are involved in C4ISR programs, which is not correct.

When one considers skill to accomplish the mission, Fort Monmouth is clearly tops in C4ISR R+D&A.

Early T-JCSG deliberations intended to send Fort Monmouth to Adelphi and Belvoir and later to Aberdeen, despite Fort Monmouth's higher military value scores. While the scores were clear, the application of those quantitative indicators was initially quite inconsistent. In the end, the T-JCSG abandoned its notion of letting research drive the future C4ISR Land warfare organization. It went along with moving the top military value scores (Monmouth and Belvoir) to the lowest score (Aberdeen) and left its original candidate receiving site (Adelphi) alone.

Military Value for Installation Management (the Army model).

Army BRAC deliberations relied on a model that summed up data call inputs in 40 different areas called “attributes.” The attributes have little to do with a R&D mission or a R&D Installation and less to do with C4ISR. The attributes try to encircle those factors that make bases run well in support of typical Army training and operational missions.

<ul style="list-style-type: none"> • TRAINING <ul style="list-style-type: none"> • Direct Fire • MOUT • Heavy Maneuver • Indirect Fire • Airspace • General Instruction • Applied Instruction • Air Quality • Noise Contours • Soil Resiliency • POWER PROJECT <ul style="list-style-type: none"> • Mobe. History • Force Deploy • Material Deploy • Operations • Accessibility • Connectivity 	<ul style="list-style-type: none"> • LOGISTICS <ul style="list-style-type: none"> • RDTE Mission Diverse • Test Ranges • Munitions • Workload • Maintenance • Supply Storage • Ammo Storage • WELL BEING <ul style="list-style-type: none"> • Crime Index • Mealeat Availability • Housing • In State Tuition • Employment 	<ul style="list-style-type: none"> • COST EFFICIENT <ul style="list-style-type: none"> • Workforce Avail. • Area Cost • Joint Facilities • C2 TGT, Facilities • Inst. Unit Cost • FUTURE OPTIONS <ul style="list-style-type: none"> • Bullidable Acres • Brigade Capacity • Environment • Urban Sprawl • Infra. Proximity • Water
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Figure 3: Military Value—Installation

In a nutshell, one does not score well in areas in which one does not work; one does score well in areas in which one does work — an unfortunate consequence if one’s mission is Land and Joint C4ISR. Figure 3 presents the attributes; only two have a slight relevance to a R&D or C4ISR mission, but Fort Monmouth scored quite high (top 12%) in the Army in the cost efficiency category.

Based on other BRAC recommendations and inspection of Aberdeen today, one can quickly ascertain that Aberdeen has room for additional missions and needs tenants to help pay for overhead. The MVI technique drives the Army (or vice versa) towards the solution to put many functions on fewer big bases. In this case, the mission (the C4ISR mission) will be put at great risk for a yet-to-be substantiated business theory.

It is noteworthy to mention that neither the Air C4ISR center nor the Maritime C4ISR center deliberators (in their respective Services and in the T-JCSG) seemed worried about optimizing base business functions. They chose to optimize around mission accomplishment and leverage the excellent workforce surrounding their single mission bases in California, New York and Massachusetts.

Military Judgment.

Military judgment overrode quantitative military value several times during the DOD BRAC deliberative period. For example, early-on in the T-JCSG scenario development phase, military judgment was used to override technical military value

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scores; in the Land C4ISR instance, much smaller research programs were given greater emphasis than much bigger and higher scoring D&A programs. Just the opposite occurred when the Air C4ISR center was being debated.

Such unexplained inconsistencies are a concern. Equally concerning is: who might be the “military judges” who made these weighting decisions? In the C4ISR area, little evidence exists that senior, C4ISR-experienced military personnel were involved.

Will the real Military Value please stand up?

The DOD BRAC recommendation would move a multi-billion dollar, 5000+ person, highest mission military value C4ISR capability to an installation with insignificant C4ISR program levels and employee numbers—and with the lowest mission military value scores—in order to satisfy a military value scheme that aims to save the business base of a large installation with new found vacancies. This move, for a cost of more than \$1B, results in the loss thousands of technical employees and the insertion of unacceptable risk into Army and Joint C4ISR programs. Which military value is more important—mission value or garrison operations value?—and for what cost/risk?

An Opportunity for True Jointness.

DOD has the opportunity to create a robust Joint Concept by linking the highest ranked C4ISR RDA organization, with the strong military value for installations that Fort Dix received (23rd) with excellent scores in all 40 attributes (Annex 1., Capability Analysis; DA BRAC 2005—Analysis and Recommendations). By adding the capabilities of the Air force and Navy to those Fort Dix Army installation criteria/attributes and coupling with the ranking of Fort Monmouth’s installation cost and C4ISR rankings, DOD has the opportunity to create a true Joint capability that is technically proficient and operationally efficient as a path to the future Joint Warfighter. Figure 4 shows how a linked Dix, Lakehurst, McGuire Monmouth Base would fair using the Army installation attributes. All blue is a strong score.

<ul style="list-style-type: none"> • TRAINING <ul style="list-style-type: none"> • Direct Fire • MOUT • Heavy Maneuver • Indirect Fire • Airspace • General Instruction • Applied Instruction • Air Quality • Noise Contours • Soil Resiliency • POWER PROJECT <ul style="list-style-type: none"> • Mobe. History • Force Deploy • Material Deploy • Operations • Accessibility • Connectivity 	<ul style="list-style-type: none"> • LOGISTICS <ul style="list-style-type: none"> • RDTE Mission Diverse • Test Ranges • Munitions • Workload • Maintenance • Supply Storage • Ammo Storage • WELL BEING <ul style="list-style-type: none"> • Crime Index • Medical Availability • Housing • In State Tuition • Employment 	<ul style="list-style-type: none"> • COST EFFICIENT <ul style="list-style-type: none"> • Workforce Avail. • Area Cost • Joint Facilities • C2 TGT, Facilities • Inst. Unit Cost • FUTURE OPTIONS <ul style="list-style-type: none"> • Buildable Ceres • Brigade Capacity • Environment • Urban Sprawl • Infra. Proximity • Water
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Figure 4: Military Value of Joint Organization



3.0 THE LOSS OF INTELLECTUAL CAPITAL: Deviation from Criteria 1, 4, 7

The loss of a highly skilled workforce of this quality and quantity has never been experienced in DOD and is unique in BRAC 2005. To displace over 5000 government personnel plus approximately 4000 contractor support personnel to a location without a C4ISR foundation and without a C4ISR skilled workforce to absorb some of the losses will mean unacceptable disruption and will take at least a decade to overcome.

A large percentage of the workforce will not move:

- BRAC report uses 75% relocation as a standard for calculations – history over all BRAC periods show that *technical workforces moved at a rate less than 20%*.
- Fort Monmouth/Belvoir C4ISR personnel are a highly skilled and an “in-demand” workforce that has many options for outside employment. *Statistics for recent hiring in New Jersey punctuate this point. New Jersey currently has America’s lowest unemployment rate and technology job opportunity growth is expected to continue.*
- Data on technology workforce moves from past BRAC decisions do not support the large percentage used as the BRAC calculation standard. *Estimates are that well less than 20% will go.*
- Recruitment, time delays in training the workforce and high cost of trying to obtain the right people are understated or not considered. *Our estimates are that it may take as much as 100% (average) of salary to obtain new people when all factors are considered.*
- There is an excessive time to get clearances and majority of the new workforce must be cleared at the Secret level to function. *Clearances cannot start until the employee is hired and are averaging above 18 months for TS/SCI clearances and up to 12 months for secret clearances. This is all lost and unproductive time.*
- Establishing the credentials for the Acquisition Certified Work Force takes time to meet experience thresholds and continuing educational requirements.

C4ISR is a dynamic and challenging multi billion dollar business for Fort Monmouth and its elements at Fort Belvoir. The lynchpin for this successful business is the dedication and competence of the personnel and the system engineering expertise that integrates its multiple products. Personnel in C4ISR constitute “critical infrastructure” just like a three mile long pier is considered “critical infrastructure” for seagoing ammunition loading. Fort Monmouth’s active R&D activities include: rapid adaptation of commercial products; the largest Army Small Business Innovative Research program; a large number of Cooperative Research and Development Agreements with Industry; dynamic interaction with Industry Independent Research and Development programs; networked laboratories; and field experimentation to better evaluate emerging technology in a real environment. The annual funding for the R&D activities is \$876 Million on average.



Fort Monmouth has the largest number of U.S. Army acquisition programs (98) being managed by C4ISR experts with a portfolio of \$12 Billion (Source: Fort Monmouth reports and briefings). These programs cover: post, camp, and station infrastructure; strategic reach-back communications; sustaining base communications; tactical C2 systems; Intelligence systems; Electronic Warfare systems; and Radar and Sensor Systems for the Army, Joint, Coalition and Intelligence communities. The leadership & contributions of these acquisition experts are providing needed capabilities for our current force & the foundation for the future force.

Fort Monmouth provides the sustainment of all C4ISR systems in the field and accounts for approximately half the Army inventory of National Stock Numbered items. It has Logistics Representatives in the field with the users; fields and trains new equipment (610 fieldings); and are leading the revolution in military logistics. Fort Monmouth is executing the Logistics Modernization program and is the systems integrator to link wholesale and retail sales into a single commercial based system. *This new system is "live" at Fort Monmouth and will soon begin migration to the other Army Commands.*

Fort Monmouth is also the center for C4ISR Software Management and provides for maintenance and software upgrades to deployed systems. Its software engineers are "forward deployed" to provide real time upgrade support to the using units. These experts currently support over 200 systems with 190 Million Lines of Code.

Considering the magnitude of the programs being executed by Fort Monmouth and its Fort Belvoir components and the absence of any C4ISR capability at Aberdeen, it is inconceivable that the Army did not calculate or mention the tremendous impact a move of this magnitude will have on our current and future C4ISR needs and, hence, our warfighter capability. This information, inexplicably, did not impact the Military Value and Military Judgment considerations or the cost considerations in the BRAC recommendation, and it clearly violates the DOD BRAC criteria.

A Look at the Characteristics of the Multi-Functional C4ISR Workforce at Fort Monmouth and its Fort Belvoir Components:

The type of work done at Fort Monmouth/Belvoir requires years of experience and "greening" of the workforce to understand the needs of the Army and now the Joint Warfighter. It is not just a matter of replacing an engineer with a new hire out of some university. It takes roughly 10-15 years for an engineer/scientist to progress to a mid level manager and 20 years to a senior manager. It is those mid level and senior managers that will not move and cannot be replaced simply by a new hire. "Greening" a replacement workforce will take over 10 years at least and that's an intangible that hasn't been adequately considered by the BRAC process. In addition, there is a considerable salary differential between government mid/senior managers and industry



and we do not anticipate any significant number of "experienced" industry personnel taking government jobs due to significant pay differences.

Figure 5 below shows the statistics of the personnel implementing Research (Applied Research and Advanced Technology Development) and also providing Department of the Army matrix engineering support for the various PEO/PMs. The workforce is highly technical averaging 18 years experience with 67% Engineers; 12% Scientists; and 3% Business. 82% have Degrees with 39% Masters or higher. Many S&Es have crossed the technical disciplines shown in the figure increasing their value to the organization. Because of the co-location of Research (R) with Development and Acquisition (D&A),

Technical Discipline	# People	Degrees	
		BA/BA, M, PhD	Clearances Conf.—TS/SCI
Command & Control	355	289 (81%)	340 (96%)
Intelligence & Info Warfare	372	311 (84%)	372 (100%)
Software	244	243 (100%)	230 (94%)
Communication	461	394 (84%)	400 (87%)
Night Vision & Sensors	517	378 (73%)	500 (96%)
Headquarters	106	73 (69%)	100 (94%)
Totals	2055	1688 (82%)	1942 (95%)

many people have worked in both the certified acquisition world and the R&D world. It is not unusual to find individuals that have worked Intelligence, Command and Control, and Communications in both program management and technology development positions. This level of across-the-board capability cannot be easily recruited; it must evolve as part of a career path.

Figure 5: R&D Workforce Statistics

Over the next five years, 1336

of the skilled R&D personnel are eligible for retirement or optional retirement (65% of the workforce) under the old Civil Service Retirement System. With an average age of 48, most would normally remain until age 61 (a real statistical average) but BRAC would force them to make an early decision to leave with the majority of the senior personnel leaving early because of their market value. It is relatively easy to recover a 2%/year pension loss once employed at a higher salary in industry. The majority of this workforce has high security clearances with many at the SCI level. Those hired in the past approximately 25 years are under the Federal Employee Retirement System, which is a portable system, akin to a 401K plan. These employees are not "handcuffed" to 35 years of service and 50 years of age. They can choose to carry their pension contributions with them to a Federal or non-Federal employer in the prospering New Jersey technical employment environment.

Figure 6 shows the Development and Acquisition (D&A) personnel statistics which include the Post Deployment Software support and the Logistics functions. While the number of degrees is lower than those found in Fort Monmouth/Belvoir's R&D components, the average years of experience is the same 18 years. This workforce is also highly

Area	# People	Degrees	
		BA/BA, M, PhD	Clearances Conf.—TS/SCI
Cmd. Control, Communication	275	176 (64%)	275 (100%)
Intell. EW & Sensors	106	67 (63%)	106 (100%)
Software Engineering	156	101 (65%)	156 (100%)
Logistics & Headquarters	1943	1071 (55%)	1943 (100%)
Totals	2480	1415 (57%)	2480 (100%)

Figure 6: Development & Acquisition Personnel Includes Software & Logistics Support Plus Command Hqs.



educated with a high percentage of Masters Degrees, and is holding many of the Acquisition Certified positions. Over 80% of the positions are Acquisition Certified, including those in the RDEC. At Fort Monmouth/Belvoir there are 3,846 Acquisition Certified positions. The Logistics staff is highly specialized and experts in supporting the complex C4ISR systems. They manage over 57,000 materials/items, half the total items managed by the Army and includes over 6,000 end items. In the last year (2004) alone they have performed over 800 fieldings of C4ISR equipment and over 450 so far this year. The logistics staff participated in 400 deployment events with over 200 logistics assistance representatives with Army units in OIF/OEF. They have also "reset" 180 battalions with over 75 different C4ISR systems.

TRAINING---is a continual process at Fort Monmouth and is a combination of Army, DOD, and centrally-funded/unique technical and leadership classes. For the Career Program 11 (Comptroller) up to 25 courses are required for new hires; for Career Program 14 (Contracting and Acquisition) up to 10 courses are required for new hires; for Career Program 16 (E&S) up to 8 courses are required for new hires with an advanced degree highly encouraged; and for Career Programs 13 & 17 (Materiel Maintenance and Supply Management) up to 17 courses are required for new hires.

Fort Monmouth is the host site for the Defense Acquisition University (DAU), Northeast Regional with approximately 1,500 participants in FY 04. It is also a Distance Learning Location for the Naval Post Graduate School with 15 participants in FY 05.

It will be extremely difficult to find the critical GS-13 and above employees who must meet the acquisition certification criteria. Certainly a Land C4ISR center at Aberdeen will be able to hire entry level technical employees, but they will take years to get enough experience and certification to be effective mid-level managers. In the meantime there will be an unacceptable gap in leadership and a probable inability to carry out even fundamental acquisition functions for a program that in development and production exceeds \$5B.

Because Industry is a large part of our direct support workforce, the industry statistics must be considered in any loss of intellectual capital analysis. Figure 7 shows a sampling of the Fort

Monmouth/Belvoir contractor base, estimated at 4000 people.

We surveyed 7 contractors totaling 1221 people and found a very highly skilled workforce (72% With Degrees) and mostly all cleared (93%) many at the SCI level. These industry personnel are largely collocated with government personnel and

Company	# People Direct Support	Degrees BA/BA, M, PhD	Clearances Conf.—TS/SCI
A	304	204 (67%)	303 (100%)
B	149	132 (89%)	122 (82%)
C	171	103 (60%)	146 (85%)
D	116	70 (60%)	89 (77%)
E	182	135 (76%)	152 (84%)
F	119	60 (50%)	100 (84%)
G	180	180 (100%)	180 (100%)
Totals	1221	804 (72%)	1139 (93%)

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facilities and operate as an extension of the government. Industry labs are utilized in direct support of and critical to the Fort Monmouth mission. We also found that 15-18% of this workforce is retired military or government yielding a very large number of years of practical and program management experience. Our recent survey indicates that 80% of this workforce would not move; 100% of those company's employees who are retired military or government personnel would not move.

A loss of the direct support industry base (only 20% moving) will exacerbate the loss of government personnel. In addition, Industry offering higher salaries would probably hire people "away" from their customer—the government. If we need to hire a contractor cleared workforce on the order of 3200 people (80% of the estimated 4000 contractors) along with the government workforce estimated 4500 (80% of 5000) as well, it will create huge holes in C4ISR capability. The clearance delays alone, which can only begin once an individual is hired, will bring operations to a halt.

SECURITY CLEARANCE ISSUE:

The large number of security cleared personnel required to execute the C4ISR mission will present an insurmountable task to recruit, hire and train personnel with adequate clearances who also have the requisite expertise to implement the Fort Monmouth C4ISR mission. Delays in obtaining clearances can and probably will exceed 18 months for TS/SCI and up to 12 months for secret— the clearance process can only begin once the individual is hired. This will result in unacceptable delays in hiring what is essentially a new workforce at Aberdeen.

Dr. Sega, the Director of Defense Research & Engineering, in his testimony before the Subcommittee on Emerging Threats and Capabilities of the Senate Armed Services Committee, on 9 March 2005 indicated the following:

- There is an increasing and growing concern about the availability of cleared S&Es for the DOD workforce.
- 60% of federal employees are over 45 years old and will be retirement eligible shortly under both the CSRS and FERS.
- A significant number of the workforce with valuable skills will be eligible for retirement and in fact, under FERS, most employees would consider their retirement contributions as portable.
- There is a declining supply of U.S Citizens awarded degrees in defense related S&E fields.
- DOD will face increased competition with domestic and global commercial interests for top notch cleared people.

Dr. Sega said: "The department is struggling to recruit enough engineers".

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The Federal Times in a 7 February 2005 article stated: "that the Defense Department needs to hire 14,000 S&E personnel next year. The pool of candidates is shrinking with > 50% of graduates being foreign nationals. The pipeline of available talent is running dry."

The Honorable Claude M. Bolton, Jr. Assistant Secretary of the Army (Acquisition, Logistics and Technology) before the Air Land Subcommittee on the Senate Armed Forces Committee, March 11 2004 also recognized this problem. "With over a decade of downsizing activities and the anticipated retirements of 25% eligible to retire (based on 55 years of age and 30 years of service) or more of Army acquisition workforce personnel in the next five to 10 years, Human Capital Strategic Planning for the Army Acquisition, Logistics and Technology Workforce is critical in order to proactively plan for the future acquisition workforce. Loss or diminishment of the highly skilled acquisition workforce will seriously impact warfighting capability and readiness unless dramatic steps are taken."

Dr. Sega chaired the T-JCSG panel and it is surprising that the T-JCSG didn't mention, calculate or otherwise recognize the magnitude of the problem created by moving so many skilled positions that require clearances from Fort Monmouth/Belvoir to Aberdeen. Senior leaders recognize the magnitude of this problem, but it was not factored in the BRAC process. When one reviews the dozens of scenarios considered over many months by the Army and the T-JCSG, not one mentions the potential significant loss in workforce, the challenge in rehiring to fill thousands of technical position all at once or its resultant disruption to the Army.

"IF THE BRAC RECOMMENDATION IS UPHELD WILL THE TALENTED WORKFORCE MOVE?"

Answer: No. The majority of the workforce, especially the most experienced, will not move and if forced to a decision would go to industry or to another more attractive government location. A recent independent poll of the workforce by Harris Interactive and attached as an Annex indicates that less than 20% will move. This is consistent with historical data from previous BRAC moves of technical workforces.

The rationale for most of the people not moving (Figure 8) is that they had a two-income family; had children in school and were not willing to disrupt their lives; had marketable skills that were found attractive in industry; or were going to take an early retirement.

As the Figure 8 shows, only 13% of the ARL workforce moved from Fort Monmouth to Adelphi as a result of the 1993 BRAC decision. Taking into account the lead time necessary to grant a patent and the two or three years it took to fully implement BRAC

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	Activity	From	To	Total	# Moved (%)
BRAC 95	Signals Warfare	Vint Hill, VA	Ft Monmouth, NJ	180	29 (16%)
BRAC 93	Phy. Sciences Dir.	Ft Monmouth, NJ	Adelphi, VA	300	40 (13%)
1990	TMDE	Ft Monmouth, NJ	Huntsville, AL	40	1 (2%)
1980	Laser Tech Div	Ft Monmouth, NJ	Ft Belvoir, VA	50	5 (10%)

Figure 8: Workforce Move Statistics

93, the bulk of the 360 scientists and engineers (S&E) that did not move as a result of BRAC 93 found other employment. In the 1995-1997 timeframe, a measure of productivity of a basic research laboratory such as ARL was the number of patents awarded. Figure 9's chart shows a catastrophic decline in the number of patents awarded; a decline that has yet to be corrected.

While publishing and producing patents are standard measures of performance for the basic and applied research workforce, the measures for the systems technologists are counted in terms of system delivery. The result when the systems technologists' performance falls is the Warfighter does not receive equipment or support.

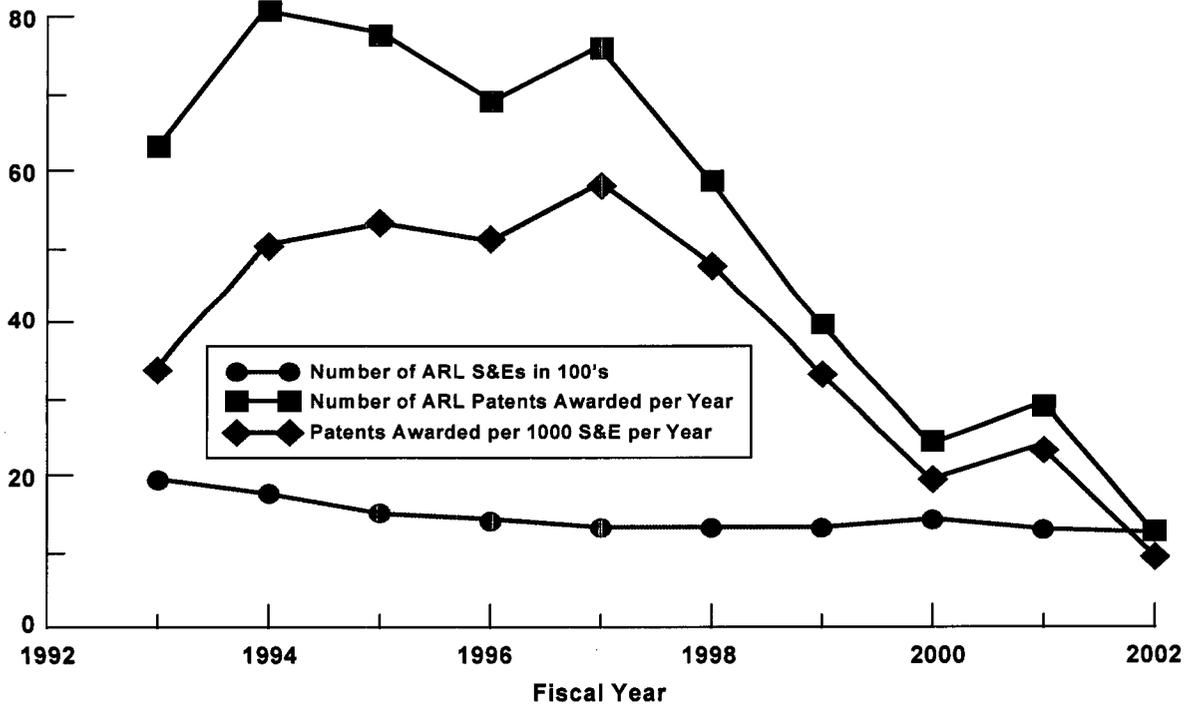


Figure 9: Productivity Declines As A Result of BRAC 93
 Note: The Peaks in 1994—1996 Result from Patents Submitted Prior To BRAC 93



NEW JERSEY SCIENCE & ENGINEERING HIRES IN 2004: To reinforce the opportunities available in New Jersey, we surveyed recent S&E hires in 2004:

- 23,742 new hires for S&E related occupations per quarter.
- New hires for S&E accounted for 5% of total state new hires (464,548).
- 11,545 S&E degrees conferred in FY 2004.
- S&E Degrees accounted for 18.8% of total State Degrees in FY 2004.
- Computer Systems Design and Related Services ranked 1st in terms of new hires.
- Telecommunications industry ranked 3rd in terms of new hires.

CAN THE TECHNICAL SKILLS AT ABERDEEN FILL THE GAP?

Answer: No. Aberdeen employs a number of S&Es in chemical and biological warfare defense and in the Army Research Laboratory's materials sciences and super-computer programs. These disciplines are not compatible with the C4ISR development and acquisition (D&A) functions being recommended for relocation to Aberdeen. The very limited number of C4ISR personnel and their very minor programs (<\$4M/year) cannot serve as a base upon which relocating employees or new hires can "fall in" on nor can that very, very small Aberdeen cadre of C4ISR employees make an easy transition to developing and fielding C4ISR systems.

We also examined the capability of the workforce at Adelphi and find C4ISR personnel conducting basic research and exploratory development, which transitions to Fort Monmouth and Fort Belvoir for productization. The skill set at Adelphi is not compatible with the advanced technology development; systems development and demonstration, production, logistics, and sustainment mission for Fort Monmouth/Belvoir. They have neither the technical orientation nor the acquisition experience to fill personnel gaps.

CONCLUSIONS FOR LOSS OF INTELLECTUAL CAPITAL

- BRAC analysis has not given sufficient weight to C4ISR Intellectual Capital. *The process is flawed because the cost model uses 75% as a standard for relocation calculations, but the reality of a 20% move is never factored into the Military Value or Military Judgment analyses and therefore DOD has violated their criteria.*
- The combined workforce of 5000 government personnel and 4000 industry personnel in direct support will result in a significant loss of capability. *The absence of cleared people with C4ISR experience will seriously impact Army and Joint missions. Even assuming a higher percentage will move, the problem still remains, especially if only the younger, less experienced people move.*
- Excessive delays in obtaining high level (TS/SCI) security clearances (18 months average) and secret level (up to 12 months) will create a critical personnel vacuum, with hired people being unable to work efficiently because of the absence of a clearance. For the many programs requiring an SCI clearance, the loss of productivity is extreme. *Clearances are a major problem since a condition of employment in most areas of C4ISR is having a Secret Clearance.*

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- The existing skills at Aberdeen and Adelphi do not match the needed C4ISR skills and those personnel cannot fill the jobs required. *A valuable C4ISR individual is one that has many years experience in the area with cross training across the C4ISR domains. Research personnel are normally focused in a single research area and have no understanding of the systems implications of developing C4ISR systems.*
- The length of time to recruit, hire, and train this NEW workforce has not been considered and the impact on the Warfighter never considered. *We have indicated the training and experience thresholds required for mid to high level personnel mandated by the acquisition corps—it will take considerable time to enable a new workforce to be productive and “learn” how to bring programs and capabilities to the field.*
- Finally, one must consider a frightening scenario: some will move – 20% or so – but they are likely to be the least qualified and least confident in their abilities to get rehired in New Jersey. Certainly there will be a few very strong performers, but too many will be from the “B-Team.” The B-Team will be faced with: program disruption, relocation logistics, and hiring several thousand technical people. What quality will the B-Team hire? Are they likely to hire the A-Team or the C-Team? The prospects for Land C4ISR for the next decade are ominous.

The loss of a highly skilled workforce of this quality and quantity has never been experienced in DOD and is unique in BRAC 2005. To displace over 5000 government personnel plus approximately 4000 contractor support personnel to a location without C4ISR foundation and without a C4ISR skilled workforce to absorb some of the losses is an unacceptable risk. The type of work done at Fort Monmouth/Belvoir requires years of experience and “greening” of the workforce to understand the needs of the Army and now the Joint Warfighter. It is those mid level and senior managers that will not move and cannot be replaced simply by a new hire. The loss of thousands, mostly all at once, was not considered. The enormous cost to reconstitute the workforce was not calculated. The unavailable supply of clearable technical personnel was not considered. The competition for the best people to work with support contractors instead of with the government was not considered. That the less qualified person will likely relocate and be given responsibility for dealing with relocation logistics, program disruption and hiring thousands of replacement employees was not considered.

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WHY FORT MONMOUTH IN NEW JERSEY?

Fort Monmouth's location in New Jersey is of great benefit to the Army and the Warfighter because it can leverage and support the: "Information Technology" corridor that exists with both Industry and Academia; cooperative research agreements with DoD and Commercial Industry leading contractors; and New Jersey and New York in their Homeland Security objectives.

New Jersey is home to many high technology information industry and academic institutions, all leading in and specializing in the underpinnings of C4ISR. Fort Monmouth's proximity to these entities facilitates the collaboration necessary to develop, field and sustain today's, and tomorrow's, superior C4ISR capabilities. This geographical advantage also enables Fort Monmouth to cultivate and harvest the very best candidates to continually refresh the technical workforce. Figure 10 shows some of the local relationships Fort Monmouth has with academia and industry and a brief summary of each follows.

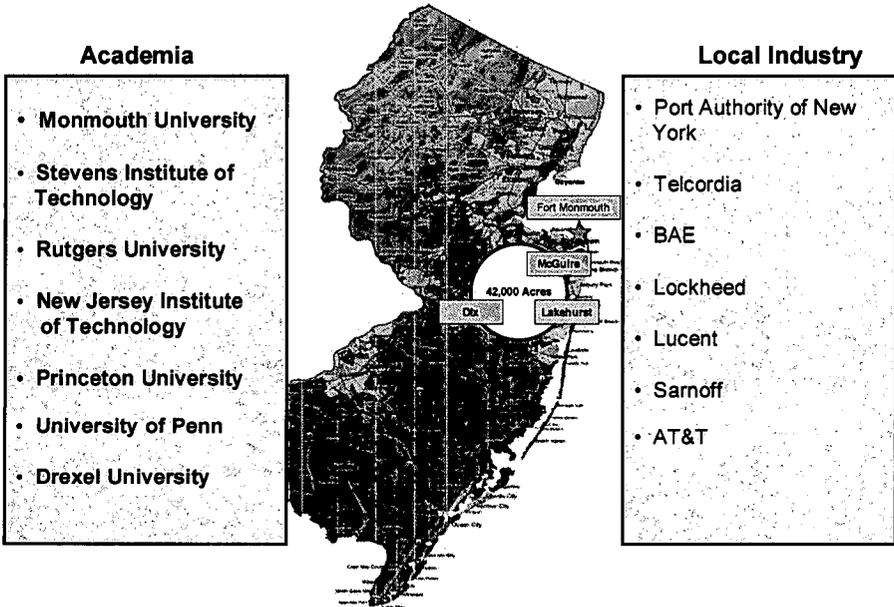


Figure 10: Fort Monmouth Relationships

ACADEMIA (only a brief summary of the work is presented)

- **Monmouth University**—19 year relationship with Monmouth University allows Fort engineers to obtain Masters of Science Degree in Software Engineering, with curriculum established to meet changing software



engineering and Army software development needs. Over 220 graduates to date from this program, of which over 70% have been retained at Fort Monmouth. Fort Monmouth also partners with Monmouth University in the establishment of the Center for Rapid Response Database system that enables rapid response to bioterrorism incidents.

- **Stevens Institute of Technology**—conducting joint R&D in the areas of optoelectronics and photonics for application to wide-band communications. Also working in their WinSec Laboratory evaluating networks for homeland security and an urban network of 50 sensors around Hoboken to determine sensor requirements and networking for warning. In addition, a focused set of courses for C4ISR has been constructed that yield a MS in Computer Science (Cyber Security Concentration; MS in degrees in Computer Engineering, Electrical Engineering, and Systems Engineering for Fort Monmouth NJ.)
- **Rutgers University**—full sponsor of the Wireless Information Laboratory working with senior university researchers in emerging wireless systems, such as, 4G; ad-hoc mesh networks; cognitive radio systems; and sensor networks for pervasive applications. This relationship also leads to access to research sponsored by the leading Telecommunications developers who are part of this team.
- **NJ Institute of Technology**—collaboration on communications projects and sensor-based security systems for infrastructure defense, command, control and first responder support. Objectives are to strengthen communications flow throughout security and rescue communities.
- **Princeton University**—Active collaborative partner in the Princeton Institute for the Science and Technology of Materials (PRISM) with focus on materials science through photonics.
- **University of Pennsylvania**—focused Masters of Science in Technology Management with courses held on Fridays and weekends to accommodate the Fort Monmouth workforce schedules.
- **Drexel University**—collaborative program with Drexel, Sarnoff Corporation and Camden NJ. The top-level goal is to capitalize on wireless technology emerging from the commercial, communications and networking industries. In addition, a Center of Entrepreneurship, located in Camden NJ, has been formed to assist small emerging technology companies grow and to broker partnerships with major DOD industry.

INDUSTRY

- **Port Authority of New York**—Fort Monmouth and its Fort Belvoir elements are providing System Engineering Support for the development and implementation of operational solutions to safeguard the PANYNJ infrastructure and its patrons. Facilities, personnel, equipment and laboratories that cannot be replicated anywhere else are resulting in a tremendous cost saving to all participants.



- **Lucent Technologies**—Cooperative research in the wireless communications, Information Assurance/Security and MEMs Nanotechnologies focus on how these technologies can be applied to the Army Tactical mobile wireless environment. This effort will use Lucent facilities and Fort Monmouth testbed at Fort Dix.
- **Telcordia**—Collaborative research in proactive, dynamic link selection in a mobile tiered network, ad hoc networking and Quality of Service for military and commercial dynamic networks is being performed.
- **BAE**—Collaborative effort for antenna modeling and simulation, testing and validation of network architecture and demonstration, system integration and prototyping of antenna solutions is being performed. The focus is on wideband antennas for use with software defined radios.
- **Lockheed**—Established a cooperative development antenna modeling library for analysis of ad hoc mobile wireless networks for use in the future force.
- **Sarnoff**—Establish a collaborative partnership to capitalize on wireless technology emerging from commercial and consumer communications. A series of joint projects has been initiated for technologies that have application to both the commercial and DOD sector and consist of: high power wide band amplifiers; communications for urban environments; and air-ground unmanned vehicle collaboration.
- **AT&T**—Intent is to leverage AT&T investment in network operations and adaptation of their commercial network management tools for Army mobile wireless environments.

To reinforce the above discussion, we also note that the engineering and scientists professional population in the Fort Monmouth area is very large which gives an excellent source of technical talent for both hiring into Fort Monmouth or for collaborating on important C4ISR programs. This is shown in Figure 11. The Fort Monmouth area has approximately 3 times as many technical professions in its area compared to Aberdeen. Source: Department of Labor Statistics of Engineering and Math/Science Professionals within 60 miles of Fort Monmouth or Aberdeen (May 2004).

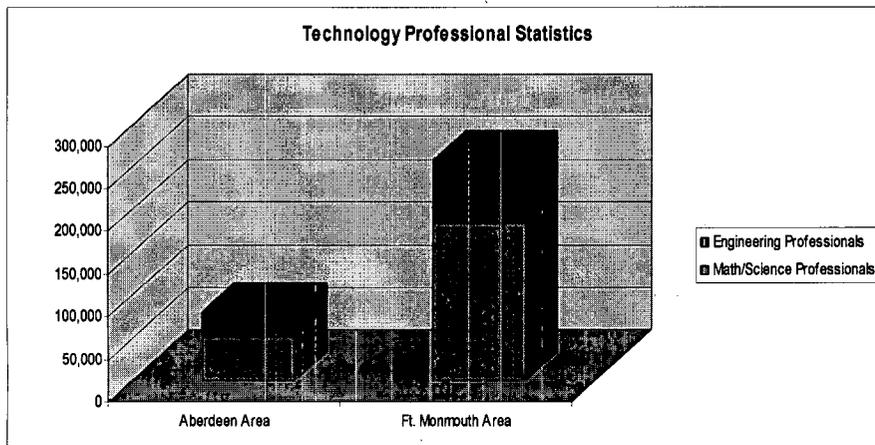


Figure 11: Professional Statistics

**WHY NEW JERSEY CONCLUSIONS**

- *Talent Pool unequalled anywhere in the world. Skilled IT, telecommunications, and sensor professionals within close proximity.*
- *Talent Replenishment with the capability and capacity to provide the next generation workforce supported by the surrounding education and research infrastructure.*
- *Academia/Industry/ Fort Monmouth linkage that allows for fruitful exchanges between the DOD, Universities, Commercial Industry and DOD Industry—allows Fort Monmouth to adapt technology rapidly.*
- *Proximity to New York with the ability to address challenges of HLS/HLD with dual-use C4ISR technology and to work directly with “First Responders” that have been “battle” hardened.*
- *Joint Base of Fort Dix, Lakehurst and McGuire that permits unique opportunities for experimentation linked to National Guard and Reserve training.*

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3.0 PROGRAM DISRUPTION CAUSED BY BRAC RELOCATION: Criteria 1 & 5.

Fort Monmouth and its Belvoir elements are decisively engaged in upgrading the Army's modular brigades and incrementally building the future force through integration of emerging programs. Disrupting these programs during their critical phases (FY 2007-2011) will have a significant disruptive impact on current force and future force capabilities.

PREDICTED LOSS OF PEOPLE:

Within technical organizations, losing a large percentage of the staff is unacceptable in cost and time. There is typically a subset of key people who understand the total architecture of the C4ISR products and the details of why it is being built and how the components fit together. Without this in-depth understanding, it is often difficult to determine integration problems and to successfully perceive the next step—the next evolution of a particular product.

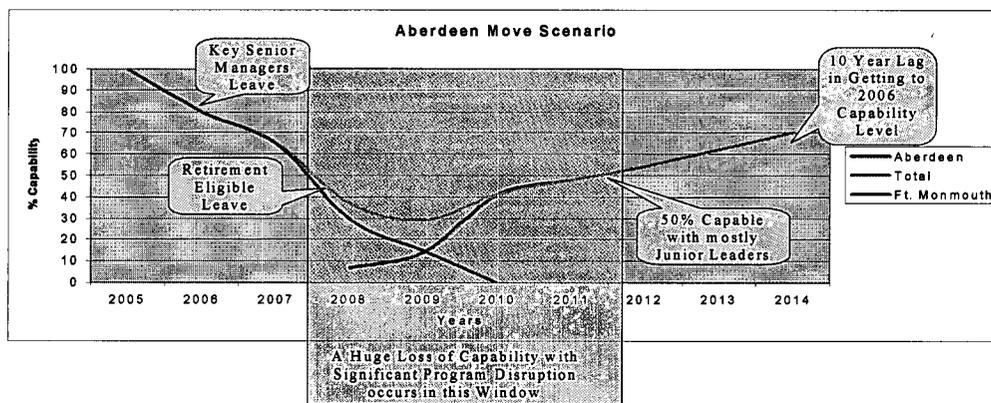


Figure 12: Disruption Based On Loss Of People

Architectural versus purely technical understanding of a product takes many years to develop. Hence, the architects (experienced system engineers) tend also to be the most senior members of the engineering staff. These System Engineers typically provide the mentoring to the newer staff. Losing the architects of a system is equivalent to a ship captain losing his navigation chart. *It is much more difficult to steer the ship without the ability to navigate. Moves of technical organizations are at a very high risk of losing their architects and hence the ability to evolve their products.* Figure 12 shows the loss of intellectual capital with more rapid loss of the more senior personnel on the front end of the BRAC window.

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As mentioned previously in this report, a loss of 80% of the people is anticipated. This is backed by previous statistics of BRAC or other moves as well as an independent survey recently completed. Many senior personnel will become eligible for retirement within the BRAC window and the more junior people (hired since 1987) are not handcuffed to a retirement system. We expect many of the key senior managers would leave early (most are highly marketable and will quickly find alternative jobs). We estimate this initial loss at 20% followed by the retirement eligible personnel (which will add an additional 30%) for a total loss of 50%. This loss will then be followed by the younger staff making a final decision at the last possible minute, which we predict will be a final 30% of the original workforce—(loss of 80%). Most of this latter element of the workforce will have just completed a Masters Degree program, paid for by the government, and the higher quality personnel will have visibility within DoD Industry.

Because of the limited availability of S&E in Northeast Maryland and the predicted difficulty in hiring a technical workforce at Aberdeen with the right experience level, with the right clearances, and with the right acquisition certifications, a lag of at least two years will occur, during a significant period, in getting this initial workforce hired. *The result will be a very junior workforce with limited experience in C4ISR, with program disruption pressures, who will be coping with the logistics of a move and the inability to rapidly hire the right people for the right job, while trying to execute a \$5B program.*

IMPLICATIONS FOR CURRENT AND FUTURE PROGRAMS: The Army is heavily engaged in creating modular brigades which are more responsive and enable Joint and Expeditionary capabilities. The modular brigade schedule is shown below in Figure 13.

	FY04	FY05	FY06	FY07	FY08	FY09	FY10
AC UEx <small>BCT(UA)s convert w/ HQs</small>							
AC BCT(UA) Builds	4 4 3	4 4 2	4 3 4 4	3 4 4 4			
ARNG UEx							
ARNG BCT(UA)s							
STRYKER (Availability)	SBCT2	SBCT3	SBCT4 <small>173rd IN Round-Out</small>	SBCT5	SBCT6		

Applying Lessons Learned from Stryker and OIF

Figure 13: Campaign Plan for Modular Units

This will provide self-contained units that can fight in a non-linear, non-contiguous battle space. These modular units will have significantly increased current C4ISR equipment that will enhance their fighting capability, improve their deployability, and enable connectivity to Joint Headquarters. In addition, as newer C4ISR equipments are ready for fielding, they will be added to the mix of upgrades for the modular units. Improvements in Networked Battle Command enabling systems will provide enhanced situation and terrain awareness and allow the exchange of mission critical information.

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The increased communications capability will consist of greater density of radios and satellite connectivity at lower echelons to extend the communications footprint. The ISR improvements will consist of UAVs with sophisticated sensors, increased target acquisition, multi sensors integrated to obtain improved classification and identification of enemy actions and the ability to fuse and integrate organic and external information.

Fort Monmouth has been instrumental in providing many C4ISR systems to these Modular units and providing training and sustainment support as these units deploy. As shown in Figure 13, this will be a continual process during the BRAC window with evolutionary upgrades in addition to the initial fielding.

The Army is Transforming. Fort Monmouth is now and needs to remain integral to that Transformation process. As Transformation progresses over the next decade, the Army will need support and upgrade of legacy systems while the newer systems are evolving to replace them. Both old and new must live together in a dynamic environment, be seamlessly connected, and complement each other. From Operation Iraqi Freedom, we recognize the problems associated with having some units with and others without critical equipment. The Army's modularity concepts and rapid fielding of "good enough" capability across the Force have made Fort Monmouth's C4ISR products even more essential—*more C4ISR products are being fielded at lower echelons to make our Unit of Action elements self contained and more responsive.* Figure 14 shows some of the "newer" C4ISR products that will dramatically improve the "network-centric" capability of our Forces. Fort Monmouth C4ISR technical and acquisition staff: originated the concepts; defined the technical requirements;

Program	2005	2006	2007	2008	2009	2010	2011	
DCGS-A 2006-2011 Funding \$1.3B		SEFX ▲						
		SDD Spiral 5					Produce & Deploy	
		MSB ▲	FCS LUT	IOT&E ▲	FSP ▲			
Aerial Common Sensor 2006-2011 Funding \$2.1B						FUE ▲		
		Increment 1 SDD & IOT&E 5 Aircraft						
			DT&E 1 ▲	LUT ▲		IOT&E ▲	LRIP 7 Aircraft	
WIN-T 2006-2011 Funding \$2.7B		MSC ▲						
		SDD Blk 1	LRIP	PVT	IOT&E		FRP	
		DT/OT ▲			FDTE ▲			
FCS			Experiment		Spiral 1 ▲		Spiral 2 ▲	
		FCS Main Program SDD						
				LUT			LUT	

Figure 14: BRAC Impact on Major Programs

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implemented technology to reduce risk; validated and resolved technical issues via experiment and Modeling and Simulation; and provided the technical direction to ensure product success. A brief summary of these four critical systems will follow.

The expected —but unanalyzed in BRAC — losses to the workforce will manifest themselves in critical disruptions during the key program years, FY2007-2011. A sample of just four programs conservatively estimates cost implications of well over \$1B in those years for those programs alone.

DCGS-A:

The Distributed Common Ground System-Army is a critical component of linking the Services processing of intelligence information to enable a common Joint picture to be formed. DCGS-A enables situation awareness, identification and location of enemy and estimates of his intentions to the Warfighter at all echelons. It enables exploitation and fusion of data from Army, Joint, National and Allied sensors and sources to provide critical information. It will consolidate 12 programs into an integrated Intelligence, Surveillance and Reconnaissance (ISR) capability that bridges the current force ISR programs into the Future Combat Systems.

The funding for the program during the critical BRAC window is \$1.3B and the success of the program is critically tied to a government/contractor System Integration Laboratory that will evaluate “Best of Breed” software for inclusion into the various software builds and system fielding. This workforce is on the order of 100 highly skilled S&E —all with TS/SCI clearances.

During this BRAC window, the DCGS-A system will be involved in the FCS Limited User Test; will conduct its own Initial Operational Test and Evaluation (IOTE) and make a decision for full scale production.

A conservative estimate of schedule and cost impact if personnel losses occur as described in Figure 12 is a delay of 4 years and an additional cost of \$300M.

DCGS-A is an integral part of the DoD Intelligence Grid and delays will significantly impact moving Army intelligence forward into a true network centric intelligence capability.

ACS:

The Aerial Common Sensor is designed to allow the Army to rapidly deploy Multi-Intelligence Systems on a long-range jet aircraft and still permit long term loitering while on station.

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The total funding within the BRAC window is \$2.1B and the program is currently in the SDD stage leading to DT&Es in FY 07 and FY 08 followed by a Limited User Test in FY 08 and an IOTE in FY 09.

This program will also be utilized by the Navy to replace some of their aging Intelligence platforms. Five Airborne Platform Systems are being procured as part of the SDD program and the Ground Processing component for the ACS system will be provided by the DCGS-A program. The payloads (subset only) being carried by this high speed, high endurance platform are: Moving Target Indicator Sensor; Synthetic Aperture Radar; Communications Intelligence Sensors and Radar Intelligence Sensors.

Over 70 government/contractor personnel are managing this program and consist of highly skilled experts in: airframe; aircraft installation and integration; airborne SIGINT; airborne Radar; data links; testing complex sensor system; processing complex modulations etc. Most have been in this business for over 15 years, have TS/SCI clearances and their loss would have a significant impact on program execution.

A conservative estimate of schedule and cost impact if personnel losses occur as described in Figure 12 is a delay of 3 years and an additional cost of \$300M.

ACS is intended to permit the Army to rapidly deploy early entry intelligence capability and permit meaningful intelligence to be supplied to deploying forces while en-route. It will have the latest Intelligence Collection equipment that will allow the Army to "see" and "hear" everything on the modern battlefield.

WIN-T:

Warfighter Information Network-Tactical is a single integrating Future Force communications network. The system will have increased network capacity, speed and quality of service and be reliable and secure. One of the major features of WIN-T will be its mobility throughput for "reach" over increased distances. The system is scalable, tailorable, and dynamically adaptive to mission, task, and purpose. WIN-T will provide seamless interoperability to Joint, Coalition and Global commercial systems. The WIN-T multi-tiered network expands and contracts with the fight, truly enabling Network Centric Operations and will be deployed from Theater to Maneuver Battalion. Portions of WIN-T will be embedded in warfighting platforms and will enable the future force.

There are over 200 government personnel on the program with average years of experience of 20 years; 75% are Acquisition Certified; and all have Secret or higher clearances. The contractor workforce is over 140 people with average years of experience of 20 years, all with Secret clearance. The funding during the BRAC window for this critical program is \$ 2.7 B.



During the BRAC window, WIN-T is scheduled for its IOTE and will be fielding 1 Unit of Employment (UEX); 4 Maneuver Brigade Combat Teams; and 6 support Unit of Action (UA) systems. It is also the primary support program in enabling the Future Combat System. Integration efforts with FCS fall inside the BRAC window. Program delays of at least two years with a cost impact of \$300M are estimated but these delays would also impact: FCS Spirals; Interoperability with Joint, Allied, and Coalition partners; On-the-move modern communications for Modular Army forces; airborne systems capability to provide high capacity reach-back; and evolution of embedded capability in highly mobile platforms. *WIN-T is the Army tactical backbone system and its link to the Global Grid. It extends the Global Grid into the area of operations and will provide high speed, high capacity communications capability to a dynamic Army. Without the WIN-T system, the concept of Network Centric Operations is not achievable.*

FCS:

Future Combat System is being designed for the Future Force, but elements of the FCS program will be expedited to the Current Force in a series of Spiral developments, which would provide the current force with near term prioritized FCS capabilities. The plans are to start to equip a FCS evaluation brigade combat team in FY 2008 with prototypes. After evaluation, fielding is planned in two-year stages, starting by modernizing current UAs. In fiscal year 2014, the Army plans to have an operational FCS UA with all the core FCS systems and have 32 of the 43 current force UAs embedded with FCS capabilities. Advances in robotics, unmanned aerial vehicles and sensors are FCS technologies that have been quick out of the gate, and some of that gear is already in the fight. Intelligence, surveillance, and reconnaissance system advances being made by Fort Monmouth/Belvoir are at a premium. There are three phases of FCS development: concept and development; system design and development; and production. The Army has entered the system design and development phase. FCS (in addition to multiple manned and unmanned platforms) will consist of: a systems of systems common operating environment; battle command software; communications and computer systems; intelligence reconnaissance and surveillance systems; networked logistics systems; and embedded training. *These are all systems that are part of the Fort Monmouth mission area and Fort Monmouth engineers support the development of Boeing's contractors or are developing and supplying much of the needed technology.*

The PM for UA Intelligence Surveillance Reconnaissance is located at Fort Monmouth (by choice) and staffed with Fort Monmouth personnel. The WIN-T, Joint Tactical Radio System, and Unattended Ground Sensors are a few of the FCS products that are provided by Fort Monmouth as well as a significant portion of the Technology programs (over \$100M/year) devoted to solving FCS technology problems.

There are approximately 500 S&E personnel devoted to the FCS program (both funded by PM-FCS and Mission funds) and losses on the order discussed previously would have a significant impact on expediting FCS Spirals to the current force plus impact the evolution of technology for the future force.

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If these Fort Monmouth capabilities are eroded, then the prime contractor, Boeing, would have to duplicate these capabilities resulting in significant increases in cost and schedule.

The biggest initial impact would be to Spiral 1 and 2 capabilities and could impact those schedules by 3 years each at a cost of \$500M.

FCS is more than the Future Force program, with early capabilities provided to the Current Force. Fort Monmouth is an integral part of supplying and supporting the C4ISR architecture and systems for this system and is playing an integral part of early release of capability to the current force.

SATELLITE COMMUNICATIONS - SPACE PARK FACILITY

Satellite communications is an integral part of Army Transformation and will provide the needed Global Reach Back to enable forward-deployed forces. Fort Monmouth is an integral part of that Satellite Transformation and their SATCOM Engineering Center is an integral part of Army and Joint Communications.

SATCOM Worldwide Connectivity

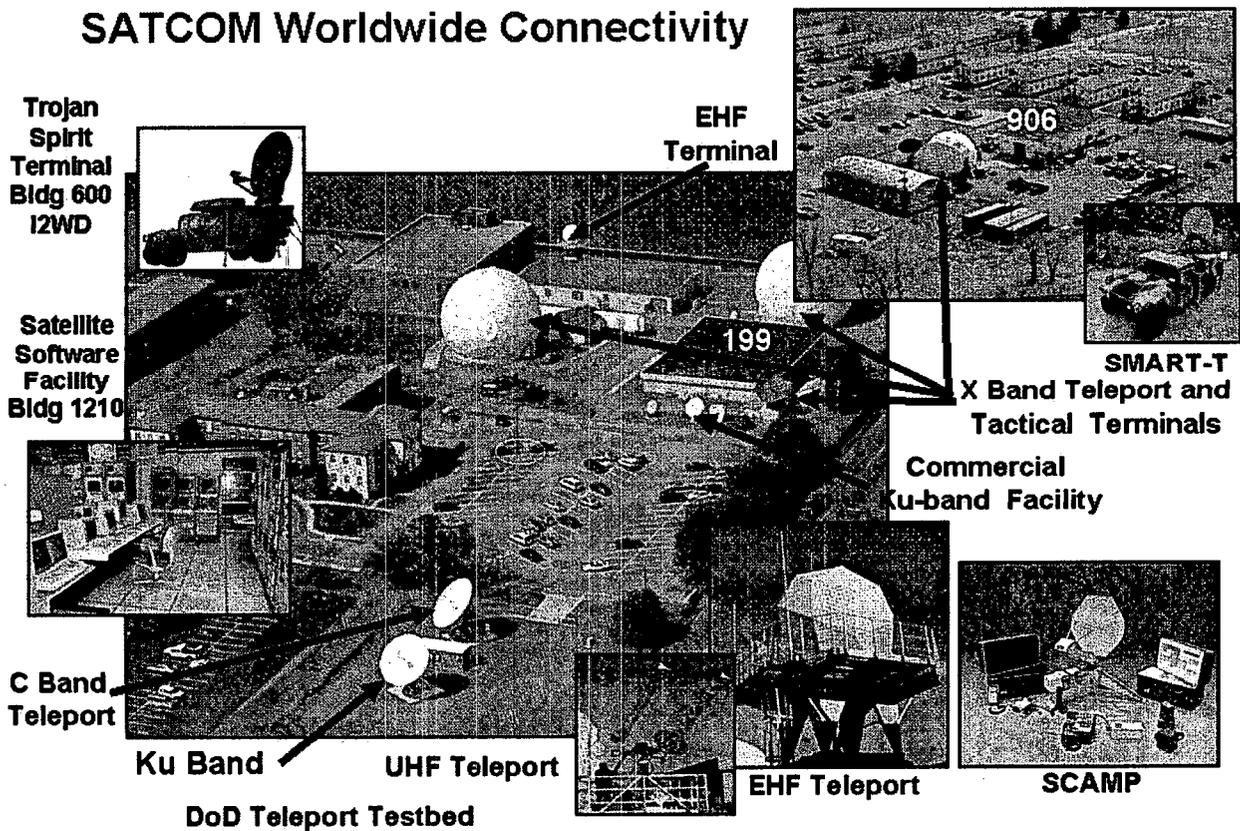


Figure 15: Satellite Space Park



The Joint SATCOM Engineering Center (JSEC) has several integrated lab facilities consisting of the Control System Lab, Strategic Systems Lab, Tactical Systems Lab, and the DoD Teleport and Standardized Tactical Entry Point Testbed. For the Joint Satellite Communications mission, Fort Monmouth designs the architecture, develops the equipment and systems and performs the integration, detailed testing, fielding and lifecycle support of the entire DoD Satellite Communications Infrastructure for the DSCS and Gapfiller satellite systems. Fort Monmouth implements a worldwide network of over 100 Satellite Communications Earth Terminals at 70 sites operated by Army, Navy, and AF personnel, support the Services, Combatant Commanders, the Intelligence Community and Deployed Warfighters.

Fort Monmouth controls and monitors the satellites which are over 22K miles out into space. Each of the 5 prime satellites provides global communications coverage, costs over \$300M and is very sophisticated equipment requiring highly trained personnel to keep them working. Fort Monmouth does all the research, development, testing and maintenance of ALL of the satellite control systems used in each of the 5 Worldwide Control Centers. The JSEC provides 24/7 support to all Joint SATCOM; provides teleport backup; and conducts Joint User Interoperability Communications exercises and trains troops prior to deployment.

The JSEC is funded at over \$450M per year and uses 170 Government employees all of which have Bachelor or higher degrees and all have clearances. There are over 500 contractors utilized to support these activities with all having Bachelor or higher degrees and security clearances. Several of the original architects (with over 20 years experience) still work in these testbeds and provide mentorship of new employees.

CONCLUSIONS:

JSEC

- *To move PM DCATS to Fort Belvoir and the JSEC to Aberdeen breaks the synergy developed over many years of partnership and will create considerable "breakage" in these important programs.*
- *The technical talent for the JSEC comes mainly from the CERDEC and large amounts of technical capability will be destroyed.*
- *24/7 real world mission support will require redundant capabilities at both Monmouth and Belvoir during transition. This will cost an additional \$200M because current equipment cannot be replicated or replaced because they are out of production.*
- *Costs of parallel operations (people/equipment) were not included in the BRAC analysis.*
- *The Wideband Gapfiller program testing and Teleport fieldings will be severely impacted by staff/facility move diversions.*



PROGRAM DISRUPTION

- *Disruption to existing programs, both the Current and Future Force, were not mentioned or calculated in any BRAC scenario or in the final recommendation.*
- *The Military Value assessment of disruption and the resultant cost implications were never considered. An assumption that people and programs would move without loss of capability and increases in cost and schedule is naïve and not borne out by history.*
- *Cost implications are in the Billions and schedule implications (dependent of phase of program) could exceed 3 years. The impact on the security of the warfighter cannot be estimated because they are so large.*
- *The BRAC recommendation to close Fort Monmouth and re-create it at Aberdeen risks serious program disruption in current abilities to support an ongoing war and to deliver priority Army and Joint C4ISR programs. Particularly at risk are programs with major development, experimentation, test and acquisition milestones in the period 2007 -2011.*
- *The loss of cleared, certified, trained, experienced DOD civilian personnel will accelerate as Fort Monmouth approaches its nominal closing date. Replacement hiring will be slow to gain momentum. One sees a major "personnel time gap" in the last half of this decade.*
- *Likewise, facilities complexity and historical evidence indicated that re-creation of technical facilities will encounter design, cost, build and outfitting delays that will prevent timely decommissioning of facilities at Fort Monmouth, thereby incurring extra costs. When new hires can be found but adequate facilities are not ready to accept them at Aberdeen, then the Army risks disruption again.*



4.0 ANALYSIS OF "RDA" AND "T&E" INTEGRATION AS A BASIS FOR RELOCATION TO APG— Deviation From "Military Value" Criteria

This section of the report shows that the synergy of co-locating R functions with D&A functions, and gaining efficiencies by co-locating an integrated RDA functions with T&E functions, while touted in the BRAC deliberations, was never accomplished with the BRAC recommendation. The preponderance of C4ISR RDA is already currently done at Fort Monmouth/Belvoir and any desired co-location should take place at those Fort Monmouth's existing facilities. Since T&E is done at many locations (virtually no C4ISR T&E at Aberdeen) there is also no benefit to integration of RDA with T&E at Aberdeen; yet that was an ill-informed conclusion added to the BRAC recommendation.

The concept of a "Land C4ISR Center of Excellence" at Aberdeen Proving Ground hinges on having a complete C4ISR capability at one location. That capability would include fundamental research, technology demonstration, systems design and development, full-scale development and production – the R, the D&A, the T&E and the Sustainment/Logistics of C4ISR. Using the "womb-to-tomb" analogy: womb and birth would represent research (6.1), youth would represent technology development and maturation (6.2), and adulthood would represent development and fielding (6.3/6.4/production/fielding). Mature adulthood through end-of-life would represent sustainment and extraction from the field. C4ISR research and early technology feasibility is the purview of ARL (Adelphi), technology maturation and demonstration is the purview of Fort Monmouth's Communications and Electronics R&D Center and its component at Fort Belvoir and development, production and fielding is the purview of Fort Monmouth's program management and acquisition offices. Independent T&E is managed by the Army Test and Evaluation Command headquarters using Fort Huachuca as the designated C4I Test Site – known as the Army Electronic Proving Ground (EPG)). When reading BRAC rationale one would conclude that its notion of a single site C4ISR Center of Excellence would be full multi-function integration of all these elements. The BRAC proposal fails to meet its stated Land C4ISR goal since it did not include the R executed at Adelphi, MD or the T&E executed principally at EPG at Fort Huachuca, AZ or the 4th Infantry Division at Ft Hood, TX, with additional T&E at various specialized sites required to determine the full robustness of C4ISR systems.

This section of the report will address the feasibility of accomplishing this goal. First to be addressed is the integration of C4ISR research (the "R") with the development and acquisition (the D&A). Next, the integration of C4ISR test and evaluation (the T&E) is addressed. Finally, this report adds the "capstone piece" sustainment. When discussing the "integration" of C4ISR R with D&A, it is illustrative to examine the budgets and where the preponderance of work is being accomplished. Figure 16 shows the funding profiles for FY06.

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A later section of this report will analyze several key Army Transformation programs in C4ISR and focus on the amount of money being spent and the high probability of program disruption across the life cycle resulting in increased cost, schedule delays, and lack of capability for our Joint Warfighters if the BRAC recommendation stands.

Funding estimates for FY06-11 for Fort Monmouth and Fort Belvoir in C4ISR are: (Source: Fort Monmouth Funding Data).

- **Basic Research 6.1 \$14M**
- **Applied Research 6.2 \$ 664M**
- **Advanced Development \$ 2B**
- **Systems Development and Demonstration \$4.4B**
- **Production \$ 10.4B**
- **OMA \$3B**

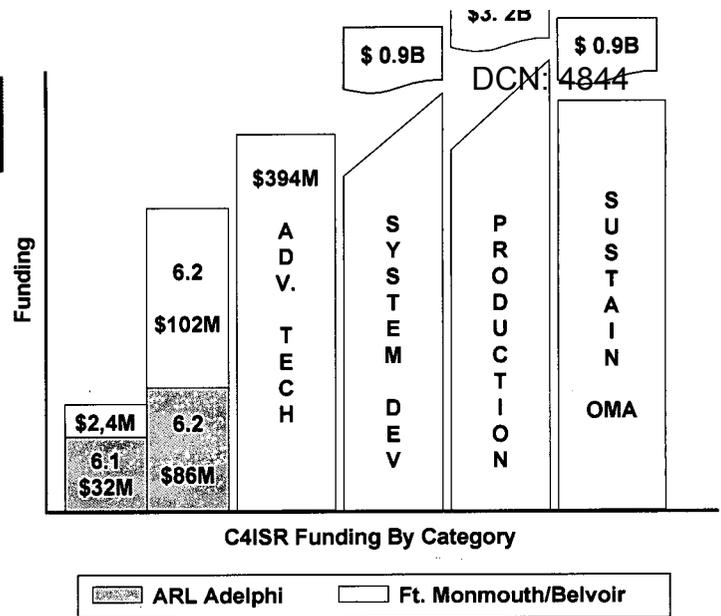


Figure 16: Funding Profiles for FY06

The BRAC recommendation did not co-locate R (Adelphi) with D&A. There is no relevant or sizeable R or D&A at Aberdeen. Moving Fort Monmouth to Aberdeen and Fort Belvoir to Aberdeen does not achieve RDA integration. It simply moves Fort Monmouth/Belvoir RD&A to a new place at nearly a \$1B cost. The end result of the BRAC recommendation is to move the bulk of the people doing C4ISR work and currently integrating technology, development, production, fielding, and sustainment to a location which has no C4ISR capability and infrastructure; at considerable expense.

ARMY RESEARCH: The Army Research Laboratory was formed in October, 1992, and consolidated all research (basic and applied) within the Army. The establishment of ARL included the requirement to develop a formal process of transitioning a significant portion of ARL research to the practical applications of Fort Monmouth and other "functional" commands. The "Technology Program Annex" (TPA) process resulted and is reviewed and verified by ARL's Board of Directors (BOD) consisting of what are now the Army R&D Command directors. In addition, a "Federated Laboratory" concept was initiated combining industrial, government and university laboratories in a geographically dispersed federation in three technology areas. *The two programs (TPAs and Fed Labs/CTAs) have proven that research and transition of its products is most successful in a focused research organization with transitioning to "external" customers part of their "scorecard" for success.* The RD&E centers are responsible for technology demonstration ("late" 6.2 & 6.3) and support of the acquisition programs of the PEO/PM community.



We conclude that the current approach for integrating C4ISR basic and applied research (6.1 and 6.2) done by ARL with the applied research and advanced technology development (6.2 and 6.3) being done by Fort Monmouth is working adequately and neither organization should be moved. Both organizations are technologically sophisticated and deal in a world of digital information management; if they had to be collocated to work effectively together, then there would be no hope of ever getting the less sophisticated warfighter client to use digital information management over distances to win wars.

C4ISR ACTIVITIES AT ARL (A brief summary): At ARL, C4ISR research activities are concentrated in two Directorates: Computational and Information Sciences Directorate and Sensors and Electronic Devices Directorate – *both located at Adelphi*. ARL also integrated all vulnerability assessment in one organization, the Survivability Lethality Analysis Directorate, *with C4ISR assessment located at Fort Monmouth to be close to the C4ISR development expertise.*

The Army Research Laboratory (ARL) Computational and Information Sciences Directorate (CISD) deals in information sciences and technology research. The research mission is focused on battlefield communications and networks, data fusion and knowledge management, battlespace weather and environmental effects, and computational science and engineering. The CISD mission (600 staff) areas include the operation of the ARL DOD Major Shared Resource Center (MSRC), the Army High Performance Computing Research Center (AHPCRC), and the ARL Federated Laboratory Consortia for Telecommunications and for Advanced Displays. The C4ISR staff is located at Adelphi and the personnel at Aberdeen run the Major Shared Resource Center and High Performance Computing Center and have no C4ISR expertise. There is a very small staff (6) of C4ISR personnel located at Aberdeen.

The ARL Sensors and Electronic Devices Directorate conducts research in sensors, including radar, electro-optic, night vision, radar and acoustic. Additionally, the directorate is responsible for research in power sources for sensors and other lightweight Army applications. The Directorate is also responsible for two CTA programs, Advanced Sensors and Power and Energy. The staff (360) is located at Adelphi with approximately 6 located at Aberdeen. SEDD interfaces very effectively with CERDEC Night Vision and Electronic Sensors Directorate.

Bottom Line for ARL: Very small number of personnel at Aberdeen which cannot alleviate the C4ISR personnel vacuum caused by the BRAC recommendation. Excellent research staff at Adelphi working well with Fort Monmouth and Fort Belvoir CERDEC personnel with a proven process for transitioning basic and applied research into technology development.



NATICK RDEC:

The Natick RDEC is organized into five directorates: the Mobility Directorate (MobD), the Survivability Directorate (SurD), the Sustainability Directorate (SusD), the Science and Technology Directorate (STD), and the Advanced Systems Concepts Directorate (ASCD). Research and development of C4ISR for the individual soldier is executed by CERDEC, along with all other C4ISR for weapons platforms such as armored vehicles and aircraft. Natick does not have any activity in C4ISR except PM Soldier support where the work is done at Fort Belvoir. They are not scheduled to move to APG. In fact, neither is PEO Soldier's PM Sensors which is located at Fort Belvoir and utilizes matrix support from NVESD. *With the proposed move of NVESD to Aberdeen without the major customer he supports, significant problems with that program will ensue.*

CONCLUSIONS:

- The Land Warfare C4ISR Center of Excellence already exists at Fort Monmouth—it has the preponderance of technical talent; the majority of the funding, by far; the highest cumulative Military scores; and a life cycle mentality that expedites products to the field with technology infusions to keep those products current. *What Army Secretary Harvey articulated as a need: "We need a technical center of excellence in Command, Control, Information Systems which is extremely important to the future Army."—Already Exists!*
- The T-JCSG philosophy and goals changed continually throughout the recommendation formulation phase. In the end, the T-JCSG did not explain the Land C4ISR Center, even though for months before it debated scenarios and made formal recommendations and received approvals from the BRAC higher level Infrastructure Steering Group (ISG). The T-JCSG report (Volume XII) makes a brief one line references to a Land Center and to closing Fort Monmouth, but do not go into detail as they do with the Maritime and Air C4ISR centers.
- The BRAC recommendations do not create an integrated C4ISR RDA.; it leaves out a large portion of R and simply moves D&A. That disrupts existing methods to integrate at a distance and will disrupt the largest site (Fort Monmouth) that is currently producing products for the Warfighter. *Insufficient recognition of the Fort Monmouth/Belvoir funding levels or military value with no analytic basis.*
- There is no C4ISR capability at Aberdeen; in fact, there are only approximately 25 ARL personnel that are classified as working in any C4ISR function at Aberdeen. The BRAC recommendation "clouded" the issue by implying there was a significant presence of C4ISR capability at Aberdeen, given the larger number of ARL employees working in Materials research and in High Performance Computing. *There is no C4ISR base of expertise at Aberdeen on which to build considering the large numbers of people that will not move from Fort Monmouth/Belvoir.*
- Analysis of the BRAC deliberations show that scenarios were "discarded" that would provide collocation of all C4ISR elements because they were considered to be too

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expensive or un-executable. Why, then, would the DOD BRAC team consider as executable or affordable the movement of over 5000 technical C4ISR experts and not discuss it anywhere in the report? *Technical Military Value developed by the T-JCSG was ignored; installation military value used by the Army is not relevant to a C4ISR or a RDA&E mission, and military judgment overrode military value too frequently.*

- Based on funding profiles alone, successful programs and the amount of C4ISR people working in this critical Army/DOD Fort Monmouth/Belvoir C4ISR should have been excluded early as a BRAC candidate.
- The linkage between the ARL research staff; other services C4ISR staff; execution of Joint programs and recipients of Joint programs and Fort Monmouth has demonstrated the ability to effectively operate with dispersed organizations. *The difficulty of transitioning basic and applied research to systems technology developers is working, coordination with other services technology is working, executing and receiving Joint programs is working—if it is not then it is a management issue and not a relocation issue.*

An integrated RDA C4ISR Land Warfare Center is not created, and in fact one that is working is “broken” by the BRAC recommendation. There is no consolidation of R with D&A activities and the Aberdeen C4ISR resident expertise is non-existent. Moving the mission of over 5000 people currently executing the C4ISR mission will result in program breakage and disruption that will cost millions and result in delays for critical products for the future.

4.2 TEST AND EVALUATION INTEGRATED WITH RDA

The integration of C4ISR RDA with T&E was never considered by the T-JCSG and was added by the Army to make a poor recommendation more palatable. The T-JCSG did consider integration of RDA with T&E but only in the areas of “platforms.”

There are various forms of testing as programs go through the development cycle. See Figure 17. In the BRAC report, the testing considered was only the formal DT and OT type testing.

At different stages of the process, experimentation, demonstration, and formal test and evaluation are conducted. During the R&D phase, this activity is principally restricted to experimentation and demonstration and could demonstrate the individual component technology or a group of technologies integrated into a system of systems context. Formal T&E generally occurs at the end of the R&D phase and is a formal process with strict rules of scoring. This testing addresses development suitability testing conducted by Independent Developmental Testers and Independent Operational Testers to determine Operational Suitability. The two separate evaluations provide for an “honest broker” evaluation of systems.

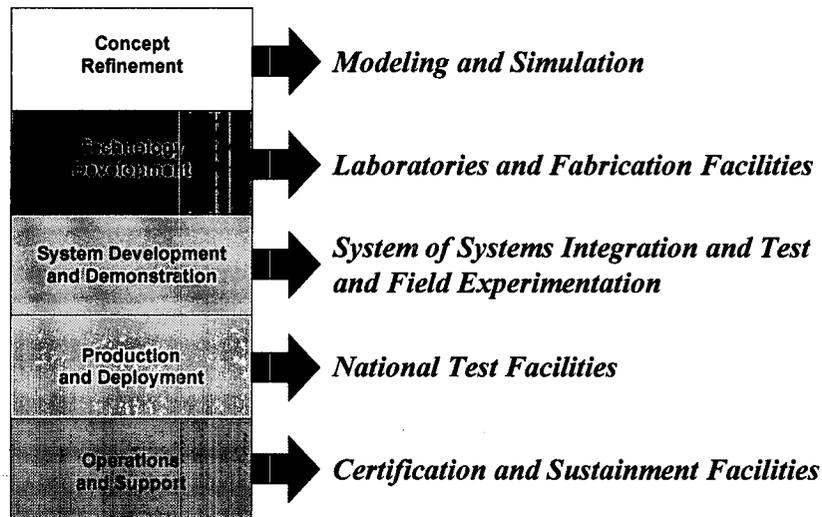


Figure 17: Various Forms of Testing

THE ARMY'S DESIGNATED C4I TEST SITE: Test and evaluation of C4ISR systems is typically performed at the Electronic Proving Ground (EPG) located at Fort Huachuca, AZ, which is the *designated site for all C4I testing*. One of the most critical features of EPG is its relatively remote location in the Arizona desert which is free from electromagnetic, i.e., radio frequency interference which is critical for effective evaluation of performance. Also, this location allows testing of systems in all aspects including electronic warfare "red team" evaluation of the systems without concern of interference of civilian electromagnetic systems. Typical regional systems of concern include radio and TV stations, commercial aircraft avionics, etc.

EPG has an extensive array of electronic system-oriented testbeds and facilities. A listing of testbeds and facilities of the *Electronic Proving Ground* demonstrates their capability to effectively test C4ISR systems:

- Antenna Test Facility (ATF)
- Battlefield Electromagnetic Environments Office (BEEO)
- COSPAS-SARSAT Test Facility
- EMI-TEMPEST Test Facility
- Environmental Test Facility (ETF)
- Fabrication Facilities
- Global Positioning System (GPS) Test Facility
- Information Assurance (IA) Test Facility



- Meteorological Team
- Radar Spoke & Resolution Facility
- Realistic Battlefield Environment (RBE)
- Tactical Radio Testbed
- Test Control Center (TCC)
- Test Technology Design & Development (T2D2) Lab

EXAMPLES OF MAJOR C4I SYSTEMS FORMALLY TESTED AT EPG INCLUDE:

- Force XXI Battle Command Brigade & Below
- Stryker C4ISR
- Army Airborne Command & Control System
- Joint Tactical Radio System
- Enhanced Position Location Reporting System
- Suite Of Integrated Infrared Countermeasures System
- Single Channel Ground & Airborne Radio System
- Global Positioning System
- Prophet Signals Intelligence & EW System
- UAVs With Sensors

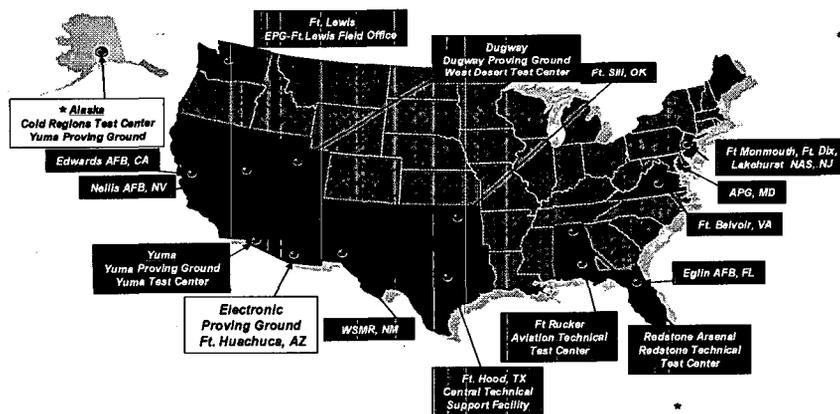


Figure 18: Test Ranges



C4ISR testing frequently utilizes other ATEC test ranges or other service test facilities: some examples include night vision & elector optics sensors at Fort AP Hill, Yuma Proving Grounds for IED jammer testing, Fort Bliss, Fort Hood, Fort Lewis, China Lake & Eglin AFB. C4 Operational Testing typically requires an active duty unit to resolve Doctrine, Organization, Training, Leadership, and Material (DOTLM) issues—testing of this type is done at Fort Hood, National Training Center (NTC), or Joint Readiness Training Center (JRTC). These other C4ISR test locations are shown in Figure 18.

ABERDEEN AS A TEST RANGE FOR C4ISR SYSTEMS

*APG is a major Army test and evaluation facility with primary responsibility for Ground Vehicle (combat, tracked and other) T&E and additional, less complete capability in weapons, materials and human systems T&E. **The site has no facilities or staff with the necessary competencies for informal or formal T&E of C4ISR systems.** Typically C4ISR systems see APG only when the host vehicle platform of the C4ISR system has to pass the “shake, rattle and roll” requirements.*

A partial listing of facilities and capabilities is provided to make the point.

- Automotive Facilities
 - Bridge Crossing Simulator
 - Munson Road Test
- Environment Effects
 - Accelerated Corrosion Complex
 - Environmental Chambers (Various)
- Fire Control
 - Evasive Target Firing Range
 - Tank Armament Test Range
- Firepower
 - Ballistic Range
 - Depleted Uranium Containment Facility
- Survivability/Lethality
 - Aircraft Vulnerability
 - Internal Blast Test Site
- Warfighter & Support Equipment
 - Bridge Test Sites
 - Joint Warfighter Range Complex (Drop Zones; Small Arms Ranges)
 - Examples of platforms tested at APG, which exemplifies testing at APG addresses vehicles “shock, rattle and roll” include:
 - Stryker Family Of Armored Vehicles
 - Family Of Medium Tactical Vehicles
 - Commercial Aircraft Vulnerability
 - Objective Individual Combat Weapons Systems
 - Advanced Amphibious Assault Vehicle
 - Land Warrior
 - Heavy Duty Support Bridge
 - Hybrid Electric Vehicle
 - Future Combat Systems Novel Swing Chamber Gun



Establishment of a Land C4ISR Center of Excellence at APG would require creation of electronic test facilities duplicating those existing at EPG and several other sites. Even if it were considered cost effective to duplicate, or even relocate the existing equipment, personnel and function from EPG at APG, test ranges required to support the mission are not suitable at APG. In addition, they would also need C4ISR soldiers and equipment. Many factors contribute to this assertion but the primary ones are Air Space limitation and Frequency Allocation limitations.

- The location of APG in the electromagnetically dense east coast ground and air corridor, and relatively close to urban areas. The restrictive frequency allocation issues and the inability to “emit” signals make this highly undesirable.
- Airspace limitations are also a concern. The Washington Air Defense Identification Zone begins nine miles south of Aberdeen’s Phillips Army Airfield. No VFR or IFR loitering is allowed to 18000 feet altitude. Typical R&D flight profiles hover at altitude, “figure 8s” can’t be performed at any substantial standoff distance starting 180 degrees south to 310 degrees northwest. Philadelphia class B airspace starts 29 miles northeast of Aberdeen. Beyond 29 miles, no typical R&D profiles are allowed from 30 degrees north to 95 degrees east. Currently night IFR approach is not authorized. Flights east of the airfield are limited due to proximity to location of active ranges. Local airspace is congested and choke areas occur by general aviation aircraft attempting to avoid Prohibited, Restricted and Class “B” airspace as well as the Washington Air Defense Identification Zone. The inability to fly R&D flight profiles and R&D aviation equipment is a severe limitation for many future technology systems.

CONCLUSIONS FOR RDA AND T&E INTEGRATION:

- Aberdeen is not now, nor should it ever become, a C4ISR Test and Evaluation facility. *The costs are too high; it would duplicate other Army test sites for no good reason; and the location is restrictive both from a spectrum and an aviation perspective.*
- Neither Army nor T-JCSG appeared to have considered airspace restrictions or to have conferred with the FAA before making recommendations to move Land C4ISR to Aberdeen. In fact, the ability of Aberdeen to support C4ISR R&D aviation testing (UAVs, Aerostats, Manned Aircraft, and Hovering Helicopters) appears to have never been considered. *This would seriously hamper the ability to do C4ISR Experimentation and Testing.*
- C4ISR formal T&E requires specialized facilities with the Electronic Proving Ground being the designated C4I test facility. *Co-location at Aberdeen will still require most testing external to Aberdeen.*
- Selected C4ISR “Platforms” may undergo some developmental testing at Aberdeen but only in the area of APG mechanical expertise.
- The T-JCSG never reached this conclusion—in fact, they recognized it only made sense for Platforms. *The recommendation made by the Army ignores the complexity of instrumenting and conducting C4ISR testing and ignores its own*



designated formal Electronic Proving Ground. In the BRAC recommendation, no cost numbers to make APG a C4ISR test site were identified.

- The T&E linkage appears to have been added by the Army to make the recommendation to move Fort Monmouth/Belvoir C4ISR activities look more attractive. It actually detracts significantly from Army credibility and from the rigor of its analysis. It reflects a disappointing understanding of C4ISR by Army personnel involved in the BRAC recommendation. *The efficiencies claimed are never quantified and in fact will add cost because all testing will still be remote—to include experimentation.*
- If the intent is to allow C4ISR experimentation (never defined in the BRAC report), then it still falls considerably short and would duplicate activities underway at the nearby DLM Joint Base discussed in another section of this report. *The existing and currently used capability at the nearby DLM Joint Base for Army and Joint field demonstrations and experimentation was not sufficiently analyzed and never mentioned in the BRAC process. In fact, the BRAC recommendation takes Land C4ISR away from Jointness, a fate worse than ignoring Jointness.*
- Indications are that Aberdeen may not be able to provide the required facilities for Fort Monmouth aviation elements (especially the lighter than air aviation elements) currently “home ported” at the Naval Air Engineering Station, Lakehurst NJ and at Fort Belvoir’s Davison Army Airfield. One believes that future aviation development, demonstrations and experiments may still need to be based out of Lakehurst. *The added cost factor, either to build the necessary facilities, or to conduct R&E experimentation at a now remote site was never considered in BRAC calculations.*

The co-location of Fort Monmouth/Belvoir C4ISR programs with the Aberdeen T&E (not C4ISR qualified) activities makes no sense and only disrupts a process already working well. The majority of formal C4ISR T&E is done at Fort Huachuca’s EPG and other instrumented Army and Joint test activities where a considerable investment has already been made. No Joint testing or experimentation is possible at Aberdeen because of the absence of troops, infrastructure, air and sea space, and frequency spectrum. However, Joint experimentation and testing can take place at Dix/McGuire/Lakehurst/W-170 and is being utilized now—this will be covered in another section of this report.

T-JCSG recommended a RDA C4ISR center, finally at Aberdeen. It separates RDA from T&E, it separates Army from Joint, and it does not consolidate R with D&A, since a large part of R (basic and applied research) stays at Adelphi. The Army attempts to add T&E back in at Aberdeen, but their conclusions about “efficiencies” are unfounded, since it is the wrong T&E.



5.0 COSTS SIGNIFICANTLY UNDERSTATED OR NOT CONSIDERED; SAVINGS OVERSTATED -- Deviation From Criteria 4 and 5

Overview: *Fort Monmouth and its Fort Belvoir elements operate many high technology laboratories and facilities focused on their C4ISR missions. These capabilities are supplemented by aviation assets, local "outside" test facilities, highly classified and specialized facilities, and facilities that have a 24/7 mission with one-of-a kind equipment. Based on the way DOD BRAC data calls were made many of these facilities and their actual size were not adequately captured in the COBRA runs. This section also discusses "non-COBRA" items, which when added to the COBRA cost estimates, present an extraordinarily high cost.*

The analyses show that corrected COBRA estimates bring one time costs to \$1.5 B ... when one adds non-COBRA considerations the one time costs rise to over \$1.8B .

This report will analyze cost in the following areas:

- MILCON costs based on increased square foot estimates and functional use.
- Special Facilities that either need to be replicated to maintain mission continuity or require one time cost beyond "building" the facility and moving equipment.
- Special Equipment from 92 laboratories that need to be disassembled, moved, reassembled, re-calibrated, and put back into operation. In some cases new equipment may need to be purchased.
- Employee population errors put into the COBRA model.
- Base Operations Support costs for specialized mission support services above the "Common Level of Services."
- Relocation estimates taking into account the actual "approved overstrength" of the organizations necessary to implement their current mission.
- Recruitment and Training costs to reconstitute the lost workforce -- not a part of the BRAC considerations but for a workforce of this size and complexity represents significant costs that must be considered.
- Disruption to existing programs is also a significant cost factor that never gets considered. While cost estimates are provided in other sections of this report estimates are presented here to demonstrate the potential magnitude of this problem.

The remainder of this section will detail each of these areas. Data and calculations that support the corrected COBRA result can be found in the annex to this report.



Cost discussions are broken into two areas: (1) COBRA related and (2) Non-COBRA related but significant impact. Innovative Management Concepts (IMC) Inc. of Dulles, VA, was contracted to re-run COBRA with corrected data. IMC does considerable system engineering and information technology work for DOD and has a recognized cost effectiveness analysis capability.

5.1 COBRA Factors: Figure 19 shows a summary of our findings which is followed by a discussion in each area.

CATEGORY	COBRA	Rev. COBRA	Delta Cost	Rationale
MILCON Ft.M/B	\$368M	\$647M	\$279M	Sq. Ft. Wrong
MILCON MAPS	\$24M	\$219M	\$195M	1391
AVIATION	\$56M	\$116M	\$60M	Hanger Space
Special Facility				
JSEC	UNK	\$102-343M	\$102-343M	Not included
Labs.	UNK	\$151M	\$151M	Not included
Relocate Labs	\$56M	\$56m	\$0	Agree
Relocate People	\$218M	\$144M	-\$74M	Less Moving
BOS & Payroll				
BOS FT.M	\$93M	\$49M	-\$44M	Incor. Data
BOS APG	\$0	\$13M	\$13M	Reimb. Svcs.
Payroll	-\$4M	\$0	-\$4M	Lower Saving

Figure 19: COBRA Cost Analyses

The following is a description of the process that was followed, along with IMC, when assessing the COBRA results used by the DOD BRAC deliberators.

Step #1 – Identified a set of COBRA input parameters that were incorrect and could be varied in an initial assessment.

Step #2 – Identified the best candidate inputs based on a review of the results in Step #1. This was accomplished by detailed study of the COBRA runs, input data from data calls, actual and Fort Monmouth information at variance.



Step #3 – Made the series of COBRA runs for the parameters identified in Step #2.

Step #4 – Analyzed the results of the COBRA runs in Step #3 to identify which parameters and potential combination of parameters demonstrated any errors in the BRAC process.

Step #5 – Based on the analysis performed in Step #4, and any additional input from other stakeholders, selected a refined set of parameters that should be varied in a second set of parametric runs. This set included a more comprehensive set of “simultaneous variations” on selected parameters to determine whether there were synergistic affects that may not have been readily obvious when dealing with variations of a single parameter.

Step #6 – Made the series of COBRA runs for the parameters and combinations of parameters identified in Step #2.

Step #7 – Analyzed the results of the COBRA runs in Step #6.

MILITARY CONSTRUCTION: Laboratory and Administrative

AREA	COBRA	Revised COBRA	Cost Increase
Facilities Ft. Mon	\$368M	\$647M	\$279M
Facilities MAPS	\$24M	\$219M	\$195M

In analyzing the space required to be built, or modified, we utilized data from the Army Facilities Details (R-Plans) Reports (see Annex Documentation) for Fort Monmouth and Fort Belvoir. Based on feedback from the July 1, 2005, Congressional visit to Aberdeen and its review of facilities to be modified the assumption was made that all “new construction” is required. A DD Form 1391 prepared by its parent organization in June 2005 for the move of the Military Academy Prep School (MAPS) was utilized to better estimate its costs; a small standard factor for “design” was added which was not included in the DD Form 1391.

We accepted the COBRA analysis for the Intelligence Information Warfare Division (I2WD) facility which is a SCIF that houses very sophisticated equipment and employees all of whom are cleared at the SCI security level. That facility is 176,000 square feet at a cost of \$375/sq. ft for a total cost of \$66.5M. However, in the other areas of both laboratory space and administrative space the DOD analysis considerably underestimated and made errors in the size and space required, based on functions to be performed. The administrative space required is 1,287,764 square feet and the laboratory square feet required is 1,161,812. Using these more correct space requirements, but using the BRAC cost data of \$150/sq. ft. for



administrative space and \$320/sq. ft. for laboratory yields an Administrative Facility cost of \$193,161,900 and a Laboratory Facility cost (above the I2WD facility discussed above of \$371,779,840) brings total C4ISR facilities costs to \$564,941,740.

As indicated above, the Military Academy Prep School costs are considerably above (~\$200M) the BRAC estimate when all factors and requirements for “separated” facilities are taken into account. The Cost Annex contains the DD Form 1391 which was the basis for the corrected estimate.

MILCON facilities are significantly larger than assumed in the BRAC analysis and supported by the corrected COBRA runs and found in the Cost Annex. DOD BRAC data calls did not “capture” all of the facilities at Fort Monmouth and Fort Belvoir, and the current condition of existing facilities will not permit refurbishment, therefore increasing new construction cost. MAPS costs were also increased based on available DD Form 1391 data. The BRAC estimate for the MILCON area was: \$376.5M; the corrected data indicate costs of \$866M -- yielding a cost difference of \$474M.

AVIATION: Includes Replication of Existing Lakehurst Capability

AREA	COBRA	Revised COBRA	Cost Increase
Facilities	\$56M	\$116M	\$60M

The Fort Monmouth/Belvoir mission responsibilities include using manned and unmanned aircraft with C4ISR equipment installed. The capabilities of the Lakehurst Naval Air Engineering Station’s Army facilities will be discussed in the Main Report Section 7, but are summarized again to show the magnitude of those facilities.

The Lakehurst facility “houses” experimental aircraft including: rotary wing aircraft; fixed wing aircraft; UAVs; and lighter-than-air craft. This facility allows:

- 24/7 airfield operation capability (VFR/IFR)
- Low altitude/high altitude—day/night Night Vision flight testing
- UAV flight testing
- Blimp/aerostat R&D operations
- C-130 modification support
- Aviation support for units mobilizing at Fort Dix.
- Aviation support of C4ISR testbed
- Modifications and test flights for HH-60L and UH-60L fielding
- Jet Tracks for AH-64 laser testing

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- Large secure remote test areas of Air/Ground communications projects

DOD BRAC estimates allocated \$56M in C4ISR aircraft-related MILCON, however, this estimate is less than half of the requirement for aviation facilities. The DOD estimate of hanger space required at Lakehurst was low by 99,000 sq. ft. and completely omitted facilities for lighter-than-air craft. Similarly the aircraft facilities at Fort Bevoir's Davidson Airfield were underestimated by 33,000 sq. ft. for unmanned and manned aviation test facilities. Lakehurst also houses Fort Monmouth's R&D lighter-than-air craft that require appropriate hangar storage facilities to allow entry and exit from the hangar in all reasonable wind conditions. The hangar is, in fact, the launch pad and must be in visible sight of the air traffic control station for launch. NBD/ILS approvals are required for night operations. This adds an additional 125,000 sq. ft. of hanger space to the previous numbers. Using BRAC FAC Codes 2111 and 1163 and recalculating the Aviation cost yields a total cost of \$116M with an increased cost of \$60M.

Aviation facilities for R&D are very specialized and current facilities are focused on the complex C4ISR mission requirements. BRAC failed to consider adequately the unique requirements of C4ISR R&D aviation and failed to capture their full requirements. This was reinforced during the APG visit to Lakehurst facilities where the statement was made that APG would have difficulty replicating these expensive capabilities

Special Facilities: Special facilities cover two major areas: (1) the Joint Satellite Communications (SATCOMM) Engineering Center (JSEC) which has a world-wide mission; parts of which require continual operation with portions of that mission that must continue regardless of BRAC; and (2) a variety of laboratory facilities that have significant "embedded" equipment that cannot be moved, but must be re-built into new facilities and, therefore, included in one time cost estimates. Neither area is adequately considered in BRAC and will be covered separately below:

JSEC:

AREA	COBRA	Revised COBRA	Cost Increase
JSEC	UNK.	\$102M--\$343M	\$102M--\$343M

The Joint Satellite Communications (SATCOM) Engineering Center (JSEC) serves the entire DOD and several other special users. The JSEC is a one-of-a-kind \$200+M facility with vital strategic and tactical SATCOM missions that demand continual 24/7 operations. It is an extraordinarily complex integration of multiple labs and a collocated antenna field of 12 SATCOM terminals. Many of the equipments/systems are classified as legacy or one of a kind that are no longer procurable, thus creating a conundrum in

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selecting a method to replicate the JSEC at Aberdeen. Regardless of the alternative chosen to replicate the JSEC at Aberdeen, the JSEC's current 24/7 CONOPS dictates minimum disruption; therefore, the facilities must remain in place until new facilities are completed. Although there were several scenario data calls, those requests lacked sufficient specificity to ensure the respondents understood the ramifications of the data call questions. There are two plausible alternatives for the JSEC: (1) if DOD determines that the JSEC mission cannot be interrupted, the legacy and one of a kind out of production items must be reproduced (at considerable cost) or (2) if JSEC downtime can be incurred, then the legacy and one of a kind items will be relocated. The PEO EIS's PM for Defense and Communications and Army Transmissions Systems and the Army Communications and Electronics R&D Center have collaborated on a government cost estimate that addresses both alternatives: \$343M to duplicate and \$102M to relocate. Its detail is found in the Cost Annex. There are cost elements that are common to both: e.g., construct a new complex at Aberdeen, acquire new or refurbish equipment when possible, obtain Joint Staff, FCC, etc. approvals, calibrate and certify JSEC (Aberdeen) and approve a "cutover" as the labs and other installed assets are completed. The variables in the two alternatives are: reverse engineer, redesign and acquire otherwise non-procurable equipments and systems or take down legacy and one-of-a-kind equipments/systems (incurring downtime) and relocate the assets to Aberdeen. The government cost estimate concluded that the total costs to replicate the JSEC, without interruption downtime will be \$343M with a cost escalation factor of 4% per year. To relocate (downtime), will cost \$102M with a cost escalation factor of 4% per year. It should be noted that the costs to dual staff the parallel JSEC operations are not included. While the range costs are included in the summary table above in the above; the responsible decision is to replicate the JSEC or a large portion of it to maintain the continuity of the mission.

The Joint Satellite Communications Engineering Center is involved in real-world missions that are critical to the DOD total satellite capability. This mission was not factored into the BRAC analysis, the JSEC supports older legacy satellites ground stations that can't be replicated, and excessive down time for movement is unacceptable.

SPECIAL LABORATORY FACILITIES:

AREA	COBRA	Revised COBRA	Cost Increase
Sp. Facilities	unk	\$151M	\$151M

A survey of all the laboratory facilities at Fort Monmouth and Fort Belvoir was conducted. It concluded that at least 14 of the 92 laboratories fall under this "special



laboratory facility” category. A special laboratory facility is one with an integrated capability that cannot be simply moved and re-assembled. Generally these facilities have been built into laboratory capabilities that cannot be de-coupled and must be re-built at the new facility. A description of these special laboratory facilities is found in the Cost Annex and a brief description will be included in this section. The correct estimates for these special costs are based on replacement cost and capital investment numbers for the original facility:

- **High Frequency Tracker Lab**---HF radio network housed in a 1400 sq. ft. shielded copper enclosure. The shielded enclosure permits operation and testing of the HF Radio Network without interference from outside EMI sources and eliminates interference. **Cost --- \$.5M**
- **Interactive Speech Technology Lab**—This facility is comprised of two sound chambers; a reverberant chamber and an anechoic. Both chambers are built into the laboratory facility and cannot be moved for reassembly. **Cost ----\$11.2M.**
- **Power Source Lab**--- Five power source laboratories exist at both Fort Monmouth and Fort Belvoir. At Fort Monmouth there are two specialized laboratories which contain specialized electrochemical material and test equipments and a custom 1% relative humidity dry room. The Test and Evaluation laboratory contains state of the art environmentally controlled systems and equipment. At Fort Belvoir there are three integrated and unique facilities that include: a Dual Room Environmental Performance Chamber, an Environmental Engine Test Chamber and a small environmental chamber. **Cost ----\$25.5M**
- **Photonics/Microwave Systems Lab**--- The lab includes the following capital equipment: a Femtosecond Spectroscopic Testbed, a Plasmonic Beam Characterization System, A Large Polarization Mode Dispersion Testbed, and an Anechoic Chamber---none can be moved because they are integrated with the laboratory. **Cost---\$3M.**
- **Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC) Lab**--- multiple chambers to address RF interference, EMI, and EMC between new and legacy systems. The lab consists of two large anechoic chambers with one fully ferrite lined to reduce radio frequency reflections. The second chamber is larger fully lined with anechoic cones. **Cost--\$3.5M**
- **Cryptographic Modernization Lab**—number of specialized facilities for secure communications evaluations. It consists of a SCIF, a shielded room within the SCIF, and a tempest enclosure room to prevent emanations during testing. The lab is a Top Secret facility. **Cost---\$6.7M**
- **Seeker Effect Lab and Anti Tank Guided Munitions Lab**—conducts open/closed loop testing of the susceptibility of advance IR Surface-To-Air Missile seekers. It consists of a three-axis gimbal table capable of supporting payloads up to 55 lbs. Multiple mirrors and specialized optics test systems are an integral part of the laboratory. **Cost--\$2M**
- **Anechoic Chamber**—this is the largest anechoic chamber in New Jersey which is utilized for vehicle and other large platforms. It has a turntable and a digitally controlled “positioner” for use in testing. **Cost---\$8.5M**

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- **Systems Engineering, Analysis and Integration Lab (SEAIL)**—includes a Cryogenic-Cooler Lab; and Automated Cooler Test Facility; a System Lab and a Laser Lab optically coupled to the other labs. **Cost--\$25.6M**
- **Virtual Prototyping and Simulation Lab**---provides a simulation theater to evaluate night vision and sensor technologies. It has an arena with a main viewing area to seat 36 and projections on multiple large screens. **Cost--\$7.5M.**
- **Detector Fabrication Cleanroom Facility**—houses an ISO Class 5 clean room and a “white” room. The detector fabrication laboratory is one of only two II-IV clean room facilities within DOD. **Cost ---\$6.3M**
- **Mine Lanes Facility**—supports countermine testing and is one of the few indoor mine lane facilities in the world. The indoor structure contains six mine lanes separated by nonmetallic barriers to prevent mixing of soils between adjacent lanes. There is also an overhead trolley system, a greenhouse structure with motorized roof and a single overhead trolley system. **Cost---\$.6M**
- **IR Detector Semiconductor Microfactory**—is a manufacturing facility for micro-chips and includes capabilities for pre-growth thermal and ion cleaning of the substrate before the infrared detecting semiconductor layers are deposited. **Cost---\$20.5M**
- **Fabrication and Integration Facilities**—consists of a large paint booth, a small paint booth, a sandblast booth, a powdercoat oven and three overhead cranes. **Cost---\$29.7M**

The special laboratory facilities were not adequately covered in the DOD BRAC analysis partially due to a limited data call and poor inputs from the government. Corrected analysis of the above 14 items is conservative compared to the cost of C4ISR special facilities.

RELOCATE SPECIAL EQUIPMENT:

AREA	COBRA	Revised COBRA	Cost Increase
Sp. Equipment	\$56M	\$56M	\$0

While we agree with this estimate it should be noted that there is approximately \$650M of capital investment in laboratory equipment. Some of that equipment discussed in the previous section will be purchased, so have concluded that the \$56M funds should be adequate for the remaining laboratory equipment.

**RELOCATE PEOPLE:**

AREA	COBRA	Revised COBRA	Cost Increase
Less Moving	\$218M	\$144M	-\$74M

In this section deals with two Relocation issues:

- Recognition of long term overstrengths which will increase the population of people moving. This would result in an increase cost.
- Recognition that in the corrected analysis, 20% vice the 75% of the population will relocate, results in a decrease in PCS costs.

The net result from analysis is a reduction in the COBRA relocation costs.

The population data source used for COBRA analysis is the Army Stationing and Installation Plan (ASIP). Not unexpectedly, ASIP uses positions authorized to account for personnel, but it does not recognize a category known as "Approved Over-strength" that are over and above ASIP authorizations and therefore omitted from COBRA calculations that accumulated the costs to move civilian personnel. These over-strength positions are documented and approved over-authorization positions (See Cost Annex) that support customer funded programs (i.e., PM funding of engineering or logistics efforts), where the program requirement exceeds the capacity of the authorized workforce. In all cases, funding is sufficient to support the positions and is expected to continue based on out year funding profiles and acquisition schedules. The costs associated with these additional positions, not considered in the DOD COBRA analysis, is \$16M (447 additional positions times the COBRA PCS factor of \$35,496) and should be reflected as additional One Time Moving Costs in corrected COBRA analyses

Other sections of the report validate (using history and a recent survey) that < 20% of the people would move. Therefore, the corrected COBRA calculations reflect a decreased cost to move employees.

As shown above there is an increase in relocation caused by authorized over-strengths and a significant reduction based on a much lower percentage of personnel moving to Aberdeen. This changes the net relocation funding to be a lower number without considering the significant cost of recruitment, hiring training etc discussed in the non-COBRA calculations.

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SAVINGS -- BASE OPERATIONS SUPPORT & PAYROLL:

AREA	COBRA	Revised COBRA	Saving Decrease
BOS Ft. Mon	\$93M	\$49M	-\$44M
BOS APG	\$0	\$13	\$13
PAYROLL	\$4M	\$0M	-\$4M

This section considers two issues that influence the recurring savings and have a direct impact on the years to payback this costly move. The first deals with Base Operations Support and the second deals with errors in payroll calculations.

BOS: There are three areas where the DOD analysis incorrectly estimated the BOS Recurring Savings (at Ft Monmouth) and Recurring Costs (at Aberdeen); COBRA did not consider Reimbursable tenant and regional support costs continuing after the Fort Monmouth closure; incorrectly handled the security force costs; and incorrectly identified the BOS costs at Fort Monmouth.

For a base that is closing, the COBRA algorithms credit as recurring savings, the direct and reimbursable BOS costs, inclusive of payroll and non-payroll, at the losing installation. To balance the costs for increased BOS at the gaining installations, the model calculates a new BOS cost and debits it as a recurring cost. COBRA identifies recurring costs based on TABS nodal analysis (for change in installation support strength) which is an algorithm that includes the change in overall personnel strength between what was, and what will be. COBRA reports this as "Delta BOS" as the difference between the starting BOS data (BOS Non-Payroll Budget) and the resulting finish BOS data. A "Unit Cost Adjustment" factor and population change are used to develop the Revised/Delta BOS, the value of recurring BOS costs at the gaining installation. For the Fort Monmouth closure scenario, \$93.5M was used for the BOS cost and by definition credited as Recurring Savings. The calculated BOS increase for Aberdeen was reported as \$21.5M in new BOS Non-Payroll costs, again by definition debited as Recurring Costs. However, this method fails to consider a substantial element of the new BOS cost at APG associated with the functions of Common Level of Service (CLS) and Regional Support Services at an installation. This point is summarized below.

- The delta BOS reflected in APG is only \$21.5M in additional costs – YET -
- The "Above CLS cost" for the Fort Monmouth realigning organizations and the Regional Support Costs are \$13M per year.

The concept of CLS is that the host installation provides a level of service in each service category for a "normal" tenant. For services exceeding that common level, the tenant is required to fund those services as unique to their respective mission and therefore, chargeable to their mission accounts vice the base operations accounts of the



host installation. Examples of this "Above Common Level of Service" may be found in the "Customer/DOIM Functional Support Agreement" [Annex 7-Cost]. Similarly any base service may have both a direct financed component (host responsibility) as well as a reimbursable financed component (tenant responsibility).

The actual annual BOS reimbursable program at Fort Monmouth is approximately \$13M and there is no reason to believe or rationale that realigning to Aberdeen will decrease the requirements for "Above CLS" at that order of magnitude. The proposition that post population changes and the concept of the Unit Cost Adjustment (as used in COBRA) are accepted as a sufficient algorithm for post sponsored and paid services. However, the omission of "Above CLS" cost fails the cost realism test, for the transferred population will undoubtedly perform the same mission, therefore, place toll calls and present briefings, et al, as they previously did at Fort Monmouth. Regional Support Services will still be required, even if accomplished by a different provider. These costs are not considered in the COBRA model. [Annex 7 Cost]

The DOD analysis also incorrectly handled the costs associated with the security force at Fort Monmouth. This function was converted from military performed to contract in FY 2003 and military strength and payroll dollars were taken as savings in COBRA (DOD analysis page 64, portion applicable to 8 officers and 96 enlisted @ \$8.9M.) However, COBRA also takes the entire Fort Monmouth BOS costs as savings (DOD analysis pg.13) which then "double-counts" the costs for the security force. This error is corrected in the "corrected COBRA run" by reducing the BOS Non-Pay value for 2003 (COBRA uses a three year average of BOS data to signify model costs).

The last BOS adjustment pertains to the starting BOS numbers for "Non Pay" and "Pay;" incorrectly included in the DOD COBRA analysis. The Static Base Data (DOD analysis pg 48) state the BOS Non-Pay to be \$93.444M and the correct BOS Non-Pay data should be \$48.6M. This includes the adjustment described above for the security force.

PAYROLL: While it is recognized that DOD's COBRA model must use a standard cost factor for civilian salary, it is noted that the actual average salary for Fort Monmouth/Belvoir is approximately \$20K higher than that used by DOD in its COBRA run. Accordingly, costs (and savings for that matter) based on salary value will actually be significantly greater than those produced by COBRA's algorithms.

Operational Efficiencies. DOD's arbitrary percentages for these efficiencies presumably result from collocation of C4ISR personnel at Aberdeen. Fort Belvoir's realigning lab & acquisition workforces are reduced by 5.5% and 15% respectively. No supporting rationale is provided to explain/justify either of the reductions. There are two major components of the organizations realigning from Belvoir, the Night Vision and Electronic Sensors labs and the Project Manager Night Vision/Reconnaissance Sensors & Target Acquisition of PEO IEW&S, both are subordinate elements of their parent headquarters and do not possess "duplicative" headquarters-like staff (that apparently the DOD



efficiency reductions target). Considering the continuous downsizing, rightsizing, streamlining and reshaping of the Army workforce over the last 15 years, an unsubstantiated "efficiency savings" cannot be unchallenged. Absent any definitive substantiation of the savings, they should be ignored and expunged from Scenario 0223V5 cost savings position. [Annex 7-Cost]

Correcting BOS data is significant to the calculation of recurring savings and, hence, to a proper calculation of the payback period. The payroll factor while small is also significant because it will reduce recurring savings.

COBRA DATA CONCLUSION:

- **The DOD COBRA analysis is flawed, does not account for major cost items and overstates savings**
 - **The cost increase above the COBRA estimated \$822M is an additional \$719M bringing the total cost for this move to \$1,541M.**
 - **The BOS and payroll data are in error bringing the recurring annual savings down from \$143M to \$74M .**

Using corrected COBRA data the total cost of closing Fort Monmouth/Belvoir activities and moving all elements to Aberdeen, and moving the Military Academy Prep School as yields a onetime cost of \$1541M with a payback period of 21 years—well beyond the original estimate of 6 years.

5.2 NON COBRA ANALYSIS

Recruitment & Training

A significant factor ignored by the Department's "terms of reference," yet applicable to Criteria 4 and 5, is the cost of replacing the workforce at the gaining installation. The omission can perhaps be wished away by focusing on the Department's use of a low percentage (25%) of personnel that will decline to relocate. The Department's standard cost model assumes that 75% of the civilian population will follow their positions. Preceding sections this report assesses previous BRAC closures and realignments and documents the number that will move to be 20% or less; a recent survey validates the historical figures (19% will chose to move). Regardless, significant hiring must occur at Aberdeen; if history repeats there will be a need to hire vast quantities (well over 3,500) of personnel and of that number 3,000+ must be highly skilled specialized technical talent.



There are extensive studies available in the body of pertinent literature that analyze and describe the cost of recruitment, training, and lost productivity when an employee must be hired to backfill the "leaver". Various models were evaluated by the Texas Center for Educational Research in an article entitled, "The Cost of Teacher Turnover", prepared for the Texas State Board for Educational Certification. Although the study was commissioned to focus on teacher turnover, the findings of the sources cited, can be applied to professionals of any discipline at every stage of their career and for every level of complexity.

William Bliss of Bliss and Associates in his study "The Business Cost and Impact of Employee Turnover" (2000) concluded that when all turnover factors are taken into account, the cost of employee turnover is at least 150% of the leaver's annual salary. The study also concludes that there is a direct correlation between the leaver's salary and the percentage applied for total turnover costs. It is understood that other elements of DoD have adapted the Bliss results in estimating their recruitment and training costs.

Several other studies/models cite similar observations and conclusions that reinforce the Bliss conclusions. N. Sorensen (1995) in her study "Measuring HR for Success" approximates that the total turnover costs based on her model are 50% of the leaver's annual salary. Sorensen includes three primary categories of expense: (1) hiring costs, (2) training costs, and (3) lost productivity costs. Hiring costs include advertising, reading applications, job fairs, and fund visits/bonuses/relocation/interviewing costs and additional expenses subsequent to hiring. Training includes orientation and formal training to gain requisite certifications plus supervisory on the job training. Lost productivity is seen as training invested in the leaver and a decline in effectiveness caused by the performance delta between the leaver and the new hire.

B. Ettore, in an article entitled "Employee Retention: Keeping the Cream" (1997) concluded that turnover costs can reach 100% of the leaver's annual salary.

J. Fitz-enz, in his study entitled, "It's Costly to Lose Good Employees" (1997), cites a Price Water-House Saratoga Institute model which estimates that the total cost of employee turnover ranges from 100 to 200% of the leaver's pay and benefits.

Several studies have been prepared by People Sense (on-line company offering management products and services); Advantage Assessment, Inc. (on-line company assisting in hiring and employee tracking; and W. Cascio, "Costing Human Resources: The Financial Impact of Behavior in Organizations" (1987). Each study uses similar parameters (recruitment, training, productivity, etc.) and applies different numerical values for each that can be utilized to develop a range of costs.

The Acquisition Review Quarterly (Spring 2000), published an article entitled "Private Sector Downsizing: Implications for DoD" by Michael L. Marshall and J. Eric Hazell that discusses the cost of employee turnover. The article provides a lengthy list of parameters which apply to replacing personnel, not the least of which are advertising



and marketing; recruitment, hiring and training; overtime to personnel taking up the slack; productivity losses; and lost training for departed workers. The article cites the Saratoga Institute study previously referenced. The Bliss conclusions are further supported by the work of Kwasha Lipton (150% of salary for exempt workers, 175% for non-exempt 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 COBRA model reflects an increase of just over 5,000 personnel at Aberdeen from various relocation sites at the conclusion of the base-closing exercise. After considering the elimination of spaces and transfers to and from various locations, 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, a maximum of 20% of employees are expected to transfer to their new location. This percentage is a reasonable application of experience data from several previous moves of a parallel nature. The remaining 80%, (3,717 employees), will have to be hired at APG. For most administrative/clerical personnel, the cost of recruitment and training will be negligible. Therefore, a pool of qualified, non-professional applicants is assumed to exist at all locations. For purposes of this analysis, 15% of the personnel are considered administrative/clerical and the remainder skilled professionals. 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). However, as described above, the effort to recruit experienced, specialized, engineering, scientific and acquisition personnel will be substantial and drawn out. It is unlikely that the recruitment process will succeed in acquiring fully experienced C4ISR technical and acquisition personnel, therefore training will be required.

COBRA used a single salary factor for civilians of \$59,959. For purposes of recruitment and training of senior and journey-person SE and AL personnel, this number is totally unrealistic and, as a result, other outlets were searched for better and more realistic cost data. The source decided upon was the Bliss study with adjustments to tailor the calculations and then results were generated for both ends of the cost spectrum. For costing purposes, the salary of a GS-14/Step 5 was chosen as representative of senior employees and for journey-person (JP) employees, GS-13 and below, the salary of a GS-12/Step 5. In all cases 28.9% is applied for cost of benefits.

High End of the Cost Spectrum.

- a. 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.
- b. 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 three months of each year for three years and

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for an AL employee two months 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, by assumption - that training time is non-productive in the year of training.

- c. Based on the set of assumptions above, total high end recruiting and training costs approach \$400M, \$214M and \$185M respectively.

Low End of the Cost Spectrum.

- a. 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%, for JP SEs - 50%), senior AL - 50% and JP AL - 30% .
- b. 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, by assumption - that training time is non-productive in the year of training.
- c. Based on the set of assumptions above, total low end recruiting and training costs slightly exceed \$200M, \$128M and \$76M respectively.

By not considering the cost of recruitment and training for C4ISR personnel to replace those from Fort Monmouth/Belvoir, who choose not to relocate to APG, the DoD analysis has ignored costs that include lost productivity that can be estimated in a range of \$200M to \$400M. [Annex 7-Cost]

Clearances

As discussed earlier in this report, the C4ISR mission requires not only personnel with experience and high tech skill sets, it also demands a high percentage of the workforce to have security clearances, virtually all career positions require a Secret clearance and most of the high tech positions as well as a significant portion of the acquisition professionals must cleared Top Secret. That, coupled with the loss of personnel due to a much smaller percentage of the workforce actually transferring (discussed above) will result in a significant additional cost for securing clearances for new employees as well as supporting new contractors. We estimate this to be an additional \$2.4M in additional One-Time Cost and note that this factor, given the 12 to 18 months lead time, too, will exacerbate disruption described below; the "new"

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workforce will be unable to complete their responsibilities until all required clearances are granted. (Annex C -Cost]

NON COBRA CONCLUSIONS:

- ***The cost of recruiting, hiring, clearing and training, a workforce of the size required to fill the voids for the thousands of skilled people not electing to move is conservatively estimated to be \$300M.***

COST CONCLUSIONS

The total COBRA and Non COBRA costs are estimated at \$1.99B with a payback of over 21 years. This estimate does not even consider program disruption cost caused by program delays and inefficiencies and contractor workforce cost passed on to the government—these would make this already dismal cost to implement the BRAC recommendation even more unattractive.



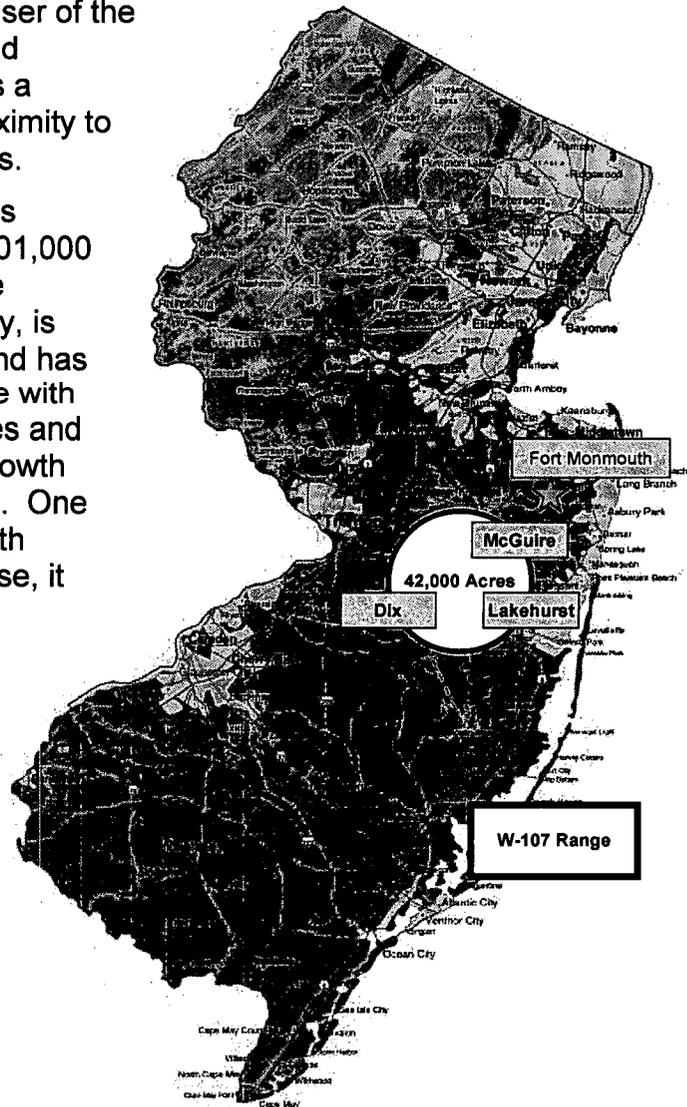
6.0 EXISTING AND JOINT OPPORTUNITY LOST: Deviation from Criteria 1

One of the major reasons for the BRAC process was to increase Joint activities. We assert that in the C4ISR area insufficient recognition was given to current Joint use opportunities using the Joint Base (Dix/McGuire/Lakehurst) nearby Fort Monmouth NJ. These experimentation activities are helping to answer many of the technical and operational issues associated with Joint operations.

Thirty miles from Fort Monmouth is a Joint Base at which the Naval Air Engineering Station Lakehurst, the Army's Fort Dix and the McGuire Air Force Base are co-located. Fort Monmouth has been using this — unique in America — Joint neighbor for development, demonstrations and experimentation in pursuing its Army and Joint C4ISR products. The synergy/connectivity of Fort Monmouth leverages the Fort Dix, McGuire Air Force Base and Lakehurst Naval Air Engineering Station facilities and test ranges. Altogether, the Joint Base has over 42,000 acres available for developmental work, experimentation, test, and training purposes. See Figure 20.

The ranges, the connectivity of the facilities and the central location in the Northeast corridor make it an ideal location for testing, prototyping, and providing operational communications that could impact the National capability to respond to a HLS/HLD or a lesser local, State, or Federal incident. While Fort Monmouth, with key technologies applicable to HLS/HLD, is a tenant and user of the Joint Base, so are several other State and Homeland Security related agencies. It is a unique facility, only enhanced by the proximity to Fort Monmouth and its C4ISR capabilities.

When one includes State managed acres surrounding the Joint Base, the total is 101,000 acres. This Joint Base concept, with one contiguous piece of Federal/DoD property, is unique within the 48 contiguous states and has built-in "Jointness." The concept is in line with DoD leadership's transformation initiatives and provides a tremendous opportunity for growth potential in conducting Joint experiments. One should also note that while Fort Monmouth leverages capabilities within the Joint Base, it also uses the nearby offshore military operating area (W-107) for its own development work. When one considers the complex satellite ground station at Fort Monmouth, instrumented C4ISR ranges at Dix, high performance runways at McGuire and Lakehurst, technical ground facilities, simulation battle labs, an expeditionary air warfare center, access to combat air support



Fort Monmouth and its Fort Belvoir C4ISR Elements

Figure 20: Joint Experimentation Already in Place

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gunnery ranges in nearby the USAF's Warren Grove range, and access to naval and supersonic aircraft operations in the nearby W-107 offshore operating area, one has all the ingredients for comprehensive sea, air, space and land Joint experiments. This confluence of Joint capability and "maneuver space" is not available elsewhere.

Admiral Harold W. Gehman, Jr. USN (Retired) in Defense Horizons December 2004 wrote: "A sound joint experimentation program plays a crucial role in making genuine progress toward the goal of force transformation. A clear understanding of the scope and concept of transformation and joint experimentation is essential to useful discourse" "For the purposes of this discussion, we can accept that Joint refers not only to operations involving two or more services, but also to military activities that are uniquely joint. Just as services have experimentation and transformation imperatives, so should the joint work. Just as there are joint forces and joint operations, there should be joint experimentation" "The joint experimentation program can be driven by those things we presently do but need to do better and by a requirement to prepare for future capabilities we can only imagine. The United States has an enormous advantage in having all the ingredients necessary to operate a truly effective joint program of experimentation. The question is, will it?"

With the leadership of Fort Monmouth, significant joint experiments have been conducted, are scheduled and can be expanded to provide meaningful opportunities to link Army ground units (current and future) with other Joint activities and headquarters. The facilities are in place in central New Jersey; the external high bandwidth connectivity is in place; the infrastructure is in place; technical personnel are available; and a quantifiable repeatable process has been established. This is an opportunity that the DOD BRAC process did not examine or mention. The current DOD BRAC recommendation would remove Army C4ISR from this Joint opportunity and move to a locale where no Joint opportunity or future promise exists. BRAC Commissioners should strongly consider this capability to comply with a top BRAC selection criterion.

FACILITIES IN PLACE: Figure 21 shows the Joint Infrastructure already has been put in place at a considerable cost. It includes high bandwidth connectivity to outside DOD elements to support Joint virtual experiments. All the connections are high speed, high bandwidth connections that permit classified and unclassified connections. These field connections are also connected to the Fort Monmouth laboratories allowing lab and field experiments to be conducted. Central communications control is at Fort Monmouth, which establishes the connectivity to JFCOM; the Boeing/FCS; US Army TRADOC Battlelabs; and others.

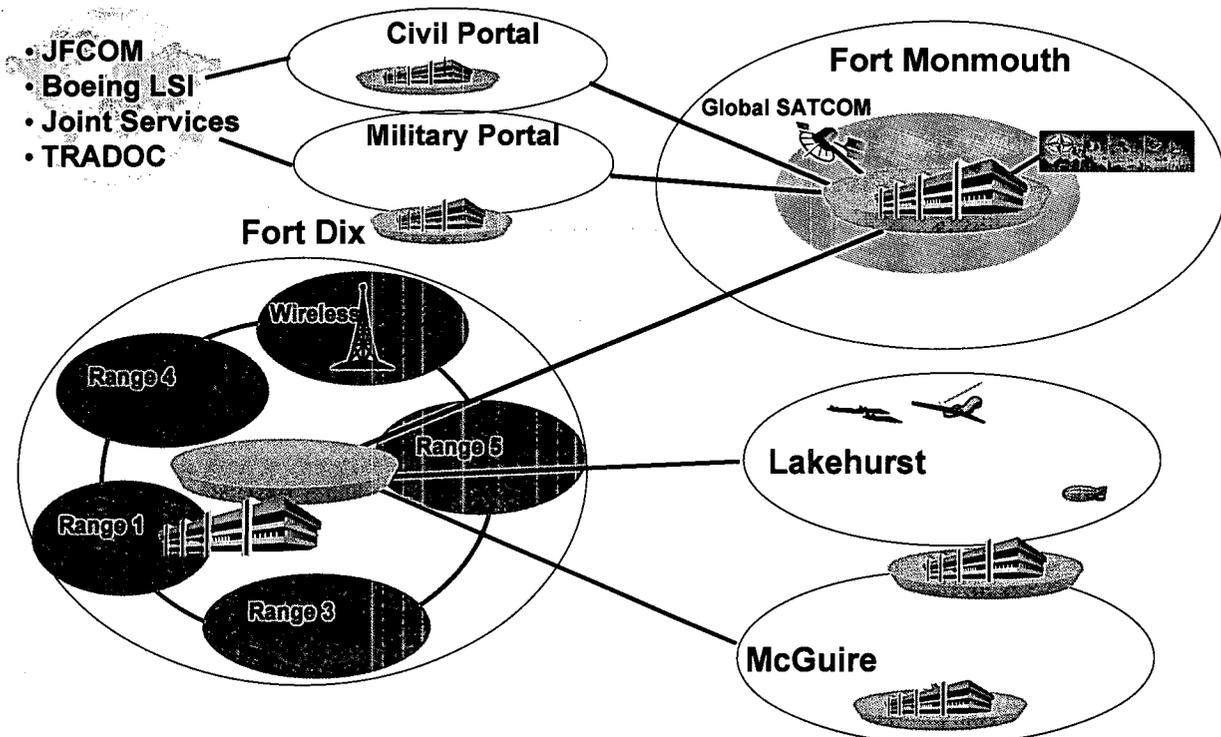


Figure 21: Fort Monmouth and Joint Base Connectivity

The Lakehurst facility “houses” the experimental aircraft; this includes rotary wing aircraft; fixed wing aircraft; UAVs; and aerostats. This facility allows:

- 24/7 airfield operation capability (VFR/IFR)
- Low altitude/high altitude—day/night Night Vision flight testing
- UAV flight testing
- Blimp/aerostat R&D operations
- C-130 modification support
- Aviation support for units mobilizing at Fort Dix.
- Aviation support of C4ISR testbed
- Modifications and test flights for HH-60L and UH-60L fielding

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- Jet Tracks for AH-64 laser testing
- Ramp area of 1,400,00 square feet
- Hangar space of 240,000 square feet with 33,000 square feet of office space
- Large secure remote test areas of Air/Ground communications projects

In addition, the Army has a GUARDRAIL Signals Intelligence system (aircraft and sensors) at Lakehurst to develop upgrades and/or software/hardware improvements to the fielded systems. The GUARDRAIL test profiles are typically flown in the military operating area W-107's nearby unrestricted airspace. These profiles are flown at 25,000 feet to a max range of 120 NM unobstructed.

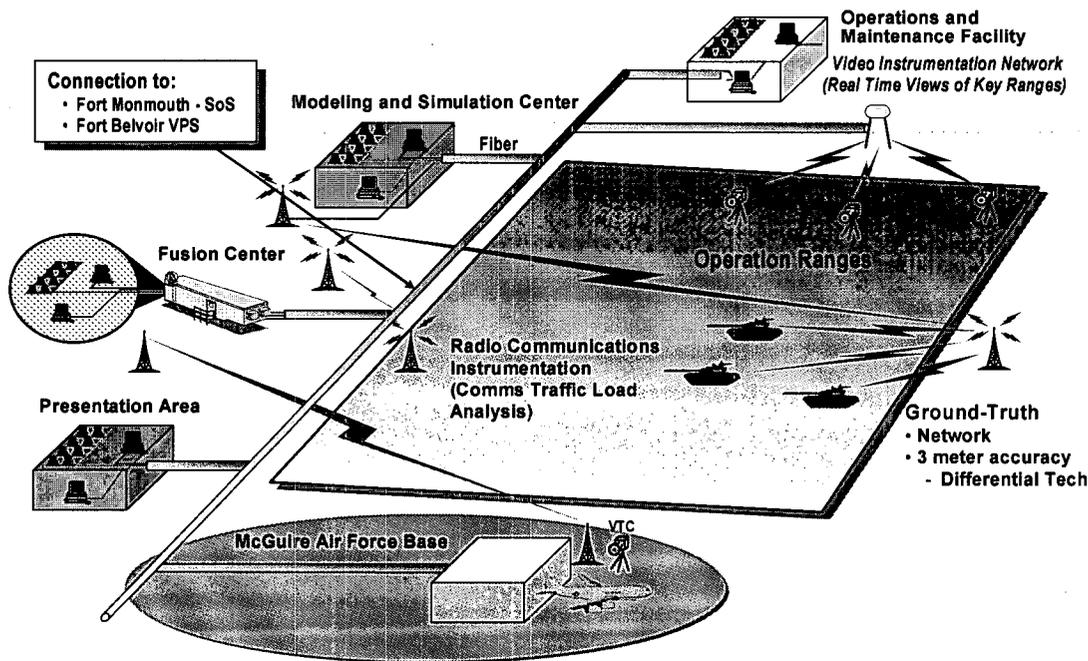


Figure 22: Fort Dix Infrastructure

When comparing the comprehensive New Jersey capability to the Aberdeen aviation ground support and flight profile capabilities, one concludes that BRAC MILCON costs are significantly (more than \$30M) understated. More importantly, the Aberdeen airspace restrictions will severely limit R&D testing.

The Fort Dix C4ISR facilities are shown in Figure 22.

The Joint Base facilities and their instrumented ranges permit data collection and analysis and have been utilized in conjunction with: Army Test and Evaluation Command; Reserve Units; "TRADOC Future;" USAF C4ISR programs from Hanscom AFB, to name a few. Ongoing and planned upgrades to the facilities include:

- Creation of a new modeling and simulation facility.



- Improved presentation and control center
- Extended High-speed access for external agencies to Fort Dix
- Upgrading networking between Fort Dix and Lakehurst NAES
- Collaboration with Fort Dix to instrument a newly funded Military Operations in Urban Terrain (MOUT) facility

JOINT AND ARMY EXPERIMENTS CONDUCTED:

Figure 23 shows the experiments conducted to date—most are Joint and are focused on providing critical answers to both technical and operation issues that characterize connecting the land force unit with other Joint units, Joint headquarters or Joint/National sources of intelligence information.

The C4ISR On-The-Move STO “JINEX 04” Capstone experiment was conducted with two primary objectives. The first objective was the exploration of precision targeting of moving targets. This exploration leveraged Air Force JSTARS radar and an Army-organic Moving Target Indicator radar to collaboratively fix and track a moving enemy. The resulting precise targeting information was fed to a Joint weapons-target pairing process for the purpose of engaging the target with cross-service indirect fire with minimal latency. The second objective focused on enabling interoperability between the modernized Air Force Tactical Air Control Party Close Air Support System and current Army Battle Command Systems.

As part of its ongoing mission, the CERDEC On-The-Move Testbed conducts experimentation in support of Tech Base programs’ testing and exit criteria validation. These experiments provide an integrated system of systems venue that enables participating programs to be exercised in a relevant environment. This integrated

ACTIVITY	STAKEHOLDER / MANDATE
C4ISR On-The-Move STO “JINEX 04” Capstone	PM FCS - FCS risk reduction via system-of-systems discovery experimentation
CERDEC Tech Base SoS Testing & Exit Criteria - RDECOM	ASAALT - Facilitate CERDEC STO exit criteria requirements. Provide facility & service resource for related DoD programs.
JEFX (Air Force)	Air Force (ESC Hanscom) - Support PM FCS participation via engineering, GIC support and material
JRAE (Navy)	Navy SPAWAR - Joint initiative to explore horizontal interoperability across the Services’ next generation tactical architectures (i.e., with PEO C3T)
DevEx ’04 Events (UAMBL)	UAMBL – Spt. human-in-loop, virtual/constructive sims. to C4ISR functions for leaders at all levels.
DGEE (Joint)	JFCOM - Establish permanent network lab capable of continuously conducting events focused on military transformation through live or virtual exp.
Air Assault Expeditionary Force (AAEF)	TRADOC Futures Center - Selecting, vetting and using “FCS-like” C4ISR into current forces

Figure 23: Joint and Army Experiments Conducted to Date



system of systems has been extended to Joint planning, fires, and situational awareness.

The CERDEC On-The-Move Testbed has supported the Army's participation in the Air Force Joint Expeditionary Force Exercise. The Testbed has provided surrogate combat vehicles equipped with a complement of C4ISR capabilities that were exercised in Joint operational mission threads. The completion of these operational threads provided key insights into the future integration and interoperability of the Army Future Combat System program in a Joint environment.

In 2004, The CERDEC On-The-Move Testbed began C4ISR explorations with the Navy. These initial efforts were made in conjunction with Navy SPAWAR during their JRAE experiment. The Testbed leveraged its growing expertise in the area of Joint fires and relationship with the Army PEO C3T to facilitate the exploration of the horizontal integration necessary to conduct Joint targeting and fires using the emerging C4ISR architectures of the Air Force, Navy, and Army.

An additional milestone activity was completed in 2004. During 2004, the Testbed worked closely with Joint Forces Command to become a member of their Distributed Continuous Experiment Environment (DCEE). This integration enabled the Testbed to participate as a headquarters element in a distributed Joint experiment and to exchange situational awareness information.

In a major undertaking, the CERDEC C4ISR On-The-Move Testbed was selected as the Lead Technical Integrator (LTI) for the Army TRADOC Air Assault Expeditionary Force study and experiment. As the LTI for this experiment, the Testbed completed the integration of an Infantry Platoon with a full complement of C4ISR capabilities. This platoon became the focus of an experiment to determine the impact of advanced C4ISR capabilities on the lethality and survivability of that platoon operating in a Joint environment.

In addition to those sampled above, the following experiments are planned:

- Hosting an Air Force Tactical Air Command Post Close Air Support System as part of the Army' Warfighter Information Network Tactical.
- Target mensuration using UAVs.
- Airborne/Space Communications for Range Extension.
- Air mobility operations from McGuire for Advanced Airborne Expeditionary Force.
- Integrate the FCS C4ISR capability into JEFX 06.
- Conducting FCS Experiment 1.1.
- HLS/HLD experimentation.

CONCLUSIONS:

- A networked facility exists and provides significant capability for increased Joint Experimentation. *Infrastructure exists and considerable investment has already been made.*



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- Instrumentation and data analysis capability exists and permits quantifiable data on experiment metrics. *Skilled personnel exist to establish, structure experiments, and provide meaningful data.*
- Lakehurst "aircraft" capabilities are extensive, on the ground and in terms of airspace, and are an integral part of any Joint experiment. UAV, aerostats, helicopters and high performance aircraft can be part of any Joint experiment.
- High bandwidth connections to JFCOM exist and the Testbed is already integrated as a remote, distributed node of the Distributive Continuous Experimentation Environment (DCEE). *An opportunity exists for increased interaction between the testbed and JFCOM.*
- The Testbed participated as a remote site, in the JFCOM Command Collaborative Information Environment (CIE) Limited Objective Experiment (LOE), demonstrating the capability of short-fused integration of distributive nodes into the CIE.

Joint Experimentation is currently being conducted by Fort Monmouth in conjunction with the nearby Joint Base Dix /Lakehurst/McGuire; more is planned. Combining Joint operational facilities with nearby laboratories, with ranges, with air and sea space, with satellite access, creates an environment rich for expanded JFCOM sponsored experiments. Current facilities at Aberdeen are not able to duplicate this capability. The Army and BRAC do not mention duplicating this capability. Even if a duplicative investment is made, Aberdeen is still unable to overcome its airspace and other maneuver space limitations and the absence of Joint opportunity.



7.0 MANEUVER AND AIRSPACE WAS NOT CONSIDERED BY THE BRAC RECOMMENDATION—Deviation from Criteria 2

The Joint Base of Fort Dix, Lakehurst Naval Air Engineering Station, and McGuire AFB (DLM) offers considerably better maneuver and airspace than Aberdeen plus an opportunity for Joint Experimentation that doesn't exist at Aberdeen.

Fort Dix consists of 31,065 acres of land, of which 13,765 acres are range and impact areas and 14,000 are classified as a contiguous maneuver area. The remainder of the installation is the cantonment area. Fort Dix training areas are bordered by the Lebanon State Forest (26,000 acres), Lakehurst Naval Air Engineering Center (2,100 acres) and selected Wildlife Management Areas (34,900 acres) which enable this installation to simultaneously support combat, combat support, and combat service support training. Fort Dix has mobilized more Reserve troops than any other Army base in the nation. It has almost 60,000 acres of state forests, and is surrounded by another 35,000 acres of preserved farmland. Another 20,000 acres in farmland is targeted for preservation. Fort Dix has mobilized more than 23,000 troops for Operation Iraqi Freedom, operation Noble Eagle and the post typically has more than 2000 reserve troops in the mobilization process.

Lakehurst presents a unique opportunity to utilize an aviation R&D capability central to any R&D experimentation. Its West Field facility has no restrictions on hours of operations. The airfield is used for both fixed wing and rotary wing operation for: Navy; Air Force; Army; Army Reserve; and Department of Justice.

The Lakehurst facility "houses" the experimental aircraft which includes: rotary wing aircraft; fixed wing aircraft; UAVs; and Aerostats. This facility allows:

- 24/7 airfield operation capability (VFR/IFR)
- Low altitude/high altitude—day/night Night Vision flight testing
- UAV flight testing
- Blimp R&D operations
- C-130 modification support
- Aviation maintenance support for mobilization efforts at Fort Dix
- Aviation support of C4ISR testbed
- Modifications and test flights for HH-60L and UH-60L fielding
- C-12 airframe which houses the GUARDRAIL Joint Theater/Army surveillance system
- Jet Tracks for AH-64 laser testing
- Ramp area of 1,400,00 square feet
- Hangar space of 240,000 square feet with 33,000 square feet of office space
- Large secure remote test areas of Air/Ground communications projects



McGuire AFB is the home of the 305th Air Mobility Wing and several tenant organizations including the 21st Air Force and the Air Mobility Warfare Center (actually located at the adjacent Fort Dix). Supporting “home-based” new transformational strategic-tactical lift C-17 aircraft, KC-10 Extenders, and KC-135 Strato-tankers, McGuire missions support the transportation of troops, passengers, equipment and cargo, and provides aerial refueling throughout the world. McGuire AFB has been utilized for Joint Experimentation with Fort Monmouth and has hosted Tactical Air Command Post (TACP) and experimental Air Space Command and Control platforms from Hanscom AFB.

When comparing Aberdeen capabilities with the maneuver space and air space capabilities of the nearby DLM Joint Bases, one finds considerable limitations that were not mentioned or considered in BRAC deliberations:

- Inadequate airspace for R&D Testing and experimentation.
- Poor maneuver testing driven by the absence of troops.
- Lack of C4ISR range instrumentation or specialized connectivity.
- Airfield capabilities that are considerably less capable than DLM.
- No dedicated sea and air military operating areas like W-107 nearby off the coast of NJ.

CONCLUSIONS:

- *BRAC Criteria 2 directs consideration be given to airspace and maneuver for ground, naval and air forces. Scenarios leading up to the BRAC recommendation and the BRAC recommendation itself do not consider the ground maneuver space at Fort Dix, better maneuver space than Aberdeen because it is instrumented for C4ISR events. It does not consider airspace available over the DLM Joint Base or the nearby air and sea space in military warning area, W-107. It does not consider the highly restricted nature of airspace in and around Aberdeen. It does not consider the restricted sea space in the northern reaches of Chesapeake Bay.*
- *Scenarios seemed simply to assume that because vehicle and ordnance are tested at Aberdeen, that it would be a better maneuver space than the Fort Monmouth access to the DLM Joint Base. Further, the Aberdeen recommendation never discusses Joint maneuver space, because it is not possible there. Finally, the DLM Joint Base is nearly equal in size to the usable maneuver space at Aberdeen. The second highest priority selection criteria was ignored.*



8.0 OTHER CONCERNS

8.1 HOMELAND SECURITY/DEFENSE

DOD policy directed that effects on homeland defense and support for civil operations be considered in BRAC recommendations, including sharing of technology. BRAC information that was released does not discuss sharing technology that will support civil operations in the case of Fort Monmouth. This is strange in view of its close proximity to the "911 Commission's" top priority (New York City), Congressional testimony referring to Fort Monmouth by "911 Commissioner" Lehman on 3 August 2004, and an April 19, 2004 National Research Council report cited the Army's C4ISR technology as most relevant to critical homeland security interoperability needs.

Immediately following 911 and the collapse of World Trade Center towers, Fort Monmouth personnel were deployed to Ground Zero providing equipment and technical support to the 22 Federal agencies mobilized at the scene. Equipment included thermal cameras to search for survivors within the rubble pile, radio frequency surveillance equipment to locate victim cell phones, and LASER Doppler vibrometers to help assess the stability of buildings in the area in which relief workers were situated. In addition, Fort Monmouth coordinated aircraft flyovers using sensitive EO/IR and spectral measuring equipment to make digital maps of the site to assist first responders in locating gas leaks and to detect burning hot spots beneath the rubble pile. Because of its expertise, Fort Monmouth has evolved into the "C4ISR Expert" for the Tactical Force and has a proven record of providing information superiority to the Warfighter and, by extension, is well suited to leverage its capabilities in defense of the Homeland.

Due to its central location within the state of New Jersey and its ability to offer both limited access and secure facilities, Fort Monmouth was selected to serve as Continuity of Operations (COOP) facilities for FEMA Region II and the Army Corps of Engineers, North Atlantic Division. The FEMA Region II COOP has been activated a number of times, most notably in support of the August 2003 NY City Blackout and during multiple regional floods. In April 05 Top Official (TOPOFF) 03 was conducted in **New Jersey and Connecticut simulating a biological attack and a chemical attack in each state respectively**. During the same timeframe, 1st Army established its Joint Task Force for Consequence Management (JTF CM) at Fort Monmouth to support US Northern Command (NORTHCOM) for the TOPOFF and the Ardent Sentry exercises.

Fort Monmouth's critical location in the heart of the Northeast Metropolitan region, with its extensive communications infrastructure, is the logical choice when selecting a staging area for both exercises and real-world Homeland Security mobilizations that support local, state and Federal First Responders.

Specifically, Fort Monmouth/Belvoir C4ISR team is engaged in the following:



- For the Port Authority of NY/NJ – Developing prototype information sharing network and Radiological Surveillance system consisting of C2, Situational Awareness, radiological sensor networks, and video assets. This effort will ensure that the critical assets of Pennsylvania, New York, and New Jersey are protected as well as the millions of citizens that it serves. *Leveraging dual-use C4ISR and radiological technologies is the key to the success of this GWOT effort.*
- For the National Guard Bureau (NGB) – NGB is finalizing Fort Monmouth's role as system engineer for the Joint Contingency Communications Support Environment (JCCSE) to ensure that this critical capability is effectively utilized by the NGB. *The C4ISR testbed assets of both at Fort Monmouth and Fort Dix will be leveraged to test/develop this critical system.*
- For the State of NJ – Fort Monmouth is developing/ transitioning intrusion detection systems and technology to protect the State's critical infrastructure and the systems involved in meeting the needs of the State and its citizens. Steps to secure the State's critical networks and databases against terrorist attacks/compromise include surveys of networks and critical information assets as well as the development/transition of dual-use host intrusion, network intrusion, and security management technology. *Fort Monmouth has been designated by the Governor, by Executive Order, as the New Jersey Homeland Security Technology Systems Center. Further, the State has indicated that Fort Monmouth will be its site for its emergency medical stockpile. One must note that in case of NY-NJ disaster, Fort Monmouth is the most accessible, secure facility for establishing command headquarters and dealing with injured and evacuees.*
- For the NYC Dept. of Environmental Protection – Fort Monmouth, in partnership with the Army Corps of Engineers, is providing an Electronic Security System (ESS) to protect the vast NYC water supply infrastructure that is key to meeting the basic water needs of 8 million citizens. A broadband communications system is being developed to support communications by First Responders and waterways security system operations personnel.
- For the NYC Dept. of Transportation – Fort Monmouth, in partnership with the Corps of Engineers, is protecting several of the bridges in NYC by developing design criteria and C4ISR systems implementations for an electronic security system to counter threats/vulnerabilities to this critical infrastructure. In partnership with FEMA, NYPD, NYFD, USACOE, and DOT, C4ISR/IT technology (IP network switches, video servers, and special sensors) will be deployed by Fort Monmouth to ensure the safety of NY's bridges and to allow their safe use by the citizens of NY.
- For the City of New York – The CIO of NYC has asked Fort Monmouth to provide assistance in their Citywide Mobile Wireless Network project. This project will provide critical data and voice communications for first responders, vehicle location, and modernization of both police call boxes and the traffic control system throughout the five boroughs of NYC. Expertise from the Fort Monmouth community will be provided in the areas of Radio Frequency (RF) communications,



networking, information security, and applications. The expertise is being provided during the critical evaluation phase of down-selecting from two vendors during live pilot demonstrations in NYC with expertise to continue during deployment of the selected systems.

- For City University of New York – The CIO of the City University of New York (CUNY) has asked Fort Monmouth to provide assistance securing the records and transactions processed by the CUNY Data Center. The center supports CUNY's 19 colleges and over 100 research centers with a student population in excess of 208,000 in both degree programs and continuing education. Intrusion Detection System (IDS) experts are assisting CUNY to design a security architecture, down select a vendor, and validate IDS deployment.
- For OSD/RDECOM – Fort Monmouth is serving as the technology transition advisor to ensure that the (dual use) technologies developed for the Warfighter that are applicable to HLS/HLD needs are being identified and leveraged for the emergency responders.

CONCLUSIONS:

- *Fort Monmouth is engaged in a broad range of Homeland Security/Homeland Defense (HLS/HLD) efforts. Many of the same technologies and System Engineering skills utilized for the Warfighter are now finding "dual-use" in protecting our most critical domestic national assets and in making the American public safer. This is all part of Team C4ISR's expanded contributions to the Global War on Terror (GWOT).*
- *Fort Monmouth plays a pivotal role in helping the various federal, state, local and private agencies achieve the goal of a common infrastructure through the development of a common architecture for telecommunications, voice and data systems that will allow various HLS/HLD systems to be interoperable and to interact more effectively and efficiently. Because all the separate systems must function as a single integrated environment, the development of an HLS/HLD communications/information environment must be seen as an inherently governmental function. Unfortunately, the private, state, local and federal agencies that make up the Homeland Security/Homeland Defense apparatus have developed, or are developing, independent information system initiatives. The varying agencies which make up this apparatus also employ differing acquisition strategies and life cycle support methodologies. The result is a disjointed collection of systems that may work well in isolation, but which function poorly, when needed, as a regional or national enterprise. Likewise, there are no strategies or mechanisms in place that might allow these agencies or organizations to move toward a more unified or "common" infrastructure, (i.e., a shared set of equipment, software and interoperable processes). In the absence of an Executive Agent, Fort Monmouth has taken the lead in an effort to bring about a single unified environment.*
- *The State of New Jersey offers a number of strategic advantages, including a large base of experienced scientists and engineers and a geographic location*



which sits astride every critical infrastructure in the Northeastern United States. New Jersey also plays a key role in both the domestic and international economy. New Jersey possesses a number of unique State and regional facilities and installations, as well as a number of civilian institutions of higher learning that are involved in research related to HLS/HLD. A number of local agencies, such as the Port Authority of New York & New Jersey, have served in the "real world" role of crisis response & consequence management.

- *Because of its close proximity to New York, Fort Monmouth is well positioned to act as a bridge between the private and public sector. This relationship is absolutely essential for addressing the complex issues that must be considered in the totality of a single integrated system rather than isolated domains. Infrastructures must be based on real data about the nature of vulnerabilities, the evolving reliability challenges, and the real-world, real-time environment in which information networks operate. Cost, performance, and reliability objectives must all be balanced through an engineering process of analysis and informed tradeoffs in order to build effective systems. Applying its system engineering talent and dual-use technologies on critical nation issues such as HLS/HLD is a workforce "force multiplier". If Fort Monmouth is closed or realigned, it will be a significant detriment to HLS/HLD initiatives that are in their infancy, but which provide promise of great rewards to the nation as a whole.*

"9/11 Commissioner" Lehman specifically called out Fort Monmouth in Congressional testimony, citing the Fort's skill in communications interoperability, but also its proximity to critical homeland security responders in New York. Further, the National Research Council cited the Army's Fort Monmouth experience and capability in "Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) to be most relevant to the needs of homeland security organizations."

8.2 DEMOGRAPHIC INACCURACIES

BRAC miscalculated medical services per patient ratios for the Monmouth/Ocean counties area, when it inaccurately used an 11 million population for the Monmouth/Ocean area. Monmouth/Ocean has better health access than the Aberdeen (Harford/Cecil) area. Annual medical premiums in NJ are only \$200/year more than MD.

In addition to the miscalculation, we offer the following for consideration: (New Jersey Commerce Economic Growth & Tourism Commission: Fort Monmouth Analysis Report, New Jersey/Maryland Comparison). Extracts from that report, as provided in the following pages, show that:

- The Monmouth County region offers a larger, more highly skilled and educated workforce than Harford/Cecil County MD.



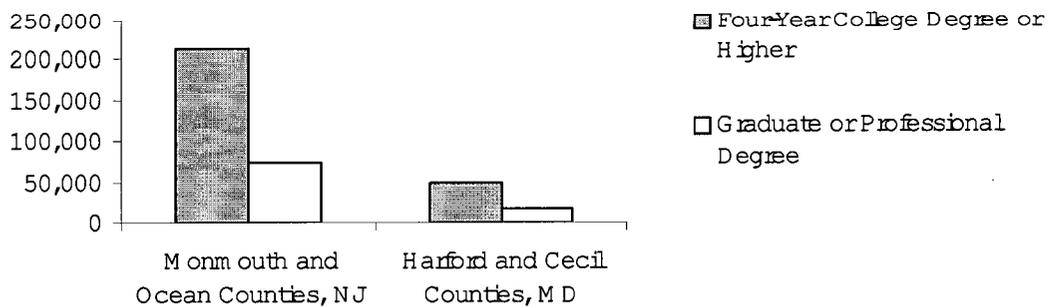
- The Monmouth County region is home to more than three times the number of people with professional and technical services backgrounds than Harford/Cecil County. (A smaller pool of qualified workers in Maryland will drive up labor costs more than expected by BRAC)
- The Monmouth County region features access to more than 19,000 business establishments versus Harford/Cecil County, which offers approximately 4,800.
- The Monmouth County region is home to six times the number of "information" and almost five times the number of "Professional and Technical Services" establishments than Harford/Cecil County MD.

The following charts are Source: United States Census Bureau, 2000 Decennial Census

Figures 24 and 25 compare the number of individuals with a college or advanced degrees and the number of civilians employed in selected industries and occupations within the two counties surrounding Fort Monmouth and Aberdeen Proving Ground. Figures 26 and 27 expand the comparison to include the number and density of specialized and technical firms located in those same counties. Figure 28 compares the number of new hires in specialized industries in those same counties during 2003-2004.

Figure 24. Number of Individuals Aged 25 and Older with a Four-Year Degree in Counties Surrounding Bases

	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Four-Year College Degree or Higher	212,677	48,224
Graduate or Professional Degree	74,583	16,672



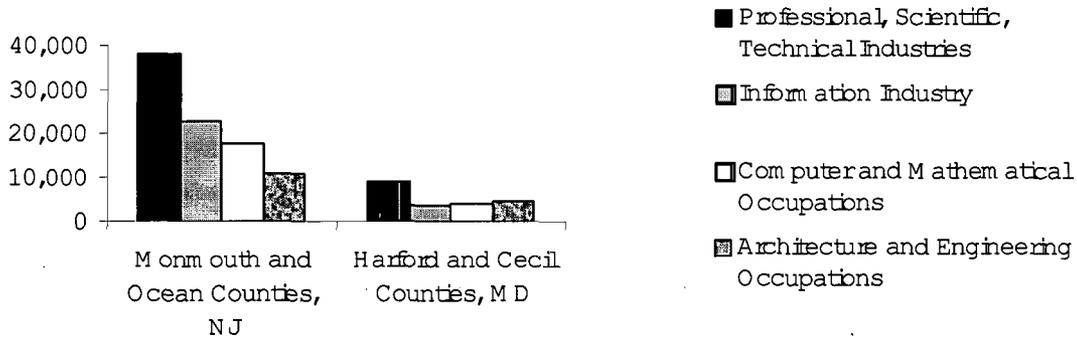
Source: United States Census Bureau, 2002 Economic Census

Figure 25. Employed Civilian Population (16 Years and Over) in Specialized Industries and Occupations in Counties Surrounding Bases

	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Employed Civilian Population (16 Years and Over) in Specialized Industries and Occupations		

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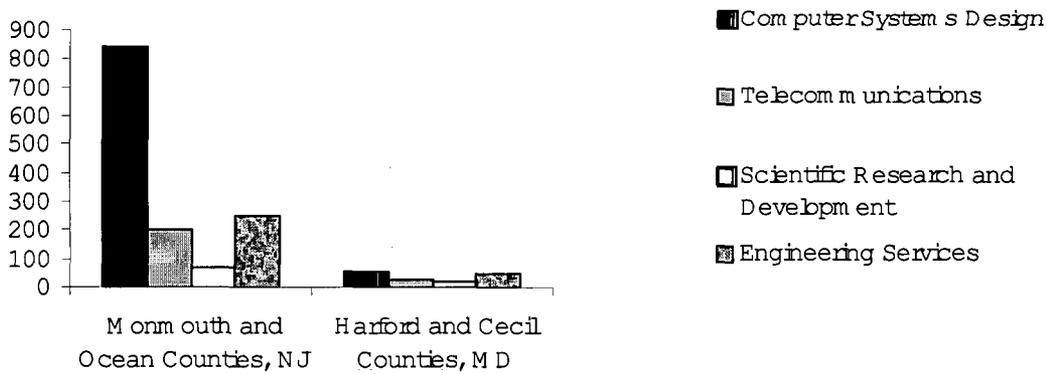
Professional, Scientific, Technical Industries	38,126	9,125
Information Industry	22,524	3,582
Computer and Mathematical Occupations	17,504	3,911
Architecture and Engineering Occupations	10,981	4,472



Source: United States Census Bureau, 2002 Economic Census

Figure 26. Total Number of Specialized Firms in Counties Surrounding Bases

	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Computer Systems Design	841	55
Telecommunications	205	31
Scientific Research and Development	68	19
Engineering Services	251	50

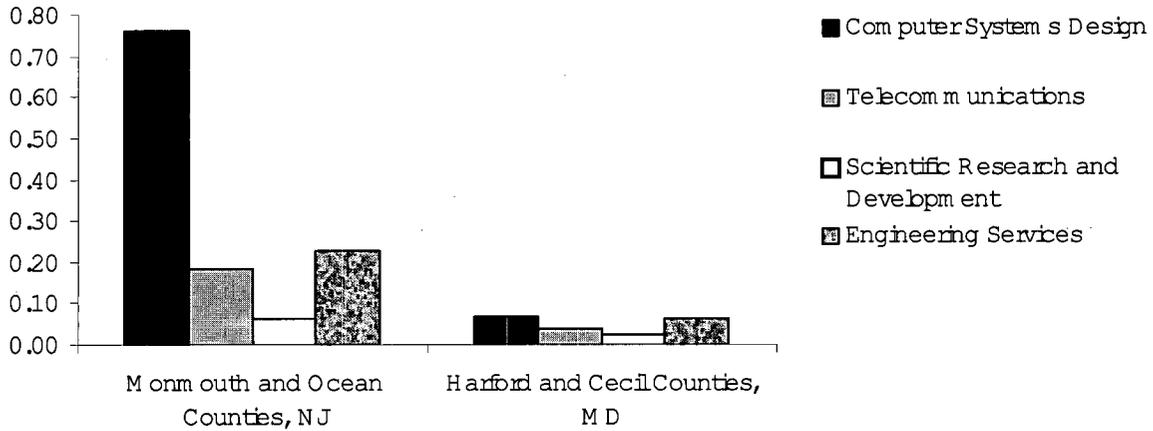


Source: United States Census Bureau, 2002 Economic Census

Figure 27. Density of Specialized Firms in Counties Surrounding Bases (per square mile)



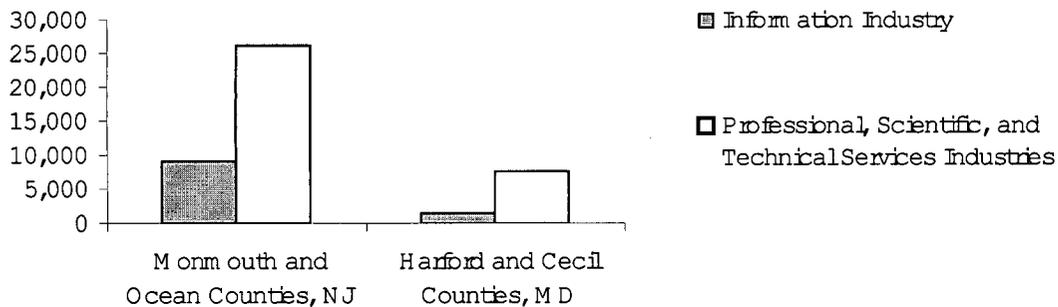
	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Computer Systems Design	0.76	0.07
Telecommunications	0.19	0.04
Scientific Research and Development	0.06	0.02
Engineering Services	0.23	0.06



Source: United States Census Bureau, 2002 Economic Census

Figure 28. Number of New Hires in Specialized Industries in the Counties Surrounding Bases, 2003-2004

	Monmouth and Ocean Counties, NJ	Harford and Cecil Counties, MD
Information Industry	9,185	1,330
Professional, Scientific, and Technical Services Industries	26,157	7,735



Source: United States Census Bureau, 2005 Longitudinal Employer-Household Dynamics



8.3 FEDERAL TENANTS NOT CONSIDERED

The cost savings or return on investment from the proposed closure or realignment of military installations shall take into account the effect of the proposed closure or realignment on the costs of any other activity of the Department of Defense or any other Federal agency that may be required to assume responsibility for activities at the military installations. *Non-DOD tenants at Fort Monmouth were not noted in written decisions. Correctly, costs associated with Non-DOD tenants were not included.*

The presence on Fort Monmouth of the Veterans Administration Health Facility, which handles over 10,000 patient visits annually, is not addressed. The report also overlooked the presence of the Department of Homeland Security Continuity of Operations Point, (FEMA Region II and the Northeast Region Corps of Engineers), the FBI's Northeast Regional Data Center. How the increased costs to these agencies caused by the closure of Fort Monmouth were taken into account in accordance with Section 2913 (e) of the BRAC Statute are unclear.

8.5 INCONSISTENT PHILOSOPHIES BETWEEN RECOMMENDATIONS FOR ARMY C4ISR CENTER AND RECOMMENDATIONS FOR NAVY AND USAF C4ISR CENTERS

The Army seemed worried about the dedicated use of a base for the C4ISR function; Navy and the USAF were not; they retain their dedicated C4ISR-use bases. Both Navy and USAF were more worried about workforce stability, access to high tech partners outside the gate, and avoiding C4ISR program disruption.

Neither the Navy nor USAF considered sending its C4ISR center of mass centers to unrelated centers with no C4ISR capability to satisfy a base operations business theory.

8.6 T-JCSG OMISSION OF DISCUSSION OF LAND C4ISR IN REPORT

Despite months of scenarios, military value/judgment "calculations," briefings and recommendations to higher committees, in the end, the T-JCSG chose not to explain the rationale for re-creating the Land C4ISR center at Aberdeen in the BRAC Volume XII report or in the briefing to the BRAC Commissioners on 1 June 2005. Perhaps it was because it had followed such a serpentine course in its philosophies and scenarios, perhaps because it discovered a 16 year payback period discrepancy with the Army in the month before the final BRAC decision. One can only speculate that such effort goes unexplained in Volume XII is suspicious.



9.0 CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

- *The BRAC recommendation substantially deviated from selection criteria and the recommendation to close Fort Monmouth and move its C4ISR efforts along with its subordinate activities at Fort Belvoir to Aberdeen Proving Ground (APG) is flawed. The resultant loss of intellectual capital and disruption to major programs supporting the Warfighter now and in the future is an unacceptable risk to capabilities that are central to the Army and Joint C4ISR.*
- In the BRAC Military Value (MV) analysis, the capabilities described in the report for Fort Monmouth/Belvoir received top scores but were "weighted" as less important and therefore not given adequate emphasis in many BRAC scenarios. MV should be judged, at least equally, on rapidly providing technology and systems to the Warfighter, and on basic and applied research that still requires considerable time to mature. Bottom-line: Fort Monmouth's MV technical score, in its prime mission areas, was unequalled within in the Army.
- The loss of a highly skilled workforce of this quality and quantity has never been experienced in DoD and is unique in BRAC 2005. To displace over 5000 government personnel plus approximately 4000 contractor support personnel to a location without C4ISR foundation and without a C4ISR skilled workforce to absorb some of the losses will mean unacceptable disruption and will take at least a decade to overcome.
- *Considering the magnitude of the programs being executed by Fort Monmouth and its Fort Belvoir components and the absence of any C4ISR capability at Aberdeen, it is inconceivable that the Army did not calculate or mention the tremendous impact a move of this magnitude will have on our current and future C4ISR needs and, hence, our Warfighter capability. This information, inexplicably, did not impact the Military Value and Military Judgment considerations or the cost considerations in the BRAC recommendation.*
- *The type of work done at Fort Monmouth/Belvoir requires years of experience and "greening" of the workforce to understand the needs of the Army and now the Joint Warfighter. It is not just a matter of replacing an engineer with a new hire out of some university. It takes roughly 10-15 years for an engineer/scientist to progress to a mid level manager and 20 years to a senior manager. It is those mid level and senior managers that will not move and cannot be replaced simply by a new hire. "Greening" a replacement workforce will take over 10 years at least and that's an intangible that hasn't been adequately considered by BRAC process.*
- *The majority of the workforce especially, the most experienced, will not move and if forced to a decision would go to industry or to another more attractive government location. A recent, independent poll of the workforce and real statistics from previous moves indicate less than 20% will move.*



- *The BRAC recommendation did not co-locate R (Adelphi) with D&A. There is no relevant or sizeable R or D&A at Aberdeen. Moving Fort Monmouth to Aberdeen and Fort Belvoir to Aberdeen does not achieve RDA integration. It simply moves Fort Monmouth/Belvoir RD&A to a new place at nearly a \$1B cost. The end result of the BRAC recommendation is to move the bulk of the people doing C4ISR work and currently integrating technology, development, production, fielding, and sustainment to a location which has no C4ISR capability and infrastructure; at **Considerable Expense.***
- *The integration of C4ISR RDA with T&E was never considered by the T-JCSG and was added by the Army to make a poor recommendation more palatable. The T-JCSG did consider integration of RDA with T&E but only in the areas of "platforms."*
- *The expected —but unanalyzed in BRAC — losses to the workforce will manifest itself in critical disruptions during the key program years, FY2007-2011. A sample of just four programs conservatively estimates cost implications of well over \$1B in those years for those programs alone.*
- *Fort Monmouth has conducted significant joint experiments; more are scheduled and can be expanded to provide meaningful opportunities to link Army ground units (current and future) with other Joint activities and headquarters. This is an opportunity that the DOD BRAC process did not examine or mention. The current DOD BRAC recommendation would remove Army C4ISR from this Joint opportunity and move to a locale where no Joint opportunity or future promise exists. BRAC Commissioners should strongly consider this capability to comply with a top BRAC selection criterion.*
- *DOD policy directed that effects on homeland defense and support for civil operations be considered in BRAC recommendations, including sharing of technology. BRAC Records that were released do not discuss sharing technology that will support civil operations in the case of Fort Monmouth. This is strange in view of its close proximity to the "911 Commission's" top priority (New York City), Congressional testimony referring to Fort Monmouth by a "911 Commissioner" in 2004, and a 2004 National Research Council report which cited the Army's C4ISR technology as most relevant to critical homeland security interoperability needs.*
- *BRAC Criterion 2 directs consideration be given to airspace and maneuver for ground, naval and air forces. Scenarios leading up to the BRAC recommendation and the BRAC recommendation itself do not consider the ground maneuver space at Fort Dix; better maneuver space than Aberdeen because it is instrumented for C4ISR events. It does not consider airspace available over the DLM Joint Base or the nearby air and sea space in military warning area, W-107. It does not consider the highly restricted nature of airspace in and around Aberdeen. It does not consider the restricted sea space in the northern reaches of Chesapeake Bay.*
- *DOD policy directed that effects on homeland defense and support for civil operations be considered in BRAC recommendations, including sharing of*

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technology. BRAC information that was released does not discuss sharing technology that will support civil operations in the case of Fort Monmouth.

RECOMMENDATIONS:

- **Reject the DOD BRAC recommendation to close Fort Monmouth and move it and its Fort Belvoir elements to Aberdeen for substantially deviating from the BRAC selection criteria.**
- **Retain all existing Army C4ISR activities, in place, at Fort Monmouth and Fort Belvoir.**
- **“Realign with enclave” the Fort Monmouth installation and organizationally align it with the DLM Joint Base to enhance Jointness and capitalize on potential overhead efficiencies.**
 - **Assign the Fort Monmouth Garrison to the Joint Base Commander.**
 - **Deliberately, over time, and cooperatively between the Fort Monmouth C4ISR Commander and the Joint Base Commander, take steps to shed excess facilities and property in accordance with mission needs and good business principles.**
- **Recommend that the Secretary of Defense consider establishing a Joint C4ISR headquarters within the DLM Joint Base- Fort Monmouth complex in order to capitalize on extant Joint capabilities and C4ISR technical talents.**
- **Should there be a BRAC Commission desire to relocate any C4ISR organization, that organization(s) should be moved to the center of mass, the Fort Monmouth-DLM Joint Base complex.**
- **Do not move the Military Academy Prep School in view of new “cost to move” data.**