DCN 1068

EC HITL / ISTF CONSOLIDATION STUDY

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ELECTRONIC COMBAT STREAMLING STUDIES OVERVIEW

Electronic Combat (EC) testing was specifically singled out in this streamlining study effort for consolidation. It should be noted, however, that EC is a sub-element of avionics/vetronics testing and that Electronic Warfare (EW), upon which these studies are primarily focused, is but a sub-element of EC. EC testing should not be consolidated as an independent function unto itself. EC testing has become and will continue to be a critical component of Air Vehicle testing. In the future, as the sophistication levels and complexity of embedded equipments advance, EC will become an even more critical element of Land Vehicle and Sea Vehicle testing. Decisions made in the consolidation of testing facilities for Land, Air and Sea Vehicles should be the drivers for future consolidation of EC testing.

The EC studies performed during these last few months have demonstrated several significant truths which bear repeating and emphasis:

- If a facility is not closed, no real savings will accrue. This is a critical finding since a number of the study efforts were focused upon "functional realignments" which moved only specified technical capabilities from Site A to Site B, with Site A remaining open to perform other test functions.

- Even if a facility is closed, there may be no savings. Specifically, closing a facility and moving much or all of its equipment and personnel to another site to retain the test capability because the receiving site lacked those functions, would most likely result in a large initial investment which would never be recouped.

- EC can be simplified to EC ground test facilities and EC open air range facilities. Modeling and Simulation is an embedded function which is distributed among all of the ground test and open air facilities. Ground test facilities include measurement, hardware-in-the-loop, and installed systems test facilities. EC integration facilities are "system specific" and are not players in the process.

- EC ground test facilities should be co-located with Air Vehicle test facilities. (An argument can be made for co-location with Armament facilities, but it is much weaker than the Air Vehicle argument.) Given only one Air Vehicle test facility, all of the EC facilities should be located at that location, with sufficient capacity to support all Services needs. If two Air Vehicle sites are maintained, they each should have their own complete EC ground test capability.

- EC open air ranges are different than typical Air Vehicle open air ranges and are fundamentally incompatible. While it would be advantageous to have both the Air Vehicle range and the EC range capability at the same physical site, the utilization rate of

the Air Vehicle Range coupled with incompatibility issues dictate that EC ranges be located near, but not necessarily at, the Air Vehicle test site.

- The two EC open air ranges under study for closure are located at Air Armament facility sites. A decision to close one of the Air Armament sites could provide the most significant influence as to which EC open air range should be closed.

- Driven by increasing costs and security considerations, a paradigm shift is underway which is moving EC testing away from the open air testing environment and toward the indoor ground testing alternative.

In conclusion, these studies have shown that consolidation of ground test facilites, while expensive, is practical. The consolidation of hardware-in-the-loop, measurement facilities, and installed systems test facilities at the same site(s) as identified for Air Vehicle testing would offer more advantages than disadvantages. The studies have also shown that eliminating one EC open air range is also a feasible consolidation alternative. While open air range predicted workload slightly exceeds the capacity of the remaining EC range infrastucture, the shifting of workload and schedule management to indoor ground test facilities more than compensates for that overage.

EXECUTIVE SUMMARY

I BACKGROUND

This report summarizes the BoD-directed study for Electronic Combat (EC) hardware -in-the-loop (HITL) and installed systems test facilities (ISTF). EC HITL facilities perform component-level test and evaluation (T&E) of EC systems used onboard all types of air vehicles (tactical, strategic, cargo, maritime, rotary wing and support). ISTFs perform systems-level T&E of EC and avionics systems as installed onboard the air vehicle. HITL and ISTF T&E requires multispectral (radio frequency (RF), infrared (IR), electro-optical (EO), millimeter wave (MMV) and ultraviolet (UV) test capabilities.

The BoD mandated alternatives were:

a. Integrate/relocate HITL and ISTF capabilities at one site

b. Combine the most effective elements of electronic linking and physical collocation of HITL and ISTF capabilities

This tri-service study team was comprised of personnel with overlapping expertise in EC and avionics T&E. The scope of the study was limited to T&E aspects of HITL and ISTFs that support EC and C3I systems.

II BASELINE

A. Requirements Baseline - HITLs verify the EC system under test produces an effective RF or IR countermeasure against individual threat systems employing a realistic environment using first open-loop, then closed-loop simulations of land, sea, and airborne systems including man-in-the-loop. After closed-loop effectiveness is proven at the component level, EC hardware and software are installed onboard the land/air vehicle for integration testing in an ISTF. An ISTF provides a realistic, controlled signal environment in an anechoic chamber using validated simulation/stimulation signal sources. Support and avionics laboratories are integral to ISTFs providing multispectral integration and pre/post testing of land/air vehicles.

B. Capabilities Baseline- DoD ISTFs at two locations support EC and avionics testing of land/air vehicles, one with a tactical-sized chamber(Navy) and one with a large-sized chamber(AF). Both are located at major air vehicle test centers.* Five HITLs conduct mission-specific EC T&E. Two HITLs are located at contractor facilities and the remaining are located at government T&E centers where shared expertise and mission synergy has matured. Because each HITL has been developed to address a specific requirement, there is no redundancy in capability.

C. Financial Baseline- Total DoD expense to operate/maintain and improve/modernize HITL and ISTFs is approximately $400M (FY94-FY99). The most significant improvements will be for ISTF upgrades to fill a gap in the current EC test process and to meet technological requirements of new highly integrated, multispectral digital avionics/EC weapon systems.

D. Workload Baseline- The study group applied a weighted average of two TERIB supplied indices to determine the workload for ISTFs; RDT&E for EC and RDT&E for air vehicles (eg avionics). HITL used only the indices for RDT&E for EC. ISTF weighted

averages were based on historic EC/avionics workload split 50/50 at the Navy ISTF and 25/75 at the AF ISTF. Using the indices, workload gradually declines during the FYDP. The study group observed critical omissions to the indices which skewed workload projections.

III. ANALYSIS

The study group analysis revealed workload indices did not include the following critical factors: 1) increased emphasis on ground T&E, 2) additional workload derived from capabilities improvements completed during the FYDP, 3) foreign military sales, foreign goverment customers, commerical customers and special projects. Additionally, the FY93 baseline year did not contain heavy use by ACAT I/II programs. In FY97 and beyond AF and Navy ACAT I/II programs will dominate HITL/ISTF workload. AF and Navy IS[illegible] workload forecast is three times higher than the workload projection derived from the indices. ISTF workload projection revealed heavy use for two anechoic chambers (1 large-sized, 1 tactical sized). Single-site consolidation of ISTF's was equally costly at either current location, with significant upfront costs and very slow payback.

EC HITL capabilities are not duplicative and each serves a specific function in the EC test process. Army HITL's were assessed to be special purpose with site-unique synergy that would be lost if forced to consolidate at an air vehicle test center. The remaining three HITL's could be consolidated to a single super-HITL at an air vehicle test center; however, there was no added capabilities gained by HITL consolidations to a single site DoD ISTF.

The option of electronic linking was studied and found to have only limited application. REDCAP was the only HITL that could be linked rather than consolidated due to its man-in-the-loop IADS mission. Other HITL's could not technically benefit from linking capabilities to other HITL/ISTFs due to the time latency of signals/response interaction.

IV. SUMMARY

Each HITL facility has unique closed-loop simulator capabilities. The BAF at Edwards AFB has a large anechoic chamber and the ACETEF at Patuxent River NAS has a tactical-sized chamber. EC and avionics workload projections support a requirement for two anechoic chambers. Workload would have to decline by 50 percent before consolidation at a single chamber would be feasible.

Consolidation of HITL's and ISTF's will provide some test efficiencies because of the reduced logistics associated with all test capabilities at one site. However there is no aggregate value-added to the test process. The existing synergies at the present sites are significantly impacted.

With a significant relocation cost, the technical requirements can be met at either site. The consolidation site should be based on the results of the air vehicle study. Payback period ranges from 50 to 100 years.

EC HITL/ISTF CONSOLIDATION STUDY OUTLINE

I. BACKGROUND

A. BOD Tasking/Alternatives
B. Study Team Members
C. Approach

II. BASELINE

A. Requirements Baseline
B. Capability Baseline
C. Financial Baseline
D. Workload Baseline

III. ANALYSIS

A. Assumptions/Limitations
B. Mandated Alternative

1. Requirements Analysis
2. Single Node Failure Analysis
3. First Order Implementation Plan
4. Advantages/Disadvantages
5. BRAC Implications
6. Impacts

IV. SUMMARY

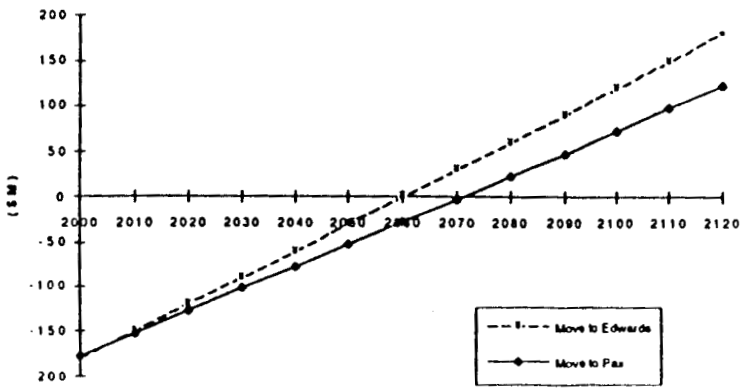
A. Results
B. Cost Savings
C. Decision Criteria/Matrix

HITL / ISTF CONSOLIDATION EXECUTIVE SUMMARY

CONCEPT

- DEVELOP OPTION TO CONSOLIDATE HITL/ ISTFs AT ONE SITE
- DEVELOP OPTIONS TO COMBINE MOST EFFECTIVE ELEMENTS OF ELECTRONIC LINKING AND PHYSICAL CO-LOCATION OF HITL/ISTF CAPABILITIES

HITL/ISTF CONSOLIDATION PAYBACK



ADVANTAGES

- REDUCES TEST LOGISTICS TO SINGLE SITE
- COMMON LOCATION OF EXPERTISE
- SMALL ANNUAL O&M SAVINGS ($2.5M - $3M)
- CO-LOCATION WITH AIR VEHICLE TESTING

DISADVANTAGES

- MOVE DURING ACAT I/II PROGRAMS
- LOSS OF EXISTING SITE SYNERGIES
- REQUIRES $100M MILCON
- LOSS OF SOME EXISTING CAPABILITY

RESULTS

- HITL & ISTF CAPABILITIES NON-DUPLICATIVE
- ISTF WORKLOAD FAVORS TWO CHAMBERS
- REDCAP ONLY LINKABLE HITL
- SINGLE-SITE LOCATION DECISION TIED TO AIR VEHICLE STUDY RESULTS
- COST TO CONSOLIDATE $150M - $180M

EC HITL / ISTF CONSOLIDATION STUDY

BRIEFER:
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SLIDE 1 TITLE PAGE

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PRESENTATION OUTLINE

INTRODUCTION

- TASKING
- SCOPE
- TEAM
- APPROACH

BASELINE

- REQUIREMENTS
- CAPABILITIES
- FINANCIAL
- WORKLOAD

ANALYSIS

- REQUIREMENTS
- WORKLOAD ASSMT
- IMPACTS
- OBSERVATIONS

IMPLEMENTATION

- ALTERNATIVES
- SINGLE NODE FAILURE
- PLAN
- SUMMARY

SLIDE 2 - PRESENTATION OUTLINE

We used the Study Methodology described in this slide to accomplish this task. This methodology follows the sample approch. (See appendix C).

BoD TASKING

MANDATED ALTERNATIVES

- Develop an option to integrate/relocate HITL and ISTF capabilities at one site; formulate an option to provide "one stop shopping" ISTF/HITL capability;
- Develop options that combine the most effective elements of electronic linking and physical collocation of HITL and ISTF capabilities.

ADDITIONAL ALTERNATIVES

- NONE APPROVED BY BoD

SCOPE

- LIMITED TO T&E ASPECTS
- ONLY HITLs / ISTFs THAT SUPPORT EC/C^3I SYSTEMS
- EC & AVIONICS WORKLOAD CONSIDERED

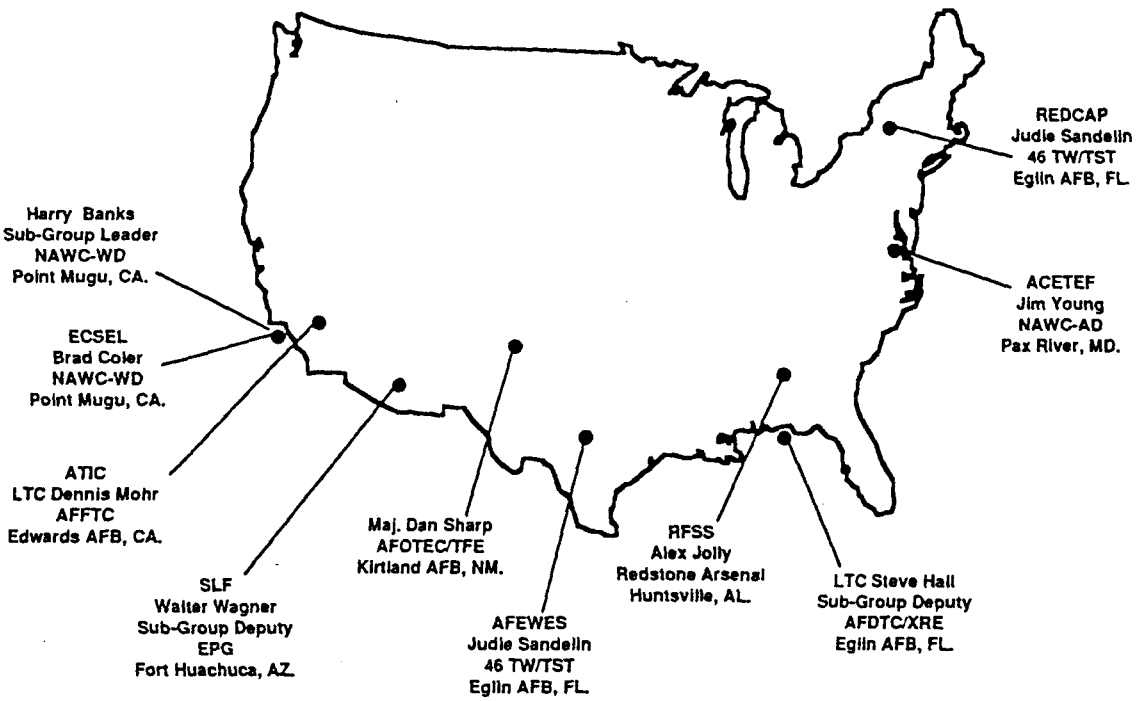
SLIDE 3 - BOD TASKING

These are the mandatory alternatives approved in the 13 Dec 93 POA&M The complete POA&M is in Appendix B. The first alternative was to integrate /relocate all the EC HITL's and ISTF's at a single site and provide "one stop shopping". The second alternative was to develop options that combine the most effective elements of electronic linking of HITL and ISTF capabilities.

We limited our scope to Test and Evaluation capabilities that support EC and C3I systems testing. The most important driver in ISTF workload is avionics system development. As systems become more integrated, it becomes more difficult to define where avionics testing ends and EC testing begins. The major conclusions the HITL/ISTF Study Group reached on ISTF workload and consolidation corroborated with the Air Vehicles Study Group.

Appendix A lists prior relevent and related studies.

EC HITL/ISTF STUDY TEAM MEMBERS



SLIDE 4 - STUDY TEAM MEMBERS

The contributing HITL/ISTF study team members and stakeholders and their represented facilities are shown here:

- Electronic Combat Simulation and Evaluation Laboratory (ECSEL) at Pt Mugu, CA .
- Avionics Test and Integration Complex (ATIC) at Edwards AFB, CA.
- US Army Stress Loading Facility (SLF) at Ft Huachuca, AZ.
- Air Force Operational Test and Evaluation Command at Kirtland AFB, NM.
- Air Force Electronic Warfare Evaluation Simulator (AFEWES), Air Force Plant No. 4, Ft.Worth, TX.
- Army Advanced Simulation Center Radio Frequency Simulation System (RFSS) at Redsone Arsenal, AL.
- Air Force EC Single Face to Customer Office at Eglin AFB, FL.
- Air Combat Environment Test and Evaluation Facility (ACETEF) at Patuxent River, MD.
- Real-time Digitally Controlled Analyzer Processor (REDCAP) at Buffalo, NY.

APPROACH

1. REVIEW THE CURRENT EC HITL/ISTF T&E CAPABILITY
2. DEVELOP A REQUIREMENTS BASELINE USING T&E PROGRAMS
3. CALCULATE THE PROJECTED WORKLOAD USING INDICIES
4. COMPARE REQUIREMENTS AND CAPABILITIES
5. EVALUATE THE WORKLOAD USING THE ANALYSIS DATA
6. DEFINE OPTIONS TO MEET MANDATED ALTERNATIVES
7. ASSESS IMPACT OF FAILURE ON THE EXISTING T&E ASSETS AND CONSOLIDATION
8. DETERMINE COSTS ASSOCIATED WITH OPTIONS
9. SUMMARIZE EC HITL/ISTF STUDY FINDINGS

SLIDE 5 - APPROACH

HITL/ISTF study group took the TERIB standardized approach shown in Appendix C and modified it slightly. First we collated baseline requirements, capability, financial, and workload data. We then analyzed this data, selected options to meet the mandated alternatives, developed cost data and implementation plans, and summarized the study results.

EC HITL / ISTF INTRODUCTION

FACILITY	CAT	PRIMARY CAPABILITIES
ACETEF (N)	ISTF	TACTICAL-SIZED ANECHOIC CHAMBER WITH HOIST LARGE SIZED SHIELDED HANGER EC / AVIONICS SUPPORT LABS (COLLOCATED) OUTDOOR TEST AREA (LIGHTNING & HIGH PWR EMITTER)
BAF (AF)	ISTF	LARGE-SIZED ANECHOIC CHAMBER WITH HOIST & TURNTABLE AVIONICS INTEGRATION LABS (COLLOCATED) ELECTRONIC COMBAT INTEGRATED TEST (ECIT) DEVELOPMENT
AFEWES (AF)	HITL	LAND-BASED RF SAM / AAA / AI CLOSED-LOOP SIMULATIONS OPEN-LOOP RF ENVIRONMENT GENERATOR LAND-BASED IR SAM AND IRCM CLOSED-LOOP SIMULATIONS
REDCAP (AF)	HITL	LAND-BASED RF EARLY WARNING CLOSED-LOOP SIMULATIONS SU-AWACS & DATA LINK CLOSED-LOOP SIMULATIONS OPEN-LOOP RF ENVIRONMENT GENERATOR
ECSEL (N)	HITL	NAVAL RF SAM / AAA / EW/ACQ CLOSED-LOOP SIMULATIONS OPEN-LOOP RF ENVIRONMENT GENERATORS
SLF (ARMY)	HITL	LAND-BASED RF/RADAR/C^3 OPEN-LOOP STIMULATIONS (ARMY APPLICATIONS)
ASC/RFSS (ARMY)	HITL	MISSILE-SIZED ANECHOIC CHAMBER RF MISSILE SUBSYSTEMS (INCLUDING FME)

SLIDE 6 - HITL / ISTF INTRODUCTION

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This slide summarizes the principal capabilities of each site considered in the study.

The U.S. Navy's Air Combat Environment Test and Evaluation Facility (ACETEF) chamber at Patuxent River, MD, employs a 100 X 60 X 35 ft (210K cubic ft) anechoic chamber which can accommodate and suspend fighter-sized aircraft from its hoist. ACETEF's installed systems testing capability has nine development labs associated with the facility.

The Edwards AFB's Benefield Anechoic Facility (BAF) can accommodate bomber and transport aircraft, and measures 264 X 250 X 70 ft (4.6 M cubic feet). It has a turntable for large aircraft and a hoist for fighter aircraft up to 80,000 lb. The Electronic Combat Integrated Test program is in a five-year upgrade to develop the associated labs and instrumentation facilities to test highly integrated digital avionics systems, like F-22 type aircraft.

Air Force Electronic Warfare Evaluation Simulator (AFEWES) at Ft. Worth is a USAF-owned, Lockheed operated test site using hardware-in-the-loop to evaluate EC systems under development, prior to installing them in the aircraft. It evaluates the new system's closed-loop performance in the spread-bench configuration (brassboard) or as a line-replaceable-unit (LRU). The site tests closed-loop EC effectiveness against 39 different SAM and AAA simulators.

REDCAP (Real-time Digitally Controlled Analyzer-Processor) is a simulation of an entire integrated air defense system (IADS), which can be reprogrammed into several strategic and tactical scenarios. It includes 17 closed-loop threats for Early Warning/Acquisition radars and C3 nodes. The product is positioning, identification, and command targeting information to the airborne interceptor (AI), SAM and AAA threat systems in the IADS. It does not include closed-loop simulations of the terminal threats.

The Electronic Combat Simulation Evaluation Laboratory (ECSEL) is the HITL facility which employs 13, almost exclusively naval, closed-loop threat simulations. In addition, the facility provides in-service engineering for the Navy's tactical EW systems.

SLF (Stress Loading Facility) is an open-loop simulator used to test Army intelligence and electronic warfare systems. It can simultaneously simulate communications emitters in the 500 kHz to 500Mhz frequency range and radar type emitters in the 500MHz to 18 GHz frequency range.

ASC/RFSS (Army System Command/Radio Frequency Simulation System) is a closed-loop HITL simulation for RF-guided missiles. Missile guidance equipment and electronic countermeasures equipment are included in real-time simulations to measure missile performance. The facility employs a 40 X 70 X 20 ft anechoic chamber

A more detailed description of each facility is included in Appendix E. TERIB core data site survey inputs are supplied in Appendix J.

EC HITL REQUIREMENT BASELINE

REQUIREMENTS	COMMENTS
CLOSED-LOOP SIMULATIONS	LAND/SEA SAM, AAA, AI ACTUAL RF/IR POWER CLUTTER, MULTISPECTRAL
OPEN-LOOP SIMULATIONS	BROAD FREQ, HIGH DENSITY AOA / SPATIAL DISTRIBUTION SIMULATION SIMULTANEOUS COMM. & RADAR REAL-TIME EMITTER VALIDATION
DYNAMIC TARGET GENERATORS	AZ, EL, RANGE, V_C, RCS
PERFORMANCE ASSESSMENT	DATA ACQ & PROCESSING TRACK DATA, MISSILE FLYOUT
SECURE ENVIRONMENT	SCIF, SHIELDED ENCLOSURE
C^3I IADS	C^3I, EW/ACQ, DATA LINK

SLIDE 7 HITL REQUIREMENT BASELINE

The most significant requirements and attributes for a hardware-in-the-loop (HITL) test facility are identified on this slide. The HITL facility is a vital step in the EC Test Process. HITL facilities verify that the new EC system produces an effective RF waveform or IR signal against each individual threat system employing a realistically dense pulse environment — before it is integrated with other avionic components. HITLs evaluate the EC system, component-by-component, starting at the brassboard level for early development work, then to line replaceable units prior to integration. The EC system is tested, closed-loop, with a manned simulator mock-up to simulate as many combat factors as possible. Refer to Appendix D for more details.

FINANCIAL BASELINE

STUDY AREA: EC/C3I

TOTAL FOR ALL SITES	T&E INSTITUTIONAL						
	TYPE FUNDS	*94*	*95*	*96*	*97*	*98*	*99*
	O&M (T&E)*	5.18	5.01	5.17	5.33	5.5	5.67
	I&M (T&E)*	13	30	30	23.9	10	0
	TOTAL	18.18	35.01	35.17	29.23	15.5	5.67

REVENUE TOTALS						
	13.2	13.5	13.1	12.3	12.1	11.9

TOTAL FOR ALL SITES	TOTAL DoD EXPENDITURES						
	TYPE FUNDS	*94*	*95*	*96*	*97*	*98*	*99*
	O&M	18.58	19.01	18.87	18.23	18.2	18.17
	I&M	48.92	62.06	78.1	63.03	40.4	24.73
	MILCON	0	0	16.62	7.28	0	0
	BOS	1.6	1.6	1.5	1.7	1.7	1.8
	TOTAL	69.1	82.67	115.1	90.24	60.3	44.7

*NOTE: O&M(T&E)= PE65807F, I&M(T&E)= CTEIP AT BAF AND ACETEF

SLIDE 9 - FINANCIAL BASELINE

This slide illustrates the O&M and I&M funding lines as well as MILCON and Base Operational Support costs through 1999. This chart has normalized the differences in Air Force, Navy, and Army funding categories by facility, to show an aggregate total. Note that I&M varies more the O&M due to the signigficant investment to improve capability. Each facility has non-duplicative threat simulator capability. Any cuts in O & M prior to consolidation therefore come at the expense of specific test capability . Cuts in I&M reduce FYDPupgrades derived from the requirements technical baseline.

The major I&M investment shown in these tables is for the ECIT instrumentation upgrades at Edwards BAF chamber. These upgrades lead the timeline requirements for the F-22 and B-1B Defensive Avionics Suite by roughly one year, with test start dates in 1998.

I&M (T&E) identifies only CEITP funding, since each service has different definitions of institutional funding. See Appendix F for additional deltails.

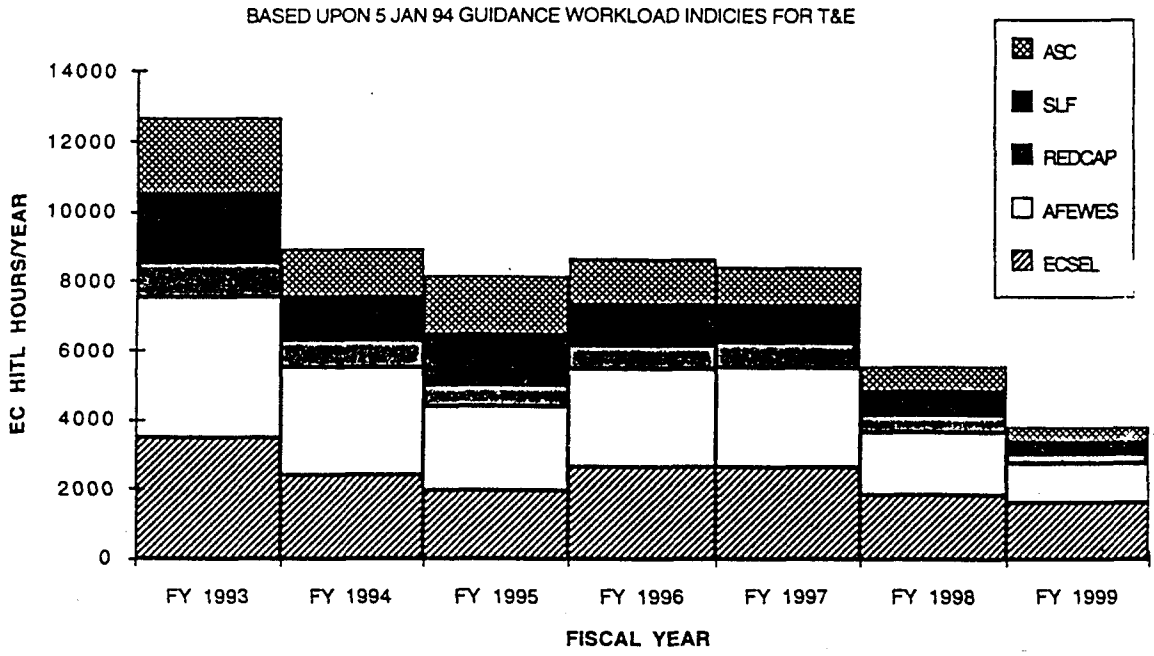
EC ISTF REQUIREMENT BASELINE

REQUIREMENTS	COMMENTS
ANECHOIC CHAMBER(S)	TACTICAL-SIZED AIRCRAFT LARGE-SIZED AIRCRAFT
VALIDATED SIMULATION STIMULATION	BROAD FREQ., HIGH FIDELITY, HIGH DENSITY, MULTISPECTRAL OPEN/CLOSED-LOOP
SUPPORT LABS	RF, EO/IR, CNI, C^3I, AVIONICS
INSTRUMENTATION	MIL-STD INTERFACE(S) SUT DATA COLLECTION REAL-TIME SCENARIOS
ADJACENT PRE/POST FLIGHT CAPABILITIES	RF INJECTION & MONITORING
ADJACENT OUTDOOR TEST AREA	LIGHTNING HIGH POWER EMITTERS

SLIDE 8 - ISTF BASELINE REQUIREMENTS

The most significant top-level requirements and attributes for ISTFs are identified on this slide. After closed-loop test effectiveness is proven at the brassboard, or component level, in HITL facilities, ISTFs demonstrate the ability of both the EC hardware and software to interact effectively with the rest of the aircraft's avionics prior to flight. This list shows the required signal environment in the anechoic chamber, in RF pulse density, signal diversity, and spatial effects. These signal sources are designed to present an operationally realistic signal load to the installed EC and avionics configuration, and ensure all systems effectively integrate without interference. See Appendix D for more details.

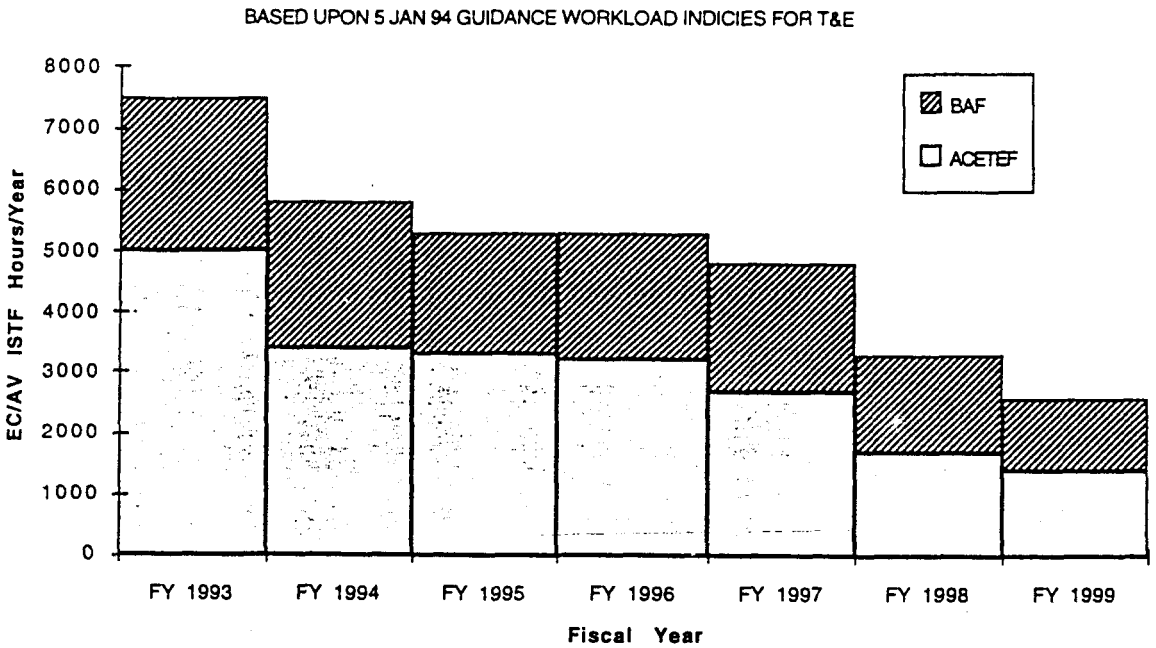
HITL Projected Workload



SLIDE 10 - HITL PROJECTED WORKLOAD

The bar chart illustrates the projected workload for all five hardware-in-the-loop sites through 1999. These values are calculated from indices in the Workload Methodology Sub-Group's index for Electronic Combat developmental testing, which shows an average 11 percent per year decline (from 1993 baseline). FY93 data is actual customer hours collected from RUMS data. The out years were then calculated by multiplying the FY93 data by the appropriate index. Projected workload values for each facility are shown in Appendix G. Indices utilized were EC RD T&E values unless modified as shown in the comments. Roughly 30 percent of the Navy's ECSEL facility hours are tasked against HITL closed-loop development testing, the other 70 percent is directed towards in-service engineering and logistics support of fielded EW systems. (Note: The USAF handles the EW logistics effort at a separate Air Logistics Center, which is not part of the service's Test and Evaluation infrastructure, but subject to consolidation under a different study.) The study group believes the workload forecast provides a unrealistically low utilization for HITL facilities.

ISTF Projected Workload



SLIDE 11 - ISTF PROJECTED WORKLOAD

The Installed Systems Test Facility (ISTF) historic FY93 workload was collected from the Benefield Anechoic Facility (BAF), and Air Combat Environment Test and Evaluation Facility (ACETEF). The BAF workload was 2500 hours for FY93 for its single-large anechoic chamber. The ACETEF FY93 workload was 5000 hours which included its tactical size chamber, shielded hanger and all support labs. The respective facility engineers assessed the proportion of Electronic Combat (EC) and avionics (AV) forecast workload was 50% EC and 50% AV for ACETEF and 25% EC and 75% AV for BAF.

TERIB indicies derived the FY94-99 forcast workload. The HITL/ISTF group weighed the RDT&E indicies (from Air Vehicle) and applied EC and avionics projected workload from the IDA and GTRI studies in Appendix G. Production indicies were not used. Results revealed near level workload for FY94-97, then a stair stepped reduction in FY98-99. Using these indicies, the FY99 workload was projected 65% below the FY93 levels, at 2600 hours/year, or about 1.3 chamber shift years (2600 hours/year)/2000 hours/shift year)

IDA and GTRI assessments of Air Force and Navy EC and avionic programs requiring an ISTF reported demand for tactical sized and large sized chambers to be equal. This supports a shared workload projections for both the tactical and the large chambers. The USAF and Navy have each projected their ISTF workload forecast based upon estimated program requirements. USAF programs forecast an average ISTF workload of approximately 5000 hours per year (125 shift-weeks/year x 40 hours/shift week) for the period FY95-05. The Navy forecasts an average ISTF workload of approximately 4200 hours per year (105 shift weeks/year x 40 hours/ shift week) for the period FY94-96. Summation of each service's forecast produce a workload of approximately 9200 hours or approximately 4.6 shift years ((9200 hours)/(2000 hours/shift year)). In contrast, the study group concluded the ISTF workload, reflected in the indicies, is unrealistically low. The group also concluded that service ISTF projections are optimistic. Using the several factors listed below, the ISTF workload should realistically reach 6000 shift hours, or 1-1/2 facility shift years per site.

Requirements Analysis

TECHNICAL REQUIREMENTS	ACETEF	BAF/ ECIT	AFEWES	REDCAP	ECSEL	SLF	RFSS
ANECHOIC CHAMBER							
TACTICAL-SIZED	X						
LARGE-SIZED		X					
VALIDATED SIM/STIM (BROAD FREQUENCY HIGH FIDELITY)	X	X	X	X	X	X	X
SUPPORT LABS (COLLOCATED)	X	X					
ADJACENT PRE/POST FLIGHT	X	X					
ADJACENT OUTDOOR TEST AREA	X						
CLOSED-LOOP SIMULATION							
LAND-BASED RF, IR			X				
SEA-BASED RF					X		
MISSILE RF							X
C3I							
IADS (CLOSED-LOOP)				X			
GROUND C3 (OPEN-LOOP)						X	
OPEN-LOOP SIMULATIONS	X	X	X	X	X	X	X
DYNAMICTARGET GENERATORS	X	X	X		X		X

SLIDE 12 FACILITY REQUIREMENTS ANALYSIS

After baseline data was compiled the analysis began. This chart shows where capabilities exist to meet the requirements The technical requirements are the major requirements developed from the requirements baseline. The shaded areas show where unique capabilities exist. An "X" in a cell means the facility has the capability to fully meet the requirement.

The ACETEF facility has an anechoic chamber that can be used by tactical-sized aircraft. ACETEF also has a large shielded hanger. The BAF has a large-sized anechoic chamber. All facilities require and have validated simulations and stimulation's.

Collocation of support labs with an anechoic chamber is an imperative for maximizing shared test assets. Support labs adjacent to anechoic chambers provide stimulus sources usually from different spectra. Open-loop simulations from chamber also feed to RF and avionics labs to provide digital signal sources. Collocation is essential due to line length limitations of data busses.

Closed-loop simulations are major components of the HITL facilities. Some closed-loop capability exists at the ISTF facilities. This chart shows there is not duplication in the types of closed-loop simulations that exist at the HITL facilities. AFEWES simulates RF and IR land-based SAM/AAA and AI systems. ECSEL simulates Naval SAM/AAA and EW/ACQ systems. The RFSS provides simulations of RF missile systems.

All facilities have some open-loop simulation to provide a dense electromagnetic environment, either used as a stand alone or in combination with closed-loop simulations. The open-loop simulations are not compatible with each other because of unique data structures for scenario generation and hardware control.

Dynamic target generators are required to more realistically simulate the conditions the systems under test will experience in flight.

EC HITL/ISTF WORKLOAD ASSESSMENT

HITL/ISTF

- The following are not factored into the indicies:
  - Increased emphasis on ground T&E
  - Additional workload due to new capabilities during FYDP (All facilities).
  - Foreign Military Sales (FMS)
  - Foreign Government Customers
  - Special Projects
  - Commercial Customers

ISTF

- ACAT I / II programs in FYDP (FY97 & Beyond) (ACAT I / II FY93 effort not significant)

SLIDE 13 EC HITL/ISTF WORKLOAD ASSESSMENT

The HITL/ISTF study group believes that the indices provided by the TERIB for workload forecasting do not generate an accurate projection of future HITL/ISTF workload for the following reasons.

1) There were no ACAT I and ACAT II programs with significant testing in the FY93 baselines year whereas in FY97 and beyond, there are several ACAT I and II programs projected to use HITLs/ISTFs in the FY97 and 98 time frame.

2) The study groups expect greater emphasis on programmatic risk reduction using ground T&E facilities due to the lower cost and high payback of ground vs flight testing.

3) The study group expects increased HITL/ISTF workload due to added ground test capabilities compared to the FY93 baseline year. Several major HITL/ISTF upgrades will mature during the FYDP.

4) The indices do not factor in workload due to foreign military sales and there was no information provided to indicate whether the indices reflected special projects workload as well.

5) Additionally the indices would not reflect funding sources from outside DoD such as for foreign governments and commercial customers.

Impact HITL Move

ADVANTAGES	AFEWES	REDCAP	ECSEL	SLF	RFSS
STANDARDIZED THREAT PARAMETRICS AND OPERATION	MOD	MIN	MOD	MIN	MIN
TRI-SERVICE THREAT CAPABILITY AT ISTF	MOD	MIN	MOD	MIN	N/A
COMMON LOCATION OF SIMULATION EXPERTISE	MIN	MIN	MIN	MIN	N/A
INTEGRATION OF LAUNCH, ECM, AND SEEKER HARDWARE	MOD*	N/A	MOD*	N/A	MOD*
REDUCES TESTING LOGISTICS TO ONE SITE AND SUPPORTS GROWTH OF CAT I (MISSION LEVEL) ISTF FACILITY	MOD	MOD	MOD	MOD	MIN

* GIVEN HITL SYSTEMS FULLY INTEGRATED INTO ISTF

DISADVANTAGES	AFEWES	REDCAP	ECSEL	SLF	RFSS
LOSS OF EXISTING SYNERGIES	MIN	MIN	MAJ	MAJ	MAJ
LOSS OF EXISTING CAPABILITY	MAJ	MIN	MOD	MOD	
POTENTIAL RESOURCE CONFLICT WITH AIRCRAFT SYSTEMS	MOD	N/A	MOD	MIN	MIN
REQUIRES MILCON	MAJ	MAJ	MAJ	MIN	MOD
LOSS OF EXPERTISE	MAJ	MAJ	MAJ	MAJ	MAJ
DOWNTIME DURING MOVE	MAJ	MAJ	MOD	MIN	MOD

SLIDE 14 IMPACTS OF HITL MOVE TO ISTF

There are certain advantages and disadvantages associated with moving HITL's and ISTF's . They can not be discussed generally because the impact of the move varies between HITL's.

We have condensed the advantages to five areas. Standardized threat parameters and operations would make it easier to change configurations and validate tests. This would benefit facilities where many parameters need to be set and verified before a test can take place. A tri-service threat capability at an ISTF would ease joint service testing. Integration of launch , ECM, and seeker hardware would allow for using the same threat system during HITL and ISTF testing making test correlation easier. Combining HITL's and ISTF's would also make test logistics simpler.

Disadvantages have been condensed to six areas. Loss of existing synergies at certain facilities are major concerns. Hitl development has been the result of user needs. In most cases the users are close by. Should ECSEL move there would be a major impact on naval tactical aircraft RWR and DECM development programs because of testing as well as knowledge sharing between development engineers and ECSEL enginers. The SLF works very closely with the Army Intelligence School because they are collocated. The RFSS is located where US missile systems are developed. The synergistic benefits of cross-fertilization between US missile design engineers and FME systems engineers would be lost.

Because of the size of the facilities to be moved a MILCON is required for three of the moves.

It is estimated that 60 percent of the personnel will not move causing a large loss of expertise.

Downtime may exceed one year for larger facilities move.

STUDY GROUP OBSERVATIONS

- ISTF FORECAST WORKLOAD
  - TWO ANECHOIC CHAMBERS NEEDED
    - 1 TACTICAL-SIZED
    - 1 LARGE-SIZED
- EC HITL CAPABILITIES ARE NOT DUPLICATIVE
- SLF AND RFSS ARE SPECIAL PURPOSE HITLS
- NO DUPLICATION OF TEST FUNCTIONS BETWEEN HITLs and ISTFs
- LINKING REDCAP CAN PROVIDE INTERACTIVE IADS TO MULTIPLE TEST FACILITIES
- LINKING CLOSED-LOOP TERMINAL THREATS HAS NO TECHNICAL BENEFIT
- CUSTOMER BASE FOR LINKING UNKNOWN

SLIDE 15 STUDY GROUP OBSERVATIONS

Based upon the workload projections for Installed System Test Facilities previously discussed, the group predicted the need for both a tactical and a large anechoic chamber. The group took the 1992 IDA study of future USAF program requirements, and the 1990 GTRI study of USN program requirements (Appendix G) and added their collective test workload. These surveys of all air vehicle and electronic combat test requirements indicate 127 USAF and 105 USN shift-weeks respectively, totaling 232 shift-weeks per year. Air Vehicles / Avionics requirements will be the driver, as Electronic Combat integration mutually effects performance of the avionics bus.

Multiplying times 40 hours per week, yields over 9000 facility shift hours, or approximately 4.5 ISTF shift-years yields over two shifts per chamber. This workload will not be fully realized until 1998 when Electronic Combat Integrated Test program at Edwards AFB will be nearly complete, and last past 2002. Conservatively, even half of the workload would support more than one shift at both the BAF and ACETEF.

Threat simulators at the Hardware-In-The-Loop facilities have been non-duplicative in development of threat system test hardware (Appendix I). AFEWES employs the land-based SAM and AAA threat systems, ECSEL employs the naval-based systems, and REDCAP employs the Integrated Air Defense System (IADS) early warning and acquisition radar and enemy C3 simulators.

The U.S. Army's Stress Loading Facility and RF Simulation System are special purpose facilities. While there is no technical limitation on integrating them at a common site, the group would recommend closing the SLF rather than moving it, because test customers could use the open-loop signal environment generation capability at the single ISTF site. The five people dedicated to the SLF would be reassigned to other tasks, yielding no O&M savings.

The RF Simulation System deals principally in missiles, and not exclusively EC systems. A relocation would involve construction of a specialized, missile-sized anechoic chamber, and could not use common ISTF or HITL facilities with the USAF or Navy. The same specialized personnel would have to be employed, therefore there could be no O&M savings. RFSS is therefore better aligned with the Munitions study where missile development uses similar facilities.

The study group found no duplication of functions between HITL and ISTF functions; however, there is some equipment in common, like signal environment generators.

Linking is advantageous to REDCAP because the man-in-the-loop target positioning and fire directing information and commands can be transmitted to multiple sites electronically via a Distributed Interactive Simulation node. "One can play chess by phone". Linking AFEWES or ECSEL's threat systems to an ISTF or Open Air Range is not technically feasible due to pulse-to-pulse delays from transmitting across long distances. This would preclude evaluation of pulsed jamming systems. "One can not play tennis by phone".

There is not yet a substantiated customer base that would desire REDCAP linked to another HITL or ISTF.

IMPLEMENTATION OF MANDATORY ALTERNATIVES

1. CONSOLIDATE HITL/ISTF FACILITIES AT EDWARDS AFB (EXCEPT SLF AND RFSS)

2. CONSOLIDATE HITL/ISTF FACILITIES AT PATUXENT RIVER (EXCEPT SLF AND RFSS)

3. LINK REDCAP TO EXISTING HITL AND ISTF SITES

SLIDE 16 IMPLEMENTATION OF MANDATORY ALTERNATIVES

After analyzing the data, the group developed three alternatives to meet the mandated alternatives. Alternative 1 would consolidate all HITL and ISTF facilities, except the SLF and RFSS which were considered special purpose HITL's at Edwards AFB, California. Alternative 2 would consolidate all HITL and ISTF facilities, except the special purpose HITLs at Patuxent River, Maryland. Alternative 3 considers linking. Since the group determined that REDCAP was the only HITL that provides information that can be linked in real-time, it was the only HITL recommended for linking. Alternative 3 would link REDCAP to other HITL and ISTF facilities.

Requirements Analysis

ALTERNATIVE REQUIREMENTS/CAPABILITIES COMPARISON			
	SINGLE SITE		
TECHNICAL REQUIREMENTS	ALT 1 MOVE TO EDW	ALT 2 MOVE TO PAX	
ANECHOIC CHAMBER			
TACTICAL-SIZED	F	F	
LARGE-SIZED	F	F	
VALIDATED SIM/STIM (BROAD FREQUENCY HIGH FIDELITY)	F	F	
SUPPORT LABS (COLLOCATED)	F	F	
ADJACENT PRE/POST FLIGHT	F	F	
ADJACENT OUTDOOR TEST AREA	F	F	
CLOSED-LOOP SIMULATION			
LAND-BASED RF, IR	F	F	
SEA-BASED RF	F	F	
MISSILE RF	ASC/RFSS	ASC/RFSS	
C3I			
IADS (CLOSED-LOOP)	F	F	
GROUND C3 (CLOSED-LOOP)	SLF	SLF	
OPEN-LOOP SIMULATIONS	F	F	
DYNAMIC TARGET GENERATORS	F	F	

SLIDE 17 REQUIREMENTS/CAPABILITIES COMPARISIONS

Based on the workload projections which support two anechoic chambers, the study group believes that a second chamber would need to be constructed at the consolidated site. For Edwards a tactical sized chamber would be needed. For PAX River a large chamber would be needed. As depicted on the chart, following consolidation, either site will be able to meet all test requirements.

The Army's Radio Frequency Simulation System (RFSS) at Redstone Arsenal, AL and the Stress Loading Facility at Ft Huachuca, AZ all special purpose HITLs. The RFSS tests missile systems and the SLF tests Army Intelligence Systems. The RFSS is collocated with the Army's Missile command and works closely with the various Project Managers testing their systems. Because the majority of RFSS work is with missile systems, the study group suggest the RFSS be realigned into the armaments subgroup.

Because of the unique nature of the work done at these facilities and the synergism each has with its respective customers, the group recommends not relocating them at the consolidated site.

Since the SLF is an open-loop simulator, and open loop simulators are part of the ISTFs at PAX River or Edwards, if a decision were made to relocate the SLF capabilities at a consolidated HITL/ISTF site, the group would suggest closing the SLF.

Single Node Failure Analysis

ATTRIBUTES	FAILURE IMPACT	BACK-UP CAPABILITY	OPTION 1 (EDW) WORK AROUNDS	OPTION 2 (PAX) WORK AROUNDS
LARGE ANECHOIC CHAMBER	MAJOR	NONE	FLIGHT TEST	FLIGHT TEST, SHIELDED HANGER
TACTICAL ANECHOIC CHAMBER	MAJOR	LARGE CHBR		
SUPPORT LABS	MAJOR	NONE	USE CONTRACTOR, FLIGHT TEST	USE CONTRACTOR, FLIGHT TEST
ADJACENT PRE/POST FLIGHT	MINOR	LEASE EQUIP	FLIGHT TEST	FLIGHT TEST
ADJACENT OUTDOOR TEST AREA (LIGHTNING, HIGH PWR EMIT)	MODERATE	LEASE EQUIP	USE CONTRACTOR	USE CONTRACTOR
CLOSED LOOP SIMULATION				
LAND-BASED RF, IR	MAJOR	NONE	REPAIR EQUIPMENT	REPAIR EQUIPMENT
SEA-BASED RF	MAJOR	NONE	FLIGHT TEST	FLIGHT TEST
MISSILE RF	MAJOR	NONE	REPAIR EQUIPMENT	REPAIR EQUIPMENT
C3I				
IADS	MAJOR	NONE	MODELING & SIM	MODELING & SIM
GROUND C3	MODERATE	NONE	REPAIR EQUIPMENT	REPAIR EQUIPMENT
OPEN LOOP SIMULATION HITL	MINOR	HITL/ISTF ASSETS		

SLIDE 18 Single Node Failure Analysis

The study group traced the major requirements against a single node failure analyses to assess the potential impact of a loss of capability. Additionally a back-up capability, if available was assessed along with work arounds for each of the move options (Edwards and Patuxent River).

For the large anechoic chamber, failure impact was assessed as major with no back-up capability. Work arounds for a large chamber failure are to conduct flight tests. The shielded hanger at Patuxent River could be used for limited EC applications

For the tactical-sized anechoic chamber, the failure impact would be major due to scheduling/queuing delays, although the back-up capability of the large chamber exists.

Loss of any support labs, collocated with the ISTF would have a potentially major impact on test programs with no back-up capability. Programs would resort to using either flight test, contractor labs, or delay until support labs are repaired.

Additionally, outdoor pre-/post flight facilities and test areas for lightning and high power emitters are important functions of ISTFs. Loss of DoD capability in that area would have a moderate impact. None the less, support equipment is commercially available. Finally the test could be turned over to a contractor.

Closed loop simulations are the distinguishing attribute of Hardware-In-The-Loop (HITL) facilities. For each of the primary DoD HITL capabilities of land-based RF/IR, sea-based RF, and missile RF, failure would result in major program impacts with no readily available back-up capability. Work around for lost capability would be to repair equipment, if program schedule permits, or proceed with flight test at greater program risk. Loss of DoD C3I HITL capability, REDCAP or the SLF, would have a moderate to major failure impact on IADS and Ground C3 testing. Work around options would include more emphasis on modeling and simulation, field testing and/or report unserviceable equipment to regain capabilities.

Open loop simulation signal generator capability is available at both HITLs and ISTFs for testing at the component level and systems level respectively. Back-up capability exists at either HITL or ISTF and no work around was necessary.

ALTERNATIVE 1 IMPLEMENTATION PLAN

CONSOLIDATE EC HITL/ISTF AT EDWARDS

- BUILD TACTICAL-SIZED CHAMBER AT EDWARDS FY97-98
- BUILD PAD AREAS FOR HERO & LIGHTNING AT EDWARDS FY97-98
- MOVE ACETEF LABS TO EDWARDS FY99
- MOVE EC HITL FACILITIES TO EDWARDS FY99
  - AFEWES
  - REDCAP
  - ECSEL
- DO NOT MOVE SPECIAL PURPOSE EC HITL FACILITIES
  - SLF
  - ASC / RFSS

Slide 19 Alternative 1 Implementation Plan

Alternative 1 is to consolidate HITL and ISTF capability at Edwards AFB as a single site. To accomplish this, the following facilities should be built to supplement the existing ISTF capability: 1) tactical-sized anechoic chamber and 2) pad areas for lightning and high energy radiation operations (HERO), It is projected that earliest possible "construction would occur in FY97-98.

Support labs from ACETEF would be moved from Patuxent River to Edwards in FY99 and the following EC HITL facilities would relocate to Edwards: 1) AFEWES, 2) REDCAP, and 3) ECSEL. These three HITL capabilities would be combined into one super-HITL. Time frame for this move would be on or after FY99, due to lead time for military construction.

It is important to note this implementation plan leaves the SLF and ASC/RFSS at their existing sites. The HITL/ISTF study group determined that synergy of the SLF and RFSS at their existing sites outweighed any advantages of consolidation to a single site. However, there is no compelling technical limitation preventing consolidation

Alternative 1 implementation assumes all of the facilities/capabilities at the losing sites would move to the new site. A "move-all equipment and personnel" scenario is a higher cost option than selectively moving equipment and personnel to achieve optimum capability at minimum cost. Therefore, a lower non-recoverable expense (NRE) and earlier payback is possible by tailoring the move. The study team was constrained by limited time and did not explore a tailored option to alternative 1.

HITL/ISTF EXCURSION - MOVE TO EDWARDS

CONCEPT	ADVANTAGES/DISADVANTAGES
• Consolidate HITL/ISTFs at Edwards and use only existing chamber • All personnel would transfer to support two shift operations	Advantages • Large chamber • Co-location with AF air vehicle testing • Common location of test support expertise • Reduces AF test logistics to single site Disadvantages • Fragments existing and planned navy and army test programs • Single site failure • Requires DETS to support tests - substantial cost to large program • Loss of synergy with Navy ASW program • >$20M/yer in additional OAR costs
CUMULATIVE SAVINGS	**RESULTS**
• $31.4M tactical chamber MILCON • $5.4M 13% reduction to Lab MILCON • $16.3M 15% ISTF CTEIP reduction • $32M 33% moving cost reduction • $12.9M primes I&M over FYDP, $1.8M/yr OAR $180M → $95M - $12.9M = 82M 50 YRS ROI → 17 YRS ROI	• Supports all DoD technical requirements for ISTFs • Worlkoad of EC/AV/AA likely to exceed single ISTF capacity • No backup capability/single node failure • Cost to consolidate may be small in comparison to potential risk to customers

ALTERNATIVE 2 IMPLEMENTATION PLAN

CONSOLIDATE EC HITL/ISTF AT PAX RIVER

- BUILD LARGE CHAMBER AT PAX RIVER FY97-98
- MOVE BAF/ECIT LABS TO PAX RIVER FY99
- MOVE HITL FACILITIES TO PAX RIVER FY99
  - AFEWES
  - REDCAP
  - ECSEL
- DO NOT MOVE SPECIAL PURPOSE EC HITL FACILITIES
  - SLF
  - ASC / RFSS

SLIDE 20 Alternative 2 Implementation Plan

Alternative 2 is to consolidate HITL and ISTF capability at Patuxent River NAS as a single site. To accomplish this, a large anechoic chamber would need to be built to supplement the existing ISTF capability in the FY 97-98 time frame.

Support labs from the BAF/ECIT would be moved from Edwards AFB to Patuxent River in FY99 and the following HITL facilities would relocate to Patuxent River: 1) AFEWES, 2) REDCAP, and 3) ECSEL. These three HITL capabilities would be combined into one super HITL. Time frame for this move would be on or after FY99, due to lead time for military construction.

It is important to note this implementation plan leaves the SLF and ASC/RFSS at their existing sites. The HITL/ISTF study group determined that synergy of the SLF and RFSS at their existing sites outweighed any advantages of consolidation at a single site. However, there is no compelling technical limitation preventing consolidation.

Alternative 2 implementation assumes all of the facilities/capabilities at the losing site would move to the new site. A "move-all equipment and personnel" scenario is a higher cost option than selectively moving equipment and personnel to achieve optimum capability at minimum cost. Therefore, a lower non-recoverable expense (NRE) and earlier payback is possible by tailoring the move. The study team was constrained by limited time and did not explore a tailored option to alternative 2.

HITL/ISTF EXCURSION - MOVE TO PAX

CONCEPT	ADVANTAGES/DISADVANTAGES
• Consolidate HITL/ISTFs at PAX and use only existing chamber • All personnel would transfer to support two shift operations	<u>Advantages</u> • Co-location with Navy air vehicle testing • Common location of test support expertise • Reduces Navy test logistics to single site <u>Disadvantages</u> • DoD ISTF workload/technical/size requirement unmet • Loss of large anechoic chamber - limited test capability with shielded hanger • Significant risk to large aircraft programs • Loss of synergy with AF flight test center integration labs • Requires DETS to support tests - substantial cost to large program • >$20M/yr in additional OAR costs
CUMULATIVE SAVINGS	**RESULTS**
• $79M large chamber MILCON • $2.5M 14% reduction to Lab MILCON • $16.3M 15% ISTF CTEIP reduction • $2.5M 7% moving cost reduction • $19.4M reduction to ECIT program • $23.9M MILCON reduction to FYDP • $12.9M primes I&M over FYDP, $1.8M/yr OAR $177M → $58M - $37M = 22M 50 YRS ROI → 5 YRS ROI	• Workload of EC/AV/AA likely to exceed single ISTF capacity • No backup capability/single node failure • Cost to consolidate may be small in comparison to potential risk to customers

TERIB Cost Summary

In Review

SLIDE 21 ALTERNATIVE COST SUMMARY

This chart summarizes the costs associated with alternatives 1 and 2. THIS IS PRELIMINARY DATA THAT IS CURRENTLY UNDER REVIEW Backup data can be found in Appendix L. We used the TERIB cost estimation model version 3 for these calculations.

PAYBACK SLIDE

In Review

Slide 22 HITL/ISTF Consolidation Payback

The cost of consolidation at either site is approximately $200 million. THIS IS PRELIMINARY DATA THAT IS CURRENTLY UNDER REVIEW. Following consolidation in the year 2000, the group estimated approximately 45 fewer personnel would be needed because of management efficiencies. Assuming an average salary of $45,000 per year, consolidation would result in an annual savings of $2 million. Using the formula

$$\text{Payback Period (P)} = \frac{\text{One Time Investment Costs}}{\text{Net annual Savings}}$$

The payback period is 100 years.

ALTERNATIVE 3 IMPLEMENTATION PLAN

LINKING

ISTFs AND HITLs REMAIN IN PLACE

- Link REDCAP to BAF and ACETEF distributed interactive simulation (DIS) network
- Link REDCAP to other HITL facilities via DIS network

SLIDE 23 ALTERNATIVE 3 IMPLEMENTATION PLAN

The implementation plan for alternative 3 is simple. HITLs and ISTFs remain where they are currently located and are linked with REDCAP via the distributed interactive simulation network based on customer demand. Cost to provide the linking capability at REDCAP is currently in the FYDP.

BRAC IMPLICATIONS

THERE ARE NO BRAC IMPLICATIONS

SLIDE 24 - BRAC IMPLICATIONS

THERE ARE NO BRAC IMPLICATIONS

SUMMARY

- HITLs & ISTFs are capability specific and non duplicative
- Cost to consolidate to a single site approximately $200m
- Consolidation of closed-loop threat HITL facilities can produce test efficiency: minimal value added
- Consolidation of HITL/ISTF to single site injects program delays (tear down/move/setup).
- Consolidation destroys existing synergies at existing sites
- No consensus on single site location (Pax, Edwards)
- Team found no aggregate value added to consolidation
- Consolidation causes major short term disruption but has long range benefits

SLIDE 25 HITL/ISTF Consolidation Summary

Each HITL facility has unique closed loop simulator capabilities which are not duplicated. The BAF at Edwards has a large anechoic chamber and the ACETEF at Pax River has a tactical sized anechoic chamber.

Projected avionics and electronic combat workload supports a requirement for two anechoic chambers.

Due to required synchronization for testing pulse to pulse simulations at AFEWES or ECSEL, the only technically feasible linking option is to the link IADS simulation at REDCAP with the man-in-the-loop hardware at an ISTF. REDCAP targeting data is not sensitive to microsecond delays due to distance.

Consolidation will provide some test efficiencies because of reduced logistics associated with all test capabilities at a single site. Collocation provides synergy between the man-in-the-loop and closed loop HITL simulations with the ISTF. However, there is no aggregate value added to the test process as both stages are accomplished separately. The existing synergy at the present sites are significantly impacted or eliminated. Significant scheduling conflicts could arise among high priority programs using portions of HITL facilities.

With a significant investment, the technical requirements can be met at either site. However, the site selected should be based on the results of the air vehicle study.

The investment cost of $200 million to consolidate has an extremely long payback (100 yrs) based on an estimated $2 million in annual O&M savings once the consolidation is completed. This is based on reducing the 300-person aggregate HITL/ISTF workforce 15 percent when consolidated. There is no infrastructure saving because the present facilities are not duplicated.

SUMMARY OF FINDINGS

- HITL and ISTFs are capability-specific and non-duplicative
- Projected workload for ISTFs favors 1 large and 1 tactical-sized chamber
- REDCAP is the only HITL facility which by linking could demonstrate a viable distributed capability
- Consolidation Pros and Cons
  - No aggregate value added to the test process (con)
  - Existing synergies are significantly impacted (con)
  - Single site injects program queuing delays (con)
  - Test efficiencies gained by having closed-loop threats at one site (pro)
  - Long term T&E synergism but major short term disruption (pro)
- Technical requirements/capabilities met at either site
  - Tie location decision to results of Air Vehicle study
- Cost to consolidate to either site is approximately $200M

APPENDICES

A. REFERENCES

B. POA&M

C. STUDY METHODOLOGY

D. TRI-SERVICE TECHNICAL CAPABILITY REQUIREMENTS BASELINE

E. TEST PROCESS/FACILITY DESCRIPTIONS

F T&E RESOURCE BASELINE

G. T&E WORKLOAD REQUIREMENTS BASELINE

H. CONCEPT OF OPERATIONS

I. SITE ANALYSIS

J. COST ANALYSIS

Document Separator

APPENDIX E

TEST PROCESS/FACILITY DESCRIPTIONS

AIR FORCE ELECTRONIC WARFARE EVALUATION SIMULATOR

(AFEWES)

Facility/Capability Description:

The AFEWES is a major HITL electronic combat test facility managed by the Air Force Developmental Test Center. The role of the AFEWES is to provide technical evaluations of EC systems (ECM systems, RWRs, decoys, IRCM systems, flares, etc.) and techniques in simulated RF and IR threat environments. The AFEWES has been used by all services and allies in every phase of the EC system life cycle from concept development through operational changes. The key features of AFEWES combine actual frequency, real-time, and man-in-the-loop testing with the capability to evaluation effectiveness in a dense background environment.

T&E RESOURCE DATABASE
GENERAL INFORMATION

Facility Title: Air Force Electronic Warfare Evaluation Simulator (AFEWES)

Origin Date:

Change Date:

Service:	AF	Activity:	AFEWES	Location:	Air Force Plant #4
Reliance Area:	Electronic Warfare	TERIB Area:	Air, EC & C3I		
DTEC Site:		Specialty Site:	Yes	Other:	

	Primary:	Secondary:
Facility Category	T&E	DE
WPN Sys Category	EC & C3I	TEST ENVIRONMENTS
T&E Resource Category	HITL	IL

ENCLOSURE (A)

T&E RESOURCE L ABASE (CONT'D)
GENERAL INFORMATION

Facility/Capability Description:

The AFEWES is a major HITL electronic combat test facility managed by the Air Force Developmental Test Center. The role of the AFEWES is to provide technical evaluations of EC systems (ECM systems, RWRs, decoys, IRCM systems, flares, etc.) and techniques in simulated RF and IR threat environments. The AFEWES has been used by all services and allies in every phase of the EC system life cycle from concept development through operational changes. The key features of AFEWES combine actual frequency, real-time, and man-in-the-loop testing with the capability to evaluate effectiveness in a dense background environment.

Functional Test Areas:

The AFEWES has a large group of surface-to-air missile, airborne interceptor, IR missile, early warning/acquisition radar, communication/data link, C^3, and AAA "closed-loop" simulations available for jammer/receiver evaluations. The AFEWES also has an open-loop simulator, the Multiple Emitter Generator (MEG) that is used to evaluate radar warning receivers and the receiver section of jammers. Measures of performance data for the closed loop simulators include miss-distance and tracking error data. Measures of performance data for the MEG includes such receiver performance data as emitter detection, identification, frequency measurement accuracy, PRI measurement accuracy, receiver response time, and ECM resource allocation.

Instrumentation/Assets:

In addition to the closed-loop and open-loop simulations listed above, AFEWES has such instrumentation assets as, (1) the Test Director System, which includes five Test Management Centers (TMC) and one Test Observation Center (TOC) - Each TMC consists of eight digital strip chart recorders, five video monitors, and two video recorders - The TOC consists of a large screen display and four video monitors, and (2) The Bus Snapshot Analyser (BSA) which is used to record EC receiver data during a MEG test. Other AFEWES assets include an RF and IR jammer techniques simulator and an RF clutter generator.

Keywords:

Hardware-in-the-loop, man-in-the-loop, actual frequency, real-time, EC system effectiveness testing, multi-spectral, RF, IR, MMW

T&E RESOURCE DATABASE (CONT'D)
FINANCIAL INFORMATION

AVE O&M (Per Yr): $1.361M AVE I&M (Per Yr): $3.8M REPLACEMENT COST (FY94): $300M

OPERATING & MAINTENANCE (O&M) COSTS - $M

	88-93	94	95	96	97	98	99	00	Total
Sources (PE)	8.168	2.072	2.420*	2.827*	3.302*	3.857*	4.505*	5.262*	32.413
Multiple Sources: DOD & FMS									
(NOTE: O&M costs are									
paid by the users)									
Totals									

* Based on average 16.8 percent increase in costs each year from 1990 - 1994

INVESTMENT & MODERNIZATION (I&M) FUNDING - $M

	88-93	94	95	96	97	98	99	00	Total
Sources (PE)									
64735F	121.4								121.4
64256F	-	18.0	3.9	4.1	2.5	4.3			22.8
Totals	121.4	8.0	3.9	4.1	2.5	4.3			144.2

T&E RESOURCE D. ABASE (CONT'D)
WORKFORCE INFORMATION

Total Government: _____ Total Contractor 48 Total Workforce: _____

Civil Service

	Number	Ave Salary (4K)
S&E		
Technician		
Support		
Other		

Total Number: _____

Ave Salary ($K): _____

Military

	Numer	Ave Salary ($K)
Officer		
Enlisted		

Total Number: _____

Ave Salary ($K): _____

Contractor

	Number	Ave Salary ($K)
S&E	48	100,529*
Technician		
Support		
Other		

Total Number: 48

Ave Salary ($K): 100,529

* Average Salary Computation:

$	23.12/Hr	Direct Labor Cost
	11.70	Engineering Overhead Cost
	11.17	Fringe Benefits
	4.68	General & Administrative
$	50.67/Hr	X 1984 Manhours = $100,529/Yr

T&E RESOUR. ATABASE
CUSTOMER INFORMATION

PROGRAM	CURRENT FY 94 SPONSOR (SERVICE/ORG)	FUNDING ($M)
BAND IV IRCM	OSD/OTD	.2
AFIWC FLARE	USAF/AFIWC	.1
ALQ-144	ARMY/AEC	.3
ATIRCM	ARMY/AEC	TBD
ASTE	USAF/ASC	TBD
ALQ-135	USAF/AFOTEC	TBD
ASPJ	NAVY/NAVAIR	.2
QTP DECOY	MULTINATIONAL	TBD
PROJECT 7	USAF SAR	.7
U-22	SWEDEN	.9
C-160 FLARE EFF	GERMANY	TBD
ALQ-178	TURKEY	TBD
DRFM	CANADA	.1
ASPJ + AAED	NAVY/NRL	.2
A/C SURVIVABILITY	LFWC	.2

PROGRAM	PLANNED (FY 95 & BEYOND) SPONSOR (SERVICE/ORG)	FUNDING ($M)
B-1B EMD	USAF/ASC	TBD
F-22 SUBSYSTEMS	USAF/ASC	TBD
ALQ-131	USAF/AWC	TBD
ALQ-184	USAF/AWC	TBD
ALQ-135	USAF/AWC	TBD
C-5 FLARE EFF	USAF/AMC	TBD
ATRJ	ARMY/CECOM	TBD
ASPJ	NAVY/NAVAIR	TBD
ELT-533	ITALY	TBD
JAS-39 ECM	SWEDEN	TBD
ADVANCED RWR	SWEDEN	TBD
FLARE EFF	SWEDEN	TBD
ZEUS	UK	TBD

T&E RESOURCE D. ABASE (CONT'D)
CAPACITY & UTILIZATION INFORMATION

RESOURCE: AFEWES

CAPACITY RATIONALE:

UNCONSTRAINED: 2 TEST AREAS (RF, IR) X 24 HRS/DAY X 365 DAYS/YR
BUDGETED: 2 TEST AREAS (RF, IR) X 8 HRS/DAY X 248 DAYS/YR
NONAVAILABILITY: 2 TEST AREAS (RF, IR) X 1.5 HRS/DAY (CALIBRATION) X 248 DAYS/YR
USER TIME: SAME AS BUDGETED SINCE USER PAYS FOR ALL RESOURCE TIME

UNCONSTRAINED CAPACITY (HRS)	17,520
BUDGETED CAPACITY (HRS)	3,968
SURGE CAPACITY (HRS)	13,552
USER TIME (HRS)	3,968
OVERTIME (HRS)	------
NON-AVAILABILITY (HRS)	744
USE EFFICIENCY (%)	81.3
UTILIZATION (%)	100
SURGE (%)	77.4

REAL TIME DIGITALLY CONTROLLED ANALYZER PROCESSOR

(REDCAP)

Resource Description:

REDCAP is the US's only Man-In-The-Loop (MILT HITL) Threat Command and Control Simulation Facility. This facility has provided validated threat radar, command and control, airborne interceptor, data link and AEW simulations since 1965. The Integrated Air Defense System (IADS) simulation incorporates the latest in FSU command and control (including both GCI and SAM weapons control), data link, airborne interceptor, and AEW capabilities. The REDCAP IADS simulation can represent up to four levels of command and control and is sized to simulate up to 540 airborne vehicles. The simulation is written in Mil Std Ada and supported by a large collateral level network of workstations and board level computers that is electronically connected through a custom digital guard to a SCIF based TS SCI network. It includes three RF shielded rooms for test articles and includes closed-loop radar and data link simulations for performing ECM effectiveness evaluations.

General Information

Resource Title: USAF REDCAP Netted Air Defense Test Facility

Origin Date:

Change Date:

Service: USAF

Organization/Activity: AFMC AFDTC 46 TW

Location: 46TW OL-AH, Buffalo NY

Reliance Area: T&E Support

TERBID Area: HITL ISTF

Type Site:

	Primary	Secondary	Tertiary
Facility Category	T&E	DE	S&T
WPN Sys Category	EC&C3I	TE	CRI
T&E Resource Category	HITL	DMS	

Resource Description: REDCAP is the US's only Man-In-The-Loop / Hardware-In-The-Loop (MITL HITL) Threat Command and Control Simulation Facility. This facility has provided validated threat radar, command and control, airborne interceptor, data link and AEW simulations since 1965. The Integrated Air Defense System (IADS) simulation incorporates the latest in FSU command and control (including both GCI and SAM weapons control), data link, airborne interceptor, and AEW capabilities. The REDCAP IADS simulation can represent up to four levels of command and control and is sized to simulate up to 540 airborne vehicles. The simulation is written in Mil Std Ada and supported by a large collateral level network of workstations and board level computers that is electronically connected through a custom digital guard to a SCIF based TS SCI network. It including three RF shielded rooms for test articles and includes closed-loop radar and data link simulations for performing ECM effectiveness evaluations.

Interconnectivity to other Resources: REDCAP has in the past been connected and provided IADS support to ACETEF at Pax River, AFEWES at Ft. Worth, and the EMTE Range at Eglin AFB. The current interconnectivity is to the ARPA/WAR BREAKER net (main terminus in Arlington VA) with DIS compliant message traffic being sent over two secure 1.544 MBPS T-1 lines. This connectivity has an IOC of Jun. 1994.

Functional Test Areas: As a HITL facility, REDCAP test devices that electronically (usually through RF) impact the operation of a threat air defense system. Additionally, REDCAP test other functional areas involving tactics, deception, situational awareness, and other factors that do not necessary electronically interface with the IADS but have an impact on its performance and the survivability of penetrating forces.

Instrumentation /Assets REDCAP has the normal RF support equipment necessary to operate and maintain RF simulators. These are standard off-the-shelf items like spectrum analyzers, network analyzers, logical analyzers, etc. Additionally, REDCAP has a unique ECM Noise Quality Measurement System used to support ECM test programs. For the test of impacts to an IADS, many of the measurements required are real-time recorded digitally. There is extensive recording of event and parametric data on the many computers in the networks.

Keywords: IADS, HITL, Closed-Loop, MITL, EW GCI, C3, C2, Link, Threat, IW, Radar, AWACS, AI

Financial Information

Ave O&M (per yr.): 556K (average O&M contract cost for 1991 - 1993)

Ave I&M (per yr.): $ 9.43 M based on FY 88 - 94
$ 10.16 M based on FY 94
$ 9.31 M based on FY 88 - 93

Replacement Cost (FY 94): $67.14 M

Operating and Maintenance (O&M) costs

Sources	88-93	94	95	96	97	98	99	0
TO&M Contract	$ 2,086,598	$ 926,649						
minus RSUH reimbursement	417,583	– 200,000 (est.)						
Total	**$ 1,669,015**	**–$ 726,649**	.3	.8	.9			

Improvement and Modernization (I&M) Funding - $ M

Sources	88-93	94	95	96	97	98	99	0
Upgrades Contract	$ 55.87 M	$ 10.16 M						
Total	**$ 55.87**	**$ 10.16 M**	–	7	0.2	5.2	[illegible]	

Workforce Information

Total Gov't: _____
Total Contractor: _____
Total Workforce: _____ ~ 40 (part-time)

Civil Service

	Number	Ave Yearly Salary ($K)
S&E	0	0
Technician	0	0
Support	0	0
Other	0	0

Military

	Number	Ave Yearly Salary ($K)
Officer		
Enlisted		

Contractor

	Number	Ave Yearly Salary ($K)
S&E	15	$ 54
Technician	2	$ 35
Support	2	$ 21
Operators (part time)	10–40	$ 50 (assume full time)

T&E Resource Database

Customer Information

Current (FY94)

Program	Sponsor Service/Org	Funding ($M)	Source (PE)
B-2 Modeling & Sim	AFOTEC	$ 4	
Combat ID Support	ESC	$ 2	
UAV Decoy	Wright Labs / Northrop	~$ 1	
War Breaker Support	ARPA	~$ .2	
B-2 Mod Sim II	AFOTEC	~$ 1.5	
Adv. Signal Support	AFFTC	~$ 3	
C3 Exploitation	AFMC	~$ 1	

Planned (FY 95 & Beyond) (Projections)

Program	Sponsor	95	96	97	98	99	00	Source (PE)
B-2 Test Support	AFOTEC	1	1	1	1	1	1	
EF-111 SIP DT&E	SPO		1	1				
EF-111 SIP IOT&E	AFOTEC			1	1			
Remote Facility	USAF / Navy / ARPA	5	5	5	5	5	5	
Contingency Support	AFTWC, ACC, SOF	1	1.5	1.5	1.5	1.5	1.5	
C3 Exploitation	USAF AFMC	5	5	5	5	5	5	
Special Projects		5	5	5	5	5	5	
F-22 Test Support		?	?	?	?	?	?	

T&E Resource Database
Page 6 of 6
Capacity & Utilization Information

	88-93	94	95	96	97	98	99	00
Unconstrained Capacity	43680	7280	7280	7280	7280	7280	7280	7280
Budgeted Capacity	12000	2000	2000	2000	2000	2000	2000	2000
Surge Capacity	31680	5280	5280	5280	5280	5280	5280	5280
User Time (hrs)	4100	1000	1200	1400	1500	1600	1600	1600
Over Time (hrs)	0	0	0	0	0	0	0	0
Non Availability (hrs)	1500	0250	0250	0250	0250	0250	0250	0250
Use Efficiency (%)	87.5 %	87.5 %	87.5 %	87.5 %	87.5 %	87.5 %	87.5 %	87.5 %
Utilization (%)	34.2 %	50 %	60 %	70 %	75 %	80 %	80 %	80 %
Surge (%)	72.5%	72.5 %	72.5 %	72.5 %	72.5 %	72.5 %	72.5 %	72.5 %

Capacity Rationale: The facility is available on a 24 hours basis. There are circumstances where multiple users could be served simultaneously, however, the most general case, a single users could require total access to the facility therefore these capacity figures reflect only a single user at a time.

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APPENDIX G

T&E WORKLOAD REQUIREMENTS BASELINE

TECHNOLOGY DRIVERS

- DYNAMIC AOA FOR ARRAY TYPE SYSTEMS
- HIGH DENSITY, HIGH FIDELITY RF FOR EW/EMI/EMC/RFC TESTING
- RADAR TARGET GENERATOR FOR HIGH FIDELITY / MULTIPLE, DYNAMIC PHASED TARGETS
- RCS R&M IMAGING
- CORRELATED RF, EW, CNI AND RADAR TARGETS
- HIGHLY INTEGRATED, ADAPTAVE, SOFTWARE-INTENSIVE AVIONICS / EC SYSTEMS
- HIGH FIDELITY IR SCENE (TARGET) GENERATOR
- MULTI-SPECTRAL CORRELATED THREATS / TARGETS
- DATA FUSION EVALUATION
- ADAPTIVE DATA COLLECTION / PROCESSING ARCHITECTURE FOR MIL STD BUSES AND HIGH SPEED DATA BUSES
- GROWTH FOR EO, MMW, LASER, LADAR SYSTEMS
- ARM TARGET GENERATION

ALL-FACILITY .KLOAD

	FY93	FY94	FY95	FY96	FY97	FY98	FY99	COMMENTS
ISTF								
ACETEF	5	3.4	3.2	3.2	2.7	1.7	1.4	50% EC/50% AV
BAF	2.5	2.4	2	2.1	2.1	1.6	1.1	25% EC/75% AV, Incr 10% from OAR
PRIMES	0.2	0.2	0.2	0.2	0.2	0.1	0.1	
Total	7.70	6.00	5.40	5.50	5.00	3.40	2.60	1000 Site-Shift-Hours
	4	3	3	3	3	2	1	Site-Shift-Years
HITL								
ECSEL	3.5	3.2	3.0	2.6	3.4	3.4	2.4	75% RDT&E/25% Prod, +10% after '96(JBAT:
AFEWES	4	3.8	2.9	3.4	3.5	2.2	1.4	+10% for redirected OAR workload
REDCAP	1	0.9	0.7	0.8	0.8	0.5	0.3	+10% for redirected OAR workload
SLF	2	1.4	1.7	1.3	1.1	0.8	0.4	+10% for redirected OAR workload
ASC	2.2	1.5	1.8	1.4	1.3	0.8	0.5	+10% for redirected OAR workload
Total	12.70	10.82	10.11	9.51	10.11	7.69	4.99	1000 Site-Shift-Hours
	6	5	5	5	5	4	2	Site-Shift-Years

NAVY ISTF REQUIREMENTS

NAVY ISTF REQUIREMENTS (FY94 - FY96)

SOURCE: GTRI STUDY 1990 SUPPPORTED BY NAWC-AD ESTIMATES

WPN SYSTEM	WEEKS/YEAR
ASEMICAP*	7.4
EP-3 ARIES*	4
F-14 ASPJ	9
P-3*	0.3
T-45	2.6
V-22*	20
SEEK SPARTAN*	3.7
UAV*	8
ATTACK HELO	2.3
ASW HELO	3.3

WPN SYSTEM	WEEKS/YEAR
H-53*	2.3
E-2C*	2.7
E-6A*	2.3
EA-6B*	6.4
ERA-3B F/O*	5
S-3*	7.7
F-14*	5.3
F-18*	7.3
F-18 E3*	5.2

TOTAL 105 WEEKS PER YEAR

* REQUIRES SOME LARGE ANECHOIC CHAMBER TESTING

AF ISTF REQUIREMENTS

AIR FORCE ISTF REQUIREMENTS (FY95 - FY05)

SOURCE: IDA STUDY 1992 SUPPORTED BY SAF/AQ LTR 30 JUL 92

WPN SYSTEM	WEEKS/YEAR
B-1*	3
B-2*	2
C-17*	1
CV-22	12
C-130*	1
AC-130U*	6
EC-130*	20
MC-130CT*	12
C-141*	1
E-3*	5
JSTARS*	0-5

WPN SYSTEM	WEEKS/YEAR
F-15	11
F-16	10
F-22*	10
EF-111	19
F-111	9
B-52*	0
TR-1/U-2	0
RC-135*	0-20

TOTAL 127 - 142 WEEKS PER YEAR

* LARGE CHAMBER REQUIRED

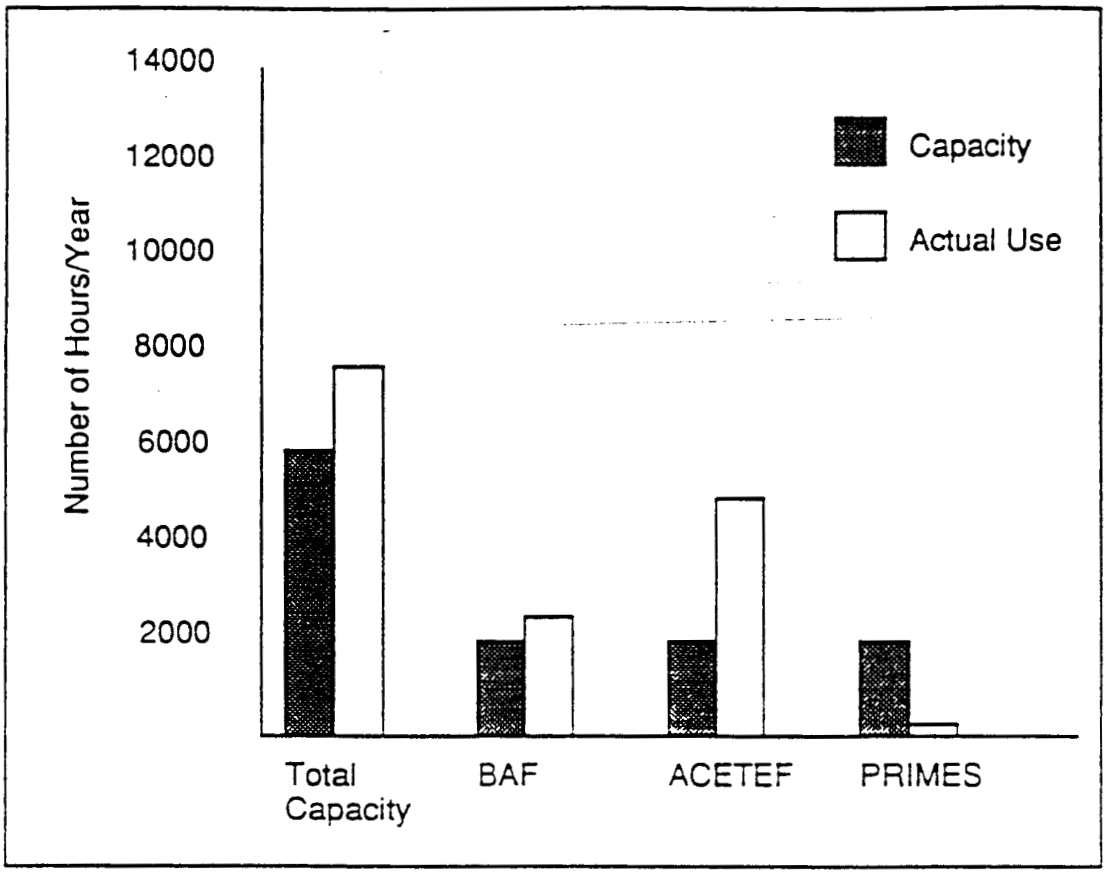


Figure xx. ISTF Facilities capacity and actual utilization for FY93

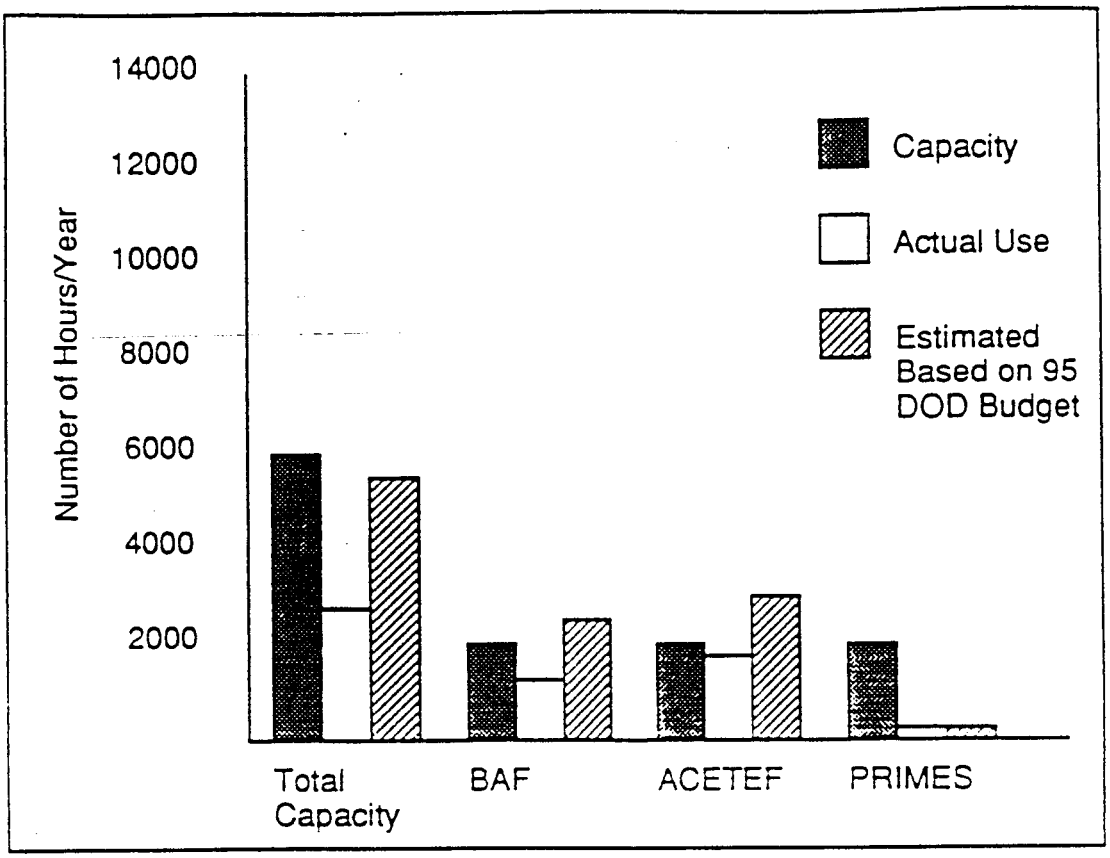


Figure xx. ISTF Facilities capacity and actual utilization for FY99

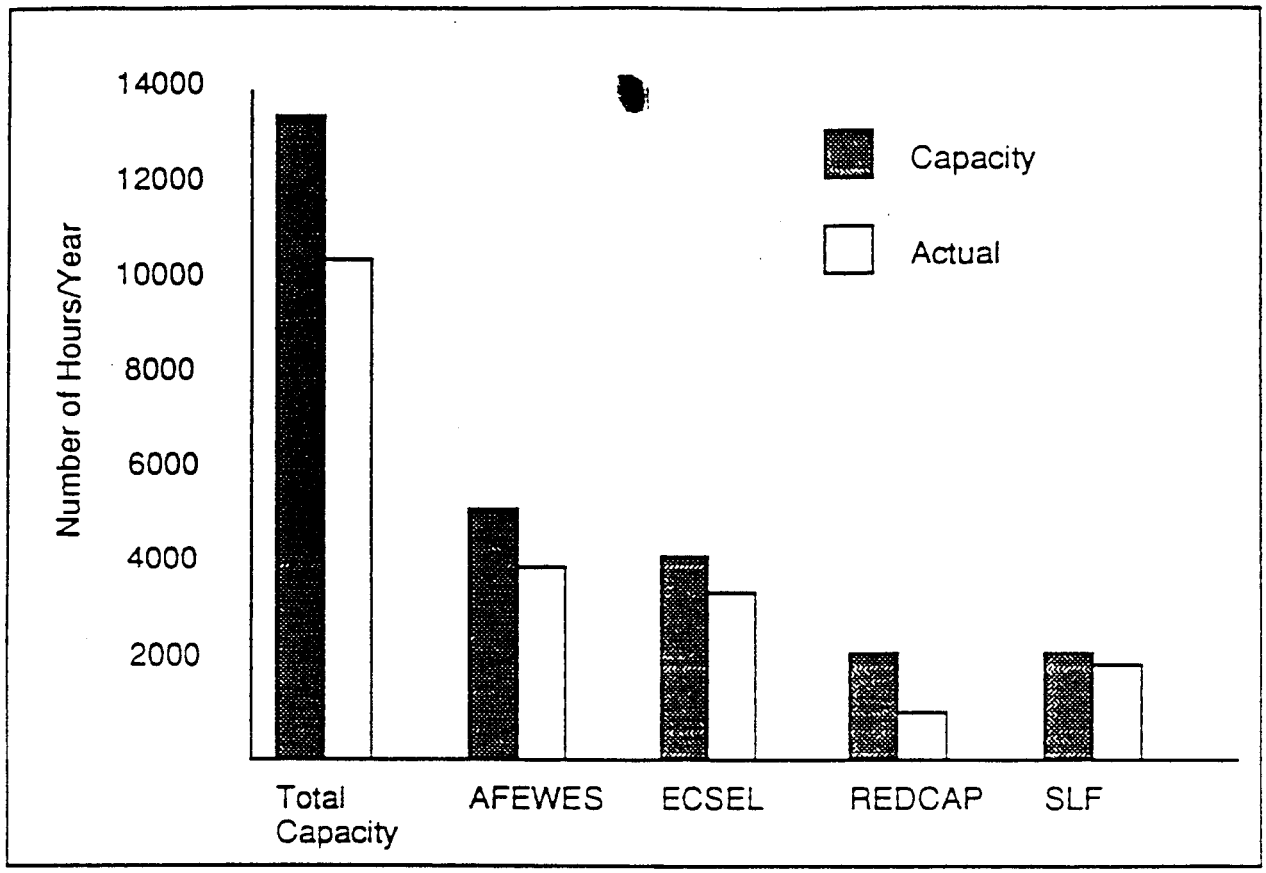


Figure xx. HITL Facilities capacity and actual utilization for FY93.

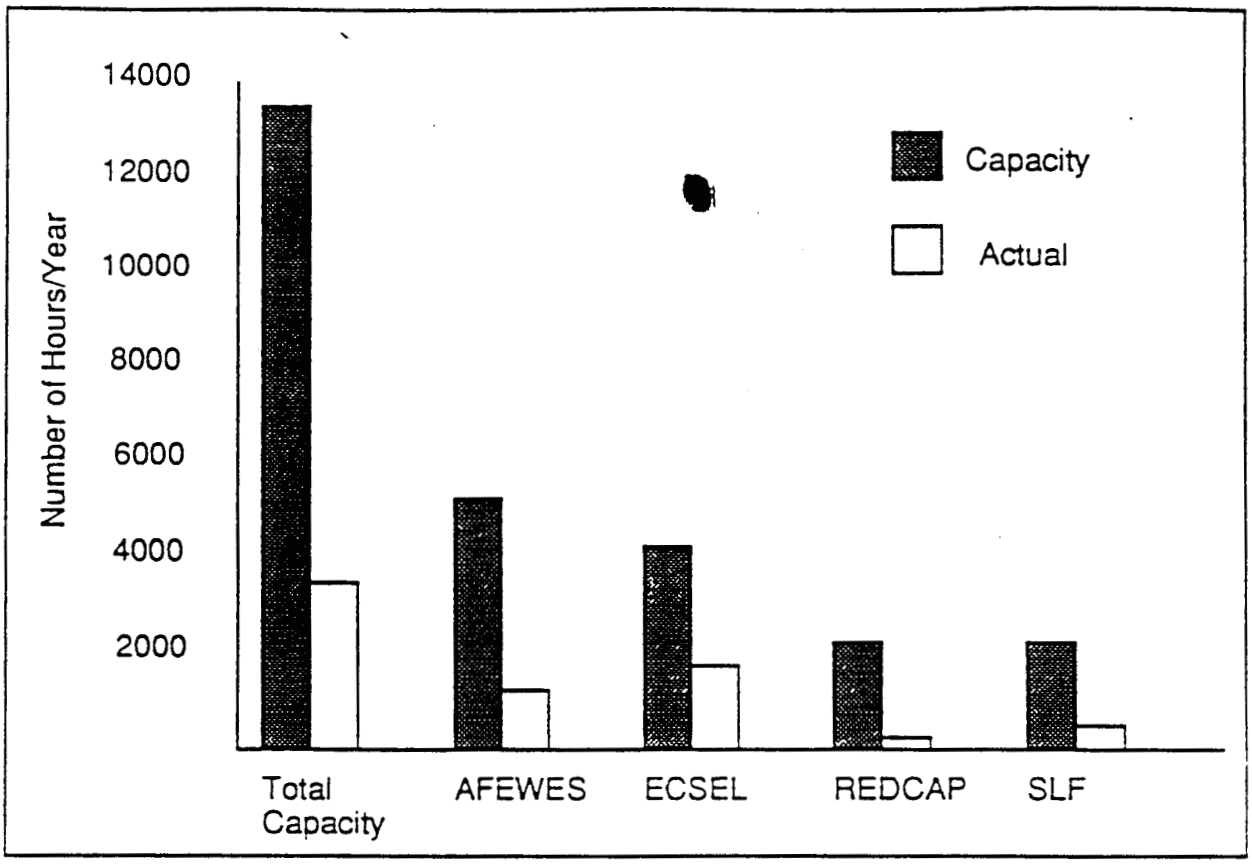


Figure xx. HITL Facilities capacity and actual utilization for FY99

APPENDIX I

SITE ANALYSIS

1/27/94 12:2

UPDATE

EC HITL SIMULATION CAPABILITIES

Threat HITL	AFEWES	ECSEL	REDCAP	SLF
SA-2	X			
SA-3	X			
SA-4	X			
SA-6M	X			
SA-8	X			
SA-10	X			
SA-N-1		X		
SA-N-3		X		
SA-N-4		X		
SA-N-6		X		
I HAWK		X		
SA-7	X			
SA-13	X			
SA-14	X			
SA-16	X			
AA-2	X			
AA-6	X			
STINGER	X			
RED EYE	X			
WILD CARD	X			
GUN DISH	X	X		
FLAP WHEEL	X	X		
DRUM TILT		X		
LONG TRK	X		X	
TOP PAIR		X		
TOP STEER		X		

Threat HITL	AFEWES	ECSEL	REDCAP	SLF
TOP PLATE		X		
TOP SAIL		X		
SUAWACS			X	
SPIN SCAN	X			
SKIP SPIN	X			
TWIN SCAN	X			
BIG NOSE	X			
JAY BIRD	X			
FOX FIRE	X			
AIM-9L	X			
AIM-9M	X			
DATA LINK	X		X	
TACAN	X		X	
IFF	X		X	
AAW C3			X	
NAVAL C3		X		
GROUND C3			X	X
Vozduk 1 C3			X	
BACK TRAP			X	
SIDE NET			X	
BAR LOCK			X	
TALL KING			X	
SQUAT EYE			X	
FLAT JACK			X	
FLAT FACE			X	
THIN SKIN			X	
SPOON REST			X	

B/U 7

LINKING FEASIBILITY

- Conditions/Uses For Which Linking Is Generally Feasible
  - Operational Testing and Training
  - Adding Entire Players From Separate Facilities To A Scenario
  - When Timing Between Actions (System or Scenario Level) Is Not Critical
  - Human Decision Making Involved In Actions
  - When End Game Effectiveness Not An Issue
- Conditions/Uses For Which Linking Is Not Generally Feasible or Desirable
  - Developmental Testing
  - System Testing In which Inputs Provided By Separate Facilities To Single Weapon System
  - When SUT or Other Players Use Automatic Decision Making

LINKING CONSTRAINTS

When Technically Feasible

- Effective Operational Minimum Range Determined By Distance of Link Between Test Facilities Providing Inputs to a System
  - Example Open Air Threat System Linked To a Chamber
  - Not Necessarily An Issue For Static Tests (Time Unimportant)
- Addition of Multiple Facilities To Conduct Test s
  - Adds To Cost - In Some Cases To Nearly Same Cost of Doing The Same Test In Flight
    - » More Facilities Involved
    - » Wage Increases Due to Overtime/Shift Differentials
  - Compounds Coordination Difficulties
  - Reduces Reliability (more systems to break)
-

LINKING CONSTRAINTS Cont

- SUTs Must Still Be Provided All Appropriate Signal Sources In All Required Spectra
  - Facilities Housing SUTs Would Still Need Front Ends Of Generators As A Minimum
    - » Can't Reduce Facility Investments By Much Without Impacting Capabilities
  - Front Ends Would Be Nearly Useless In Standalone Configurations

ISTF CONSIDERATIONS

TWO ISTF'S ARE REQURED TO SUPPORT REALISTIC DOD WORKLOAD PROJECTIONS THROUGH FY98

- o WORKLOAD PROJECTION USING INDICES DERIVED FROM FY93 UTILIZATION YIELD UNREALISTICALLY LOW ESTIMATES (AIR VEHICLE/EC)
- o PROGRAM PROJECTIONS USING INDICES DERIVED FROM FY95 FORECAST PRODUCED A MORE REALISTIC ESTIMATE(AIR VEHICLES/EC)

CURRENT LARGE/TACTICAL ANECHOIC CHAMBER MIX MATCHES FUTURE PROGRAM REQUIREMENTS

ISTF I&M UPGRADES AT AFFTC(LARGE CHAMBER) AND NAWC-AD (TACTICAL CHAMBER ARE COMPLIMENTARY

EC WORKLOAD (NON-MUNITION) AT PRIMES (EGLIN'S ISTF) SHOULD BE REDISTRIBUTED TO AFFTC AND NAWC-AD

RELOCATION OF ACS/RFSSTO AN ISTF LOCATION

Advantages

- o Co-location of missile/ECM closed loop hardware/simulations with launch and ECM Platforms
- o Integration of launch and ECM platforms with missile seeker hardware

Disadvantages

- o Cost to rebuild Shielded chamber and relocate simulation capibility
- o Loss of synergism due to location adjacent to major customers
  - Patriot project office
  - Missile and space intelligence center

ELECTRONIC COMBAT- HITL/ISTF
REDCAP MOVE TO ISTF

- ADVANTAGES (COLOCATED, BUT NOT CONNECTED TO THE ISTF)
  - REDUCES LOGISTICS OF TESTING IN MULTIPLE LOCATIONS
  - RELOCATION FROM CONTRACTOR FACILITY TO GOVERNMENT FACILITY
  - CAN PROVIDE INCREASED SYNERGY WITH OAR TESTING
  - ACETEF/BAF SUPPORTS GROWTH TO CAT I CAPABILITY (MSN LVL) (WILL DRIVE RF SIMULATORS AS WELL AS MITL)
- DISADVANTAGES
  - COST OF RELOCATION $18-30M
    - DEPENDS ON IMPLEMENTATION OF NEXT OPTION C
  - LOSS OF EXPERTISE
  - DOWNTIME OF 18 MONTHS
- ISSUES
  - MILCON REQUIREMENT
  - RECOMPETITION OF CONTRACT
  - LINKING VERSUS MOVE AS COST EFFECTIVE SOLUTION
-

VER 1 1/14/94

RELOCATE SLF CAPABILITIES TO ISTF

Advantages

- o Chamber available to support testing (less than 5% of workload)

Disadvantages

- o Loss of synergism with intelligence community at Fort Huachuca
- o Loss of synergism with Electronic Proving Ground's simulation and modeling capability
- o Loss of synergism with Joint Interoperability Test Center at Fort Huachuca (C4I testing)
- o Potential resource conflicts with high priority aircraft systems

RELOCATE ECSEL HITL CAPABILITIES TO ISTF

Move Closed Loop HITL simulation only

Advantages

- o Naval Threat system capability at ISTF
- o Common location of simulation expertise

Disadvantages

- o Loss of synergy for system development activity at Point Mugu
- o Loss of synergy for technique and In- Service-Engineering (ISE) activities
- o Simulation engineers synergy between R.D.T&E and ISE functions Loss of expertise for ISE

HITL CONSOLIDATION ISSUES

AFEWES Move to BAF or ACETEF

Advantages

- o Reduces risk of performance in installed configuration
- o Reduces testing logistics to one location
- o Provide common stimulation source and expertise of system under test from breadboard through installed configuration
- o Requires HITL/ISTF chamber interface waveguides and IR signal executive
- o ECSEL capability integrated at ISTF
- o Closed loop effort at Point Mugu is terminated
- o Supports growth of ACETEF to a category I facility

Disadvantages

- o Costs $50 - $60 Million to move selected systems
- o Loss of capability and expertise of personnel who don't move
- o Requires 12 -18 months of down time to move facility starting in FY98
- o Move completion FY99 at the earliest (MILCON 2 YRS + 1 YR AFEWES MOVE)
- o Move will effect T&E programs starting in FY96 with any AFEWES move
- o Cost to move ECSEL capability to BAF or ACETEF

Issues

- o Loss of availability for F-22 and F-18E/F in Fy97/98
- o Recompetition of AFEWES contract in FY96
- o Peak testing of F-22 avionics in FY98/99would cause slippage in other programs
- o Cost of MILCON for new building to house AFEWES costs $8 million

Document Separator

FACIMILE ELECTRO MAIL TRANSMITTAL

CLASSIFICATION Unclass -	TRANSMISSION ____IMMEDIATE ____ROUTINE	PAGE ONE OF _____ PAGES
FOR OFFICIAL USE ONLY		
TO (Organization and Functional Address Symbol)	FAX NO. DSN	COMMERCIAL (703)696-0550
ATTENTION Steve Ackerman	VOICE NO. DSN	COMMERCIAL (703) 696-0504 ext 162
FROM (Organization and Functional Address Symbol) Electronic Warfare Directorate 412 TW/EW 95 E North Base Road Edwards AFB CA 93524-8370	FAX NO. DSN 525-7779	COMMERCIAL (805) 275-7779
	VOICE NO. DSN 525-7610	COMMERCIAL (805) 275-7610

REMARKS

RELEASER'S SIGNATURE	DATE	TIME
Karla Walterman	23 May 95	0930

REDCAP SYSTEMS TO MOVE

KEEP	DECOMMISSION
SCIF Gateway	EW/HF (3)
Remote Interface	EW (3)
Reactive AI	Radars (5)
Off Line Support	Ground C2
SSDL (IFF & S-band DL)	SUAWACS
UDL (UHF A/A link)	PEG (Environmental Generator)
Classified Material	System Control
	Voice Switch
	Radar Switch
	CVDL (Old REDCAP Computers)

REDCAP Systems Disposition

1. COMPONENT	FY 1997 MILITARY CONSTRUCTION PROJECT DATA (computer generated)	2. DATE
AIR FORCE		

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
EDWARDS AIR FORCE BASE, CALIFORNIA	ADD TO AND ALTER ANECHOIC CHAMBER - BCL

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
6.58.07	317-932	FSPM973506	2,800

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
ADD TO AND ALTER ANECHOIC CHAMBER	SF	13,400		1,876
ADDITION	SF	13,400	140	(1,876) → 469K
SUPPORTING FACILITIES				640 → 160K
UTILITIES	LS			(520)
COMMUNICATIONS SUPPORT	LS			(120)
SUBTOTAL				2,516
CONTINGENCY (5%)				126 → 31.5K
TOTAL CONTRACT COST				2,642
SUPERVISION, INSPECTION AND OVERHEAD (6%)				159 → 39.8K
TOTAL REQUEST				2,801
TOTAL REQUEST (ROUNDED)				2,800
		MILCON figure includes ~~$~~ costing systems		→ $700,300

10. Description of Proposed Construction: Construct one floor over existing structure in the north side of the anechoic chamber. Work includes steel framing, concrete floors, masonry walls, interior partitions, clean rooms with insulation, and vibration/sound attenuation. Also modify and extend the utility/mechanical systems for a complete and useable facility.
Air Conditioning: 40 Tons. ~~144~~

11. REQUIREMENT: 214,500 SF ADEQUATE: 162,300 SF
SUBSTANDARD: 16,200 SF
PROJECT: Add to and alter an anechoic chamber. (New Mission)
REQUIREMENT: Additional specialized space is required to house the relocation of Real-time Electromagnetic Digitally-Controlled Analyser and Prossessor (REDCAP) and Air Force Electronic Warfare Evaluation Simulator (AFEWES) to test electronic combat and integrated avionics systems for advanced aircraft such as the F-22, F-117, B-2, and C-17. Shielded rooms must be able to house classified threat generators, target simulators and other sophisticated electronic equipment used to simulate hostile enemy airspace and equipment without compromising data collection or security.
CURRENT SITUATION: There are no specialized rooms or support space in the anechoic facility for the relocation of AFEWES and REDCAP. The existing rooms in an adjacent facility would fragment the workforce and lack required security, RFI and EMP shielding. After weapon system components are individually tested in individual specialized rooms in the adjacent facility, they are then transferred to the anechoic chamber for integrated testing on full-scale aircraft. Transferring the components to the anechoic chamber requires additional security measures and compoumds scheduling conflicts. Electronic test conditions in both the specialized

REDCAP Move Recommendation

ITEM	FUNCTION	DOCUMENT	MOVE(HRS)	TRANS $$
SCIF Gateway	SCI to Collateral	2000	1720	$5,000
Classified Material	Docu[redacted] Types	0	3020	$12,500
[redacted]	Off [redacted]	0	3320	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Receive AI	[redacted]	0	1440	
SSOL	IFF & S[redacted] Data L	0	1400	$3,300
HDL	UHF A-A Data Link			
		2000	14700	
$ 1,551,400		$ 180,000	$ 1,323,000	$48,800
$ 1,551,400	GRAND TOTAL			
$ 1,300,000	CLEANUP CALSPAN			
$ 60,000	OJT/TRAINING			
$ 50,000	SIMVAL			
$ 2,951,400	GRAND TOTAL			

LT COL GEORGE G. LONDON
Deputy Division Chief
[redacted]d Evaluation Resources

HQ US[redacted]
1650 A[redacted]
Washin[redacted]0

(703) 697-1165
DSN 227-1165
Fax xx5 5124

Date: 12 Jun 95	Cover + 1 Pages

TO: Mr. S. Ackerman

SUBJ: Additional Informat[redacted]ed on REDCAP

Per our telecon this morning, the a[redacted]sts the costs associated with the REDCAP's equipment identified for relocation. Please ca[redacted]dtional questions.

Transmit to: F[redacted]

Document Separator

AF/TE

EC Test Process and BRAC

AN ENABLING STRATEGY

"One Stop Shopping"

AF/TE

Guiding Principles

- OAR costs high
- Ground testing more affordable
  - Simulations increasing in fidelity
- Integrated avionics require integrated testing
- Collocation minimizes cost, schedule
  - "One stop shopping" for ground tests
  - Regional "one stop shopping" for OAR

AF/TE

EC Testing (Facts of Life)

- Actual threat assets have become more readily available.
- EC testing demands of highly integrated weapon systems (F-22, JAST, etc..).
- Fiscal constraints: T&E infrastructure and weapon system program offices budgets extremely austere and inelastic

AF/TE

Synergisms for EC Testing

Customer

- Reduced logistics support costs
- Collocated with air vehicle/avionics testing
- Coordinated with current/future technology drivers

Test Infrastructure

- Focused investment; reduced overhead costs
- Improved utilization of test resources

Customer and Test Infrastructure

- Pooled technical expertise
- Increased test efficiencies

Document Separator

ELECTRONIC COMBAT (EC)
TEST AND EVALUATION (T&E) REALIGNMENT PROPOSALS

COL WES HEIDENREICH
20 APRIL 1995

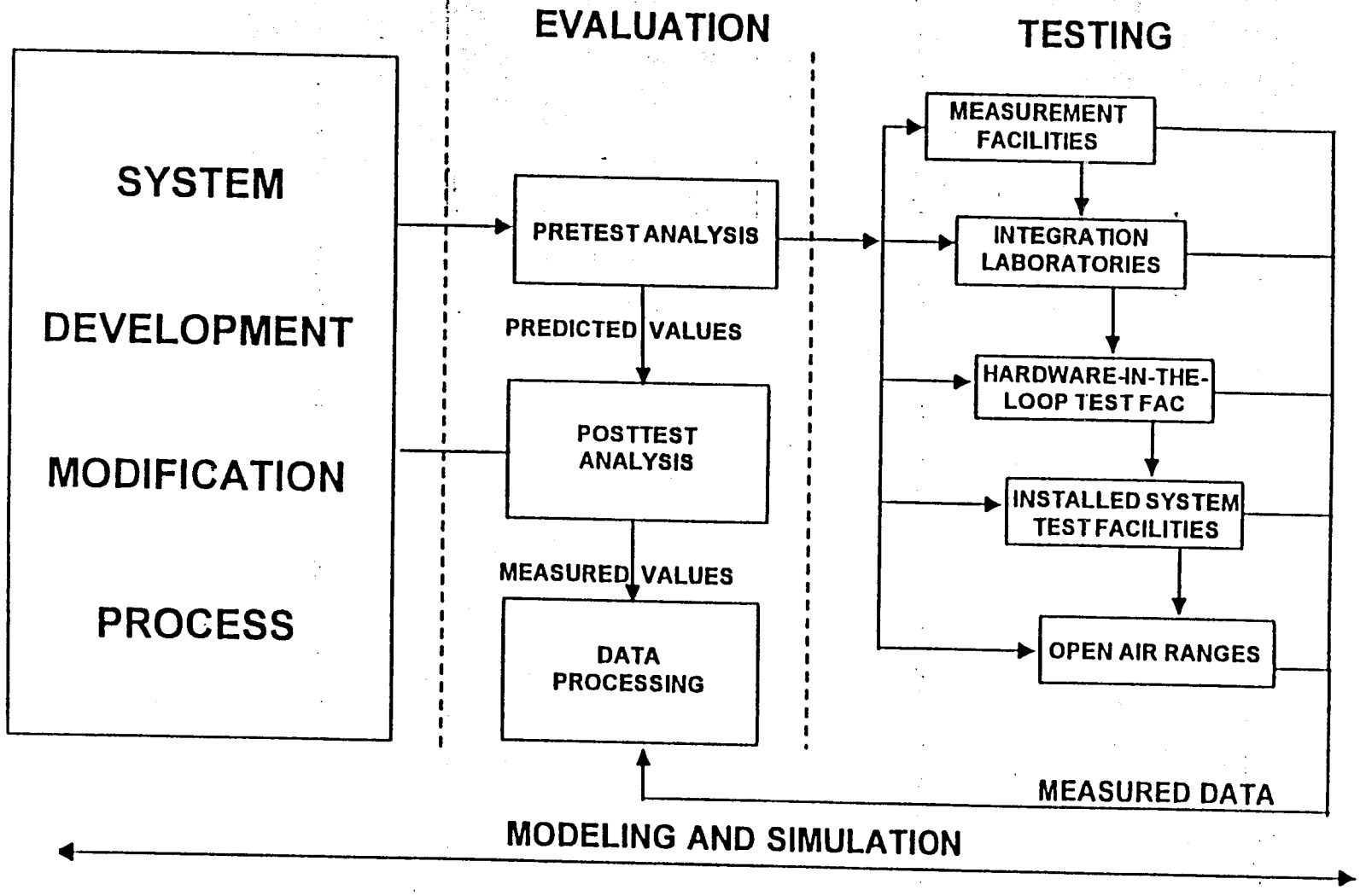
PURPOSE

PROVIDE BRAC RATIONALE FOR EC T&E REALIGNMENT RECOMMENDATIONS

OUTLINE

- AF EC T&E CAPABILITIES
- REDCAP
- AFEWES
- EMTE
- SUMMARY

EW TEST PROCESS



AIR FORCE EC
T&E CAPABILITIES

- MODELS AND SIMULATIONS
  - EGLIN, FL
  - NELLIS RANGE COMPLEX, NV
  - AFEWES, FT WORTH, TX
- MEASUREMENT FACILITIES: HOLLOMAN AFB, NM
- INTEGRATION LABORATORY: EDWARDS AFB, CA
- HARDWARE-IN-THE-LOOP TEST FACILITIES
  - AFEWES, FT WORTH, TX
  - REDCAP, BUFFALO, NY
- INSTALLED SYSTEMS TEST FACILITY
  - EDWARDS AFB, CA
- OPEN AIR RANGE
  - EGLIN AFB, FL
  - NELLIS RANGE COMPLEX, NV

PROPOSED EC REALIGNMENTS

- HARDWARE-IN-THE-LOOP
  - REAL-TIME ELECTROMAGNETIC DIGITALLY CONTROLLED ANALYZER AND PROCESSOR (REDCAP), BUFFALO, NY
  - AIR FORCE ELECTRONIC WARFARE EVALUATION SIMULATOR (AFEWES), FT WORTH, TX
- OPEN AIR RANGE
  - ELECTROMAGNETIC TEST ENVIRONMENT (EMTE), EGLIN AFB, FL

OUTLINE

- AF EC T&E CAPABILITIES
- REDCAP
- AFEWES
- EMTE
- SUMMARY

REDCAP PROPOSAL

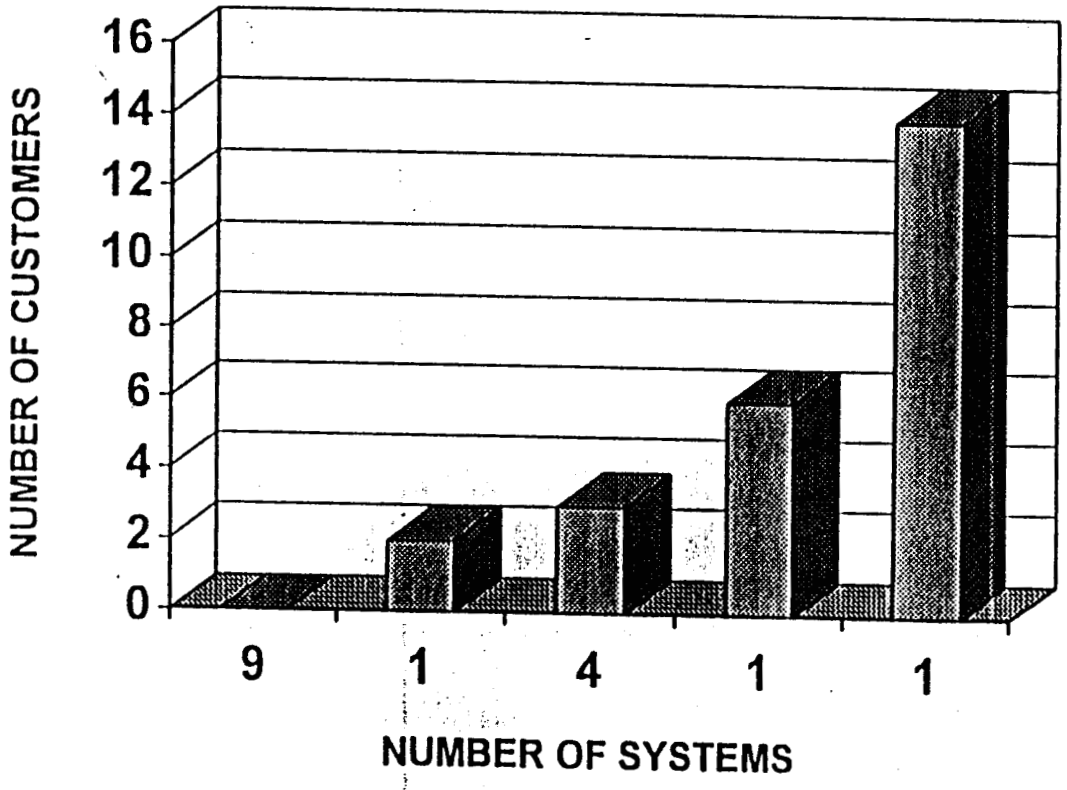
- RELOCATE APPROXIMATELY 50% OF REDCAP CAPABILITIES TO EDWARDS AFB, CA
- INTEGRATE HARDWARE-IN-THE-LOOP AND INSTALLED SYSTEMS TEST FACILITIES

BRAC did not consider
$1.3M to reconfigure
Calspan facility to house test
before AF
(floor in BAF) 700,000 MILCON at Edwards
2M add

REDCAP RATIONALE

- LOW PROJECTED WORKLOAD (10% OF CAPACITY)
- BASIC INFRASTRUCTURE IS DUPLICATED AT OTHER T&E FACILITIES
- MOST TESTING CAN BE ACCOMMODATED ELSEWHERE
- INCREASES T&E CAPABILITIES FOR INTEGRATED AVIONIC SUITES
- SAVES I&M AND O&M FUNDS
- CO-LOCATES GROUND AND OPEN AIR CAPABILITIES FOR SYNERGISM
- NON-CORE T&E ACTIVITY

REDCAP UTILIZATION



1992 - 1994

Approximately 25 customers used 7 out 16 systems.

OUTLINE

- AF EC T&E CAPABILITIES
- REDCAP
- AFEWES
- EMTE
- SUMMARY

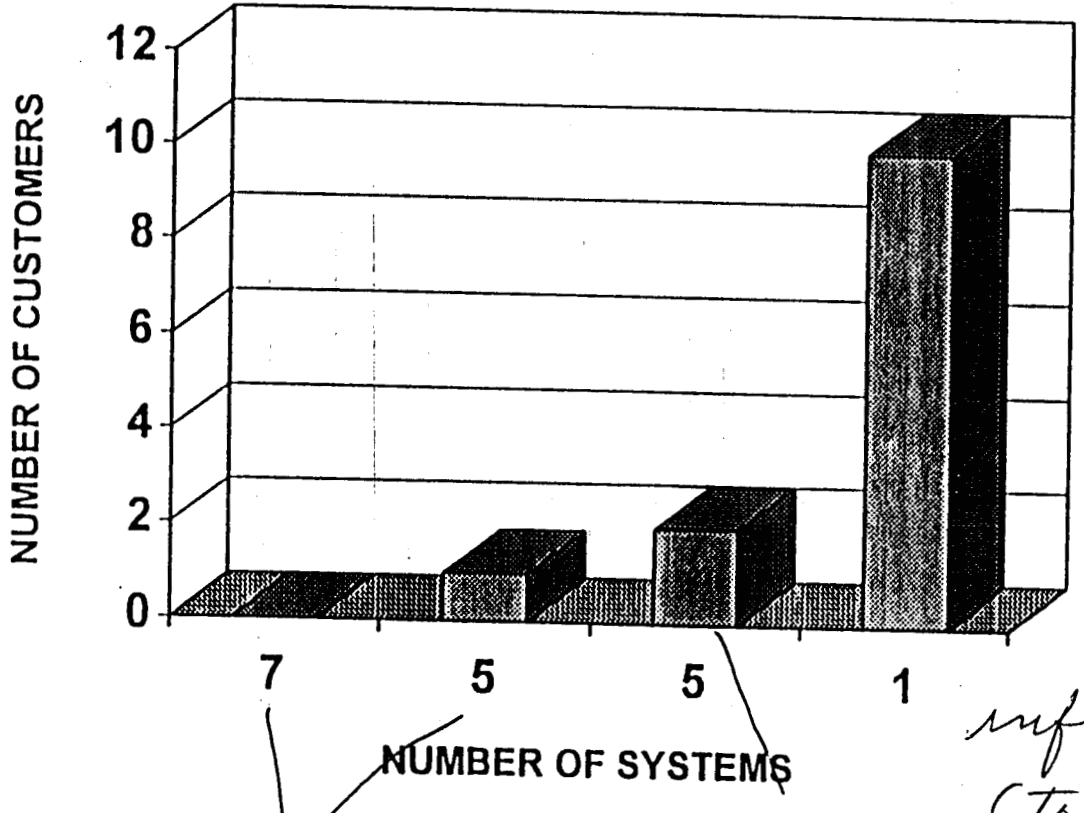
AFEWES PROPOSAL

- RELOCATE APPROXIMATELY 65% OF AFEWES CAPABILITIES
  - » RADIOFREQUENCY CAPABILITIES TO EDWARDS AFB, CA
  - » INFRARED CAPABILITIES TO EGLIN AFB, FL (complement GWEF)
- INTEGRATE HARDWARE-IN-THE-LOOP AND INSTALLED SYSTEMS TEST FACILITIES

AFEWES RATIONALE

- LOW PROJECTED WORKLOAD (28% OF CAPACITY)
- BASIC INFRASTRUCTURE DUPLICATED ELSEWHERE
- MOST TESTING CAN BE ACCOMMODATED ELSEWHERE
- INCREASES T&E CAPABILITIES FOR INTEGRATED AVIONIC SUITES
- SAVES I&M AND O&M FUNDS
- CO-LOCATES GROUND AND OPEN AIR CAPABILITIES FOR SYNERGISM
- NON-CORE T&E ACTIVITY

AFEWES UTILIZATION
FY 92-94



Mothball

to Edwards

infrared lab *
(to GWEF) move
~15 % of people
$6 M
* 2.1 Million
(floor in BAF)

OUTLINE

- AF EC T&E CAPABILITIES
- REDCAP
- AFEWES
- EMTE
- SUMMARY

EMTE PROPOSAL

- RELOCATE 10 THREAT SIMULATORS TO NELLIS RANGE COMPLEX
- RETAIN 12 EMITTER-ONLY SYSTEMS AT EGLIN FOR TRAINING AND MUNITIONS TESTING
- EXCESS REMAINING 28 SYSTEMS

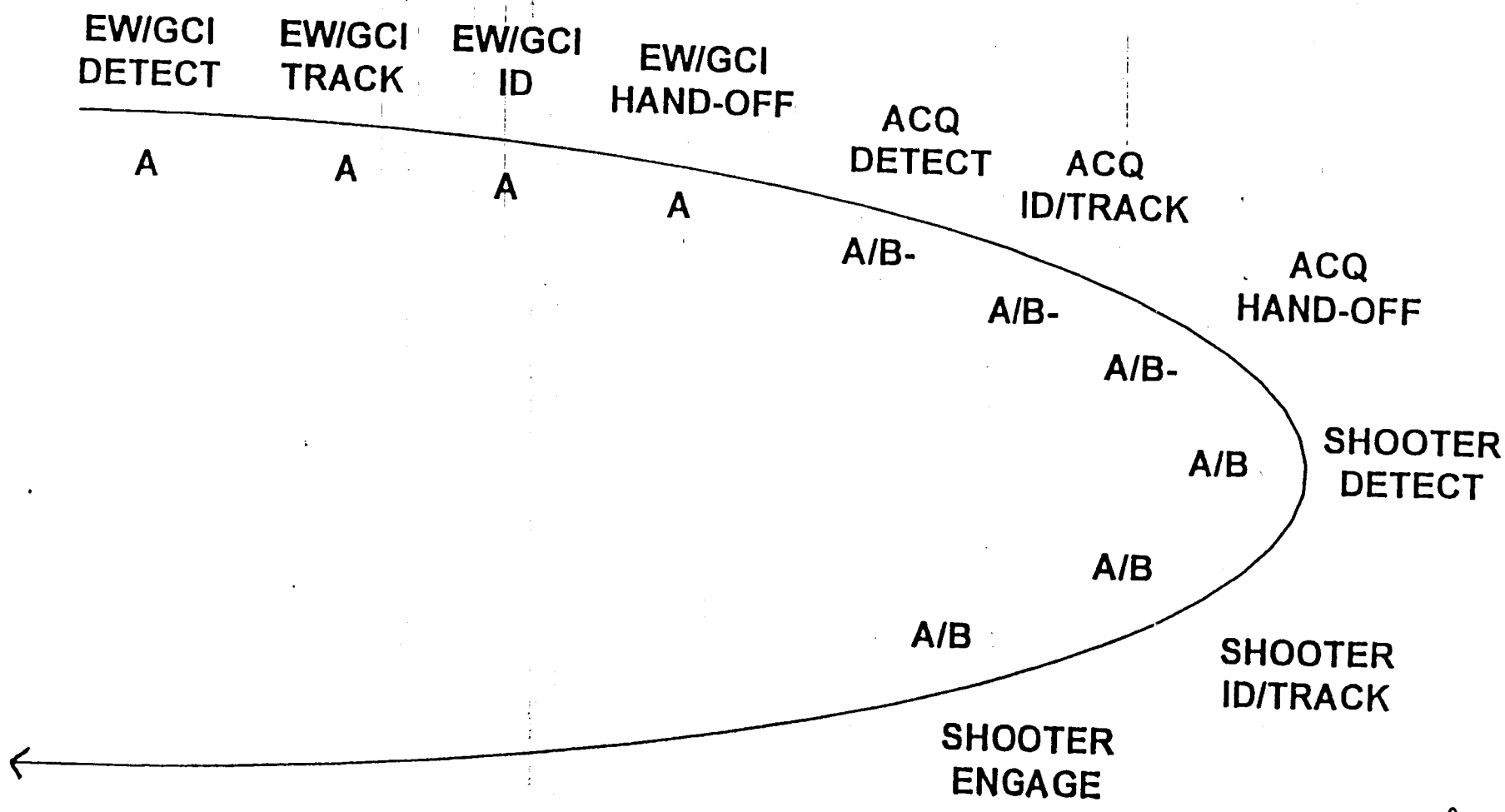
EMTE RATIONALE

- PROVIDES MORE OPERATIONALLY REALISTIC T&E CAPABILITIES
- MOST TESTING CAN BE ACCOMMODATED ELSEWHERE
  - SYSTEMS ARE 90% DUPLICATIVE
- SAVES I&M AND O&M FUNDS

AIR FORCE OPEN AIR EC RANGES

- NELLIS RANGE COMPLEX, NV
  - » DESIGNATED AS A BRAC RECEIVER SITE
- ELECTROMAGNETIC TEST ENVIRONMENT (EMTE), EGLIN AFB, FL
  - » BRAC FUNCTIONAL VALUE = 65

ENGAGEMENT PROFILE



A – Nellis
B – Eglin

CAP-COMP PPT 15

CAPABILITIES COMPARISON
(TYPES/NUMBER)

TYPE SIMULATOR	A	B
SHOOTERS	19/53	16/43
REC/REW	6/11	1/1
EW/ACQ/GCI	15/59	5/13
C^2	27/125	0/0
ACFT	3/12	0/0
A/A MISSILES	5/10	0/0
TOTAL	75/270	22/57
ACTUAL	86%	30%

types of systems → 19/53 ← number of systems

86% are "actual" systems

30% of "actual" systems

ADVANTAGES

in desert (Nellis)

- SECURITY
- DEPTH AND BREADTH
- TYPES AND NUMBERS OF SYSTEMS
- NETTING
- PROXIMITY TO GROUND TEST CAPABILITIES
- DECREASED COSTS AND CONCERNS TO SOME CUSTOMERS

DISADVANTAGES

(at Nellis)

- LIMITED VARIATION IN TOPOGRAPHY
- INCREASED COSTS AND CONCERNS TO SOME CUSTOMERS

$1.1 million per yr increase to AFSOC

lose Eglin quick turns

*

3 are Army (MISIC) not incl in initial - agreed on Nellis

4 arrived after BRAC

$ 6 M cost to move now vs $ 2.2 BRAC)

17 systems now vs 10

OUTLINE

- AF EC T&E CAPABILITIES
- REDCAP
- AFEWES
- EMTE
- SUMMARY

SUMMARY

- REALIGNMENT PROPOSALS REDUCE NUMBER OF ACTIVITIES SUPPORTING EC T&E
- CO-LOCATE HARDWARE-IN-THE-LOOP AND INSTALLED SYSTEMS TEST FACILITIES FOR INCREASED CAPABILITY TO EVALUATE INTEGRATED AVIONIC SUITES
- PROVIDES MORE OPERATIONALLY REALISTIC OPEN AIR TEST ENVIRONMENT
- SAVES OPERATIONS AND MAINTENANCE (O&M) AND IMPROVEMENT AND MODERNIZATION (I&M) FUNDS

PROJECTED COSTS/SAVINGS

original COBRAS

	1-TIME COST	STEADY STATE SAVINGS	20 YEAR SAVINGS
REDCAP	$1.7M	$0.9M/YR	$11M
AFEWES	$5.8M	$0.8M/YR	$5.8M
EMTE	$2.2M	$2.6M/YR	$31.4M

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09 Jun 95

Maj. Hoerlein

1992-93 Upgrade period

Hotbench - Not at ~~Edwards~~ REDCAP

---

* ~~Hll~~ Has the down-time that will follow this move accounted for ~~& test~~ projects that are scheduled to be tested?
  - Consider in light of ~~tran~~ projected training time, setup time, etc.

No increase ~~to~~ in operating cost for data linking.
  - Small one-time cost for line hook-up → charge to customer, charge based on duration of test.

There are no cost savings as a result of data linking. The gain in ~~data link~~ electronically linking comes from not losing any capabilities or incurring any costs that would result from the DoD ~~a~~ recommended action.

Estimated test workload requirements will decrease thru 1999 based on BOD Study (Feb 94).

REDCAP systems are scenario dependent

Do the simulators represent real threats?

Duplication → Our finding ~~tha~~ is that there is no ~~the~~ simulation duplication.

Over time the threat system has evolved and intel. data collection techniques have improved.
- SUAWACS system is reconfigurable.

Setup - Configuring the system to conform to that test.

Normally: How often and for how long a customer uses the facility.

Integrated v. Federated:
Integrated avionic suites can be partitioned.
~~Interface may be needed to~~
Integrated ~~sys~~ systems: Have to account for interfacing with each component.
Must have Hotbench → With linking you ~~can~~ ~~locate the~~ don't have to locate the HITL w/avionic suite (integrated suite)
Tolerate transport delays at this ~~step~~

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FACIMILE ELECTRO MAIL TRANSMITTAL

CLASSIFICATION UNCLASSIFIED FOR OFFICIAL USE ONLY	TRANSMISSION X IMMEDIATE ___ ROUTINE	PAGE ONE OF 3 PAGES
TO (Organization and Functional Address Symbol) AF TEAM BRAC	FAX NO. DSN	COMMERCIAL 703-696-0550
ATTENTION MR STEVE ACKERMAN	VOICE NO. DSN	COMMERCIAL 703-696-0504
FROM (Organization and Functional Address Symbol) Electronic Warfare Directorate 412 TW/EW 95 E North Base Road Edwards AFB CA 93524-8370	FAX NO. DSN 525-7779	COMMERCIAL (805) 275-7779
	VOICE NO. DSN 525-7610	COMMERCIAL (805) 275-7610

REMARKS

RELEASER'S SIGNATURE	DATE	TIME
COL WES NEIDENREICH, USAF	2 MAY 1995	1600

1. The level of workload as related to overall capacity at REDCAP and AFEWES [or any other test and evaluation (T&E) facility] is highly dependent upon how it is measured. If measured in terms of overall hardware use (as was done using the BRAC methodology), present utilization of REDCAP and AFEWES is very low (13 and 36 percent, respectively, and anticipated to decrease to 10 and 28 percent based upon workload projections). The BRAC methodology recognized that test planning, data reduction and analysis, etc, are important parts of testing and usually take significantly more time than actual test conduct; however, these aspects of T&E are generally personnel (vs facility) limited, and they can often be accommodated separately from the test facility.

Both REDCAP and AFEWES are composed of several test capabilities (16 and 18 component capabilities, respectively). The BRAC methodology recognized that, although a couple of these capabilities enjoy relatively high customer demand, overall it would be misleading to equate general facility utilization to that usage associated with the most used component. This is especially true for REDCAP and AFEWES, since most of their capabilities have had no or one customer in the past few years. For example, nine of REDCAP's test capabilities have not been utilized by a single customer in the past three years; the same is true for seven of AFEWES' capabilities.

2. Electronically linking REDCAP and AFEWES to themselves or to other test facilities does not necessarily result in lost data, but it does result in some data delay. Depending upon the purpose of the test, resulting data delays may or may not be of concern. For example, if REDCAP is linked for the purpose of providing simulated Integrated Air Defense System (IADS) cueing to terminal threats, resulting data delays should not cause problems since IADS command and control is highly people-dependent and human interactions (by their nature) are slower than electronically transferred data. However, linking terminal threat simulators to a remote test facility for the purpose of evaluating electronic countermeasures is infeasible because resulting data latency adversely impacts responses of the system under test.

The real value of linking depends upon its impact to the electronic warfare (EW) test process. Although the technical feasibility of linking REDCAP and AFEWES during live-flight exercises was demonstrated over three years ago, the resulting usefulness was such that not a single test customer has requested it.

3. Approximately 44% of the equipment at REDCAP and 50% of the equipment at AFEWES would have to be moved in order to effectively conduct EW T&E. Infrastructure currently available within the AF Flight Test Center to accommodate the REDCAP mission includes the overall facility (some MILCON is needed for work in the existing building), scenario and environment generation capability, data analysis computers, host capabilities for the system under test, and the ability to conduct hardware-in-the-loop testing against threat radars netted together into a simulated IADS.

4. The ISTF capabilities at Edwards AFB and Pax River NAS are similar in some regards and disparate in others. For example, the ISTF capability at Pax River has more advanced

instrumentation (e.g., signal generation and environment monitoring) than currently exists in the Avionics Test and Integration Complex (ATIC) at Edwards. The ECIT program will upgrade the instrumentation in the ATIC; however, most of the ECIT funds are required for joint Air Force/Navy efforts to develop infrared, radar target, and communications/navigation/identification test capabilities that do not exist in any ISTF.

In terms of facilities, the ATIC is more capable than the ISTF at Pax River because of the former's ability to accommodate large (bomber and cargo) size (or multiple fighter size) aircraft. Thus, incorporating, REDCAP and AFEWES capabilities into the ATIC would make them available for testing aircraft of all sizes, while moving the HITL missions to Pax River would restrict their use to only single fighter-size vehicles. Additionally, BRAC COBRA analysis shows Edwards to be the most cost-efficient location to receive the REDCAP and AFEWES HITL missions.

5. Although initial BRAC estimates did not include any MILCON at Edwards AFB, subsequent site visits could not locate sufficient existing floor space (that area thought to be available is required for future ECIT equipment). Thus, a floor would have to be added in a pre-existing structure to accommodate the REDCAP and AFEWES missions; this will require $2.8M in MILCON, which has been input into the BRAC COBRA analysis.

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June 7, 1995

Dear Mr. Haines:

Item #1 (upper right-hand corner) are questions raised by the Community with responses by the Air Force. (Note: The Community points are bolded)

Item #2 are questions to the Electronic Combat people at Eglin AFB. The responses to the questions are on the second and third pages.

The differing cost estimates between the Air Force and the Community are based on the amount of equipment each side asserts is needed to be moved to meed projected test requirements.

My questions:

1. What specific synergism would result from the collocation of these HITL systems on an ISTF facility with an Open-Air Range? (Here, the Air Force speaks of eliminating "costly duplication of infrastructure." They further argue that "transport delays cannot be tolerated by highly integrated electronic suites of future systems." -- Note the highlighted section on Item #1

2. What gains from the collocation of the AFEWES and the REDCAP test simulation systems can be overcome by data-linking?

3. What costs, in terms of 'real-time' loss of data during a test are associated with data-linking?

4. Would any of the tests connected with the simulation systems proposed to be transferred to Edwards be less effective if data linking had to be used to transfer information? (See, "REDCAP Systems to Move")

5. Are the concerns over the illicit interception of information that are associated with data-linking valid, and are they easy to overcome?

ANSWERS TO BRAC QUESTIONS

1. **Question:** What specific synergism would result from the collocation of these HITL systems on an ISTF facility with an open-air range? (Here, the Air Force speaks of eliminating "costly duplication of infrastructure." They further argue that "transport delay cannot be tolerated by highly integrated electronic suites of future systems.")

Answer: If these three facilities are to be linked electronically, some management efficiencies would undoubtedly result from having them all report to the same organization. Moreover, test planning and coordination might be easier if they were all in the same place. Technically, however, there are no meaningful synergisms. Even if all three facilities were at Edwards, they would still be linked electronically; the difference is that the linking would be over much shorter distances (hundreds of yards instead of hundreds of miles) with much shorter inherent transport delays. However, since the transport delays associated with the current locations are tolerable (see answers to Questions 2, 3 & 4), the linking of the facilities would be transparent to a user (i.e., he won't be able to tell the difference between linking and collocation).

The Air Force maintains that there will be a lot of synergy from the collocation of a HITL, an ISTF, and an open-air range. Their concept goes by the name of ***"one-stop shopping,"*** which sounds appealing but in reality has little substance. The theory behind the concept is that it would be cheaper and easier for test customers (i.e., weapon system program offices, for the most part) to get all their testing at the same place rather than go to one place for HITL testing, another for ISTF testing, and yet another for open-air testing. *And that assumption would undoubtedly be true if all the different types of testing could be done during a single visit to the designated test site*. However, the reality is that the different types of tests occur at different phase points in the development of the system, *widely separated in time*, which forces the customer to make a separate trip to the facility for each test. Given that he has to make separate trips, it doesn't matter very much in terms of cost or convenience whether he goes to the same place each time or to different places. The reason most SPOs try to avoid going to HITLs is not that the HITLs are in the wrong place, but that *it means an extra trip for them. Cutting out the HITL testing altogether* is what really appeals to them, because it saves them cost and schedule, and--though this is never openly admitted--it avoids a potential embarrassment, since the intense scrutiny which HITL testing provides may reveal latent deficiencies in their system which would otherwise remain hidden until operational testing, when they become somebody else's responsibility.

AF/TE insists that, since they can't force the SPOs to do the right thing, they are trying to lure them into doing it through the appeal of one-stop shopping. However, there is no evidence that the concept particularly appeals to any SPO, except possibly the F-22 SPO, and, even here, the rationale fails the test of logic. For integrated avionic suites, there is a valid concern that, if you do HITL testing the conventional way (i.e., by putting the entire

system under test in the HITL), you have to have an avionics hot bench at the HITL facility, and this means that the SPO has to buy an additional ship set of avionics as a test item. An entire ship set of avionics (i.e., all the avionics in the airplane) is very expensive, and the prospect of having to buy one more than he would otherwise need is enough to bias the SPO against HITL testing. However, it is in this exact situation that electronic linking affords one of its greatest payoffs: it allows the HITL to be linked to a place where an avionics hot bench has to be located for other reasons. This place is the system integration lab (SIL), which has to have an avionics hot bench (with a complete ship set of avionics) in order to perform its primary mission of avionics integration testing. Most aircraft programs have two SILs, a contractor SIL, located at the integrating contractor's plant, and an Air Force SIL, located in the IFAST at Edwards AFB, CA. The HITL could be linked to either or to both. Ironically, under the concept of one-stop shopping, even if the HITL were moved to Edwards AFB, it would still have to be linked to the IFAST (from one building to another on the same base), and the test would have to be partitioned in exactly the same way as if the HITL were in Fort Worth or Buffalo. The only difference would be that transport delay would be much less. However, since transport delay is not a problem, this difference is of little consequence, and the location of the HITL would be transparent to the user. What *would* make a difference to the user is that--in either case--HITL testing would be piggybacked onto avionics integration testing conducted at an existing SIL and using an avionics hot bench that he has to build anyway, for other reasons.

This brings us back to the original conclusion that collocation affords no vital synergies, and the one-stop shopping concept is bogus. Since linking is cheaper than collocation, it makes sense to link the HITL facilities from their present location rather than to relocate them and then link them. The cost and technical rationale of this argument has been explained numerous times to the Air Force, but AF/TE persists in its course of trying to please the SPOs and listening to the advice of the AFFTC on how to do so.

2. **Question:** What gains from the collocation of the AFEWES and the REDCAP test simulation systems can be overcome by data-linking?

Answer: Technically, all of the gains afforded by integrating AFEWES and REDCAP with another facility (or with each other) can be realized by electronic linking, as well as by collocation. The difference is in the cost: linking is an order of magnitude cheaper. Linking does impose some constraints on how the test is configured (i.e., which pieces of the system under test are located at each site), but these constraints are manageable and do not compromise the gains achievable from integration.

3. **Question:** What costs, in terms of "real-time" loss of data during a test are associated with data-linking?

Answer: None. Analysis **and tests** conducted to determine the impact of transport delay on a distributed (i.e., remotely linked) test facility indicate that, even for transcontinental distances, transport delays are tolerable. If there later proves to be some

COMMENTS ON AIR FORCE RESPONSES TO THE BRAC (#1)

Birmingham Regional Hearings

Point 3: The amount of projected savings or loss resulting from realigning EMTE, AFEWES, and REDCAP is highly dependent upon how much of each facility the Air Force plans to move. It is possible, however, to make two unconditional statements:

1. Virtually all of the capability at both facilities is still needed, and it is not duplicated at Edwards AFB or anywhere else. For a given simulator, need should be determined by the existence of the threat, not by frequency of simulator use. There are reasons why potential customers don't use the HITLs that have nothing to do with need. Moreover, when the Air Force claims duplication of capabilities, they mean that some of the AFEWES and REDCAP threats can also be simulated at **an open-air range**. This is not duplication, because a range is not interchangeable with a HITL.

2. If all the capability at AFEWES and REDCAP is moved, as required, the actual costs will exceed the Air Force estimates by nearly an order of magnitude. The Board of Directors (BoD) Study, conducted in FY94, estimated the cost for moving AFEWES (selected systems only) to be $50-60M and that for moving REDCAP to be $18-30M. Moreover, the recovery period will not be five years, or even 20 years, but something much longer. The Board of Directors study estimated 60 years, in the context of a larger move involving four facilities.

One way of reducing the moving costs below that estimated by the BoD is not to move the entire facility. This is what the Air Force is doing, using elimination of duplication and/or unneeded capability as their excuse. As stated above, this excuse is a total misrepresentation. Even so, however, the Air Force has seriously underestimated the cost of moving AFEWES. The Lockheed estimate for the capabilities the Air Force plans to move is $29.6M (this number scales to their estimate of $66.7M for moving the entire facility), as compared to the $8.9M estimated by the Air Force. For REDCAP, the Air Force estimate of $3M+ could be in the ballpark, given that the Air Force plans to move only a fraction of the capability, leaving most of the simulation hardware behind. However, the fact remains that both facilities will have been stripped of much of their vital capability.

On the issue of return on investment, there is a legitimate question of whether the Air Force can expect ***any*** annual operation and maintenance (O&M) savings from moving the facilities, again assuming the entire capabilities of both are moved. The current O&M line for each facility actually funds two efforts: (1) actual operating cost over and above that reimbursed by customers (on the average, this amounts to about $300K per year for each facility) and (2) routine upgrades that are not large enough to justify a separate upgrade

contract. Both these efforts will still be required after the move, and it's doubtful that a contractor can provide them more cheaply at Edwards AFB that at Fort Worth and Buffalo. Of course, the Air Force can make O&M appear to decrease by playing shell games, such as putting routine upgrades on a separate contract and funding it out of another line, but this artifice doesn't really save money, it merely moves it around. Another strategy could be to increase user charges, which sounds viable but doesn't save as much money as it would first seem. The reason is that an O&M account still has to be established to cover contingent liability (i.e., to pay the operating contractor during periods when usage is down), and, even if the money isn't required for operating costs, it will be used for something else, such as routine upgrades. The only sure-fire way of decreasing O&M is to move only part of the capability, so that there's less to maintain, and this appears to be what the Air Force is doing. Even so, the Air Force estimates are questionable. In the time period of the upgrades, the annual amount programmed for AFEWES O&M is $1.3M. The Air Force's projected savings is $800K annually--possible only by severely reducing the AFEWES capability. By comparison, the annual amount programmed for REDCAP O&M is only $900K, and the Air Force estimates they will save that entire amount. This savings can be realized only by eliminating REDCAP altogether or by operating and maintaining it entirely in house, which they don't have the capability to do, regardless of what they say. (All the other test facilities at Edwards AFB are contractor operated, and REDCAP--if it survives--will be no exception.)

The bottom line is that the Air Force cost estimates are highly suspect and, more importantly, reflect the intent to eliminate test capability that is badly needed and unique, not duplicative.

To obtain a more cosmic perspective on this issue, one needs to step away from the haggling over exact dollar figures and consider the following question: given that AFEWES and REDCAP represent a $400M investment to the Air Force, $150M of which has been spent during the last six years in the ongoing upgrade program, what sense does it make for the Air Force to spend a lot more money up front to do something that jeopardizes that investment for the sake of a highly dubious return that--at best--represents only a marginal fraction of the investment?

CALSPAN's Submittal on Real-time Electronic Digitally Controlled Analyzer Processor (REDCAP)

Points 1 & 2: The Air Force response reveals a fallacy that has plagued T&E for a long time and stands in the way of virtually every proposed modernization of the EC test infrastructure, namely, the myth that test customers (e.g., weapon system program offices) are the people who should specify what EC test capability the Air Force needs. In general, customers have neither the test expertise nor foresight needed to make this determination. Customers should specify only the functions and technology of the systems they are planning to build; it is then the job of the *test community* to specify the infrastructure needed to test them--*in accordance with the EC Test Process.* Regardless of the current rhetoric, most customers don't understand the implications of the EC Test Process or, if

they do, they resist it due to fear that it will add overhead to their programs. Hence, waiting for customers to articulate every needed improvement in the EC test infrastructure before it can be built means that the Air Force will constantly be playing catch-up. The situation is equivalent to letting sick people dictate the pace and direction of medical technology by dictating what medicines and machines can be used to treat them. In reality, patients tell doctors their symptoms, and the doctors determine the treatment. Ideally, this is the way things should work in the T&E world.

The fact that AF/TE appears to be going along with this myth is evidence of a hard political fact, namely, that the EC test facilities are run by Air Force Material Command (AFMC), and in AFMC **the SPO's rule!** The SPO's don't like the EC Test Process, so AFMC pays lip service to it while ignoring it in practice. The SPO's don't like AFEWES and REDCAP (the F-22, in particular, doesn't like REDCAP), so AFMC advocates disestablishing them. The whole issue of REDCAP utilization has little to do with the relevance of the REDCAP capability but a whole lot to do with the fact that the SPO's aren't following the EC Test Process. Rightly or wrongly, AF/TE believes they can't tell the SPO's what to do, and for big programs like the F-22 they're probably right. However, AF/TE hasn't really tried; instead, they've abandoned both the EC Test Process and the HITL facilities without a fight.

The contention that, "The combined effects of linking various facilities create transport delays that cannot be tolerated by highly integrated electronic suites of future systems." contains a grain of truth, but it is basically a red herring. There are some things that probably cannot be linked. For example, it appears impractical to link the actual RF signals; hence, a receiver must be collocated with the transmitter generating the signal it's receiving. Not only does this constraint have nothing to do with integrated avionics, it does not nullify the value of electronic linking (i.e., it's possible to live with this constraint and still do the tests that need to be done). Another constraint is that avionics sensors and their associated data processors (i.e., computers) may have to be collocated. This constraint does have something to do with integrated avionics (i.e., it is imposed by the high data rates of integrated avionics systems, in which situation awareness is generated by the fusion of multiple--and multi-spectral--sensor outputs); however, it's not a constraint that poses problems (i.e., there's no particular need to separate sensors and processors in the first place).

Finally, the statement, "The cost of maintaining a separate facility, with largely duplicative infrastructure, is not offset by linking." is totally inaccurate. First of all, REDCAP is an absolutely unique facility: it's not duplicated anywhere in the free world. The Air Force contention that REDCAP is duplicative is based upon the fact that a less robust simulation of an integrated air defense system (IADS) exists on an **open-air range**. Even if this range simulation were equivalent to REDCAP in density and flexibility (which it is not), **an open-air range and a HITL facility are not interchangeable!** They have different roles in the EC Test Process, and they are used at different times in the system development cycle. There is nothing in the HITL category at Edwards AFB (or elsewhere) that even remotely resembles REDCAP. Secondly, linking is cheaper than

relocation by a factor of ten--providing all the necessary parts of REDCAP (i.e., virtually all of them) are moved to the new location. Of course, if the Air Force scraps enough of the REDCAP components, they can drive the moving costs down to almost any level they like. This seems to be what is happening; however, moving only the components identified by the Air Force would reduce the capability of REDCAP to an almost meaningless level.

Point 3: REDCAP is currently 100% dedicated to the AFOTEC B-2 test. The reason that only the off-line system is being used at present is that it is the computer used to program the scenario, and the B-2 test is currently in the test preparation phase, in which a threat laydown is being programmed into the computer. In the FY 95 Appropriations Act, Congress added money--with accompanying language--to automate this process, but OSD saw fit to withhold this money, thereby necessitating the manual programming of threat laydowns for the B-2 and any subsequent tests until the money is released.

In its response, the Air Force appears to make three key points, both of them misleading. The first is that, for REDCAP to be considered "utilized" at any point in time, all its components have to be in use. This perception is simply not consistent with the way REDCAP is partitioned. REDCAP is a single, comprehensive simulation of an IADS, which, though it has many components, cannot be subdivided into multiple IADS, each dedicated to a separate test. In other words, the IADS can only serve one customer at a time, even if not all of its components are needed to simulate the environment for that particular customer.

Note: C2 and React AI → Computer that run these test systems control the R1-R5 radars.

The second point the Air Force tries to make is that it is not fair to count test preparation time as utilization time. The logical response to this assertion is, "Why not?" Test preparation is an integral part of the EC Test Process, it's necessary to satisfy the customer's requirements, it utilizes the facility, and the customer is charged for it. Hence, the accurate metric of REDCAP utilization is the percentage of time a customer is in the facility. At any point in time, if there's a customer in the facility, it's being utilized; if there's no customer in the facility, it's not being utilized. To try to measure utilization on a per-component basis is totally meaningless.

The third Air Force point is the implication that, if a given REDCAP component (or capability) isn't being used much, we can afford to do away with it. This is very dubious logic, if only because of the fact that the Air Force isn't enforcing its own EC Test Process, as discussed under Points 1 & 2. A more valid litmus test for determining the need for a particular capability is whether or not it simulates a threat that exists in the real world and whether or not we may ever have to face that threat in combat. If the threat is "out there," and if it is in the hands of a potential adversary (or may be sold to a potential adversary), then we probably need the capability to test against it. This criterion is particularly valid for EC, because EC is needed just as much against third-world countries as major powers, and third-world countries have a lot of the older threat systems.

Subjective

AF call, not BRAC

Finally, the Air Force estimate of 10% utilization for REDCAP, projected into the future, is totally inaccurate and misleading. This estimate is based upon years in which REDCAP usage was down--due to primarily to the ongoing upgrades. Moreover, it ignores the years in between, and it applies a totally artificial and inappropriate scaling factor (72%) to obtain the future projection. More realistic estimates can be obtained from the Board of Directors (BoD) Study:

Year	FY 88-93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00
Utilization	34.2%	50%	60%	70%	75%	80%	80%	80%

All of these utilization estimates, however, ignore the most critical factor of all, namely, that the Air Force is not enforcing the EC Test Process. If it were, REDCAP would have more customers than it could handle, and low utilization would not be an issue.

Points 4 & 5: I can neither confirm nor deny that the AFFTC is requesting additional MILCON to accommodate REDCAP, but understand that Col Heidenreich has increased his estimate of the moving cost by including $700K for MILCON. The amount of MILCON actually required to accommodate REDCAP at the ECIT depends upon the fraction of REDCAP that is to be moved. Calspan's $6-7.8M figure is based upon two assumptions: (1) that all of REDCAP will be moved and (2) that the Air Force will build a separate building at Edwards AFB to house it. Obviously, the second assumption is somewhat dependent upon the first. Given what we know about the Air Force's intentions, the small fraction of REDCAP that is earmarked for relocation will probably not justify a separate building. It could probably be accommodated within the empty space inside the Benefield Anechoic Chamber (BAF) hangar. Of course, MILCON would be required to convert that space to a laboratory facility suitable for housing REDCAP. Presumably, this is the MILCON that Col Heidenreich has added to his estimate. Whatever the real number may be, I agree that, for the small fraction of REDCAP that the Air Force plans to move, it's less than the Calspan projection.

The problem with the above MILCON argument is that it skirts the real issue of how much of REDCAP the Air Force really needs to keep, which, I maintain, is essentially the whole facility. The contention that there is another IADS test capability which can accommodate REDCAP's workload is a deliberate misrepresentation. The capability the Air Force refers to when it makes this assertion is not the BAF (which has nothing remotely resembling REDCAP, nor will it have even after the ECIT upgrade is complete), but rather an open-air range. The deliberate misrepresentation results from two known facts: (1) the threat environment of the range is much less robust than that of REDCAP, and (2) a range and a HITL facility are not interchangeable. Even though they have been told these facts repeatedly, AF/TE continues to listen to the AFFTC, which continues to deny them.

Point 6: The Air Force estimate may or may not be valid for the small fraction of REDCAP which has been identified for relocation. Certainly, the COBRA methodology

appears to be totally divorced from reality and should not be expected to give an accurate answer, except by accident. To even approach the right answer, one has to start with grass-roots estimates from the contractor. However, the Calspan estimate is probably too high for the portion of REDCAP the Air Force plans to move.

Once again, however, the critical factor in any cost estimate is the issue of how much of REDCAP needs to be relocated. Since REDCAP it unique (i.e., no duplication exists), I firmly believe that virtually the entire facility should be preserved in any realignment. For moving the entire facility, I believe Calspan's estimate of $6.5M for disassembly, moving, reassembly and test is, if anything, **low**! However, if all of REDCAP could be accommodated in the present BAF hangar (doubtful, particularly when AFEWES is taken into consideration), Calspan's estimate of the MILCON costs ($6.0M for a new building) might be high.

COMMENTS ON AIR FORCE RESPONSES TO MR. ACKERMAN'S QUESTIONS (#2)

1. What knowledge do you have on the level (or percentage) of workload to total available capacity at the REDCAP and AFEWES facilities?

The Air Force response to this question, like their estimates provided with the original recommendation, is inaccurate and misleading.. These estimate (10% for REDCAP and 28% for AFEWES) were based upon years in which facility usage was down--due to primarily to the ongoing upgrades. Moreover, it ignores the years in between, and it applies a totally artificial and inappropriate scaling factor (72%) to obtain the future projection. For REDCAP, more realistic estimates can be obtained from the Board of Directors (BoD) Study:

Year	FY 88-93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00
Utilization (REDCAP)	34.2%	50%	60%	70%	75%	80%	80%	80%

The same BoD Study documents 100% utilization of AFEWES. Although this is misleading, because it counts some hours the Air Force paid for but didn't use, it is a lot closer to reality than the estimate submitted to the BRAC. The real numbers can be obtained from monthly reporting data submitted from Lockheed to the Air Force (i.e., the AFEWES-REDCAP Program Office at Eglin AFB, FL) in accordance with the program office's own formula for measuring utilization:

Year	Prior Year	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98
Utilization (AFEWES)	??	52.4%	88%	92%	??%	??%	??%	??%

As previously discussed, the Air Force estimates appear to be based upon two inappropriate assumptions:

A. For a facility to be considered fully "utilized" at any point in time, all its components have to be in use. If only some of its capability is in use over a period of time, it only gets credit for fractional utilization during that time period. **Every test facility** would show low utilization if subjected to this unrealistic standard.

B. Test preparation time is not counted as utilization time. This rule can't help but make the facility seem underutilized, since test preparation inherently takes a lot more time than the test itself. However, it is essential to the test, and it

occupies the facility. Customers recognize this and have no problem with it (i.e., they pay for the preparation time as well as the actual test time.)

2. When conducting live-flight exercises, does electronically-linking the REDCAP and the AFEWES simulation systems result in a real-time loss of data?

It is true that time delays are more critical for the end-game simulations (which seems to be what the Air Force is talking about when they use the term, "evaluating electronic countermeasures") than they are for the command and control simulations. However, the sixty-four-dollar question is still, "Can the delays resulting from the linking of facilities be tolerated?" For a long time, we weren't sure of the answer to this question. Now we believe the answer is an unequivocal, "**Yes!**" Recent analysis **and tests** conducted to determine the impact of transport delay on a distributed (i.e., remotely linked) test facility indicate that, even for transcontinental distances, transport delays are tolerable. If there later proves to be some unforeseen application in which the transport delay is not tolerable, an error predictor-corrector code can be used to mitigate the effect. The use of an error predictor-corrector code has already been tested in a transport delay experiment at AFEWES recently and was found to work well, as predicted.

3. Based on your knowledge of the REDCAP and AFEWES missions, as well as infrastructure in place at both Edwards AFB and NAWC Patuxent River, what percentage and type of infrastructure would be required to be moved in order to effectively conduct the mission?

What infrastructures are in place at Edwards AFB and NAS Patuxent River to adequately house and operate the necessary equipment to effectively carry out the REDCAP mission?

I'm fairly confident that Edwards AFB couldn't accommodate all of AFEWES and REDCAP without a new building. However, if the AFFTC converts the empty space in the BAF hangar into laboratory facilities, they might be able to accommodate the fraction of AFEWES and REDCAP that they actually plan to move. Incidentally, I don't believe that this fraction in as high as the percentages cited in the Air Force response (44% for REDCAP and 50% for AFEWES). Having seen the lists of equipment for both facilities, I don't believe the percentages are nearly that high, either in terms of floor space or capability (as measured in any meaningful way). **This brings us back to the point that, regardless of whether Edwards AFB can accommodate the equipment or not, the realignment proposed by the Air Force effectively <u>dismantles</u> the AFEWES and REDCAP facilities.**

As for Patuxent River, there is insufficient room <u>in the laboratory areas that I have seen</u> to accommodate even the fraction of AFEWES and REDCAP that the Air Force plans to move. There may, however, be available space elsewhere, that I have not seen, which could accommodate them.

4. The Test & Evaluation Joint Cross-Service Group has noted that the collocation of HITL and ISTF capabilities "allows for the sharing of costly resources." Given the Electronic Combat Integrated Test (ECIT) program upgrade at the Avionics Test and Integration Complex at Edwards AFB, what differences in capabilities exist between Edwards and Patuxent River, and which facility is more capable of integrating the REDCAP and AFEWES's HITL missions?

In terms of building space to accommodate AFEWES and REDCAP, I don't know which location is more capable. However, I consider this the least important factor in making a choice. In every other respect, I disagree with the Air Force response: Patuxent River is, by far, the facility best capable of integrating the HITL missions of AFEWES and REDCAP. The reason is that Patuxent River is an EC test center, whereas Edwards AFB is not. Edwards is a *flying qualities and performance test center*, and over the last 10-15 years, it has picked up an *avionics integration test* mission, but they don't know a thing about EC. Patuxent River has been one of the Navy's two primary EC test centers (along with China Lake, CA) since time immemorial. Moreover, Patuxent River already has a limited HITL capability of its own. The ECIT upgrade and the presence of the large anechoic chamber at Edwards are both red herrings, because they pertain to an ISTF mission, not a HITL mission. When systems come to a HITL, they aren't integrated onto the host aircraft yet, so they have no need for an anechoic chamber--large or otherwise.

Furthermore, my belief (based upon rumor and acquaintance with some of the people involved) is that, if AFEWES and REDCAP were to be transferred to Navy management, they wouldn't be moved physically to Patuxent River. Some of the management there appreciates the virtues of linking, and, if allowed to have their way, I think they would choose to link with the two facilities at their existing locations. As you probably know, an initiative to link REDCAP to Patuxent River is already underway. This effort is directed by Congress, funded by OSD, and managed by Patuxent River.

Of course, in the final analysis, any Navy relocation plan could be driven by politics instead of technical merit and cost, just as the Air Force plan has been.

5. To your knowledge, is there any MILCON planned at Edwards to accommodate the AFEWES and REDCAP missions, or are these missions to be housed and operated in pre-existing structures?

I can't comment on the validity of the $2.8M estimate for converting empty space within the current BAF hangar into laboratory floor space (assuming that's what the Air Force response alludes to). Originally, there was no MILCON in the Air Force estimate; then, I heard that $700K was added; now, they're saying $2.8M. What this indicates is the people who did the original analysis didn't have a handle on the problem, and the Air Force was willing to mislead the BRAC by submitting a totally fabricated analysis. Be that as it may, however, if the fraction of AFEWES and REDCAP the Air Force plans to move will fit into the BAF hangar, $2.8M may be a reasonable estimate for making the necessary modifications. However, if the Air Force moved the entire capability of the two facilities,

it would not fit into the BAF hangar but rather require a new building, at a cost of considerably more that $2.8M. For this contingency, I believe the cost would probably be even higher than the Calspan estimate of $6.0M, which was just for REDCAP alone. The addition of AFEWES requires a lot more floor space.

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REDCAP NON-UTILIZATION

No Customers - Past Three Years

- SUAWACS
- EW/HF
- EW
- PEG
- SCIF Gateway
- Remote Interface
- CVDL
- SSDL
- UDL

Response from REDCAP (CALSPAN) through Lt Col Sam Vellgrens (REDCAP PROGRAM MGR) office to 412TW/EW study team.

USAF REDCAP - ART INPUT
4/7/95

Q. 1 What is the utilization by system, by test agency for the past three years?

Precision RTJ Paths
- Contract Status: Completed
- Assets Required: ~~SUAWACS, OL~~ Support
- Organization: AFDTC/46TW
- Performance Period: 2/94 - 1/95

✓ CID Tech Support
- Contract Status: Completed
- Assets Required: OL Support
- Organization: ESC/ZJI
- Performance Period: 1/3/94 - 3/31/95

TO&M Management
- Contract Status: Completed
- Assets Required: OL Support
- Organization: AFDTC/46TW
- Performance Period: 10/1/93 - 9/30/94

TO&M Maintenance
- Contract Status: Completed
- Assets Required: All Hardware and Software
- Organization: AFDTC/46TW
- Performance Period: 10/1/93 - 9/30/94

✓ MLAT Modeling & Simulation I
- Contract Status: Completed
- Assets Required: System Control, Ground C2, Reactive AI, OL Support, Voice Switch
- Organization: AFOTEC/ST
- Performance Period: 8/26/94 - 9/30/94

✓ F-117 CLOAR OT&E Prep
- Contract Status: Completed
- Assets Required: System Control, Ground C2, Reactive AI, OL Support, Voice Switch
- Organization: SMALC/OLA
- Performance Period: 8/23/94 - 9/30/94

✓ AFMC Exploitation
- Contract Status: Completed
- Assets Required: OL Support
- Organization: AFMC
- Performance Period: 10/10/93 - 4/10/94

USAF REDCAP - ART INPUT
4/7/95

Q. 1 What is the utilization by system, by test agency for the past three years? cont

C3 Tiger Team
- Contract Status: Completed
- Assets Required: OL Support
- Organization: AFOTEC
- Performance Period: 10/10/93 - 4/13/94

REDCAP Net Enhancements
- Contract Status: Completed
- Assets Required: OL Support
- Organization: AFDTC/46TW
- Performance Period: ~~5/93~~ - 7/94

Warlock Testing
- Contract Status: Completed
- Assets Required: System Control, OL Support, R2, R4, R5, Radar Switch
- Organization: ESD/Lockheed Sanders
- Performance Period: 6/13/93 - 10/31/93

Millimeter Wave Technology
- Contract Status: Completed
- Assets Required: OL Support
- Organization: AFECO/EWT
- Performance Period: 8/22/93 - 4/3/94

B-2 Testing
- Contract Status: Completed
- Assets Required: System Control, Ground C2, OL Support, Voice Switch, R2, R4, R5, Radar Switch
- Organization: AFOTEC/ST
- Performance Period: 9/19/93 - 7/24/94

Warbreaker Support
- Contract Status: Completed
- Assets Required: OL Support
- Organization: AFDTC/46TW
- Performance Period: 10/93 - 12/93

Weapons Systems Test Capabilities
- Contract Status: Completed
- Assets Required: OL Support
- Organization: AFOTEC
- Performance Period: 11/93 - 1/94

- Assets Required: OL Support
- Organization: AFDTC/46TW
- Performance Period: ~~10-5-92~~ - 10/1/93

USAF REDCAP - ART INPUT
4/7/95

Q. 1 What is the utilization by system, by test agency for the past three years? cont

TO&M Maintenance
- Contract Status: Completed
- Assets Required: All ~~Hardware~~ and Software
- Organization: AFDTC/46TW
- Performance Period: ~~10/5/92 - 10/1/93~~

~~AFMC Exploitation~~
- ~~Contract Status: Completed~~
- ~~Assets Required: OL Support~~
- ~~Organization: AFMC~~
- ~~Performance Period: 10/10/93 - 4/10/94~~

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REDCAP Net Enhancements
- Contract Status: Completed
- Assets Required: OL Support
- Organization: AFDTC/46TW
- Performance Period: ~~5/93 - 7/94~~

Tiger Team Support II
- Contract Status: Completed
- Assets Required: OL Support
- Organization: AFSC
- Performance Period: 10/11/92 - 11/1/92

SUAWACS Baseband Upgrade
- Contract Status: Completed
- Assets Required: ~~OL Support~~, System Control, SUAWACS
- Organization: AFDTC/46TW
- Performance Period: ~~5/92 - 3/93~~

IBM Computer
- Contract Status: Completed
- Assets Required: ~~OL Support~~
- Organization: AFDTC/46TW
- Performance Period: ~~6/92 - 3/93~~

IADS Database Training
- Contract Status: Completed
- Assets Required: ~~OL Support~~
- Organization: AFDTC/46TW
- Performance Period: 10/11/92 - 12/6/92

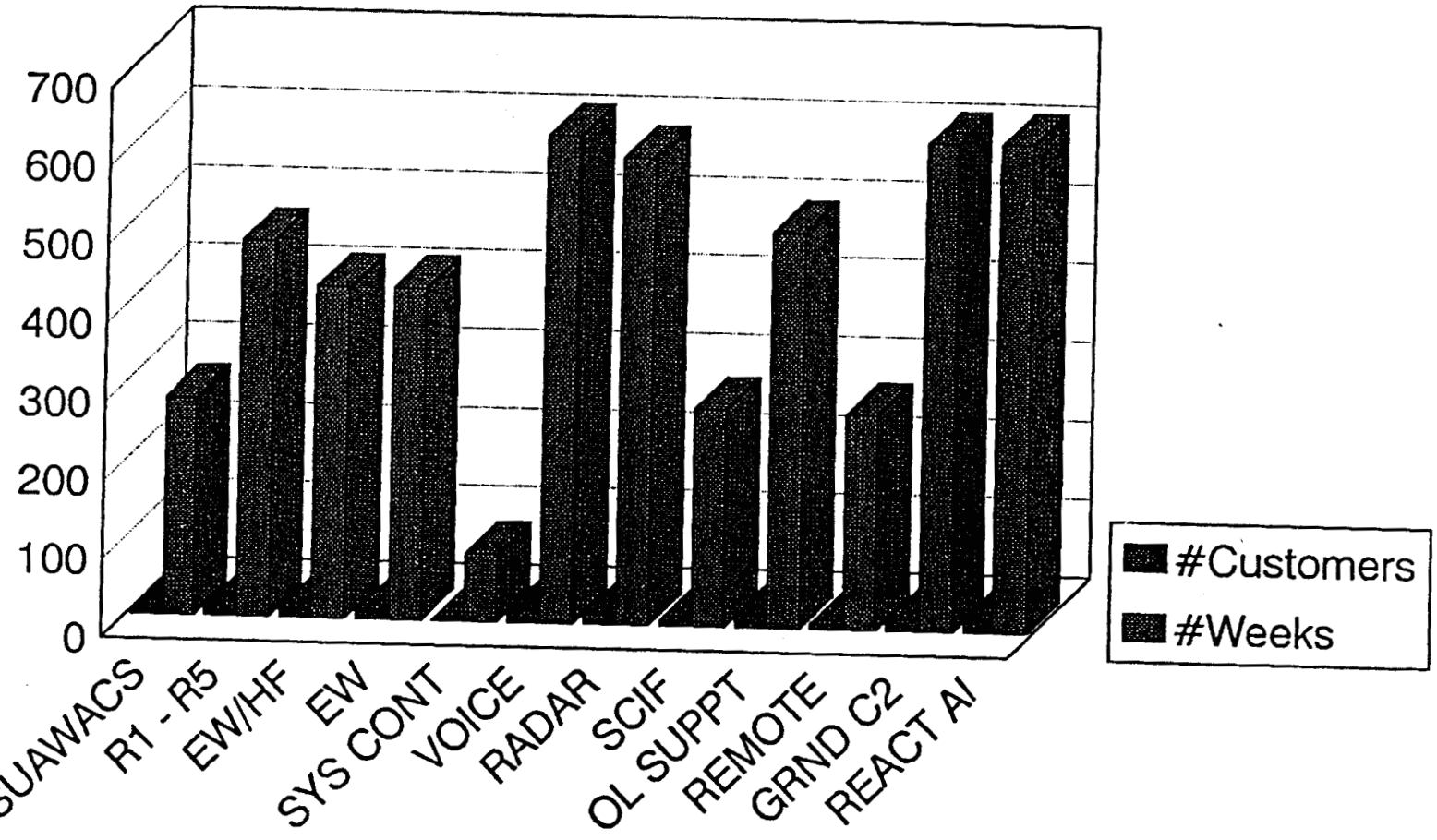
REDCAP WORKLOAD

Anticipated Customers

- Firm Customers - 3
  - Generally consistent
- Pending Customers - 3
  - Generally typical
- Future Customers
  - MUCH more ambitious

REDCAP FUTURE UTILIZATION

By System



	SUAWACS	R1 - R5	EW/HF	EW	SYS CONT	VOICE	RADAR	SCIF	OL SUPPT	REMOTE	GRND C2	REACT AI
#Customers	7	11	10	10	1	14	13	6	15	6	14	14
#Weeks	277	478	422	422	86	620	594	276	502	273	620	620

USAF REDCAP - ART INPUT
4/7/95

Q. 2 What is the utilization by system, by test agency projected for the next year?

This list includes all items (including completed ones) for GFY 95 and following years.

Precision RTJ Paths

Contract Status:	Completed	
Assets Required:	OL Support	
POC:	Maj Rick Hale	(904-882-3410)
Organization:	AFDTC/46TW	
Performance Period:	1/10/94 - 12/31/94	

Combat ID Technical Support

Contract Status:	On contract thru Apr - contract extension thru Sep in work	
Assets Required:	OL Support	
POC:	Ms Sue Angell	(617) 377-6540
Organization:	ESC/ZJI	
Performance Period:	1/3/94 - 4/30/95	

MLAT Modeling & Simulation I

Contract Status:	Nearing completion	
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, SCIF Support	
POC:	Capt Kurt Rinke	(505) 846-5328
Organization:	AFOTEC/ST	
Performance Period:	8/26/94 - 4/17/95	

F-117 CLOAR OT&E Prep

Contract Status:	On Contract	
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support	
POC:	Maj Doug Higgins	(916) 643-6935
Organization:	SM-ALC/QLA	
Performance Period:	8/23/94 - 4/24/97	

TO&M Management

Contract Status:	Ongoing	
Assets Required:	OL Support	
POC:	Maj Rick Hale	(904-882-3410)
Organization:	AFDTC/46TW	
Performance Period:	1/10/95 - 9/30/96	

USAF REDCAP - ART INPUT
4/7/95

Q. 2 What is the utilization by system, by test agency projected for the next year? cont

TO&M Maintenance
Contract Status: Ongoing
Assets Required: All hardware and software
POC: Maj Rick Hale (904-882-3410)
Organization: AFDTC/46TW
Performance Period: 1/10/95 - 9/30/96

F22 Inquiry Support
Contract Status: Completed
Assets Required: OL Support
POC: Maj Rick Hale (904-882-3410)
Organization: AFDTC/46TW
Performance Period: 1/10/94 - 1/31/95

LMLAT Modeling & Simulation II
Contract Status: Draft SOW delivered. Not currently on contract
Assets Required: ~~System Control, Ground C2, Reactive AI, Voice Switch, OL Support, R1...R5, EW/HF1...EW/HF8, EW1...EW9, SCIF Support~~
POC: Capt Kurt Rinke (505) 846-5328
Organization: AFOTEC/ST
Performance Period: 1/31/95 - 4/24/96

B-2 ASC/YS Modeling & Simulation
Contract Status: Contract award imminent
Assets Required: OL Support, SCIF Access
POC: Maj Keith Carter (513) 255-9682
Organization: ASC/YSDT
Performance Period: 5/1/95 - 2/26/96

Air Force Advanced Distributed Simulation
Contract Status: Awaiting funding
Assets Required: System Control, ~~Ground C2~~, Reactive AI, ~~Voice Switch, OL Support~~
POC: Capt Ron Wiegand (505) 846-6265 DSN 246-6256
Organization: AWC/DET 4 TACCSF
Performance Period: 1/19/95 - 12/8/95

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JADS Planning Support
Contract Status: On contract - extension likely
Assets Required: OL Support
POC: Lt Col Homer Jeffers (505) 846-4203
Organization: HQ AFOTEC JADS/JTF
Performance Period: 2/15/95 - 4/11/95

USAF REDCAP - ART INPUT
4/7/95

Q. 2 What is the utilization by system, by test agency projected for the next year? cont

JADS Link Development
Contract Status: Future
Assets Required: System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface
POC: Lt Col Homer Jeffers (505) 846-4203
Organization: HQ AFOTEC JADS/JTF
Performance Period: 11/1/95 - 6/30/97

2/12/97 - 10/28/97

JADS Correlation and Validation
Contract Status: Future
Assets Required: System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, R1...R5, EW/HF1...EW/HF3, EW1...EW3, PEG, SUAWACS Simulator
POC: Lt Col Homer Jeffers (505) 846-4203
Organization: HQ AFOTEC JADS/JTF
Performance Period: 10/1/96 - 6/30/98

JADS Mission Level Assessment
Contract Status: Future
Assets Required: System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, R1...R5, EW/HF1...EW/HF3, EW1...EW3, PEG, SUAWACS Simulator
POC: Lt Col Homer Jeffers (505) 846-4203
Organization: HQ AFOTEC JADS/JTF
Performance Period: ? -12/30/99

Air Force Advanced Distributed Simulation
Contract Status: Awaiting funding
Assets Required: System Control, Ground C2, Reactive AI, Voice Switch, OL Support
POC: Capt Ron Wiegand (505) 846-6265 DSN 246-6256
Organization: AWC/DET 4 TACCSF
Performance Period: 1/19/95 - 12/8/95

B-2 STRATCOM Penetration Test
Contract Status: Future
Assets Required: System Control, Ground C2, Reactive AI, Voice Switch, OL Support, SUAWACS, R1...R5, EW/HF1...EW/HF3, EW1...EW3
POC: Mr Bob Linnell (402) 294-1095
Organization: US STRATCOM/J5/CPC
Performance Period: 10/1/95 - 4/2/96

USAF REDCAP - ART INPUT
4/7/95

Q. 2 What is the utilization by system, by test agency projected for the next year? cont

✓JETTA

Contract Status:	Study effort on contract, awaiting funding for test effort
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, SUAWACS, R1...R5, EW/HF1...EW/HF3, EW1...EW3, Remote Interface
POC:	Ms Laura Knight (619) 553-3969
Organization:	Naval Research & Development Center
Performance Period:	11/1/95 - 4/30/96

✓B-2 MLAT III Penetration Analysis

Contract Status:	Future
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, R1...R5, EW/HF1...EW/HF3, EW1...EW3, Remote Interface, SCIF Support
POC:	Capt Kurt Rinke (505) 846-5328
Organization:	AFOTEC/ST
Performance Period:	2/1/96 - 2/21/97

✓F-117 CLOAR

Contract Status:	On Contract
Assets Required:	~~System Control~~, Ground C2, Reactive AI, ~~Voice Switch~~, OL Support, SCIF Support, ~~R1...R5, EW/HF1...EW/HW3, EW1...EW3~~
POC:	Maj Doug Higgins (916) 643-6935
Organization:	SM-ALC/QLA
Performance Period:	10/1/96 - 4/28/97

✓F22 CNI Test

Contract Status:	Unknown
Assets Required:	New Radar Simulator, SCIF
POC:	Maj Lhomond Jones(513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	6/1/97 - 7/31/97

USAF REDCAP - ART INPUT
4/7/95

Q. 2 What is the utilization by system, by test agency projected for the next year? cont

F22 FMS / REDCAP Test Phase I

Contract Status:	Unknown
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, R1...R5, EW/HF1...EW/HW3, EW1...EW3, SUAWACS
POC:	Maj Lhomond Jones(513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	10/21/96 - 10/17/97

F22 Baseline RCS Test

Only Have F-22 Leg.

Contract Status:	Unknown
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, R1...R5, EW/HF1...EW/HW3, EW1...EW3, SUAWACS
POC:	Maj Lhomond Jones(513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	2/12/97 - 10/28/97

F22 EC Effectiveness RCS Test

Contract Status:	Unknown
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, R1...R5, EW/HF1...EW/HW3, EW1...EW3, SUAWACS
POC:	Maj Lhomond Jones(513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	4/1/97 - 10/27/97

F22 FMS/REDCAP Test Phase II

Contract Status:	Unknown
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, R1...R5, EW/HF1...EW/HW3, EW1...EW3, SUAWACS
POC:	Maj Lhomond Jones(513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	6/8/98 - 11/27/98

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DOD ELECTRONIC COMBAT TESTING & EVALUATION

- BACKGROUND
  - EC EQUIPMENT EXPENSIVE, COMPLEX & SOFTWARE INTENSIVE FORCE MULTIPLIER
  - MUST TEST AGAINST MULTIPLE THREAT SYSTEMS WHICH ARE CONSTANTLY CHANGING
  - THREAT SYSTEMS, SIMULATORS & ACTUAL FOREIGN EQUIPMENT, MUST REPRESENT EXPECTED ADVERSARY CONFIGURATION
  - ACTUAL IADS & MULTIPLE AAA ENVIRONMENTS, MISSILES & GUNS, TOO EXPENSIVE TO DEPLOY - SIMULATION USED
  - OAR TESTING INSTRUMENTATION MUST BE ACCURATE ENOUGH TO MEASURE EC CAUSED TRACKING ERRORS & MISSILE MISS DISTANCE
  - TEST RESULTS MUST BE REPEATABLE TO ASSURE EC EFFECTIVENESS

DOD ELECTRONIC COMBAT TESTING & EVALUATION

- BACKGROUND (CONT)
  - QUESTIONABLE EC TESTING RESULTS DELAYED DEVELOPMENT, PROCUREMENT & DEPLOYMENT
    - » ALSO RESULTED IN INEFFECTIVE SYSTEM DEPLOYMENTS - ALQ-161
    - » CAUSED CONGRESSIONAL CONCERNS DUE TO EC SYSTEMS COST vs EFFECTIVENESS
  - RESULTED IN CONGRESSIONAL DIRECTION TO DEVELOP REALISTIC EC TEST FACILITIES
    - » HARDWARE-IN -THE LOOP, MAN-IN-THE- LOOP SIMULATORS
    - » OARs WITH THREAT SIMULATORS AND ACTUAL EQUIPMENT THAT COULD PROVE EC EFFECTIVENESS

DOD ELECTRONIC COMBAT TEST & EVALUATION

- BACKGROUND (CONT)
  - CONGRESSIONAL CONCERN DEMONSTRATED AGAIN IN 1995 DEFENSE AUTHORIZATION ACT
    - » DIRECTED DOD TO SUBMIT AN EC MASTER PLAN TO THE CONGRESS BEFORE CHANGING THE EC TEST INFRASTRUCTURE
  - SIMILARLY, SENATE APPROPRIATIONS COMMITTEE FY '95 REPORT
    - » DIRECTED DOD TO PROVIDE A STUDY CLEARLY DEMONSTRATING THAT ELECTRONIC LINKING OF HARDWARE-IN THE- LOOP EC TEST FACILITIES WAS INFEASIBLE BEFORE CONSOLIDATING THESE FACILITIES

DOD ELECTRONIC COMBAT TESTING & EVALUATION

- DOD EC TEST CAPABILITY
  - OARs
    - » EGLIN - DT&E, OT&E, TRAINING
    - » CHINA LAKE - OT&E
    - » NELLIS - TRAINING, OT&E, LIMITED DT&E
  - ISTFs - HITL INTEGRATION FACILITIES
    - » EGLIN - PRIMES
    - » PAX RIVER - ACETEF
  - HITL SIMULATION FACILITIES
    - » REDCAP - AIR DEFENSE PENETRATION
    - » AFEWES - TERMINAL EFFECTS (AAA DEFENSES)
    - » PT MUGU - LIMITED TERMINAL EFFECTS
  - EDWARDS HAS NO EC CAPABILITY

DOD ELECTRONIC COMBAT TEST & EVALUATION

- RECOMMENDATIONS TO BRAC & COSTS
  - CLOSE EMTE, REDCAP & AFEWES
    - » EMTE EQUIPMENT TO NELLIS
    - » REDCAP & AFEWES EQUIPMENT TO EDWARDS
  - AF ESTIMATED COSTS & SAVINGS
    - » EMTE TO NELLIS - ONE TIME COSTS - $6.2m SAVINGS $48M
    - » REDCAP TO EDWARDS - ONE TIME COSTS - $1.7M SAVINGS $11M
    - » AFEWES TO EDWARDS - ONE TIME COSTS - $5.8M SAVINGS $5.8M

DOD ELECTRONIC COMBAT TEST & EVALUATION

- RECOMMENDATIONS TO BRAC & COSTS
  - INDEPENDENT* ESTIMATE OF COSTS & SAVINGS
    - » EMTE TO NELLIS - ONE TIME COSTS $16.1M SAVINGS - NEG $88M
    - » REDCAP TO EDWARDS - ONE TIME COSTS $13M SAVINGS - NEG $9.1M
    - » AFEWES TO EDWARDS - ONE TIME COSTS $100M SAVINGS - NEG $92M
  - * REDCAP BY CALSPAN, AFEWES BY LOCKHEED, EMTE BY OKALOOSA COUNTY EDC

DOD ELECTRONIC COMBAT TEST & EVALUATION

- RECOMMENDATIONS TO BRAC - IMPLICATIONS
  - CAPABILITY LOST - UNREALISTIC AF BUDGET ESTIMATE TO RECREATE EMTE, REDCAP & AFEWES IN WESTERN US
  - LIMITATIONS IMPOSED
    - » DATA REDUCTION - EDWARDS/NELLIS CAPABILITIES ARCHAIC
    - » OAR RANGE TIME - REDUCED BY 2/3 W/O TANKERS DUE TO DISTANCE FROM EDWARDS TO NELLIS RANGE
      - IF TANKERS USED COSTS GO UP
    - » COMPETITION BETWEEN TESTERS & TRAINERS FOR NELLIS RANGE TIME
  - BOTTOM LINE - HIGHER COST TO TAXPAYERS/CUSTOMERS

DOD ELECTRONIC COMBAT TEST & EVALUATION

- RECOMMENDATIONS TO BRAC
  - CIRCUMVENT WILL OF CONGRESS
    - » REPORTS & STUDIES CALLED FOR BY CONGRESS NOT DELIVERED
    - » CONGRESS LOSES OPPORTUNITY TO EVALUATE DOD PLAN BEFORE IRREVERSIBLE CHANGES MADE TO DOD EC TEST INFRASTRUCTURE
  - SHOULD BE DISAPPROVED AND CONGRESS GIVEN THE OPPORTUNITY TO STUDY DOD'S MASTER PLAN FOR EC

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Fort Worth, TX 76101
Facsimile Phone Number 817-777-1564

Cover Page Plus 11 Sheets

FACSIMILE REQUEST

TO:
Name of Company: BRAC
Attention: FRANCIS A. CIRILLO, JR
City & State: ARLINGTON, VA
Phone Number: (703) 696-0504
Facsimile Number: (703) 696-0550

FROM: LOCKHEED Fort Worth Company
Name: DEWEY R. TIPTON
Mail Zone: 1343
Dept.: 610-2000
Phone No.: 817-777-2192

Type or Use Black Ink Only

FOR YOUR INFORMATION.

Dewey R. Tipton

Copy to
Jim O.
Les F.
Steve A.

Lockheed
Fort Worth Company

P.O. Box 748, Fort Worth, Texas 76101

6 June 1995

Francis A. Cirillo, Jr., PE
Air Force Team Leader
Defense Base Closure & Realignment Commission
1700 N. Moore St., Suite 1425
Arlington, VA 22209

References:

(A) 12 May 1995 Memorandum, F. A. Cirillo, Jr., to Maj. Gen. Blume, AF/RT, Subject: Request for Information re: AFEWES

(B) 23 May 1995 Memorandum, AF/TE to AF/RTR, Subject: Request for Information to Support the Base Closure Process

(C) 25 May 1995 Memorandum, AF/RT to Defense Base Closure & Realignment Commission, Additional COBRA Run.

(D) T&E Infrastructure Executive Agent Board of Directors BoOD Study on EC HITL/ISTF Consolidation, 4 February 1994

(E) 19 May 1995 Memorandum, D. R. Tipton to L. C. Farrington, Subject: Thirteen (13) Issues Concerning Proposed AFEWES Realignment

Attachments:

(A) Excerpts from Air Force BRAC '95 Analysis of T&E Infrastructure, February 1995

(B) AFEWES Equipment-Moving Costs Estimate

(C) Col. Wes Heidenreich presentation, 20 April 1995, Electronic Combat (EC) Test and Evaluation (T&E) Realignment Proposals

Dear Sir:

Speaking for the 100 AFEWES contractor employees at Lockheed Martin Tactical Aircraft Systems (LMTAS) in Fort Worth, we are very appreciative of your Reference (A) request for additional information from the Air Force (AF) and for the opportunity to review it. We have carefully examined the References (B) and (C) responses and would like to bring the following points to the attention of the Base Closure and Realignment Commission:

1. The AF now admits that their previous quote of $5.8M is only a portion of the total cost of moving the AFEWES. Their new estimate is $8.937M with a return on investment in 13 years (instead of 7 years) and a net present value in 2015 of a savings of $2.173M instead of $5.8M. This is a small step toward reality. Their estimate of $2.5M for MILCON is far short of the * $8.0M estimated in the BoOD report (Reference (D)). Furthermore, their cost estimate still does not include the necessary cost of documenting the equipments to enable operations and maintenance (O&M) by non-LMTAS personnel and training of the new O&M personnel. The facts are that either far more than $8.937M will be spent or only about 10% of AFEWES will be revived after the move.

2. Although the Air Force repeatedly states that AFEWES utilization is low, the facts are that the optimization model used by the AF to predict utilization in 2001 indicated that the AFEWES usage (in terms of test hours) would be about equal to the sum of the Open Air Range (OAR) test usage at all three Air Force OARs combined (Attachment (A)). There is a difference between low utilization in terms of percentage of capacity (especially if you define an abnormally high capacity) and low utilization in terms of hours of test conducted. In terms of actual usage, the AFEWES is predicted by the Air Force, to be its most used facility in 2001 for the purposes of effectiveness evaluations. Because of this fact, the AF optimization model recommended, in every case, that the AFEWES be retained.

3. The Air Force's "certified data" from which its cost estimate for moving the AFEWES was made was the certified cost per pound to move the Guided Weapons Evaluation Facility (GWEF) across Eglin AFB (see Attachment (B)). There are no "certified" data as to the weight of the AFEWES or to similarities between the GWEF and the AFEWES that make such a rationale reasonable. However, our estimates for the cost of moving about 50% of AFEWES is comparable ($6.5M vs. $5.8M) to their estimate. The difference in our total cost estimate and theirs is in the cost of MILCON, documentation, and training. The cost of MILCON was referenced in point 1 above. Our estimate of the cost of documentation and training were based on knowledge of the existing AFEWES data and the requirements for the XM-11 equipments which we delivered to the Army and the Have Copper equipments which we delivered to the AF at Eglin AFB. Since the AF said the move was to occur in 1998, we used 1998 rates as approved by our DPRO for forward pricing. Our quotes are easily verifiable. The AF's plan to "reverse engineer" the documentation is a far more expensive and time consuming process; especially when the AF plans to replace 100 people who have in excess of 1500 years of AFEWES experience with far fewer untrained people with no simulation experience.

* ~~Interested~~ B
* BoOD Study info. on REDCAP equipment.
- Documentation, training costs

4. LMTAS agrees that some of the AFEWES simulations have not been used for several years and that cost savings can be achieved by reducing infrastructure and operations support. However, maintaining a capability for all AFEWES simulations has been a contractual requirement. By modifying the O&M contract to delete the requirement to support these seldom used simulations, comparable savings could be realized by reducing AFEWES infrastructure and operations support at Air Force Plant No. 4 without the unnecessary expense in dollars and lost T&E capability associated with facility relocation.

5. The AF claim that it will achieve savings by having the AFEWES collocated with an installed systems test capability and integration laboratory is wishful thinking. The AFEWES is now on the same campus (AF Plant 4) with an installed system facility and integration laboratory but there is no cost savings because there is no common denominator for reduction.

6. The claim that the cost of AFEWES is too high for the workload supported is totally subjective and devoid of any factual justification. The average contingency liability expenditure over the last 10 years is about $300K per year, which is a fraction of the total potential liability.

7. The statement that "competition within the Air Force does not exist for relocated assets" is curious. The fact is that the AFEWES is being split up and the infrared (IR) portion is to be sent to Eglin AFB in Florida according to a presentation to the BRAC on 20 April 1995 at Eglin AFB (see Attachment (C)). Putting the RF and IR portions on opposite sides of the continent is a large step away from satisfying the need for multi-spectral integrated systems testing as needed on the F-22 and other future aircraft.

8. The Air Force admits in the next-to-last paragraph of Reference (B) that it does not understand the AFEWES situation. This despite the presence of a five-person Air Force office, headed by a Lt. Colonel, on site, fully capable of answering such questions if asked. The approximately 100 jobs are clearly defined and individual names identifiable. The analogy to Eglin is clearer if the AF corrects its facts. The 100 AFEWES jobs include both upgrade and O&M work. The AFEWES has 39 simulations, not 20. The current number of contractor and government personnel associated with EW testing on the EMTE at Eglin is between 150 and 200, not 50-60. In addition, because the AFEWES is a simulation, not flight test facility, there is much test preparation work that is not associated with radar setup on a range.

Clearly the AF has not done a thorough job of analyzing the cost of moving the AFEWES nor the impact on testing that such a move will create. I believe this will be made clear to the BRAC if it will request that the AF answer the questions previously submitted (Reference (E)) and provide the following which they claim to have:

1. The data which identifies who the AFEWES customers (including international) are, when and what they plan to test, and the impact on their test plans of moving the AFEWES. This must exist as they say they "considered all utilization by test customers (including international utilization)" and "AFEWES customer impacts are being strongly considered in our process" and "most of the testing conducted at AFEWES can be done elsewhere."

2. Identification of the "elsewhere" that "most of the testing conducted at AFEWES can be done." This "elsewhere" must be capable of doing simultaneous integrated RF and IF effectiveness testing on equipment not yet capable of being installed on an aircraft since the AFEWES niche is to provide a measure of countermeasures effectiveness in the early stages of development where changes to the system under test can be accomplished economically.

My staff and I are also available to answer additional questions if necessary. Your time in reading this response and in assuring a cost effective test process is greatly appreciated.

Dewey R. Tipton
Manager, EC Programs
LMTAS

Attachment (A)

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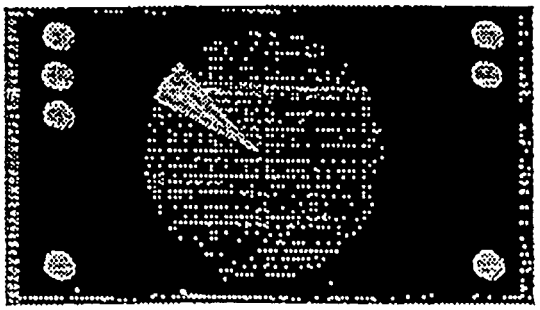
Annex 1

Air Force BRAC '95 Analysis of T&E Infrastructure

Completion of T&E JCSG Analysis Plan

Electronic Combat T&E Analysis



February 1995

Attachment (A)

FOR OFFICIAL USE ONLY - BRAC SENSITIVE

EC T&E Baseline

DoD Workload (Test Hours)

Activity	Functional Value	DM&S	MF	IL	HITL	ISTF	OAR
AFDTC Eglin	65		2390			761	899
NAWC Pt Mugu	58		487	459	223		
NAWC Pax River	53		148			2843	
AFFTC Edwards	52			3088			758
NAWC China Lake	47		2311	1770			745
EPG	47	246	858				369
AFDTC Holloman	29		6091				
AFDTC AFEWES	17				2524		
NSWC Crane	17		4344				
AFDTC REDCAP	15				86		

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7 2/13/95

This chart is similar to the previous one except that, here, workload (in terms of test hours/year projected for the year 2001) is shown in place of capacity. Figures on this chart are directly related to the quantity of electronic combat T&E work being accomplished at each facility today. Comparing this chart to the previous one allows determination of where and how much excess capacity exists, and in which test facility categories.

Attachment (A)

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Optimization Model Outputs

EC T&E

Objective Functions

Activity	MAXSFV (W=0)	MINSITES (W=95)	MAXSFV (MINSITES)	MINXCAP (W=100)	MAXSFV (suite)	MIN NMV (W=95)	Summary
AFDTC, Eglin AFB	1	1	1	1	1	1	Retain
NAWC, Pt Mugu	1	1	1	1	1	1	Retain
NAWC, Pax River	1	1	1	1	1	1	Retain
AFFTC, Edwards AFB	1	1	1	1	1	1	Retain
NAWC, China Lake	1	0	0	0	0	0	Realign
EPG	1	1	1	1	1	1	Retain
AFDTC, Holloman	1	1	1	1	1	1	Retain
AFDTC, AFEWES	1	1	1	1	1	1	Retain
NSWC, Crane	1	1	1	1	1	1	Retain
AFDTC, REDCAP	0	0	0	0	0	0	Realign

1 = Retain 0 = Realign

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The optimization model was run six times, each for a different objective function. Objective functions are described in detail in the JCSG analysis plan, and are discussed in the main body of this report

In terms of activities, the model output was basically identical under five of the six objective functions. The "summary" column summarizes the model's output, which basically indicates that (considering EC T&E functional value, capacities and workload) DoD can best be served by realigning all Electronic Combat test workload from NAWC China Lake and AFDTC REDCAP. Unfortunately, NAWC China Lake was designated a core T&E activity by the JCSG, eliminating all facilities located thereon from realignment consideration by the JCSG working group. Realignment of AFDTC REDCAP (along with two other EC test activities) was considered by the JCSG working group, and will be described in greater detail in following charts.

Attachment (B)

FOR OFFICIAL USE ONLY - BRAC SENSITIVE

AFEWES EQUIPMENT - MOVING COSTS ESTIMATES

AFEWES

JCSG total equipment tonnage is 281.1. Identified 20 of 33 systems to relocate which is 60.6%. Used 65% of total tonnage or 182.7 tons to be moved. Equated this facility to the GWEF, a new facility at AFDTC which has 30% more space and an equivalent tonnage of equipment (245 tons). The GWEF had certified moving costs of $7.75M or $31.6K per ton. Moving costs are estimated as 281.1 x .65 x $31.6K = $5.77M.

Move to Pt Mugu all but 9,610 lbs or 553,749 lbs or 276.87 ton or $8,749K.

Move to Pax River same amount of equipment that was moved to Edwards = $5,770K.

REDCAP EQUIPMENT - MOVING COSTS ESTIMATES

REDCAP

Total equipment value not identified in JCSG. Total equipment tonnage is identified as 109.6 tons. Equated this facility to the GWEF, a new facility at AFDTC which has 2X the square footage of REDCAP and 2X the equipment tonnage of REDCAP. The GWEF had BRAC certified moving costs of $7.75M or $31.6K per ton. Only 42% of the equipment at REDCAP has been identified to move. Using a conservative estimate of 50% of equipment to be moved, the moving costs are 109.6 tons x .5 x $31.6K = $1.7M.

Move to Pt Mugu all equipment or 109.6 tons @ $31.6/ton for a total of $3,464K.

Move to Pax River all equipment except the Communications Multiple Emitter Generator (COMEG). COMEG estimated at approximately 5% of total equipment. Total shipping cost is $3,290K.

EDWARDS CONTRACTOR COSTS

REDCAP = 2 CONTRACTORS @ 180K PLUS 30K EQUIPMENT	390
AFEWES = 3 CONTRACTORS @ 180K PLUS 30K EQUIPMENT	570

ALL EFFORT TRANSFERS IN FY 98

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ELECTRONIC COMBAT (EC)
TEST AND EVALUATION (T&E) REALIGNMENT PROPOSALS

COL WES HEIDENREICH
20 APRIL 1995

APR 26 '95 07:44PM
P.2
Attachment (C)

PURPOSE

PROVIDE BRAC RATIONALE
FOR EC T&E REALIGNMENT
RECOMMENDATIONS

AFEWES PROPOSAL

- RELOCATE APPROXIMATELY 65% OF AFEWES CAPABILITIES
  - RADIOFREQUENCY CAPABILITIES TO EDWARDS AFB, CA
  - INFRARED CAPABILITIES TO EGLIN AFB, FL
- INTEGRATE HARDWARE-IN-THE-LOOP AND INSTALLED SYSTEMS TEST FACILITIES

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, DC

25 MAY 1995

HQ USAF/RT
1670 Air Force Pentagon
Washington, DC 20330-1670

Defense Base Closure and Realignment Commission
1700 North Moore Street, Suite 1425
Arlington, BA 22209

Dear Mr. Cirillo

This is to provide you an additional COBRA run based on site survey information for the Air Force Electronic Warfare Evaluation Simulator (AFEWES) Facility.

We trust this information is useful for your analysis.

Sincerely

Jay D. Blume Jr

JAY D. BLUME, Jr.
Major General, USAF
Special Assistant to the Chief of Staff
for Base Realignment and Transition

Attachments:
1. AFEWES COBRA
2. Electronic Copy

RT192

Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

Starting Year : 1996
Final Year : 1998
ROI Year : 2011 (13 Years)

NPV in 2015($K): -2,173
1-Time Cost($K): 8,937

Net Costs ($K) Constant Dollars

	1996	1997	1998	1999	2000	2001	Total	Beyond
MilCon	0	2,100	0	0	0	0	2,100	0
Person	0	0	-84	-204	-204	-204	-697	-204
Overhd	2	1	49	43	43	43	181	43
Moving	0	0	5,811	0	0	0	5,811	0
Missio	0	0	-630	-630	-630	-630	-2,520	-630
Other	0	0	1,000	0	0	0	1,000	0
TOTAL	2	2,101	6,145	-791	-791	-791	5,875	-791

	1996	1997	1998	1999	2000	2001	Total
POSITIONS ELIMINATED							
Off	0	0	2	0	0	0	2
Enl	0	0	0	0	0	0	0
Civ	0	0	1	0	0	0	1
TOT	0	0	3	0	0	0	3
POSITIONS REALIGNED							
Off	0	0	2	0	0	0	2
Enl	0	0	0	0	0	0	0
Stu	0	0	0	0	0	0	0
Civ	0	0	0	0	0	0	0
TOT	0	0	2	0	0	0	2

Summary:

Realigns AFEWES from AFDTC (Ft Worth) to AFFTC Edwards

Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

Costs ($K) Constant Dollars

	1996	1997	1998	1999	2000	2001	Total	Beyond
MilCon	0	2,100	0	0	0	0	2,100	0
Person	0	0	36	18	18	18	90	18
Overhd	2	1	55	54	54	54	222	54
Moving	0	0	5,814	0	0	0	5,814	0
Missio	0	0	570	570	570	570	2,280	570
Other	0	0	1,000	0	0	0	1,000	0
TOTAL	2	2,101	7,476	642	642	642	11,506	642

Savings ($K) Constant Dollars

	1996	1997	1998	1999	2000	2001	Total	Beyond
MilCon	0	0	0	0	0	0	0	0
Person	0	0	120	222	222	222	787	222
Overhd	0	0	7	11	11	11	41	11
Moving	0	0	3	0	0	0	3	0
Missio	0	0	1,200	1,200	1,200	1,200	4,800	1,200
Other	0	0	0	0	0	0	0	0
TOTAL	0	0	1,330	1,434	1,434	1,434	5,631	1,434

NET PRESENT VALUES REPORT (COBRA v5.08)
Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

Year	Cost($)	Adjusted Cost($)	NPV($)
1996	2,120	2,091	2,091
1997	2,101,590	2,017,787	2,019,878
1998	6,145,402	5,742,430	7,762,308
1999	-791,444	-719,754	7,042,554
2000	-791,444	-700,490	6,342,064
2001	-791,444	-681,742	5,660,321
2002	-791,444	-663,496	4,996,825
2003	-791,444	-645,738	4,351,087
2004	-791,444	-628,456	3,722,631
2005	-791,444	-611,636	3,110,995
2006	-791,444	-595,266	2,515,729
2007	-791,444	-579,334	1,936,394
2008	-791,444	-563,829	1,372,565
2009	-791,444	-548,739	823,826
2010	-791,444	-534,052	289,774
2011	-791,444	-519,759	-229,985
2012	-791,444	-505,848	-735,833
2013	-791,444	-492,310	-1,228,143
2014	-791,444	-479,133	-1,707,276
2015	-791,444	-466,310	-2,173,586

TOTAL ONE-TIME COST REPORT (COBRA v5.08)
Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
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(All values in Dollars)

Category	Cost	Sub-Total
Construction		
Military Construction	2,100,000	
Family Housing Construction	0	
Information Management Account	0	
Land Purchases	0	
Total - Construction		2,100,000
Personnel		
Civilian RIF	0	
Civilian Early Retirement	0	
Civilian New Hires	0	
Eliminated Military PCS	18,284	
Unemployment	0	
Total - Personnel		18,284
Overhead		
Program Planning Support	4,902	
Mothball / Shutdown	0	
Total - Overhead		4,902
Moving		
Civilian Moving	0	
Civilian PPS	28,800	
Military Moving	14,509	
Freight	601	
One-Time Moving Costs	5,770,000	
Total - Moving		5,813,910
Other		
HAP / RSE	0	
Environmental Mitigation Costs	0	
One-Time Unique Costs	1,000,000	
Total - Other		1,000,000
Total One-Time Costs		8,937,097
One-Time Savings		
Military Construction Cost Avoidances	0	
Family Housing Cost Avoidances	0	
Military Moving	3,140	
Land Sales	0	
One-Time Moving Savings	0	
Environmental Mitigation Savings	0	
One-Time Unique Savings	0	
Total One-Time Savings		3,140
Total Net One-Time Costs		8,933,957

TOTAL MILITARY CONSTRUCTION ASSETS (COBRA v5.08)
Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

All Costs in $K

Base Name	Total MilCon	IMA Cost	Land Purch	Cost Avoid	Total Cost
EDWARDS	2,100	0	0	0	2,100
EGLIN	0	0	0	0	0
Totals:	2,100	0	0	0	2,100

PERSONNEL SUMMARY REPORT (COBRA v5.08)
Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

PERSONNEL SUMMARY FOR: EDWARDS, CA

BASE POPULATION (FY 1996, Prior to BRAC Action):

Officers	Enlisted	Students	Civilians
728	3,754	0	3,876

PERSONNEL REALIGNMENTS:
From Base: EGLIN, FL

	1996	1997	1998	1999	2000	2001	Total
Officers	0	0	2	0	0	0	2
Enlisted	0	0	0	0	0	0	0
Students	0	0	0	0	0	0	0
Civilians	0	0	0	0	0	0	0
TOTAL	0	0	2	0	0	0	2

TOTAL PERSONNEL REALIGNMENTS (Into EDWARDS, CA):

	1996	1997	1998	1999	2000	2001	Total
Officers	0	0	2	0	0	0	2
Enlisted	0	0	0	0	0	0	0
Students	0	0	0	0	0	0	0
Civilians	0	0	0	0	0	0	0
TOTAL	0	0	2	0	0	0	2

BASE POPULATION (After BRAC Action):

Officers	Enlisted	Students	Civilians
730	3,754	0	3,876

PERSONNEL SUMMARY FOR: EGLIN, FL

BASE POPULATION (FY 1996, Prior to BRAC Action):

Officers	Enlisted	Students	Civilians
1,428	6,087	0	4,041

PERSONNEL REALIGNMENTS:
To Base: EDWARDS, CA

	1996	1997	1998	1999	2000	2001	Total
Officers	0	0	2	0	0	0	2
Enlisted	0	0	0	0	0	0	0
Students	0	0	0	0	0	0	0
Civilians	0	0	0	0	0	0	0
TOTAL	0	0	2	0	0	0	2

TOTAL PERSONNEL REALIGNMENTS (Out of EGLIN, FL):

	1996	1997	1998	1999	2000	2001	Total
Officers	0	0	2	0	0	0	2
Enlisted	0	0	0	0	0	0	0
Students	0	0	0	0	0	0	0
Civilians	0	0	0	0	0	0	0
TOTAL	0	0	2	0	0	0	2

SCENARIO POSITION CHANGES:

	1996	1997	1998	1999	2000	2001	Total
Officers	0	0	-2	0	0	0	-2
Enlisted	0	0	0	0	0	0	0
Civilians	0	0	-1	0	0	0	-1
TOTAL	0	0	-3	0	0	0	-3

PERSONNEL SUMMARY REPORT (COBRA v5.08) - Page 2
Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

BASE POPULATION (After BRAC Action):

Officers	Enlisted	Students	Civilians
1,424	6,087	0	4,040

TOTAL PERSONNEL IMPACT REPORT (COBRA v5.08)
Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
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	Rate	1996	1997	1998	1999	2000	2001	Total
CIVILIAN POSITIONS REALIGNING OUT		0	0	0	0	0	0	0
Early Retirement*	10.00%	0	0	0	0	0	0	0
Regular Retirement*	5.00%	0	0	0	0	0	0	0
Civilian Turnover*	15.00%	0	0	0	0	0	0	0
Civs Not Moving (RIFs)*+		0	0	0	0	0	0	0
Civilians Moving (the remainder)		0	0	0	0	0	0	0
Civilian Positions Available		0	0	0	0	0	0	0
CIVILIAN POSITIONS ELIMINATED		0	0	1	0	0	0	1
Early Retirement	10.00%	0	0	0	0	0	0	0
Regular Retirement	5.00%	0	0	0	0	0	0	0
Civilian Turnover	15.00%	0	0	0	0	0	0	0
Civs Not Moving (RIFs)*+		0	0	0	0	0	0	0
Priority Placement#	60.00%	0	0	1	0	0	0	1
Civilians Available to Move		0	0	0	0	0	0	0
Civilians Moving		0	0	0	0	0	0	0
Civilian RIFs (the remainder)		0	0	0	0	0	0	0
CIVILIAN POSITIONS REALIGNING IN		0	0	0	0	0	0	0
Civilians Moving		0	0	0	0	0	0	0
New Civilians Hired		0	0	0	0	0	0	0
Other Civilian Additions		0	0	0	0	0	0	0
TOTAL CIVILIAN EARLY RETIRMENTS		0	0	0	0	0	0	0
TOTAL CIVILIAN RIFS		0	0	0	0	0	0	0
TOTAL CIVILIAN PRIORITY PLACEMENTS#		0	0	1	0	0	0	1
TOTAL CIVILIAN NEW HIRES		0	0	0	0	0	0	0

* Early Retirements, Regular Retirements, Civilian Turnover, and Civilians Not Willing to Move are not applicable for moves under fifty miles.

+ The Percentage of Civilians Not Willing to Move (Voluntary RIFs) varies from base to base.

Not all Priority Placements involve a Permanent Change of Station. The rate of PPS placements involving a PCS is 50.00%

TOTAL APPROPRIATIONS DETAIL REPORT (COBRA v5.08) - Page 1/3
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Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

ONE-TIME COSTS -----($K)-----	1996	1997	1998	1999	2000	2001	Total
CONSTRUCTION							
MILCON	0	2,100	0	0	0	0	2,100
Fam Housing	0	0	0	0	0	0	0
Land Purch	0	0	0	0	0	0	0
O&M							
CIV SALARY							
Civ RIF	0	0	0	0	0	0	0
Civ Retire	0	0	0	0	0	0	0
CIV MOVING							
Per Diem	0	0	0	0	0	0	0
POV Miles	0	0	0	0	0	0	0
Home Purch	0	0	0	0	0	0	0
HHG	0	0	0	0	0	0	0
Misc	0	0	0	0	0	0	0
House Hunt	0	0	0	0	0	0	0
PPS	0	0	29	0	0	0	29
RITA	0	0	0	0	0	0	0
FREIGHT							
Packing	0	0	0	0	0	0	0
Freight	0	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0	0
Driving	0	0	0	0	0	0	0
Unemployment	0	0	0	0	0	0	0
OTHER							
Program Plan	2	1	1	0	0	0	5
Shutdown	0	0	0	0	0	0	0
New Hire	0	0	0	0	0	0	0
1-Time Move	0	0	5,770	0	0	0	5,770
MIL PERSONNEL							
MIL MOVING							
Per Diem	0	0	2	0	0	0	2
POV Miles	0	0	1	0	0	0	1
HHG	0	0	11	0	0	0	11
Misc	0	0	1	0	0	0	1
OTHER							
Elim PCS	0	0	18	0	0	0	18
OTHER							
HAP / RSE	0	0	0	0	0	0	0
Environmental	0	0	0	0	0	0	0
Info Manage	0	0	0	0	0	0	0
1-Time Other	0	0	1,000	0	0	0	1,000
TOTAL ONE-TIME	2	2,101	6,833	0	0	0	8,937

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

RECURRINGCOSTS -----($K)-----	1996	1997	1998	1999	2000	2001	Total	Beyond
FAM HOUSE OPS	0	0	0	0	0	0	0	0
O&M								
RPMA	0	0	48	48	48	48	191	48
BOS	0	0	6	6	6	6	26	6
Unique Operat	0	0	0	0	0	0	0	0
Civ Salary	0	0	0	0	0	0	0	0
CHAMPUS	0	0	0	0	0	0	0	0
Caretaker	0	0	0	0	0	0	0	0
MIL PERSONNEL								
Off Salary	0	0	0	0	0	0	0	0
Enl Salary	0	0	0	0	0	0	0	0
House Allow	0	0	18	18	18	18	72	18
OTHER								
Mission	0	0	570	570	570	570	2,280	570
Misc Recur	0	0	0	0	0	0	0	0
Unique Other	0	0	0	0	0	0	0	0
TOTAL RECUR	0	0	642	642	642	642	2,569	642
TOTAL COST	2	2,101	7,476	642	642	642	11,506	642

ONE-TIME SAVES -----($K)-----	1996	1997	1998	1999	2000	2001	Total
CONSTRUCTION							
MILCON	0	0	0	0	0	0	0
Fam Housing	0	0	0	0	0	0	0
O&M							
1-Time Move	0	0	0	0	0	0	0
MIL PERSONNEL							
Mil Moving	0	0	3	0	0	0	3
OTHER							
Land Sales	0	0	0	0	0	0	0
Environmental	0	0	0	0	0	0	0
1-Time Other	0	0	0	0	0	0	0
TOTAL ONE-TIME	0	0	3	0	0	0	3

RECURRINGSAVES -----($K)-----	1996	1997	1998	1999	2000	2001	Total	Beyond
FAM HOUSE OPS	0	0	0	0	0	0	0	0
O&M								
RPMA	0	0	0	0	0	0	0	0
BOS	0	0	7	11	11	11	41	11
Unique Operat	0	0	0	0	0	0	0	0
Civ Salary	0	0	23	47	47	47	163	47
CHAMPUS	0	0	0	0	0	0	0	0
MIL PERSONNEL								
Off Salary	0	0	79	157	157	157	551	157
Enl Salary	0	0	0	0	0	0	0	0
House Allow	0	0	18	18	18	18	73	18
OTHER								
Procurement	0	0	0	0	0	0	0	0
Mission	0	0	1,200	1,200	1,200	1,200	4,800	1,200
Misc Recur	0	0	0	0	0	0	0	0
Unique Other	0	0	0	0	0	0	0	0
TOTAL RECUR	0	0	1,327	1,434	1,434	1,434	5,628	1,434
TOTAL SAVINGS	0	0	1,330	1,434	1,434	1,434	5,631	1,434

Department : USAF
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Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
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ONE-TIME NET -----($K)-----	1996	1997	1998	1999	2000	2001	Total
CONSTRUCTION							
MILCON	0	2,100	0	0	0	0	2,100
Fam Housing	0	0	0	0	0	0	0
O&M							
Civ Retir/RIF	0	0	0	0	0	0	0
Civ Moving	0	0	29	0	0	0	29
Other	2	1	5,771	0	0	0	5,775
MIL PERSONNEL							
Mil Moving	0	0	30	0	0	0	30
OTHER							
HAP / RSE	0	0	0	0	0	0	0
Environmental	0	0	0	0	0	0	0
Info Manage	0	0	0	0	0	0	0
1-Time Other	0	0	1,000	0	0	0	1,000
Land	0	0	0	0	0	0	0
TOTAL ONE-TIME	2	2,101	6,830	0	0	0	8,934

RECURRING NET -----($K)-----	1996	1997	1998	1999	2000	2001	Total	Beyond
FAM HOUSE OPS	0	0	0	0	0	0	0	0
O&M								
RPMA	0	0	48	48	48	48	191	48
BOS	0	0	-0	-5	-5	-5	-16	-5
Unique Operat	0	0	0	0	0	0	0	0
Caretaker	0	0	0	0	0	0	0	0
Civ Salary	0	0	-23	-47	-47	-47	-163	-47
CHAMPUS	0	0	0	0	0	0	0	0
MIL PERSONNEL								
Mil Salary	0	0	-79	-157	-157	-157	-551	-157
House Allow	0	0	-0	-0	-0	-0	-1	-0
OTHER								
Procurement	0	0	0	0	0	0	0	0
Mission	0	0	-630	-630	-630	-630	-2,520	-630
Misc Recur	0	0	0	0	0	0	0	0
Unique Other	0	0	0	0	0	0	0	0
TOTAL RECUR	0	0	-685	-791	-791	-791	-3,059	-791
TOTAL NET COST	2	2,101	6,145	-791	-791	-791	5,875	-791

PERSONNEL, SF, RPMA, AND BOS DELTAS (COBRA v5.08)
Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
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Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

	Personnel			SF		
Base	Change	%Change		Change	%Change	Chg/Per
EDWARDS	2	0%		10,050	0%	5,025
EGLIN	-5	0%		0	0%	0

	RPMA($)			BOS($)		
Base	Change	%Change	Chg/Per	Change	%Change	Chg/Per
EDWARDS	47,878	0%	23,939	6,444	0%	3,222
EGLIN	0	0%	0	-11,525	0%	2,305

	RPMABOS($)		
Base	Change	%Change	Chg/Per
EDWARDS	54,322	0%	27,161
EGLIN	-11,525	0%	2,305

RPMA/BOS CHANGE REPORT (COBRA v5.08)
Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
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Net Change($K)	1996	1997	1998	1999	2000	2001	Total	Beyond
RPMA Change	0	0	48	48	48	48	191	48
BOS Change	0	0	-0	-5	-5	-5	-16	-5
Housing Change	0	0	0	0	0	0	0	0
TOTAL CHANGES	0	0	47	43	43	43	176	43

INPUT DATA REPORT (COBRA v5.08)
Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

INPUT SCREEN ONE - GENERAL SCENARIO INFORMATION

Model Year One : FY 1996

Model does Time-Phasing of Construction/Shutdown: Yes

Base Name	Strategy:
EDWARDS, CA	Realignment
EGLIN, FL	Realignment

Summary:

Realigns AFEWES from AFDTC (Ft Worth) to AFFTC Edwards

INPUT SCREEN TWO - DISTANCE TABLE

From Base:	To Base:	Distance:
EDWARDS, CA	EGLIN, FL	2,092 mi

INPUT SCREEN THREE - MOVEMENT TABLE

Transfers from EGLIN, FL to EDWARDS, CA

	1996	1997	1998	1999	2000	2001
Officer Positions:	0	0	2	0	0	0
Enlisted Positions:	0	0	0	0	0	0
Civilian Positions:	0	0	0	0	0	0
Student Positions:	0	0	0	0	0	0
Missn Eqpt (tons):	0	0	0	0	0	0
Suppt Eqpt (tons):	0	0	0	0	0	0
Military Light Vehicles:	0	0	0	0	0	0
Heavy/Special Vehicles:	0	0	0	0	0	0

INPUT SCREEN FOUR - STATIC BASE INFORMATION

Name: EDWARDS, CA

Total Officer Employees:	728	RPMA Non-Payroll ($K/Year):	47,109
Total Enlisted Employees:	3,754	Communications ($K/Year):	19
Total Student Employees:	0	BOS Non-Payroll ($K/Year):	49,855
Total Civilian Employees:	3,876	BOS Payroll ($K/Year):	0
Mil Families Living On Base:	64.0%	Family Housing ($K/Year):	9,411
Civilians Not Willing To Move:	10.0%	Area Cost Factor:	1.00
Officer Housing Units Avail:	0	CHAMPUS In-Pat ($/Visit):	0
Enlisted Housing Units Avail:	0	CHAMPUS Out-Pat ($/Visit):	0
Total Base Facilities(KSF):	9,196	CHAMPUS Shift to Medicare:	20.9%
Officer VHA ($/Month):	157	Activity Code:	19
Enlisted VHA ($/Month):	165		
Per Diem Rate ($/Day):	140	Homeowner Assistance Program:	No
Freight Cost ($/Ton/Mile):	0.07	Unique Activity Information:	No

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

INPUT SCREEN FOUR - STATIC BASE INFORMATION

Name: EGLIN, FL

Total Officer Employees:	1,428	RPMA Non-Payroll ($K/Year):	19,708
Total Enlisted Employees:	6,087	Communications ($K/Year):	323
Total Student Employees:	0	BOS Non-Payroll ($K/Year):	48,998
Total Civilian Employees:	4,041	BOS Payroll ($K/Year):	0
Mil Families Living On Base:	34.0%	Family Housing ($K/Year):	8,792
Civilians Not Willing To Move:	10.0%	Area Cost Factor:	1.00
Officer Housing Units Avail:	0	CHAMPUS In-Pat ($/Visit):	0
Enlisted Housing Units Avail:	0	CHAMPUS Out-Pat ($/Visit):	0
Total Base Facilities(KSF):	9,932	CHAMPUS Shift to Medicare:	20.9%
Officer VHA ($/Month):	84	Activity Code:	21
Enlisted VHA ($/Month):	57		
Per Diem Rate ($/Day):	91	Homeowner Assistance Program:	No
Freight Cost ($/Ton/Mile):	0.07	Unique Activity Information:	No

INPUT SCREEN FIVE - DYNAMIC BASE INFORMATION

Name: EDWARDS, CA

	1996	1997	1998	1999	2000	2001
1-Time Unique Cost ($K):	0	0	0	0	0	0
1-Time Unique Save ($K):	0	0	0	0	0	0
1-Time Moving Cost ($K):	0	0	0	0	0	0
1-Time Moving Save ($K):	0	0	0	0	0	0
Env Non-MilCon Reqd($K):	0	0	0	0	0	0
Activ Mission Cost ($K):	0	0	570	570	570	570
Activ Mission Save ($K):	0	0	0	0	0	0
Misc Recurring Cost($K):	0	0	0	0	0	0
Misc Recurring Save($K):	0	0	0	0	0	0
Land (+Buy/-Sales) ($K):	0	0	0	0	0	0
Construction Schedule(%):	0%	0%	0%	0%	0%	0%
Shutdown Schedule (%):	0%	0%	0%	0%	0%	0%
MilCon Cost Avoidnc($K):	0	0	0	0	0	0
Fam Housing Avoidnc($K):	0	0	0	0	0	0
Procurement Avoidnc($K):	0	0	0	0	0	0
CHAMPUS In-Patients/Yr:	0	0	0	0	0	0
CHAMPUS Out-Patients/Yr:	0	0	0	0	0	0
Facil ShutDown(KSF):	0	Perc Family Housing ShutDown:				0.0%

Name: EGLIN, FL

	1996	1997	1998	1999	2000	2001
1-Time Unique Cost ($K):	0	0	1,000	0	0	0
1-Time Unique Save ($K):	0	0	0	0	0	0
1-Time Moving Cost ($K):	0	0	5,770	0	0	0
1-Time Moving Save ($K):	0	0	0	0	0	0
Env Non-MilCon Reqd($K):	0	0	0	0	0	0
Activ Mission Cost ($K):	0	0	0	0	0	0
Activ Mission Save ($K):	0	0	1,200	1,200	1,200	1,200
Misc Recurring Cost($K):	0	0	0	0	0	0
Misc Recurring Save($K):	0	0	0	0	0	0
Land (+Buy/-Sales) ($K):	0	0	0	0	0	0
Construction Schedule(%):	0%	0%	0%	0%	0%	0%
Shutdown Schedule (%):	0%	0%	0%	0%	0%	0%
MilCon Cost Avoidnc($K):	0	0	0	0	0	0
Fam Housing Avoidnc($K):	0	0	0	0	0	0
Procurement Avoidnc($K):	0	0	0	0	0	0
CHAMPUS In-Patients/Yr:	0	0	0	0	0	0
CHAMPUS Out-Patients/Yr:	0	0	0	0	0	0
Facil ShutDown(KSF):	0	Perc Family Housing ShutDown:				0.0%

Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

INPUT SCREEN SIX - BASE PERSONNEL INFORMATION

Name: EGLIN, FL

	1996	1997	1998	1999	2000	2001
Off Force Struc Change:	0	0	0	0	0	0
Enl Force Struc Change:	0	0	0	0	0	0
Civ Force Struc Change:	0	0	0	0	0	0
Stu Force Struc Change:	0	0	0	0	0	0
Off Scenario Change:	0	0	-2	0	0	0
Enl Scenario Change:	0	0	0	0	0	0
Civ Scenario Change:	0	0	-1	0	0	0
Off Change(No Sal Save):	0	0	0	0	0	0
Enl Change(No Sal Save):	0	0	0	0	0	0
Civ Change(No Sal Save):	0	0	0	0	0	0
Caretakers - Military:	0	0	0	0	0	0
Caretakers - Civilian:	0	0	0	0	0	0

INPUT SCREEN SEVEN - BASE MILITARY CONSTRUCTION INFORMATION

Name: EDWARDS, CA

Description	Categ	New MilCon	Rehab MilCon	Total Cost($K)
Anechoic Lab	OTHER	10,050	0	2,100
Add/alter BAF				

STANDARD FACTORS SCREEN ONE - PERSONNEL

Percent Officers Married:	76.80%	Civ Early Retire Pay Factor:	9.00%
Percent Enlisted Married:	66.90%	Priority Placement Service:	60.00%
Enlisted Housing MilCon:	80.00%	PPS Actions Involving PCS:	50.00%
Officer Salary($/Year):	78,668.00	Civilian PCS Costs ($):	28,800.00
Off BAQ with Dependents($):	7,073.00	Civilian New Hire Cost($):	4,000.00
Enlisted Salary($/Year):	36,148.00	Nat Median Home Price($):	114,600.00
Enl BAQ with Dependents($):	5,162.00	Home Sale Reimburse Rate:	10.00%
Avg Unemploy Cost($/Week):	174.00	Max Home Sale Reimburs($):	22,385.00
Unemployment Eligibility(Weeks):	18	Home Purch Reimburse Rate:	5.00%
Civilian Salary($/Year):	46,642.00	Max Home Purch Reimburs($):	11,191.00
Civilian Turnover Rate:	15.00%	Civilian Homeowning Rate:	64.00%
Civilian Early Retire Rate:	10.00%	HAP Home Value Reimburse Rate:	22.90%
Civilian Regular Retire Rate:	5.00%	HAP Homeowner Receiving Rate:	5.00%
Civilian RIF Pay Factor:	39.00%	RSE Home Value Reimburse Rate:	0.00%
SF File Desc:	Final Factors	RSE Homeowner Receiving Rate:	0.00%

STANDARD FACTORS SCREEN TWO - FACILITIES

RPMA Building SF Cost Index:	0.93	Rehab vs. New MilCon Cost:	0.00%
BOS Index (RPMA vs population):	0.54	Info Management Account:	0.00%
(Indices are used as exponents)		MilCon Design Rate:	0.00%
Program Management Factor:	10.00%	MilCon SIOH Rate:	0.00%
Caretaker Admin(SF/Care):	162.00	MilCon Contingency Plan Rate:	0.00%
Mothball Cost ($/SF):	1.25	MilCon Site Preparation Rate:	0.00%
Avg Bachelor Quarters(SF):	256.00	Discount Rate for NPV.RPT/ROI:	2.75%
Avg Family Quarters(SF):	1,320.00	Inflation Rate for NPV.RPT/ROI:	0.00%

APPDET.RPT Inflation Rates:
1996: 0.00% 1997: 2.90% 1998: 3.00% 1999: 3.00% 2000: 3.00% 2001: 3.00%

Data As Of 10:32 05/02/95, Report Created 10:02 05/19/1995

Department : USAF
Option Package : TE-2 (EC) - Edwards
Scenario File : C:\COBRA\REPORT95\COM-AUDT\SS-AFEWS.CBR
Std Fctrs File : C:\COBRA\REPORT95\COM-AUDT\DEPOTFIN.SFF

STANDARD FACTORS SCREEN THREE - TRANSPORTATION

Material/Assigned Person(Lb):	710	Equip Pack & Crate($/Ton):	284.00
HHG Per Off Family (Lb):	14,500.00	Mil Light Vehicle($/Mile):	0.43
HHG Per Enl Family (Lb):	9,000.00	Heavy/Spec Vehicle($/Mile):	1.40
HHG Per Mil Single (Lb):	6,400.00	POV Reimbursement($/Mile):	0.18
HHG Per Civilian (Lb):	18,000.00	Avg Mil Tour Length (Years):	4.10
Total HHG Cost ($/100Lb):	35.00	Routine PCS($/Pers/Tour):	6,437.00
Air Transport ($/Pass Mile):	0.20	One-Time Off PCS Cost($):	9,142.00
Misc Exp ($/Direct Employ):	700.00	One-Time Enl PCS Cost($):	5,761.00

STANDARD FACTORS SCREEN FOUR - MILITARY CONSTRUCTION

Category	UM	$/UM	Category	UM	$/UM
Horizontal	(SY)	0	other	(SF)	0
Waterfront	(LF)	0	Optional Category B	( )	0
Air Operations	(SF)	0	Optional Category C	( )	0
Operational	(SF)	0	Optional Category D	( )	0
Administrative	(SF)	0	Optional Category E	( )	0
School Buildings	(SF)	0	Optional Category F	( )	0
Maintenance Shops	(SF)	0	Optional Category G	( )	0
Bachelor Quarters	(SF)	0	Optional Category H	( )	0
Family Quarters	(EA)	0	Optional Category I	( )	0
Covered Storage	(SF)	0	Optional Category J	( )	0
Dining Facilities	(SF)	0	Optional Category K	( )	0
Recreation Facilities	(SF)	0	Optional Category L	( )	0
Communications Facil	(SF)	0	Optional Category M	( )	0
Shipyard Maintenance	(SF)	0	Optional Category N	( )	0
RDT & E Facilities	(SF)	0	Optional Category O	( )	0
POL Storage	(BL)	0	Optional Category P	( )	0
Ammunition Storage	(SF)	0	Optional Category Q	( )	0
Medical Facilities	(SF)	0	Optional Category R	( )	0
Environmental	( )	0			

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EDCAP REALIGN (CALSPAN VERSION) IN $000'S	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
UTLAYS	-8230	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430
OST REDUCTIONS	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900
NCREMENTAL VOLUME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EPRECIATION EXP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GROSS INCOME	-7330	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
ESS: TAXES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET INCOME FROM PROJECT	-7330	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
LUS: DEPRECIATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NCREMENTAL INVESTMENT																				
CAPITAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WORKING CAPITAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNUAL CASH FLOW	-7330	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
UMULATIVE CASH FLOW	-7330	-6860	-6390	-5920	-5450	-4980	-4510	-4040	-3570	-3100	-2630	-2160	-1690	-1220	-750	-280	190	660	1130	1600

OI	1.0%
AYBACK	16.6 YEARS
CRR	NEG

CQUISITION OUTLAYS	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
ACK/SHIP/INSTALL & MAKE OPERATIONAL	6500																			
ESTORE EXISTING REDCAP FACILITY	1300																			
LECTRICITY/VENDOR MAINT & MATL	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430
TOTAL	8230	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430

EPRECIATION								
ACRS	0	0	0	0	0	0		0
		0	0	0	0	0	0	0
OTAL	0	0	0	0	0	0	0	0

AVINGS	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
OST REDUCTIONS	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900
OTAL	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900

DISCOUNTED RATE OF RETURN -REDCAP REALIGNMENT (CALSPAN VERSION) IN $000'S

PERIOD	ANNUAL CASH FLOW (IN $000'S)	3.6%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330
2	470	438	447	427	392	361	336	313	294	276	261	247	235
3	470	423	426	388	326	278	240	209	184	163	145	130	118
4	470	408	406	353	272	214	171	139	115	96	80	69	59
5	470	394	387	321	227	165	122	93	72	56	45	36	30
6	470	381	368	292	189	126	87	62	45	33	25	19	15
7	470	367	351	265	157	97	63	41	28	19	14	10	8
8	470	355	334	241	131	75	45	28	17	11	8	5	4
9	470	342	318	219	110	58	32	18	11	7	4	3	2
10	470	330	303	199	91	44	23	12	7	4	2	1	1
11	470	319	289	181	76	34	16	8	4	2	1	1	0
12	470	308	275	165	63	26	12	6	3	1	1	0	
13	470	297	262	150	53	20	8	4	2	1	0		
14	470	287	249	136	44	16	6	2	1	0			
15	470	277	237	124	37	12	4	1	0	0			
16	470	267	226	112	31	9	3	1	0				
17	470	258	215	102	25	7	2	1	0				
18	470	249	205	93	21	6	1	0					
19	470	240	196	85	18	4	1	0					
20	470	232	186	77	15	3	1						
21		0	0	0	0	0	0						
22		0	0	0	0	0							
23		0	0	0									
TOTAL	1600	-1158	-1649	-3398	-5053	-5774	-6157	-6390	-6547	-6659	-6743	-6808	-6860

YEARS TO BREAKEVEN

PERIOD	CASH FLOW	3.6%	$
1	-7330	1.000	-7330
2	470	0.933	438
3	470	0.900	423
4	470	0.869	408
5	470	0.839	394
6	470	0.810	381
7	470	0.781	367
8	470	0.754	355
9	470	0.728	342
10	470	0.703	330
11	470	0.678	319
12	470	0.655	308
13	470	0.632	297
14	470	0.610	287
15	470	0.589	277
16	470	0.568	267
17	470	0.549	258
18	470	0.530	249
19	470	0.511	240
20	470	0.493	232
21	470	0.476	224
22	470	0.460	216
23	470	0.444	209
24	470	0.428	201
25	470	0.413	194
26	470	0.399	188
27		0.385	0
			74

DISCOUNTED RATE OF RETURN -REDCAP REALIGNMENT (CALSPAN VERSION) IN $000'S

PERIOD	ANNUAL CASH FLOW (IN $000'S)	4.0%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330	-7330
2	470	437	447	427	392	361	336	313	294	276	261	247	235
3	470	420	426	388	326	278	240	209	184	163	145	130	118
4	470	404	406	353	272	214	171	139	115	96	80	69	59
5	470	388	387	321	227	165	122	93	72	56	45	36	30
6	470	373	368	292	189	126	87	62	45	33	25	19	15
7	470	359	351	265	157	97	63	41	28	19	14	10	8
8	470	345	334	241	131	75	45	28	17	11	8	5	4
9	470	332	318	219	110	58	32	18	11	7	4	3	2
10	470	319	303	199	91	44	23	12	7	4	2	1	1
11	470	307	289	181	76	34	16	8	4	2	1	1	0
12	470	295	275	165	63	26	12	6	3	1	1	0	
13	470	284	262	150	53	20	8	4	2	1	0		
14	470	273	249	136	44	16	6	2	1	0			
15	470	262	237	124	37	12	4	1	0	0			
16	470	252	226	112	31	9	3	1	0				
17	470	242	215	102	25	7	2	1	0				
18	470	233	205	93	21	6	1	0					
19	470	224	196	85	18	4	1	0					
20	470	216	186	77	15	3	1						
21		0	0	0	0	0	0						
22		0	0	0	0	0							
23		0	0	0									
TOTAL	1600	-1366	-1649	-3398	-5053	-5774	-6157	-6390	-6547	-6659	-6743	-6808	-6860

PERIOD	YEARS TO BREAKEVEN CASH FLOW	4.0%	$
1	-7330	1.000	-7330
2	470	0.929	437
3	470	0.893	420
4	470	0.859	404
5	470	0.826	388
6	470	0.794	373
7	470	0.764	359
8	470	0.734	345
9	470	0.706	332
10	470	0.679	319
11	470	0.653	307
12	470	0.628	295
13	470	0.603	284
14	470	0.580	273
15	470	0.558	262
16	470	0.536	252
17	470	0.516	242
18	470	0.496	233
19	470	0.477	224
20	470	0.459	216
21	470	0.441	207
22	470	0.424	199
23	470	0.408	192
24	470	0.392	184
25	470	0.377	177
26	470	0.362	170
27	470	0.348	164
			-72
			=====

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REDCAP BRIEFING

9 JUN 95

REDCAP

- BACKGROUND OF FACILITY
- DESCRIPTION OF SYSTEMS
- REDCAP TEST PROGRAMS
- BRAC FINDINGS
- PROPOSED REDCAP SYSTEMS TO MOVE/DECOMMISSION

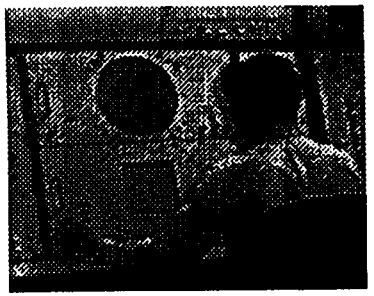
USAF REDCAP

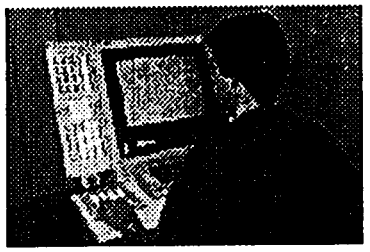
HIGH FIDELITY SIMULATION OF THE MODERN THREAT INTEGRATED AIR DEFENSE SYSTEM (IADS)

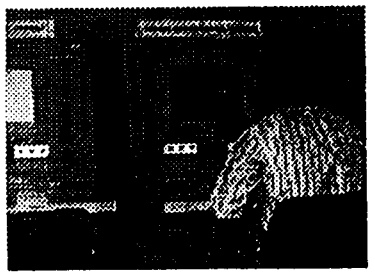
REDCAP FACILITY BACKGROUND

- HISTORY
  - SURVEILLANCE RADAR NETWORK SIMULATION EVOLVING FROM AFAL'S PENVAL ANALYSIS PROGRAM
  - BECAME OPERATIONAL IN 1968
- PURPOSE
  - SIMULATES THE SURVEILLANCE, EARLY WARNING (EW), BATTLE MANAGEMENT (BM), AND COMMAND, CONTROL & COMMUNICATION (C^3) ELEMENTS OF A HOSTILE INTEGRATED AIR DEFENSE SYSTEM (IADS)
  - CAN SIMULATE A COMPLETE IADS WHEN AUGMENTED BY A TERMINAL DEFENSE (i.e., "SHOOTERS") SIMULATION SUCH AS AFEWES
- STATUS NO
  - AIR FORCE GOCO FACILITY (CONTRACTOR OWNS BUILDING)
  - OPERATED AND MAINTAINED BY CALSPAN ADVANCED TECHNOLOGY CENTER (ATC), BUFFALO NY
- UPGRADE PROGRAM
  - INITIATED BY THE AIR FORCE IN 1988
  - RESTRUCTURED IN 1991 DUE TO FUND WITHDRAWAL BY OSD
- FUNDING SOURCE: PE 0604256F
  - O&M (3600)
  - I&M (3600)
- CALSPAN EMPLOYEES
  - TOTAL CORPORATION: 1775
  - ATC: 475
  - REDCAP: 75

SIMULATING THE IADS WITH REDCAP

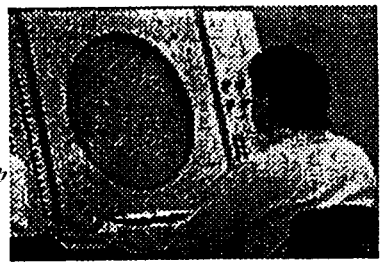


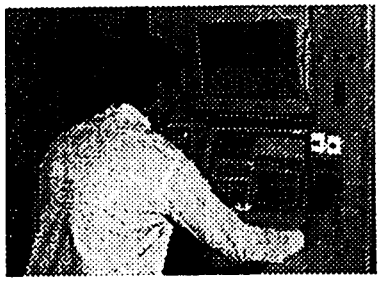


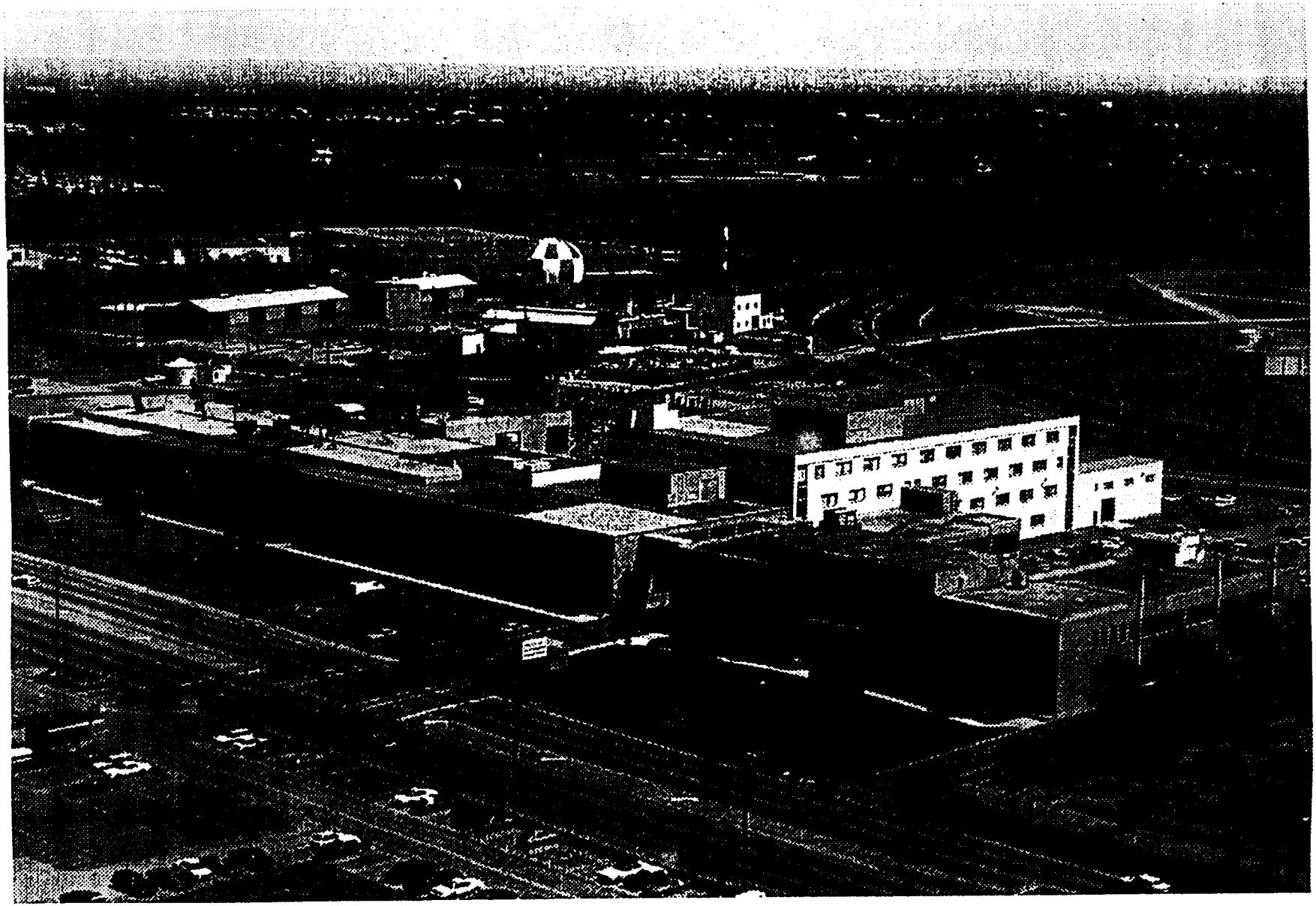


- Algorithm Level C3 Netting Simulation
- Man in the Loop
- Hardware in the Loop
- Real Receivers
- Pulse to Pulse RF
- Digital Simulation
- 30 Year Threat and EC Experience Base

Operational Testing of Blue







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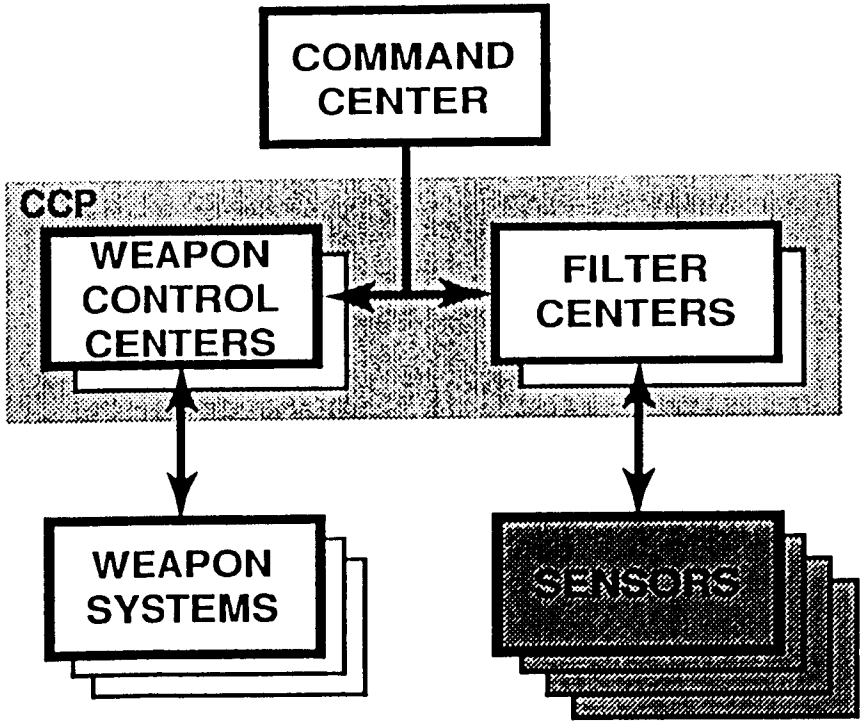
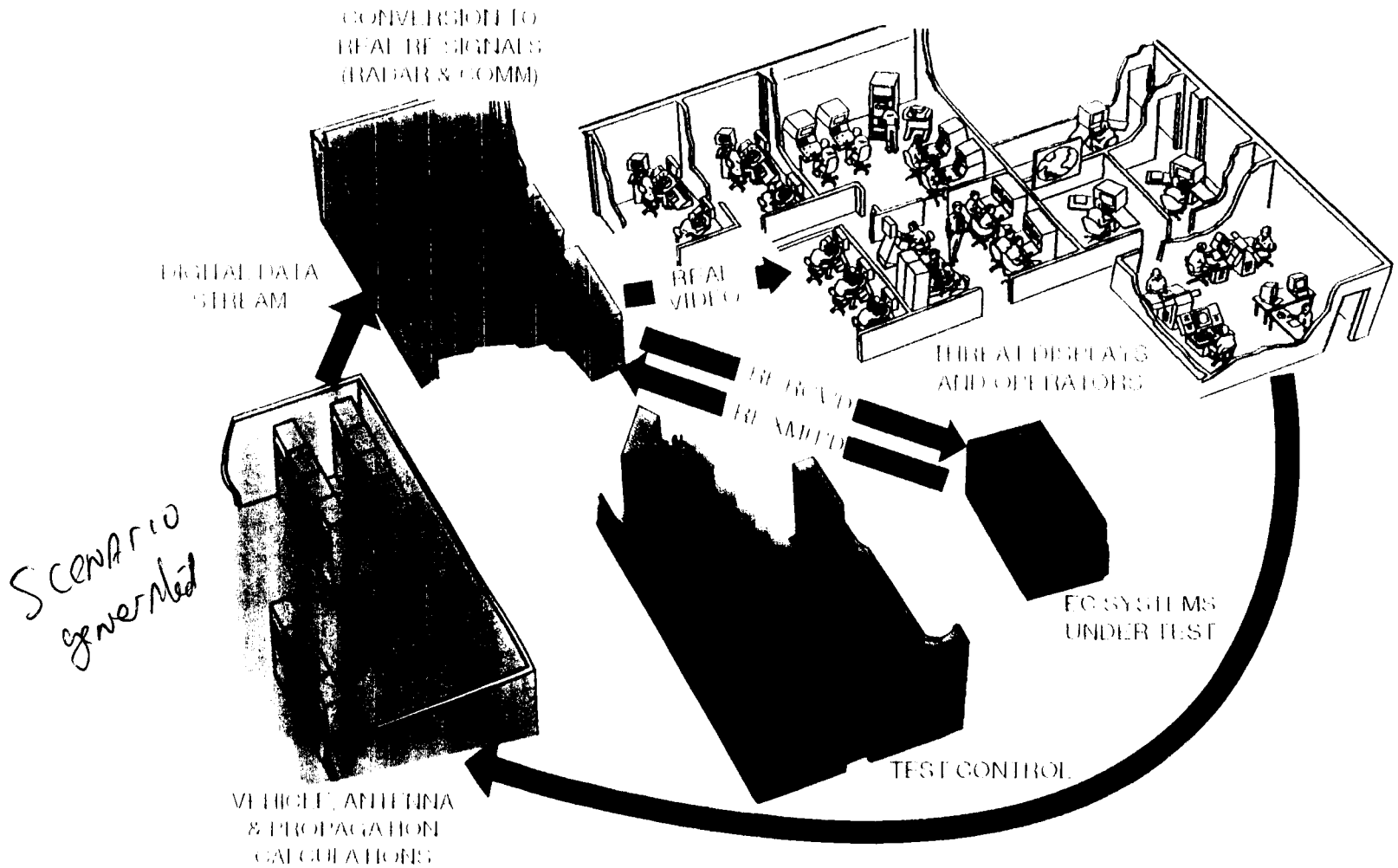
Description of Systems

INTEGRATING THE THREAT ASSETS THROUGH COMMAND AND CONTROL



REAL TIME INTERACTIONS AT REDCAP



REDCAP COMPONENT DESCRIPTIONS

- **SUAWACS** - RECONFIGURABLE, CLOSED-LOOP SIMULATOR FOR SOVIET AIRBORNE WARNING AND CONTROL SYSTEM, USED BY THE CIS AND SOME CLIENT STATES
- **R1, R2, R3, R4, R5** - CLOSED-LOOP SIMULATORS FOR OLDER BUT STILL ACTIVE SURVEILLANCE/EARLY WARNING RADARS
- **EW/HF 1, EW/HF 2, EW/HF 3** - CONSOLES FOR SURVEILLANCE/ EARLY WARNING RADARS ALSO HAVING HEIGHT-FINDERS
- **EW 1, EW 2, EW 3** - CONSOLES FOR SURVEILLANCE/ EARLY WARNING RADARS NOT HAVING HEIGHT-FINDERS
- **PULSE ENVIRONMENT GENERATOR (PEG)** - OPEN-LOOP SIGNAL GENERATOR THAT PROVIDES THE BACKGROUND ENVIRONMENT FOR THE CLOSED-LOOP RADAR SIMULATORS
- **COMMEG, VOICE LINK, VHF DATA LINK (CVDL)**
  - **COMMEG** - OPEN-LOOP SIGNAL GENERATOR THAT PROVIDES THE BACKGROUND ENVIRONMENT FOR THE C^3 LINKS
  - **VOICE LINK** - GCI LINKS BETWEEN THE AIRBORNE INTERCEPTOR (AI) PILOTS AND CONTROLLERS EITHER ON THE GROUND OR IN THE SUAWACS
  - **VHF DATA LINK** - LINKS BETWEEN COMPUTERS IN THE AIRPLANES (AI, SUAWACS) AND COMPUTERS ON THE GROUND

REDCAP COMPONENT DESCRIPTIONS

- **SSDL** - IFF AND S-BAND DATA LINK SIMULATIONS
  - **IDENTIFICATION FRIEND OR FOE (IFF)** - SIMULATION OF THE IFF SYSTEMS ON THE AIs AND SUAWACS
  - **S-BAND DATA LINK** - GCI DATA LINK FROM AI TO GROUND OR SUAWACS
- **UHF DATA LINK (UDL)** - DATA LINK FROM AI-TO-AI OR FROM AI-TO-SUAWACS
- **SYSTEM CONTROL** - SYSTEMS WHICH CONTROL THE TEST, NOT THREAT SIMULATORS. INCLUDES THE COMPUTER RUNNING THE SCENARIO, WHICH IS PART OF THE NEW SUN ARCHITECTURE.
- **VOICE SWITCH** - ANOTHER TEST CONTROL SYSTEM. CONTROLS VOICE COMMUNICATION AMONG TEST CONTROLLERS.
- **RADAR SWITCH** - ANOTHER TEST CONTROL SYSTEM. ROUTES VIDEO DISPLAYS FROM COCKPITS, RADARS, AND FUSION CENTERS TO TEST CONTROLLERS.
- **SPECIAL COMPARTMENTED INFORMATION FACILITY (SCIF) GATEWAY** - COMPUTER WHICH SCREENS ALL INCOMING AND OUTGOING MESSAGES TO PRESERVE SECURITY OF SCI INFORMATION. FACILITY SYSTEM, NOT A THREAT SIMULATION.

REDCAP COMPONENT DESCRIPTIONS

- **OFF-LINE (OL) SUPPORT** - COMPUTERS WHICH ENABLE SCENARIO PROGRAMMING, DATA PROCESSING/ ANALYSIS, AND HARDWARE/SOFTWARE MAINTENANCE. PART OF THE NEW, SUN COMPUTER ARCHITECTURE.
- **REMOTE INTERFACE** - H/W & S/W REQUIRED TO LINK REDCAP TO ANOTHER FACILITY (e.g., ACETEF)
- **GROUND COMMAND AND CONTROL(C^2)** - SIMULATIONS OF IADS FILTER CENTERS, CONTROL POSTS, BRIGADE-LEVEL SAM C^2, ETC. INCLUDES ALL RED MAN-IN-THE-LOOP, EXCEPT AI PILOTS.
- **REACTIVE AIRBORNE INTERCEPTORS (AI)** - FOUR RECONFIGURABLE, MANNED COCKPIT SIMULATORS, COMPLETE WITH CONTROLS AND DISPLAYS, WHICH CAN SIMULATE THE ENTIRE MIG AND SU-SERIES OF SOVIET AIs.

REDCAP TEST PROGRAMS

On Contract

- B-1 MLAT
- F-117 CLOAR
- Combat ID Technical Support

Planned

- JADS
- B-2 STRATCOM
- F-22
- Project Warlock

BRAC Findings

T&E JCSG Alternatives Functional Values

Air Vehicles

Activity	JCSG FV
AFFTC- Edwards	85
NAWC - Pax River	81
NAWC - Pt Mugu	69
AFDTC - Eglin	56
476WEG - Tyndall	49
UTTR - Hill	46
AQTD - Edwards	46
EPG - Ft Huachuca	44
NAWC - China Lake	43
YPG - Yuma	35
ATTC - Ft Rucker	34
AFDTC - Holloman	33
NSWC - Dahlgren	25
NAWC - Indianapolis	19
AEDC - Arnold	18
NAWC - Warminster	14

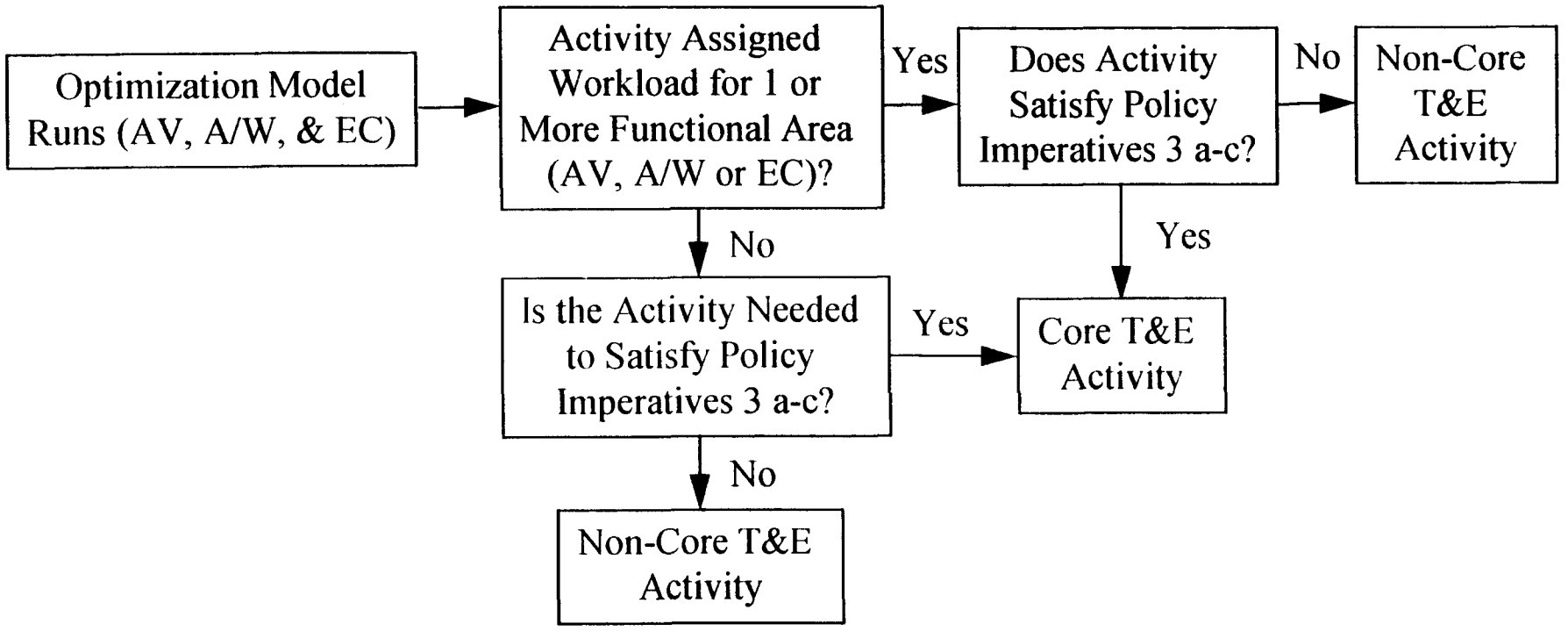
Armaments/Weapons

Activity	JCSG FV
AFDTC - Eglin	82
NAWC - Pt Mugu	77
NAWC - Pax River	57
NAWC - China Lake	57
WSMR	50
AFDTC - Holloman	30
YPG - Yuma	29
NAWC - WSMR	25
RTTC - Redstone	21
NSWC - Dahlgren	17
AEDC - Arnold	16
NSWC - Indian Head	14
NSWC - Crane	13

Electronic Combat

Activity	JCSG FV
AFDTC - Eglin	65
NAWC - Pt Mugu	58
NAWC - Pax River	53
AFFTC- Edwards	52
NAWC - China Lake	47
EPG - Ft Huachuca	47
AFDTC - Holloman	29
NSWC - Crane	17
AFEWES - Ft Worth	17
REDCAP - Buffalo	15

Core/Non-Core T&E Activities
T&E JCSG Designation Process



Policy Imperatives:

3a. Retain Irreplaceable Air, Land, and Sea Space, as well as Diverse Topography and Climatology
3b. Retain Capabilitiesto Preserve Test Process (i.e., Satisfy DoD T&E Requirements)
3c. Realign/Consolidate into MRTFBs with Open-Air-Ranges

Core/Non-Core T&E Activities Summary

MILDEP	Activity (Location)	Core	Non-Core	Retained by Opt Model	Retained as "Core" by T&E JCSG	Rationale
AF	AFFTC (Edwards)	√				
	AFDTC (Eglin)	√				
	AEDC (Arnold)	√				
	AFFTC (UTTR)	√		No	Yes	Cruise Missile Capability
	AFDTC (Holloman)	√				
	475 WEG (Tyndall)		√			
	AFEWES (Ft Worth)		√	Yes	No	Not MRTFB OAR (PI 3c)
	REDCAP (Buffalo)		√			
Navy	NAWC (Pax River)	√				
	NAWC (China Lake)	√				
	NAWC (Pt Mugu)	√				
	NAWC (WSMR)	√		No	Yes	Unique Navy S-A Capability
	NAWC (Indianapolis)		√			
	NAWC (Warminster)		√			
	NSWC (Dahlgren)		√	Yes	No	Not MRTFB OAR (PI 3c)
	NSWC (Indian Head)		√			
	NSWC (Crane)		√	Yes	No	Not MRTFB OAR (PI 3c)
Army	WSMR	√				
	EPG	√				
	YPG	√		No	Yes	Unique Army Rotary Wing
	RTTC		√			
	ATTC - Ft Rucker		√			
	AQTD - Edwards		√			

d. Compute average outlay baseline (AOB) for FY92 and FY93.

$$AOB = \frac{TBA_{92} + TBA_{93}}{2}$$

e. Divide total outlay baseline for fiscal year x from step c by the average outlay baseline from step d for fiscal years FY95 - FY01 to get the workload projection index for all functional areas.

$$I_x = \frac{TBA_x}{AOB} \qquad x = FY95, FY96, \ldots\ldots\ldots, FY01$$

f. Select test facility category (TFC_j; j = 1, 2, ..., 6) and functional area (FA_i ; i = 1, 2, 3).

g. Compute total workload baseline for each test facility category for FY92 and FY93 within this functional area by summing over all sites s using test hour data from the Historical Workload form in the T&E JCSG Data Calls.

$$WTB_{ij} = \sum_{s} \frac{FY92_i \text{ Workload } TFC_j + FY93_i \text{ Workload } TFC_j}{2}$$

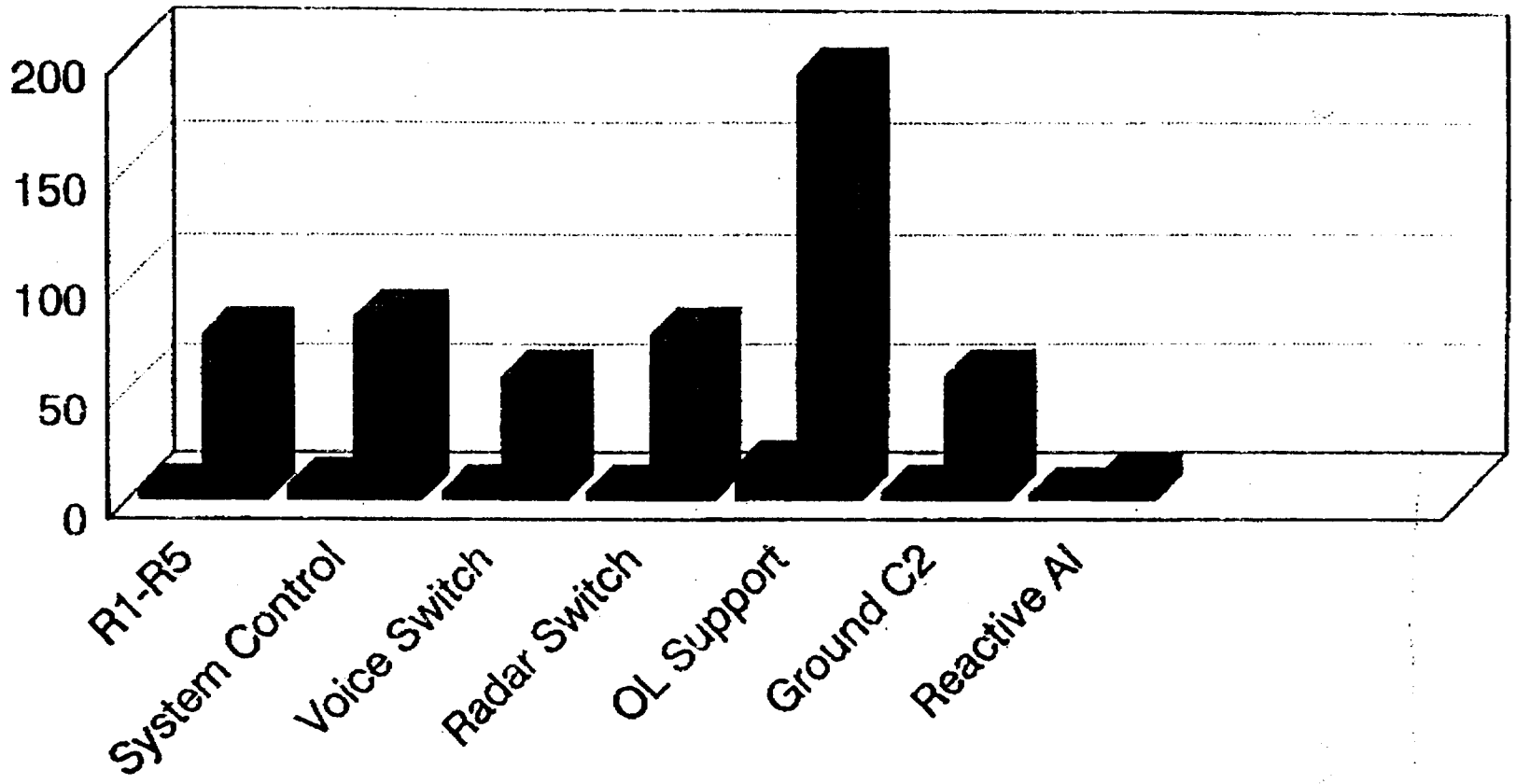
h. Multiply total workload baseline from step g by the workload projection index from step e to get the projected workload W_{xij} for test facility category j for fiscal year x and functional area i.

$$W_{xij} = FY_{xi} \text{ Workload } TFC_j = I_x \times WTB_{ij}$$

i. Repeat steps f through h for each test facility category and each functional area.

PAST REDCAP UTILIZATION

Last Three Years, By System



	R1-R5	System Control	Voice Switch	Radar Switch	OL Support	Ground C2	Reactive AI
#CUSTMR	3	6	3	3	14	3	2
#WEEKS	75	83	56	75	192	56	8

#CUSTMR #WEEKS

Excluding 46TW Activities

REDCAP NON-UTILIZATION

No Paying Customers - Past Three Years

- SUAWACS
- PEG
- SSDL
- UDL
- CVDL

PROPOSED REDCAP SYSTEMS TO MOVE/DECOMMISSION

MOVE

- SCIF Gateway
- Remote Interface
- Reactive AI
- Off Line Support
- SSDL (IFF & S-band DL)
- UDL (UHF A/A link)
- Classified Material

DECOMMISSION

- EW/HF (3)
- EW (3)
- Radars (5)
- Ground C2
- SUAWACS
- PEG
- System Control
- Voice Switch
- Radar Switch
- CVDL

planned put in place at Edwards

Document Separator

MEMORANDUM

From: Steve Ackerman

To: Madelyn Creedon

Subject: CALSPAN contract information.

Date: April 24, 1995

Madelyn:

Attached are some of the items we requested from CALSPAN, that arose from the April 7, 1995 meeting on the REDCAP issue. Included are copies of the O & M contract, as well as the agreement/terms on the upgrade program mentioned. While CALSPAN stated that the Air Force set in motion an 18-month extension, I could not locate that specific information in this particular contract information.

Also included is part of some process information on guidelines of utilizing private contractors for defense-related research.

Please note that these are all original copies, and let me know if you think a copy of the contract information should go to our library. Also, if you need any additional specific information let me know. Thanks.

Steve.

Document Separator

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
P.O. Box 400, Buffalo, New York 14225 Tel (716) 632-7500
Fax (716) 631-6722

21 December 1994

AFDTC/PKZ
205 West D Avenue, Suite 428
Eglin AFB, FL 32542-6864

Attention: Ms. Maureen A. Preta
Contracting Officer

Subject: CBD Announcement dated 12/9/94
Real Time Electromagnetic Digitally
Controlled Analyzer and Processor (REDCAP)
Reconfigurable Early Warning/Ground
Control Intercept (EW/GCI) Radar Simulators
Contract No. F33657-88-C-2093

Dear Ms. Preta:

We are writing in response to the CBD announcement dated 9 December 1994 entitled "Real Time Electromagnetic Digitally Controlled Analyzer and Processor (REDCAP), Reconfigurable Early Warning/Ground Control Intercept (EW/GCI) Radar Simulators." We believe that it is in the best interest of the government to continue these efforts under the existing contract rather than to initiate another contract. We have been told that the new contract is required because the exercise date of Option E expired on 1 June 1993. We are willing to extend the exercise date and Not To Exceed cost of Option E, as well as that of Option F, to 30 September 1995. Beyond that action, we wish to offer you our comments from the perspective of being the contractor on the REDCAP Upgrades program for six years and, perhaps more importantly, as the original developer of the hardware-in-the-loop testing approach embodied in REDCAP over thirty years ago, having provided continuous support since that time.

In our opinion, if this work is contracted for separately, the government would be assuming significant additional risk and expense. Our current contract includes AFSC FAR Clause 52.217-9001, Total System Performance Responsibility (TSPR). Under that clause we are responsible for the performance of the total system and all of its components. If another contractor were to execute this new contract, we would have to be relieved from the responsibilities of the clause, greatly increasing government responsibility to assure total system performance.

We are concerned that another contractor, bidding in a competitive environment, will not supply equipment meeting the same requirements that Calspan is meeting under the current contract. We make the statement because our current contract was constructed by personnel at Wright Patterson AFB who knew that (1) we were under the TSPR Clause, (2) we had a history of upgrading REDCAP to high quality standards and in a manner that minimized future maintenance costs and (3) we had a vested interest in minimizing maintenance costs since we anticipated having to face all of the maintenance problems far

into the future. As a result, and based upon our unique familiarity with the requirements, we do not believe that the existing Statement of Work and requirements documents completely and adequately address the requirements for the equipment. The documented requirements are just not adequate for an open, competitive procurement. Other contractors who bid to these requirements may not provide equipment of the same quality and capability as we would provide under the existing contract, resulting in a significant increase in the risk to the government and major additional expense for integration into REDCAP and for maintenance, spare parts, and other long term logistic support.

Based upon our experience, we feel that any attempt to create a more appropriate Request for Procurement package at this time will only result in a significant delay before the new equipment is ready for customer use. At the present time, there are customers using REDCAP (AFOTEC, F117) who would be gaining more insight into the effectiveness of their system if the new radars were available today. Further, the F-22 program has near term needs for these new radar simulators. Any delay to generate an adequate RFP package for a competitive procurement will result in less comprehensive analyses for these customers. This could cause increased cost to those programs, or worse, increased risk to the personnel whose lives depend on their system's effectiveness.

Note that this effort, now called Option E, is actually contracted work. We were performing this effort from September 1988 to January 1991 when, because of funding constraints, certain efforts were delayed and extended in time. These efforts became known as Options A through F, however, they were not truly Options but only a way of stretching out the work to correspond with funding constraints. It has been our understanding that Calspan would receive funding to perform Option E and other options because of the importance of maintaining a consistent technical approach to the REDCAP system. From our perspective, Option E is follow-on rather than stand-alone work, especially in light of our responsibility under AFSC FAR Clause 52.217-9001 provided in Section H(A) of the REDCAP contract.

As noted earlier, we have been told that one reason for the CBD announcement was that the Option E exercise date had expired on 1 June 1993. However, it seems that a precedent was set by awarding Options A and B on 3 March 1993, even though their exercise dates had expired on 1 June 1992. Likewise, Option C was awarded on 3 June 1994, even though its exercise date had expired on 1 June 1993. Also, it would seem a reasonable interpretation of the contract to assume that the expiration date for Option E was extended in conjunction with the award of Option C since the Modification P00017 Statement of Work (which restructured the REDCAP Upgrades effort) specifically states that Option E "may be exercised concurrent with or any time after Option C".

It seems to us that competing this element of the REDCAP Upgrades Program will almost assuredly result in a protest. First, Calspan's cost for this effort is now public knowledge and was provided to the government as part of a sole source procurement. Our cost has been discussed openly in Air Force and government meetings where various support contractors were present. The government has made no effort to conceal these costs from these support contractors and we can only assume that, through them, other contractors already have obtained or could obtain the information. Should we propose and lose, we would argue that it was because disclosure of our price put us at a competitive disadvantage. Conversely, if we were to propose and win, others would undoubtedly protest on the basis that Calspan has an unfair advantage by virtue of our long-term history on the program. Any protests would only add to the delay of the start of the program and inevitably result in additional costs and deficient results for test customers.

Lastly, we also note that Contract No. F33657-88-C-2093 does not require associate contractor agreements, except those specified in Clause H-014. In the past we have been reluctant to sign an associate contractor agreement with a potential competitor for fear of disclosure of company proprietary information. Even in the event that we did agree to sign an associate contractor agreement, assuming that we were unsuccessful in the competition, the government would still need to act as the systems integrator, thus taking on significant performance and cost risks.

Taking all of these factors into account, it seems to us that the government is risking its $70+M investment in the REDCAP Upgrades program just for the possibility of saving a small amount by competing Option E. And, in all likelihood, any savings that might possibly be realized would be overtaken by increased costs for maintenance and logistics support, in addition to the government costs associated with a competitive procurement.

To reiterate, we believe that competing this work is not in the best interest of the government. We trust that you will accept our comments in the constructive spirit in which they are offered, and we look forward to a positive dialogue with you.

Very truly yours,

Calspan Advanced Technology Center

Thomas M. Pleban
Director of Contracts and Procurement

TP/aec
12/763/94
cc: LTC A. Villagran, COL D. Voss
Fax/Mail - all

Document Separator

TEXT

FASA II: Draft Procurement Reform Legislation Prepared by OFPP and DOD

DRAFT {DATE|January 18,1995} {TIME|12:40}

SEC. 101 TECHNICAL AMENDMENTS TO CONFORM OR CORRECT PROVISIONS OF LAW FROM THE FEDERAL ACQUISITION STREAMLINING ACT OF 1994.

(a) Section 4104(b) of the Federal Acquisition Streamlining Act of 1994 is repealed.

(b) MICRO-PURCHASES.—Section 32(d) of the Office of Federal Procurement Policy Act (42 U.S.C. xxx) is amended by striking out "the contracting officer determines" and inserting in lieu thereof "a determination is made".

(c) DISPOSITION OF NAVAL VESSELS.—Section 7306(a)(1) of title 10, United States Code, is amended by inserting "territory," after "state,".

(d) ENHANCED SMALL BUSINESS PARTICIPATION GOALS.—Section 712 of the Business Opportunity Development Reform Act of 1988 (15 U.S.C. 644 note) is amended—

(1) by amending subsection (b)(1) to read as follows:

"(1) SMALL BUSINESS RESERVE.—During the term of the Program, all contract opportunities in the industry groups designated in section 717 shall be reserved for exclusive competition among emerging small business concerns in accordance with the competition standard specified in §15(j) of the Small Business Act (15 U.S.C. 644(j)), if the estimated value of the contract is equal to or less than the Simplified Acquisition Threshold as defined in §4(11) of the Office of Federal Procurement Policy Act (41 U.S.C. 403(11)) but above the micro-purchase threshold as defined in §32(g) of the Office of Federal Procurement Policy Act (41 U.S.C. 428(g)).";

(2) by striking out subsections (b)(2) and (b)(3); and

(3) by redesignating subsection (b)(4) as subsection (b)(2).

(e) PROCUREMENT PROCEDURES.—Section 713 of the Business Opportunity Development Reform Act of 1988 (15 U.S.C. 644 note) is amended—

(1) in paragraph (a), by striking out "$25,000" each place it appears and inserting in lieu thereof in each instance "the Simplified Acquisition Threshold as defined in §4(11) of the Office of Federal Procurement Policy Act (41 U.S.C. 403(11))"; and

DRAFT {DATE|January 18,1995} {TIME|12:40}

SEC. 118. COORDINATION AND COMMUNICATION OF DEFENSE RESEARCH ACTIVITIES.

Section 2364 of title 10, United States Code, is amended—

(1) in subsection (b)(5), by striking out "milestone 0, milestone I, and milestone II" and inserting in lieu thereof "acquisition program";

(2) in subsection (c)—

(A) by amending paragraph (2) to read as follows:

"(2) The term 'acquisition program decisions' has the meaning given to it by the regulations promulgated by the Secretary of Defense."; and

(B) by striking out paragraphs (3), and (4).

SEC. 119. CONTRACTING FOR DEPARTMENT OF DEFENSE COMMERCIAL OR INDUSTRIAL FUNCTIONS.

(a) CONSOLIDATED STATUTE.—(1) Section 2461 of title 10, United States Code, is amended to read as follows:

"§ 2461. Contracting for Department of Defense commercial or industrial functions

"(a) IN GENERAL.—(1) Except as otherwise provided by law, the Secretary of Defense or secretary of a military department shall procure those supplies and services necessary for or beneficial to the performance of authorized functions of the Department of Defense from a source in the private sector, if such a source can provide the service or supply adequate to meet defined performance standards at a cost that is lower than the cost at which the Department can provide the same supply or service. This cost comparison shall include any cost differential required by law, Executive Order, or regulation. The requirements of this subsection shall not apply to inherently governmental functions or functions which the Secretary concerned determines must be performed by military or Government personnel.

"(2) A Department of Defense function may not be converted to performance by a private contractor to circumvent civilian personnel hiring policies.

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EXECUTIVE CORRESPONDENCE TRACKING SYSTEM (ECTS) # 950606-20

FROM: QUINN, JACK	TO: DIXON
TITLE: REP. (NY)	TITLE: CHAIRMAN
ORGANIZATION: U.S. CONGRESS	ORGANIZATION: DBCRC
INSTALLATION (s) DISCUSSED: REDCAP	

OFFICE OF THE CHAIRMAN	FYI	ACTION	INIT	COMMISSION MEMBERS	FYI	ACTION	INIT
CHAIRMAN DIXON				COMMISSIONER CORNELLA	✓		
STAFF DIRECTOR	✓			COMMISSIONER COX	✓		
EXECUTIVE DIRECTOR	✓			COMMISSIONER DAVIS	✓		
GENERAL COUNSEL	✓			COMMISSIONER KLING	✓		
MILITARY EXECUTIVE				COMMISSIONER MONTOYA	✓		
				COMMISSIONER ROBLES	✓		
DIR./CONGRESSIONAL LIAISON		✓		COMMISSIONER STEELE	✓		
DIR./COMMUNICATIONS				REVIEW AND ANALYSIS			
				DIRECTOR OF R & A	✓		
EXECUTIVE SECRETARIAT				ARMY TEAM LEADER			
				NAVY TEAM LEADER			
DIRECTOR OF ADMINISTRATION				AIR FORCE TEAM LEADER		X	
CHIEF FINANCIAL OFFICER				INTERAGENCY TEAM LEADER	✓		
DIRECTOR OF TRAVEL				CROSS SERVICE TEAM LEADER			
DIR./INFORMATION SERVICES							

TYPE OF ACTION REQUIRED

✓	Prepare Reply for Chairman's Signature		Prepare Reply for Commissioner's Signature
	Prepare Reply for Staff Director's Signature		Prepare Direct Response
X	ACTION: Offer Comments and/or Suggestions	✓	FYI

Subject/Remarks:

FORWARDING DOCUMENTS REGARDING REDCAP.
1) COST OF REALIGNMENT
2) REDCAP UTILIZATION INFO

Due Date: 950609	Routing Date: 950606	Date Originated: 950606	Mail Date:

JACK QUINN
30TH DISTRICT, NEW YORK

TRANSPORTATION AND
INFRASTRUCTURE

SUBCOMMITTEES:
'RFACE TRANSPORTATION
(ESOURCES AND ENVIRONMENT
RAILROADS

VETERANS' AFFAIRS

SUBCOMMITTEE:
HOSPITALS AND HEALTHCARE

JINT ECONOMIC COMMITTEE

Congress of the United States
House of Representatives
Washington, DC 20515–3230

PLEASE RESPOND TO:

WASHINGTON OFFICE
331 CANNON BUILDING
WASHINGTON, DC 20515
(202) 225–3306
FAX: 226–0347

MAIN OFFICE:
403 MAIN STREET
SUITE 240
BUFFALO, NY 14203–2199
(716) 845–5257
FAX: 847–0323

SATELLITE OFFICE:
1490 JEFFERSON AVENUE
BUFFALO, NY 14208
(716) 886–4076

June 6, 1995

Mr. Alan Dixon
Chairman
Defense Base Closure and Realignment Commission
1700 North Moore Street
Suite 1425
Arlington, Virginia 22209

Dear Mr. Dixon:

I have enclosed several documents which should clarify some pending questions regarding the REDCAP facility located in my district in Buffalo, New York. I hope you will find this information helpful.

If you have any further questions regarding this information please do not hesitate to contact me or Beth Meyers of my staff at (202) 225-3306.

Thank you in advance for your assistance with this matter.

Very truly yours,

Jack Quinn
Member of Congress

JQ:bmm

OUTSOURCE RDT&E ACTIVITIES

In "Directions for Defense", Report of the Commission on Roles and Missions of the Armed Forces", May 24, 1995

The Commission recommends "Outsource all commercial type support activities."

Why move REDCAP (and AFEWES) and insource an operation which has been outsourced for the last 30 years?

RETURN ON INVESTMENT

	USAF ($M)	LIKELY ($M)
MILCON	0.7	6.2
MOVING	1.7	6.5
MISSION (savings per year)	0.8	0.3
OTHER	1.3	1.3
NPV (20 years)	-8.9 (savings)	8.1
ROI YEAR	2002	2034
ROI PERIOD	4 Years	36 Years

LIKELY MILCON COSTS
(see attached detail)

REDCAP Facility including support areas (27,000 sq ft x $164.40 sq ft)	Pages 399 and 530*	$ 4,438,800 ✓(-)
Raised floor required (18,000 sq ft at $11.63 sq ft)	Page 262*	209,340 ✓(-)
Supplemental cooling required	Page 357*	158,700 * included
RF shielded rooms / SCIF shielded rooms	Actual experience	300,000 ✓(-)
Supplemental under floor electrical costs (from REDCAP Upgrades)	Actual experience	301,256 *
Supplemental security controls (Alarms, access control system, cameras, locks, etc.)	Actual experience	100,000 *
		5,508,096
Architectural fees @ 8.5%	Page 408*	468,188 ✓(-)
		5,976,284
Furniture (tables, chairs, etc.) (See Furniture Listing)		198,400 ✓(-)
TOTAL		$ 6,174,684

*Means Building Construction Cost Data, 53rd Edition, 1995 Bakersfield, CA, is listed as the closest city to Edwards AFB.

~~559,956 To Increase~~

LIKELY MILCON COSTS DETAIL

- REDCAP Facility

Means Page 399, Colleges Science & Engineering Laboratories	$150/sq ft
Bakersfield, CA multiplier, Page 530	1.096
	$164.40/sq ft
REDCAP Facility and support areas	27,000 sq ft
	$4,438,800

- Raised floor, Page 262 - 18,000 sq ft @ $11.63/sq ft including high pressure covering and snap on strings — 9K — ~~$209,340~~ 105K

- Supplemental cooling, Means Page 357
  12 units @ 3 tons - $9,775 each = $117,300
  2 units @ 10 tons - $20,700 each = $41,400 — $158,700

$5,508,096

- Architectural Fees, Means Page 408 for project size of 5M churches, hospitals, etc., @ 8.5% — $468,188

$5,976,284

- Furniture Listing:

Chairs - 242 @ $300 each	72,600
Tables/computer desks - 116 @ $300 each	34,800
~~Safes - 45 @ $1,500 each~~	~~67,500~~
Supply Cabinets - 50 @ $200 each	10,000
Equipment Carts - 15 @ $300	4,500
Bookcases - 45 @ $200	9,000
Total	$ 198,400

Seems excessive to buy these New. Not suppose to "get well" on BRAC.

LIKELY COSTS TO MOVE REDCAP

(See REDCAP Move Costs)

Documentation including Security Accreditations	$ 1,052,807
Package, Ship, Unpack	1,700,531
Test System	3,537,536
Replacement cost of embedded CFE	170,014
Total Cost to Move	$ 6,460,888

? Air Force estimate seems to be based on weight only. Didn't include documentation of undocumented systems, security accreditation, reintegrating the system and testing it. All of these assume that the same cables can be used, i.e., the same spacial orientation and cable routing is maintained. There is also a small amount of contractor materials in some of the older systems.

REDCAP M[illegible] COSTS

ITEM	SPACE (sq ft)	POWER (120Vckts)	DOC UPDATE (hrs)	PACKAGE (hrs)	PACKAGE ($)	SHIP ($)	UNPACK/SETUP (hrs)	STANDALONE TEST (hrs)	SYSTEM INTEGRATION (hrs)	TOTAL (hrs)	MATERIAL ($)
SUAWACS	1200	14·30A, 7·20A	2320	1100	5,200	16,000	1200	2000	2080	8700	21,200
A1	270	8·20A	240	240	1,200	4,200	280	720	640	2120	5,400
A2	240	7·20A	240	220	1,200	4,200	280	720	640	2100	5,400
A3	240	7·20A	240	220	1,200	4,200	280	720	640	2100	5,400
A4	240	7·20A	240	320	1,200	4,200	360	960	640	2520	5,400
A5	270	8·20A	240	240	1,200	4,200	280	720	640	2120	5,400
EW/HF 1 note 2	120	3·20A	0	160	400	3,000	160	80	160	560	3,400
EW/HF 2 note 2	120	3·20A	0	160	400	3,000	160	80	160	560	3,400
EW/HF 3 note 2	120	3·20A	0	160	400	3,000	160	80	160	560	3,400
EW 1 note 2	60	2·20A	0	80	250	2,000	80	80	80	320	2,250
EW 2 note 2	60	2·20A	0	80	250	2,000	80	80	80	320	2,250
EW 3 note 2	60	2·20A	0	80	250	2,000	80	80	80	320	2,250
PEG	180	5·20A	0	200	1,000	3,800	240	1000	960	2400	4,800
CVDL	690	23·20A	4480	400	2,000	16,100	640	4000	0	9520	18,100
SSDL	150	5·20A	0	200	1,000	3,800	400	200	640	1440	4,800
UDL	120	4·20A	0	160	800	2,500	400	200	640	1400	3,300
SYSTEM CONTROL note 1	1080	16·20A, 2·30A	0	360	1,200	9,000	520	400	1280	2560	10,200
VOICE SWITCH	60	2·20A	0	160	500	2,000	520	1000	200	1880	2,500
RADAR SWITCH	120	3·20A	0	160	500	3,000	400	400	200	1160	3,500
SCIF GATEWAY	130	2·30A	2000	200	3,000	2,000	400	480	640	3720	5,000
OL SUPPORT note 1	2100	75·20A, 6·30A	0	400	1,600	11,000	1000	640	1280	3320	12,600
REMOTE INTERFACE	240	6·20A	0	240	600	4,300	300	420	320	1280	4,900
GROUND C2	1320	23·20A	0	560	2,800	14,100	560	800	3600	5520	16,900
REACTIVE AI	420	10·20A	0	280	1,200	4,500	240	400	1600	2520	5,700
CLASSIFIED MATERIAL	540		0	1510	500	12,000	1510	0	0	3020	12,500
TOTALS	10150		10000	7890	* 29,850	* 140,100	10530	16260	17360	62040	169,950

Documentation Updates - 10,000 hours

Package, ship, unpack/set up - 18,320 hours plus *'s above)

Standalone test and system integration - 33,600 hours

Replacement cost of CFE (estimated)

$ 1,052,807 #210,961

1,700,531 $48,800

3,537,536

~~170,014~~

~~$ 6,460,888~~ 1.75

Material #43,900

Are we paying for documentation updates? I don't think that is a BRAC cost.

MISSION

(savings/year)

Air Force used 1.2M annual mission cost (source unknown).
Currently REDCAP requires less than 1M.
(Also anticipate we will hold to that ceiling in the future.)
Therefore

	Air Force	Likely
at Buffalo	1,200	1,000
Contractor at Edwards	*390	*390
Utilities	0	~~203~~ 89,300
Computer Maintenance Contracts	0	~~140~~
Total	800K	260K

*covers only 44% of the equipment.

Verify this contractor figure w/AF.

Verified 06/13

Assume entire REDCAP mission?

To be done in-house

? explain these numbers how is the "total" obtained?

Would the cost to Edwards increase by 140K for computer maintenance costs if do maintain 42% of the activity? No - in house.

OTHER

REDCAP Facility Abandonment Costs

Usually assume cost to excess or abandon is equal to proceeds from potential sales.

General Construction	$ 729,813 est.
Electrical	367,014 est.
Mechanical	245,697 est.
Total	$ 1,342,523 est.

COB'
COBRA REALIGNMENT SUMMA .OBRA v5.08)
Data As of 06/05/95, Report Created 06/05/1995

Department	: USAF
Option Package	: TE-1 (EC) - Edwards
Scenario File	: C:\COBRA508\TEST\REDCAP1.CBR
Std Fctrs File	: C:\COBRA508\TEST\DEPOTFIN.SFF
Starting Year	: 1996
Final Year	:1998
ROI Year	:2034 (36 years)
NPV in 2015 ($K)	8121
Time Cost ($K)	13978

Net Costs ($K) Constant Dollars

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2034	Total	Beyond
MilCon	0	(1200) 6175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6175	0
Person	0	0	-54	-125	-125	-125	-125	-125	-125	-125	-125	-125	-125	-125	-125	-3000	-4554	-4250
Overhd	1	1	15	12	12	12	12	12	12	12	12	12	12	12	12	288	449	408
Moving	0	0	6461	0	0	0	0	0	0	0	0	0	0	0	0	0	6461	0
Missio	0	0	-267	-267	-267	-267	-267	-267	-267	-267	-267	-267	-267	-267	-267	-6408	-9879	-9078
Other	0	0	0	1342	0	0	0	0	0	0	0	0	0	0	0	0	1342	0
TOTAL	1	6176	6155	962	-380	-380	-380	-380	-380	-380	-380	-380	-380	-380	-380	-9120	-6	-12920

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2034	Total
POSITIONS ELMINATED																	
Off	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Enl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Civ	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOT	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
POSITIONS REALIGNED																	
Off	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Enl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Civ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOT	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Summary:
Realign REDCAP from AFDTC (Buffalo) to AFFTC Edwards

COB
COBRA REALIGNMENT SUMMA . OBRA v5.08)
Data As of 06/05/95, Report Created 06/05/1995

Department : USAF
Option Package : TE-1 (EC) - Edwards
Scenario File : C:\COBRA508\TEST\REDCAP1.CBR
Std Fctrs File : C:\COBRA508\TEST\DEPOTFIN.SFF

Costs ($K) Constant Dollars

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2034	Total	Beyond
Milcon	0	6175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6175	0
Person	0	0	18	9	9	9	9	9	9	9	9	9	9	9	9	216	342	306
Overhd	1	1	20	19	19	19	19	19	19	19	19	19	19	19	19	456	706	646
Moving	0	0	6462	0	0	0	0	0	0	0	0	0	0	0	0	0	6462	0
Missio	0	0	733	733	733	733	733	733	733	733	733	733	733	733	733	17592	27121	24922
Other	0	0	0	1342	0	0	0	0	0	0	0	0	0	0	0	0	1342	0
OTAL	1	6176	7233	2103	761	761	761	761	761	761	761	761	761	761	761	18264	42148	25874

Savings ($K) Constant Dollars

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2034	Total	Beyond
ilcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
rson	0	0	72	134	134	134	134	134	134	134	134	134	134	134	134	3216	4896	4556
verhd	0	0	5	7	7	7	7	7	7	7	7	7	7	7	7	168	257	238
oving	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
ssio	0	0	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	24000	37000	34000
her	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TAL	0	0	1078	1141	1141	1141	1141	1141	1141	1141	1141	1141	1141	1141	1141	27384	42154	38794

COBI
COBRA REALIGNMENT SUMMA OBRA v5.08)
Data As of 06/05/95, Report Created 06/05/1995

)epartment : USAF
)ption Package : TE-1 (EC) - Edwards
Scenario File : C:\COBRA508\TEST\REDCAP1.CBR
Std Fctrs File : C:\COBRA508\TEST\DEPOTFIN.SFF

ECURRING COSTS ($K)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2034	Total	Beyond
AM HOUSE OPS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
&M																		
PMA	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	384	592	544
OS	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	72	111	102
nique Operat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
iv Salary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHAMPUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
aretaker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IL PERSONNEL																		
)ff Salary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
nl Salary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
House Allow	0	0	9	9	9	9	9	9	9	9	9	9	9	9	9	216	333	306
THER																		
Mission	0	0	733	733	733	733	733	733	733	733	733	733	733	733	733	17592	27121	24922
Misc Recur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
nique Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TAL RECUR	0	0	761	761	761	761	761	761	761	761	761	761	761	761	761	18264	28157	25874
TAL COST	1	6176	7233	2103	761	761	761	761	761	761	761	761	761	761	761	18264	42148	25874

IE-TIME SAVES ($K)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2034	Total	Beyond
NSTRUCTION																		
ILCON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
m Housing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M																		
Time Move	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
. PERSONNEL																		
l Moving	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
HER																		
nd Sales	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
vironmental	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COBRA
COBRA REALIGNMENT SUMMARY (COBRA v5.08)
Data As of 06/05/95, Report Created 06/05/1995

:partment : USAF
ɔtion Package : TE-1 (EC) - Edwards
:enario File : C:\COBRA508\TEST\REDCAP1.CBR
d Fctrs File : C:\COBRA508\TEST\DEPOTFIN.SFF

:CURRING SAVES ($K)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2034	Total	Beyond
.M HOUSE OPS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
;M																		
PMA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OS	0	0	5	7	7	7	7	7	7	7	7	7	7	7	7	168	257	238
nique Operat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ıv Salary	0	0	23	47	47	47	47	47	47	47	47	47	47	47	47	1128	1715	1598
HAMPUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L PERSONNEL																		
ff Salary	0	0	39	79	79	79	79	79	79	79	79	79	79	79	79	1896	2883	2686
ıl Salary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ɔuse Allow	0	0	9	9	9	9	9	9	9	9	9	9	9	9	9	216	333	306
HER																		
ocurement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ıssion	0	0	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	24000	37000	34000
ısc Recur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ıique Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TAL RECUR	0	0	1076	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142	27408	42188	38828
TAL SAVINGS	0	0	1077	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142	27408	42189	38828

FILE:NPV

NET PRESENT VALUE (NPV) OF FUTURE COSTS

RATE: 2.71% Should be 2.75

YEAR	COST ($)	ADJUSTED COST ($)	NPV $
1996	1	1	1
1997	6,176	5,924	5,925
1998	6,155	5,746	11,671
1999	962	874	12,545
2000	-380	-336	12,209
2001	-380	-327	11,882
2002	-380	-318	11,564
2003	-380	-310	11,254
2004	-380	-302	10,952
2005	-380	-294	10,659
2006	-380	-286	10,373
2007	-380	-278	10,095
2008	-380	-271	9,824
2009	-380	-263	9,561
2010	-380	-256	9,304
2011	-380	-250	9,055
2012	-380	-243	8,812
2013	-380	-236	8,575
2014	-380	-230	8,345
2015	-380	-224	8,121

REDCAP UTILIZATION IDENTIFIED FOR 93% OF FACILITY

TEST CUSTOMER

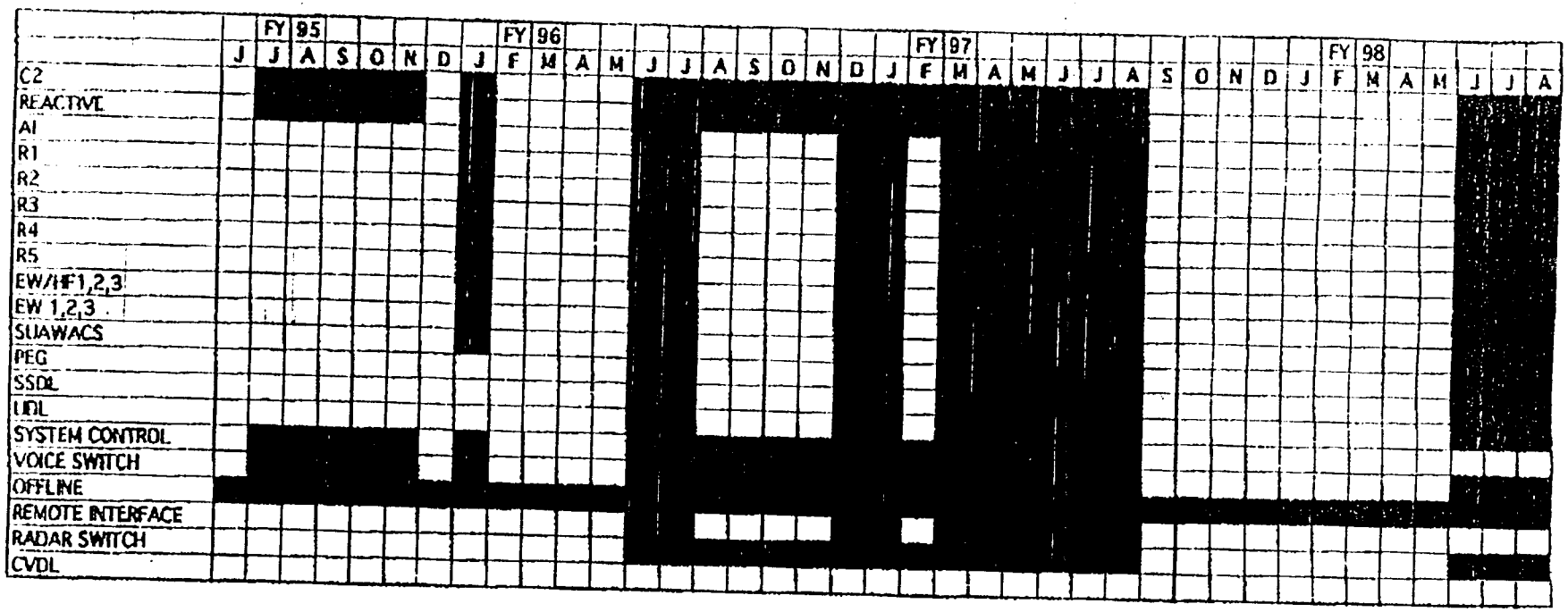
SYSTEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
C2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X							
REACTIVE AI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X							
R1			X	X	X			X	X		X	X	X	X	X		X	X	X	X							
R2			X	X	X			X	X		X	X	X	X	X		X	X	X	X							
R3			X	X	X			X	X		X	X	X	X	X		X	X	X	X							
R4			X	X	X			X	X		X	X	X	X	X		X	X	X	X							
R5			X	X	X			X	X		X	X	X	X	X		X	X	X	X							
EW/HF-1,2,3			X	X	X			X	X		X	X	X	X	X		X	X	X	X							
EW 1,2,3			X	X	X			X	X		X	X	X	X	X		X	X	X	X							
*SUAWACS					X				X		X	X	X	X			X	X	X	X							
PEG					X				X					X													
SSDL					X				X					X													
CVDL																											
UDL					X									X		X											
SYS CONTR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
VOICE SWITCH	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
OFFLINE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
REMOTE INTERFACE					X	X	X	X	X		X			X					X	X							
RADAR SWITCH					X			X	X					X													

Not on O&M contract

Low-Priority

Support Systems

SCHEDULED REDCAP UTILIZATION FY'95 TO FY'98



Item Descriptions

SUAWACS - SUAWACS RF simulation, VAX computer, RAMTEK display, SUAWACS C2 processor and 7 SUAWACS consoles.

R1, R2, R3, R4, R5 - Five old radar simulations. One radar control panel, and one video extractor is included with each old radar simulation.

EW/HF 1, EW/HF 2, EW/HF 3 - Three combined early warning (EW) radar display consoles and height finder (HF) consoles. The EW console includes a PPI display, 2 alphanumeric displays, joystick and various switches. The HF console includes a PPI display, height indicator display, and various switches.

EW 1, EW 2, EW 3 - Three EW radar display consoles.

PEG - Radar pulse environment generator.

CVDL - The IBM 9221 computer, communications environment generator, 4 RF voice links, and the old VHF band data link. This equipment is not presently integrated with the upgraded REDCAP. Integration of this equipment is planned for Option D.

SSDL - IFF and S band data link simulation. Simulation includes 1 interrogator and 4 transponders for IFF and 1 S band transmitter.

UDL - An RF simulation of a UHF band Air-Air data link. UDL provides for up to 4 remote sites and 1 central site. Configurable to two sets of two sites.

System Control - Overall system control. System control includes Facility Master Controller processor, Test Conductor area, video and voice recorders, and TV cameras. The Test Conductor area includes 4 workstations, 1 large screen projector, 3 PPI displays, 8 color monitors, 3 high resolution monochrome monitors, and 9 low resolution monochrome monitors.

Voice Switch - Voice switch matrix. The voice switch provides intercom between all consoles along with public address system.

Radar Switch - Controls the routing of video signals to Test Conductor, radar video to EW and HF consoles, and synchronization signals between radars simulators.

SCIF Gateway - A guard between SCI facility and collateral facility.

OL Support - Off-line (OL) support. OL support includes two SUN file servers, 13 SUN workstations, 20 PCs and 30 terminals. OL is used to support software and hardware maintenance, scenario development and test analysis.

Remote Interface - Remote interface equipment. The remote interface includes DIS interface, tactical situation display of DIS entities, encryption gear, voice channels, MIL-STD-1553B interface and data multiplexers. Also, include interface kit for remote facility.

Ground C2 - Ground C2 simulation. Ground C2 includes the Ground C2 processor used for real time software models of radars, radar sites, filter centers, passive detection, site to site data links, ground to air links including IFF, etc. Ground C2 also includes 8 commander consoles, 6 controller consoles, 3 manual plot boards, and 2 large screen projectors (used as automatic plotters). Each commander console provides a color graphic display, keyboard, trackball, and various switches. Each controller console provides a stroke graphics display, 2 alphanumeric displays, joystick and various switches.

Reactive AI - Reactive aircraft simulation. Reactive AI includes the reactive aircraft control processor, 4 pilot stations and 2 weapons system officer (WSO) consoles. Each pilot station provides a head down display, an out the window display, throttle, joystick and various switches. Each WSO console provides a head down display and joystick.

Classified Material - All classified documents and archived tapes presently stored at REDCAP.

NOTES

Note 1 - Required before any simulation can be performed. All simulation elements depend upon system control for scenario execution. OL support is required to develop scenarios.

Note 2 - Requires at least one old radar simulator and the Ground C2.

This list includes all items (including completed ones) for GFY 95 and following years.

1 **MLAT Modeling & Simulation I**

Contract Status:	Completed	
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, SCIF Support	
POC:	Capt Kurt Rinke	(505) 846-5328
Organization:	AFOTEC/ST	
Performance Period:	8/26/94 - 4/17/95	

2 **F-117 CLOAR OT&E Prep**

Contract Status:	On Contract	
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support	
POC:	Maj Doug Higgins	(916) 643-6935
Organization:	SM-ALC/QLA	
Performance Period:	8/23/94 - 4/24/97	

3 **MLAT Modeling & Simulation II**

Contract Status:	On contract	
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, R1...R5, EW/HF1...EW/HF3, EW1...EW3, SCIF Support	
POC:	Capt Kurt Rinke	(505) 846-5328
Organization:	AFOTEC/ST	
Performance Period:	1/31/95 - 4/24/96	

4 **B-1 MLAT Test Program**

Contract Status:	SOW submiteed. Contract award eminent.	
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, R1...R5, EW/HF1...EW/HF3, EW1...EW3, SCIF Support	
POC:	Mike Marker	(505) 846-5202
Organization:	HQ AFOTEC/XRR	
Performance Period:	6/15/95 - 2/14/96	

5 **REDCAP/ACETEF Linkage***

Contract Status:	On contract.	
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, R1...R5, EW/HF1...EW/HF3, EW1...EW3, SCIF Support SSDL, UDL, PEG, Remote Interface	
POC:	Mr. Bob Ruddy	(301) 826-6192
Organization:	NAWCAD/ACETEF	
Performance Period:	5/15/95 - 6/30/96	

*Utilizes Electronic Linkage to one or more other facilities

6 **Air Force Advanced Distributed Simulation***

Contract Status:	Awaiting funding
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface
POC:	Capt Ron Wiegand (505) 846-6265 DSN 246-6256
Organization:	AWC/DET 4 TACCSF
Performance Period:	1/19/95 - 12/8/95

7 **JADS Link Development***

Contract Status:	Future
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface
POC:	Lt Col Homer Jeffers (505) 846-4203
Organization:	HQ AFOTEC JADS/JTF
Performance Period:	11/1/95 - 6/30/97

8 **JADS Correlation and Validation***

Contract Status:	Future
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, R1...R5, EW/HF1...EW/HF3, EW1...EW3, PEG, SUAWACS Simulator
POC:	Lt Col Homer Jeffers (505) 846-4203
Organization:	HQ AFOTEC JADS/JTF
Performance Period:	10/1/96 - 6/30/98

9 **JADS Mission Level Assessment***

Contract Status:	Future
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, SUAWACS Simulator R1...R5, EW/HF1...EW/HF3, EW1...EW3, PEG,
POC:	Lt Col Homer Jeffers (505) 846-4203
Organization:	HQ AFOTEC JADS/JTF
Performance Period:	? -12/30/99

10 **Air Force Advanced Distributed Simulation***

Contract Status:	Awaiting funding
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface
POC:	Capt Ron Wiegand (505) 846-6265 DSN 246-6256
Organization:	AWC/DET 4 TACCSF
Performance Period:	1/19/95 - 12/8/95

11 **B-2 STRATCOM Penetration Test**

Contract Status:	Future
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, SUAWACS, R1...R5, EW/HF1...EW/HF3, EW1...EW3
POC:	Mr Bob Linnell (402) 294-1095
Organization:	US STRATCOM/J5/CPC
Performance Period:	10/1/95 - 4/2/96

*Utilizes Electronic Linkage to one or more other facilities

12 JETTA*

Contract Status:	Study effort on contract, awaiting funding for test effort
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, SUAWACS, R1...R5, EW/HF1...EW/HF3, EW1...EW3, Remote Interface
POC:	Ms Laura Knight (619) 553-3969
Organization:	Naval Research & Development Center
Performance Period:	11/1/95 - 4/30/96

13 B-2 MLAT III Penetration Analysis*

Contract Status:	Future
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, R1...R5, EW/HF1...EW/HF3, EW1...EW3, Remote Interface, SCIF Support
POC:	Capt Kurt Rinke (505) 846-5328
Organization:	AFOTEC/ST
Performance Period:	2/1/96 - 2/21/97

14 REDCAP/ACETEF Testing*

Contract Status:	Pending funding release.
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, R1...R5, EW/HF1...EW/HF3, EW1...EW3, SCIF Support SSDL, UDL, PEG, Remote Interface
POC:	Mr. Bob Ruddy (301-826-6192)
Organization:	NAWCAD/ACETEF
Performance Period:	6/30/96 - 12/31/96

15 F-117 CLOAR

Contract Status:	On Contract
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, SCIF Support, R1...R5, EW/HF1...EW/HW3, EW1...EW3
POC:	Maj Doug Higgins (916) 643-6935
Organization:	SM-ALC/QLA
Performance Period:	10/1/96 - 4/28/97

16 F22 CNI Test

Contract Status:	Unknown
Assets Required:	New Radar Simulator, SCIF
POC:	Maj Lhomond Jones (513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	6/1/97 - 7/31/97

*Utilizes Electronic Linkage to one or more other facilities

17 F22 FMS / REDCAP Test Phase I*

Contract Status:	Unknown
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, SUAWACS R1...R5, EW/HF1...EW/HW3, EW1...EW3,
POC:	Maj Lhomond Jones (513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	10/21/96 - 10/17/97

18 F22 Baseline RCS Test

Contract Status:	Unknown
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, SUAWACS R1...R5, EW/HF1...EW/HW3, EW1...EW3,
POC:	Maj Lhomond Jones (513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	2/12/97 - 10/28/97

19 F22 EC Effectiveness RCS Test*

Contract Status:	Unknown
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, R1...R5, EW/HF1...EW/HW3, EW1...EW3, SUAWACS
POC:	Maj Lhomond Jones (513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	4/1/97 - 10/27/97

20 F22 FMS/REDCAP Test Phase II*

Contract Status:	Unknown
Assets Required:	System Control, Ground C2, Reactive AI, Voice Switch, OL Support, Remote Interface, R1...R5, EW/HF1...EW/HW3, EW1...EW3, SUAWACS
POC:	Maj Lhomond Jones (513) 255-1715 ext 2485
Organization:	ASC/YF
Performance Period:	6/8/98 - 11/27/98

21 Precision RTJ Paths

Contract Status:	Completed	
Assets Required:	OL Support	
POC:	Maj Rick Hale	(904-882-3410)
Organization:	AFDTC/46TW	
Performance Period:	1/10/94 - 12/31/94	

22 Combat ID Technical Support

Contract Status:	On contract	
Assets Required:	OL Support	
POC:	Ms Sue Angell	(617) 377-6540
Organization:	ESC/ZJI	
Performance Period:	1/3/94 - 6/30/95	

*Utilizes Electronic Linkage to one or more other facilities

23 **TO&M Management**

Contract Status:	Ongoing	
Assets Required:	OL Support	
POC:	Maj Rick Hale	(904-882-3410)
Organization:	AFDTC/46TW	
Performance Period:	1/10/95 - 9/30/96	

24 **TO&M Maintenance**

Contract Status:	Ongoing	
Assets Required:	All hardware and software	
POC:	Maj Rick Hale	(904-882-3410)
Organization:	AFDTC/46TW	
Performance Period:	1/10/95 - 9/30/96	

25 **F22 Inquiry Support**

Contract Status:	Completed	
Assets Required:	OL Support	
POC:	Maj Rick Hale	(904-882-3410)
Organization:	AFDTC/46TW	
Performance Period:	1/10/94 - 1/31/95	

26 **B-2 ASC/YS Modeling & Simulation**

Contract Status:	Contract award imminent	
Assets Required:	OL Support, SCIF Access	
POC:	Maj Keith Carter	(513) 255-9682
Organization:	ASC/YSDT	
Performance Period:	6/1/95 - 2/26/96	

27 **JADS Planning Support**

Contract Status:	Completed	
Assets Required:	OL Support	
POC:	Lt Col Homer Jeffers	(505) 846-4203
Organization:	HQ AFOTEC JADS/JTF	
Performance Period:	2/15/95 - 4/11/95	

*Utilizes Electronic Linkage to one or more other facilities

ELECTRONIC LINKING OF REDCAP

From Executive Correspondence Tracking System 950510-7

Response # 2 from Lt Col Wes Heidenreich

> "REDCAP is linked for the purpose of providing simulated Integrated Air Defense System (IADS) cueing to terminal threats, resulting data delays should not cause problems since IADS command and control is highly people-dependent and human interactors (by their nature) are slower than electronically transferred data!"

Conclusion:

> REDCAP does not need to move but can and should be electronically linked.

INFRASTRUCTURE ISSUES

From Executive Correspondence Tracking System 950510-7
Response # 3 from Lt Col Wes Heidenreich

3. Approximately 44% of the equipment at REDCAP and 50% of the equipment at AFEWES would have to be moved in order to effectively conduct EW T&E. Infrastructure currently available within the AF Flight Test Center to accommodate the REDCAP mission includes the overall facility (some MILCON is needed for work in the existing building), scenario and environment generation capability, data analysis computers, host capabilities for the system under test, and the ability to conduct hardware-in-the-loop testing against threat radars netted together into a simulated IADS.

Comment:

A. REDCAP is an integrated system. Moving only 44% of the equipment will severely impact it's EC test mission capability. The command and control simulation is what the test community needs. Most other subsystems exist to support the command and control simulation.

B. Current infrasturucture does not exist at AFFTC. The space doesn't exist, scenario and environment generation capability is incompatible, data analysis computers are not compatible. Host capabilities for the systems under test would have to be integrated with REDCAP subsystems and would conflict with current usage of that capability.

C. There is no capability to conduct hardware-in-the-loop (radar receivers) testing against threat radars netted together into a simulated IADS. Range radars do not fulfill the requirements for hardware-in-the-loop testing.

SHARING OF COSTLY ISTF RESOURCES

From Executive Correspondence Tracking System 950510-7
Response # 4 from Lt Col Wes Heidenreich

Summary:

The ATIC at Edwards has a much larger Anechoic Chamber than ACETEF at Pax River, assuming the ECIT Program builds the required infrastructure, the ATIC would be a better candidate to have REDCAP and AFEWES than ACETEF because of the larger chamber size.

Comment:

All of REDCAP's capabilities can be available to both facilities by electronic linkage to ATIC at Edwards and ACETEF at Pax River. No capabilities need to be abandoned and linkage would be independent of ECIT funding.

Additionally electronic linkage of REDCAP can provide all REDCAP's capabilities to the training, contingency planning, and intelligence communities, a task impossible once REDCAP is broken up and moved.

MILCON TO HOUSE REDCAP AT EDWARDS

From Executive Correspondence Tracking System 950510-7
Response # 5 from Lt Col Wes Heidenreich

5. Although initial BRAC estimates did not include any MILCON at Edwards AFB, subsequent site visits could not locate sufficient existing floor space (that area thought to be available is required for future ECIT equipment). Thus, a floor would have to be added in a pre-existing structure to accommodate the REDCAP and AFEWES missions; this will require $2.8M in MILCON, which has been input into the BRAC COBRA analysis.

Comment:

A. The current REDCAP Facility and required support areas occupying 27,000 sq ft. The Air Force likely used just the equipment "footprint" of the hardware without considering operational area requirements, maintenance or storage areas, and no separate SCIF.

I'm confused. Is MILCON in COBRA sufficient?

Document Separator

REDCAP : The Nation's only threat integrated air defense system test facility

Briefing by : Peter J. Calinski
REDCAP Facility Manager

Attachments:

- REDCAP Description
- Analysis of SECDEF recommendations
- Electronic Combat Community Concerns on Move
  - "DOD BRACC Targets EC Testing"
- Congressional direction restricting move of REDCAP

MOVE REDCAP ?

- IT IS ESSENTIAL TO THE REDCAP MISSION THAT REDCAP CONTINUE TO BE OPERATED BY THE SAME ORGANIZATION THAT HAS OPERATED IT FOR OVER 30 YEARS
- THE GREATEST MILITARY VALUE IS ACHIEVED AT ITS PRESENT LOCATION
- OUR FINDINGS DIFFER SIGNIFICANTLY FROM THE SECDEF RECOMMENDATIONS

REDCAP Realignment -
The SECDEF's BRACC Recommendations

Recommendation:
Disestablish the Real-Time Digitally Controlled Analyzer Processor activity (REDCAP) at Buffalo, New York.
Required test activities and necessary support equipment will be relocated to the Air Force Flight Test Center (AFFTC) at Edwards AFB, California.
Any remaining equipment will be disposed of.

Justification:
The Test and Evaluation Joint Cross-Service Group (JCSG) recommended that REDCAP's capabilities be relocated to an existing facility at an installation with a Major Range and Test Facility Base (MRTFB) open air range. Projected workload for REDCAP is only 10 percent of its available capacity. AFFTC has capacity sufficient to absorb REDCAP's workload. REDCAP's basic hardware-in-the-loop infrastructure is duplicated at other Air Force T&E facilities. This action achieves significant cost savings and workload consolidation.

Return on Investment:
The total estimated one-time cost to implement this recommendation is $1.7 million. The net of all costs and savings during the implementation period is a savings of $1.9 million. Annual recurring savings after implementation are $0.9 million with a return on investment expected in one year. The net present value of the costs and savings over 20 years is a savings of $11.0 million.

Impacts:
Assuming no economic recovery, this recommendation could result in a maximum potential reduction of 5 jobs (3 direct jobs and 2 indirect jobs) over the 1996-2001 period in Erie County, New York economic area, which is less that 0.1 percent of economic area employment. This action will have minimal environmental impact.

REDCAP Realignment - The TESTER's Perspective

ASSERTION

Projected workload for REDCAP is only 10% of its available capacity.

FACT

- REDCAP is being utilized at over 100% capacity. Current usage is 12/hours/day, 5 days/week.
- Projected workload of REDCAP is under-represented.
- Projected Workload was artificially defined as 72% of the FY92 & 93 average.
- FY92 & 93 were before Redcap Upgrades
- Utilization in 94 and 95 increased by 400%
- Anticipated Linking will increase workload

REDCAP Realignment - The SECDEF's BRACC Recommendations

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FINAL SELECTION CRITERIA

Military Value (given priority consideration)

1. The current and future mission requirements and the impact on operational readiness of the Department of Defense's total force.
2. The availability and condition of land, facilities, and associated airspace at both the existing and potential receiving locations.
3. The ability to accommodate contingency, mobilization, and future total force requirements at both the existing and potential receiving locations.
4. The cost and manpower implications.

Return on Investment

5. The extent and timing of potential costs and savings, including the number of years, beginning with the date of completion of the closure or realignment, for the savings to exceed the costs.

Impacts

6. The economic impact on communities.
7. The ability of both the existing and potential receiving communities infrastructure to support forces, missions and personnel.
8. The environmental impact.

MILITARY VALUE

1. Current and future mission requirements and impact on operational readiness

   REDCAP's Mission is more important than ever. Electronic Combat systems are integral to our defense structure.

   REDCAP's Mission is growing because:

   - We now have the only modern threat systems to test against
   - With reduced budgets, REDCAP can reduce expensive flight testing.
   - REDCAP's capabilities are not duplicated anywhere

MILITARY VALUE

2. Availability and condition of land, facilities, and airspace at the existing and potential receiving locations.

REDCAP requires no land or airspace.

It occupies 20,000 sq.ft. of laboratory space at the contractor's facility in Buffalo, New York.

The government does not pay for:

- Rent for the space the facility occupies
- Cost of utilities
- Cost for guard force
- Building maintenance/cleaning, etc.

The receiving location (Edwards AFB) has no facility available to accept the REDCAP equipment.

MILITARY VALUE

3. The ability to accomodate contingency, mobilization, and future total force requirements at both the existing and potential processing sites:

Buffalo, New York	Edwards AFB California
50 people with technical degrees experienced with operating REDCAP	No one experienced with operating REDCAP
Over 40 people trained as enemy operators	No one trained as enemy operators
Nearly 400 skilled degreed contractor's employees to draw on in peak periods	No provision to handle peak loads
The contractor can "absorb" surplus staff during slow test periods	Government will have to pay entire staff continuously irrespective of testing load
Current location has space available equal to more than twice the current REDCAP space	No facility to accomodate even existing REDCAP equipment
Large number of nearby colleges and universities can supply technical degreed people at low Western New York labor costs	Very limited labor pool at very high California labor costs - typically 29% higher

MILITARY VALUE

4. The cost and manpower implications

REDCAP in Buffalo, NY , costs less to operate and will provide better support to our customers than at Edwards AFB

Remain at Buffalo	Move to Edwards
Government does not pay:	Government must pay:
Rent	-
Utilities, security, etc.	Utilities, security, etc.
Surge	Salaries for surge
Government does pay:	
900 K for Maintenance	900 K for Maintenance
Salaries only when testing	Full time salaries
	To build facility here and train 50 people to maintain
	Hire and train over 40 operators
	Move costs $13.8M (not 1.7)

Reinventing government means moving jobs into the private sector.
Moving REDCAP is moving jobs out of the private sector.

RETURN ON INVESTMENT

The true return on investment is negative.
- cost of $9.1 M not $11.0 M savings

Details are in the handouts and in additional information provided to the BRAC STAFF.

Basically, the SECDEF recommendation failed to consider:

True cost to pack up, ship, and install at destination	$6.5 M
Restore existing facility	$1.3 M
Provide facility at destination	$6.0 M
Acquire and train appropriate staff and operators	?
Cost to maintain and operate at destination	?

Short Note About Co-locating

- Some advocates say REDCAP needs to be co-located with other Facilities at Edwards AFB to provide data to those facilities

- REDCAP data is needed many places
    - EDWARDS AFB California
    - ACETEF Patuxent River MD
    - JETTA - Joint Environment for Testing, Training and Analysis
    - JADS - Joint Advanced Digital Simulation
    - ADS - Advanced Digital Simulation
    - B2 Simulator

- We have proven that REDCAP data can be available to all, therefore, no need to move REDCAP.

Why Was REDCAP on the List?

- It is not really a base, camp, post, etc. including any leased facility
- There are less than 300 civilian jobs at REDCAP (none)

Was it to circumvent Congressional Direction in the FY95 Senate Appropriations Report?

Summary

The greatest Military Value is achieved by keeping REDCAP in the hands of the people who know how to use it.

- The government pays for only the time the facility is used and a minimal maintenance cost.
- Net present value of costs and savings are a cost of $9.1 M
- The true cost to move the facility is $13.8 M not $1.7 M
- Moving REDCAP means moving jobs from the private sector into government
- Moving REDCAP will destroy its capability to perform its mission

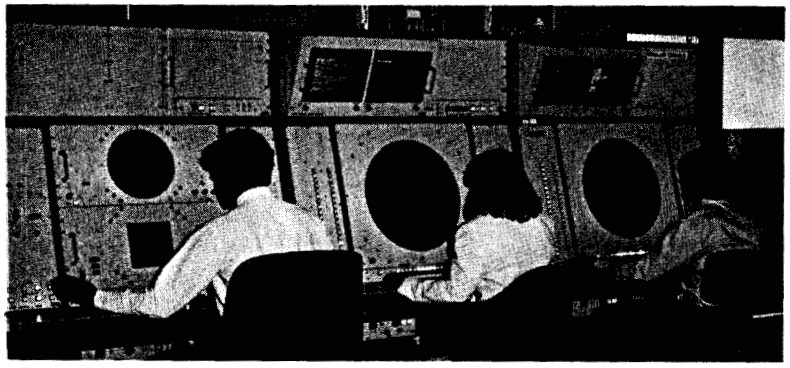
Document Separator

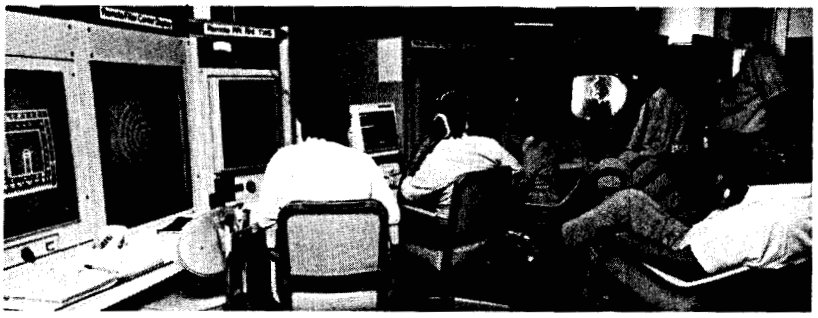
REDCAP Description

AIR FORCE

NETTED AIR DEFENSE SIMULATION FACILITY

REDCAP





USAF REDCAP

NETTED AIR DEFENSE SIMULATION FACILITY

The testing of highly integrated weapons platforms must be performed against an integrated air defense system (IADS). Effectiveness in countering a multiple-radar and command and control structure cannot be extrapolated from the results of a series of single-radar simulations. REDCAP is the nation's only high-fidelity, radio-frequency, hardware-in-the-loop, man-in-the-loop simulation of threat IADS, including the advanced AEW/C2 capabilities of the Soviet Union Airborne Warning and Control System (SUAWACS). REDCAP is used to evaluate the effectiveness of electronic-combat hardware, techniques, tactics, and concepts to defeat or degrade a threat IADS' ability to detect, track, and engage penetrating forces. It includes closed-loop radars and data links at RF, manned data fusion and weapons control posts, and manned interceptor stations in a 21,000 sq. ft. multi-security-level facility. Terminal threat engagements can be digitally simulated based on data measured on closed-loop simulators or by real-time secure data links with facilities possessing these simulators. In turn, REDCAP provides threat early warning, C2, and battle management services to these and other remote facilities.

REDCAP is owned by the United States Air Force and managed by the Air Force Development Test Center's 3246th Test Wing, Eglin AFB, FL. Continuing REDCAP upgrades maintain not only a cost-effective, high-fidelity simulation of modern threat IADS, but also leverage this resource to provide high-fidelity threat C2 capabilities to simulation facilities, ranges, and integrated test facilities throughout the Department of Defense.

REDCAP CAPABILITIES

Represents, in real time and simultaneously, hundreds of maneuvering vehicles (airborne, on land, or at sea) using multiple, varied, and reactive countermeasures/tactics.

Configures to represent a wide variety of threat scenarios, configurations, and capabilities, including specific geographical and order-of-battle representations.

Supports cost-effective exploitation, evaluation, and threat assessment of advanced threat C2 concepts, algorithms, and procedures by prototyping and testing prior to implementation in range facilities.

Provides evaluation of ECM effectiveness against both manned closed-loop EW/GCI/HF/AEW radars and RF communication links (both voice and data).

Allows evaluation of detectability and susceptibility to threat data fusion capabilities for a wide range of penetrator RF signatures.

Provides high-fidelity, reactive, threat radar and communications RF environment for evaluation and tailoring of situational awareness initiatives.

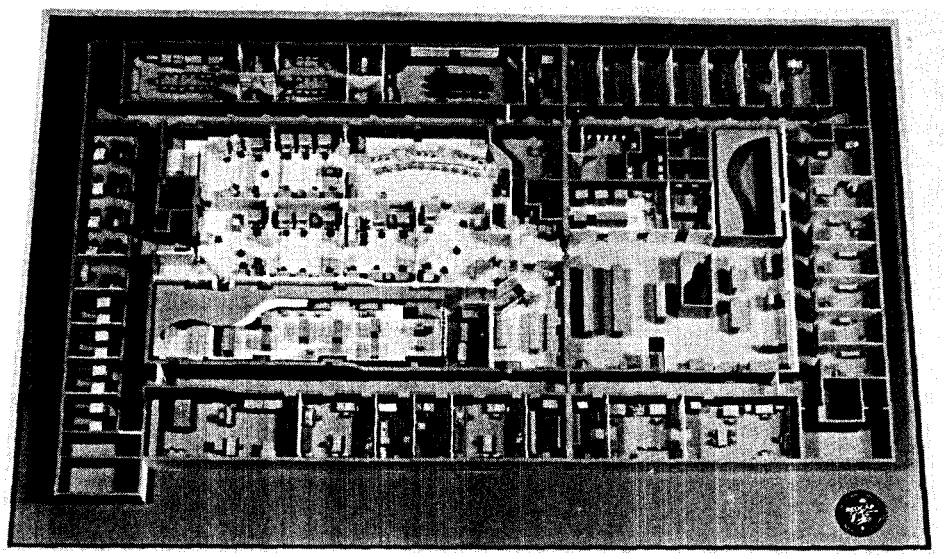
Incorporates the very difficult-to-digitally-model human and real hardware non-linear effects .

Interfaces in real-time via secure high-speed data links with integrated test facilities (anechoic chamber based), open air ranges, and hybrid laboratory facilities to provide both high-fidelity threat C2 and battle management and to use their assets to increase the fidelity of REDCAP tests.

Supports the development of level III and IV digital models by measuring the parametrics to be incorporated and validating the algorithms used.

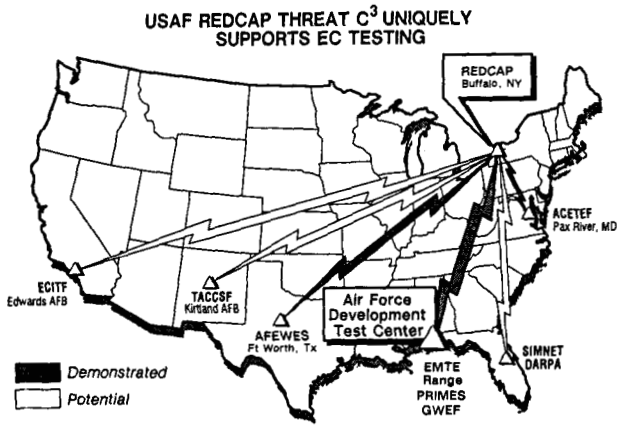
Permits the testing of equipment against highly classified and sensitive signals at RF within a 2000 sq. ft. RF shielded TEMPEST SCIF.

REDCAP TEST FACILITY

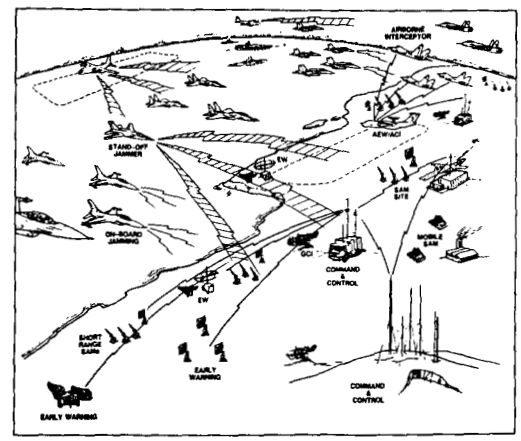


APPLICATIONS

THREAT DEFINITION:	"Soft" intelligence sensitivity testing
CONCEPT DEVELOPMENT:	Evaluation/refinement of concepts; parameter sensitivities; countermeasures effects; development of specifications
TECHNIQUE DESIGN:	Development of countermeasures techniques, impact of parameter tradeoffs; sensitivity to threat changes; cost/effectiveness; algorithm evaluation; breadboard testing
PREPRODUCTION EVALUATION:	Testing of hardware subsystems/systems; quantification of effectiveness; planning, screening, and extension of full-scale testing
PRODUCTION TESTING:	Support of operational tests and evaluations (OT&E)
DEPLOYMENT:	Tactics and employment; roles and missions; extension of OT&E test data
THREAT C3 SUPPORT TO REMOTE FACILITIES:	Air Combat Environment Test and Evaluation Facility (ACETEF) Air Force Electronic Warfare Evaluation Simulator (AFEWES) Eglin AFB Electromagnetic Test Environment (EMTE)



REDCAP Represents Integrated Air Defense Systems



USING REDCAP

REDCAP is a full-service test facility providing support from initial test planning through final test reporting. REDCAP has several decades of experience (since 1965) in using physical / mathematical simulations to address the intricate problems of electronic combat and the unique issues associated with penetrating a netted air defense system. As a laboratory facility, REDCAP provides a cost effective method of collecting statistically meaningful sample sizes under controllable and repeatable test conditions. Test results can be presented in numerous graphical and tabular formats and can be tailored to the needs of test customers. Most results fall into two categories: measures of performance / effectiveness and raw data. The following are typical of the measurements made at REDCAP:

Measures of Performance/Effectiveness

EW Radar and Reporting Outputs
- o Probability of initial target detection
- o Probability of track loss/continuity
- o Tracking accuracy
- o Reporting rate, frequency, delay
- o False target reports, number, and duration

Processing Center Outputs
- o Track accuracy versus number of tracks
- o Ability to correlate redundant tracks
- o Delay from first report to established track
- o Tracking accuracy through triangulation
- o The ability of the net to correlate sparse data and direct weapons with limited inputs

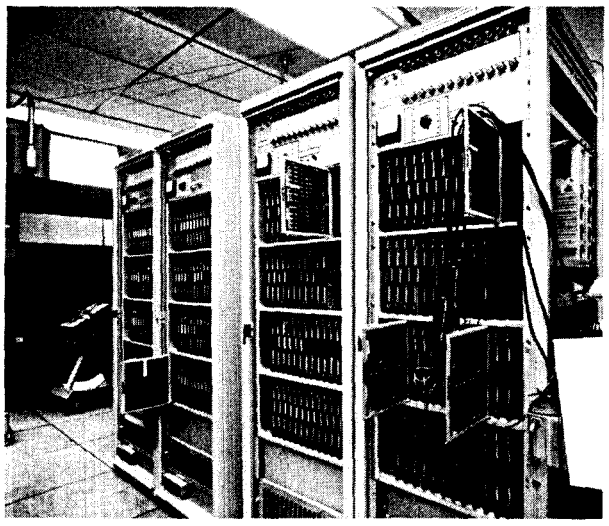
Weapons Direction Outputs
- o Assignment delays
- o Probability of arrival
- o Probability of detection
- o Probability of conversion
- o Engagement type, range, aspect distribution
- o Vectoring error

Raw Data

- o Tracking statistics
- o Event histories
- o Jamming/signal (J/S) time histories/histograms
- o Pulse-to-pulse or scan-to-scan data

SOVIET UNION AIRBORNE WARNING AND CONTROL SYSTEM SIMULATION (SUAWACS)

A crucial component of an IADS is the capabilities associated with its airborne warning and control systems. REDCAP contains our Nation's only simulaton of the advanced capabilities associated with the SUAWACS weapon system. It includes comprehensive closed-loop RF simulations of both the SUAWACS radar and the data links associated with this platform. Radar and C3 consoles are provided, allowing operators to perform various C3 functions. These include target identification and tracking, data fusion, resource allocation, AI vectoring, and coordination with other assets, etc. Manned pilot stations are integrated with the simulation to allow for the simulation of both single seat and two seat AIs with WSOs. This simulation supports test of electronic-countermeasures (ECM) equipment and technique effectiveness against both the radar and data links and performance evaluations of threat C3 and battle management functions.



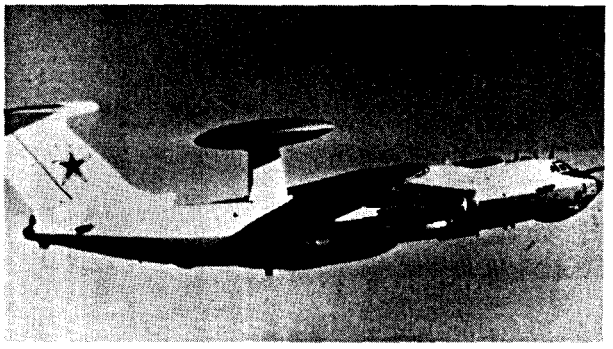
Some of the digital signal processor hardware required by the SUAWACS simulator.

The SUAWACS radar simulator does not radiate signals but provides RF inputs directly to systems under test. Transmitters, antennas, aircraft, terrain overflown, and propagation losses are represented in total via special-purpose digital and RF computer-driven hardware, and RF signal generators to insert the correct RF signals into receiver antenna terminals at the correct times. In addition to simulated target- and ground-clutter echoes, one-way path simulations are supplied for RF signals to and from the ECM systems under test. Elements of the radar beyond the receiver antenna terminals are simulated by direct implementation of their functions (e.g., mixers, amplifiers, detectors) and not by means of simulation analogs, as in RF environment simulations.

The simulation is computer-controlled for generating uniform sidelobe-clutter-control data. Further control is provided by a series of custom-designed signal processors for extremely high-speed operation and great flexibility.

Two of the four SUAWACS simulator consoles.

The SUAWACS, and the advanced C3 capabilities represented, provide additional challenges to be overcome when pentetrating a netted air defense system. In REDCAP, this simulation is appropriately integrated into the ground IADS network to provide the most comprehensive test capability available for penetrating a modern IADS.



This photo courtesy of the Royal Norwegian Air Force.

For less complex problems, the radar simulator can function as a standalone facility. This is often a cost-effective method to develop or test the robustness of concepts or techniques. The main advantages of standalone operation are the ease of collecting engineering data and the ability to evaluate jammer techniques economically by using tests with many replicates.

Document Separator

Analysis of SECDEF Recommendations

REDCAP Realignment

THE FACTS

MAJOR REDCAP EVENTS

1964	First Radar simulation - company sponsored	
1964-1970	Continuous small to medium upgrades	$ 2M
1970	Major upgrade to support B1A	2M
1970-1982	Continuous small to medium upgrades	3M
1982	Addition of Soviet AWACS	5M
1988	Start of Major Upgrade	
1993	New Battle Management and Datalinks	$49M
1994	New Ground IADS and Link to other Facilities	$14M
1995	Integrate Radars into New Architecture	$13M
1997	Advanced Radars	?
1999	Advanced Radars	?

REDCAP Realignment - The TESTER's Perspective

ASSERTION

Required test activities and necessary support equipment will be relocated to the Air Force Flight Test Center (AFFTC) at Edwards AFB, CA. Any remaining equipment will be disposed of.

FACT

REDCAP is in the final stages of a $75M Upgrade scheduled for completion in Oct 1995. The total facility is needed to perform REDCAP's mission, failure to move the entire facility and its capabilities will significantly degrade the Nation's Electronic Combat capabilities.

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The SECDEF's BRACC Recommendations

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The Test and Evaluation Joint Cross-Service Group (JCSG) recommended that REDCAP's capabilities be relocated to an existing facility at an installation with a Major Range and Test Facility Base (MRTFB) open air range.

FACT

It is JCSG Policy to realign/consolidate capabilities, where cost effective, into existing MRTFB activities with Open Air Ranges. There is no existing facility which is currently capable of housing REDCAP. Approved MILCON at ECITF is being added to house REDCAP prior to BRACC final determination. Instead of relocating, the JSG policy to realign/consolidate can be implemented via ELECTRONIC LINKAGE, (a capability demonstrated with ACETEF, similar to the Information Super-highway), of REDCAP to the ECITF at Edwards AFB and the ACETEF facility at Patuxent River, NAS at a much lower cost with no loss of capability.

REDCAP Realignment -
The SECDEF's BRACC Recommendations

Recommendation:
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Return on Investment:
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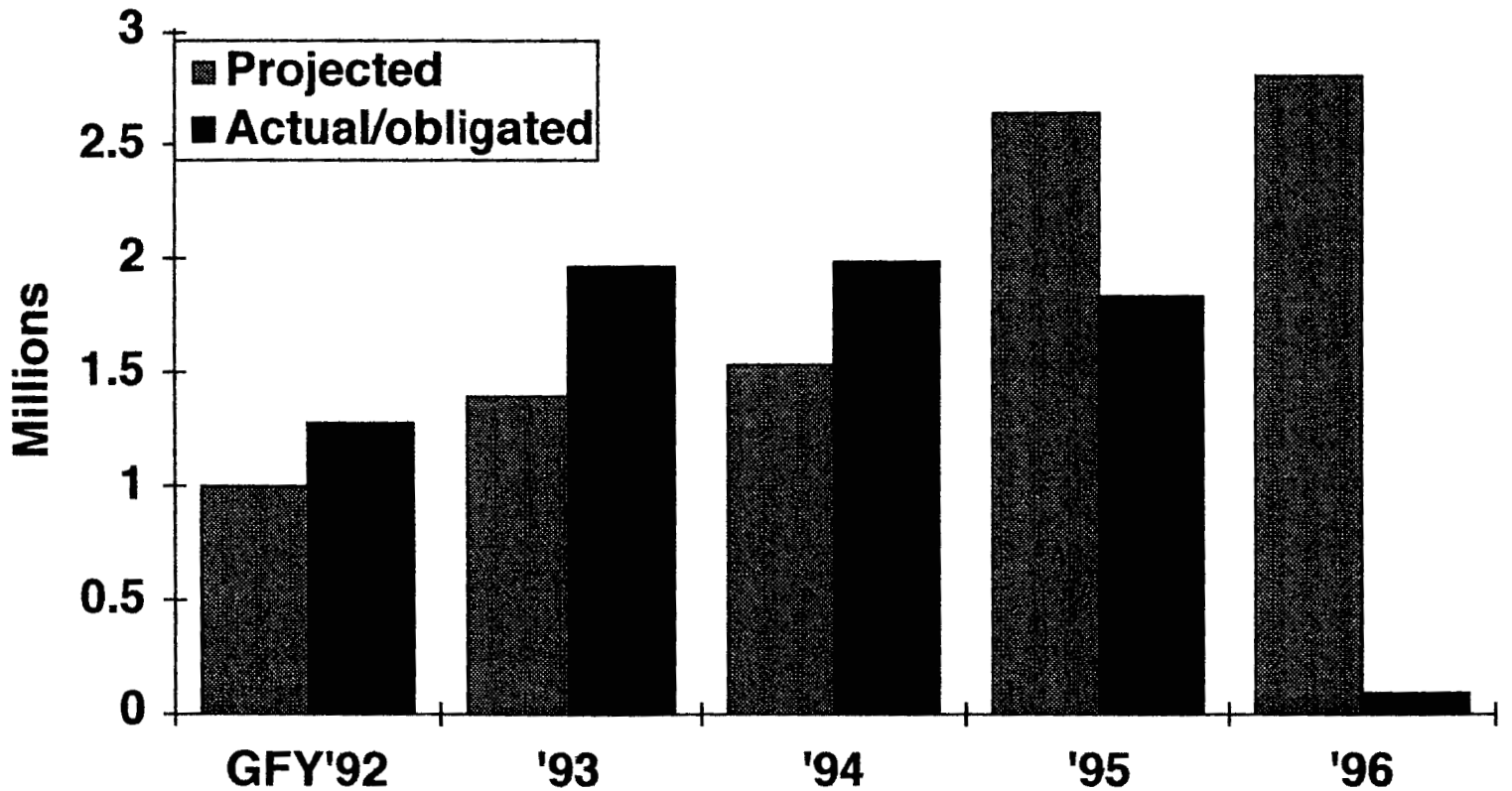
REDCAP WORKLOAD

ACTUAL WORKLOAD ALWAYS EXCEEDS PROJECTED

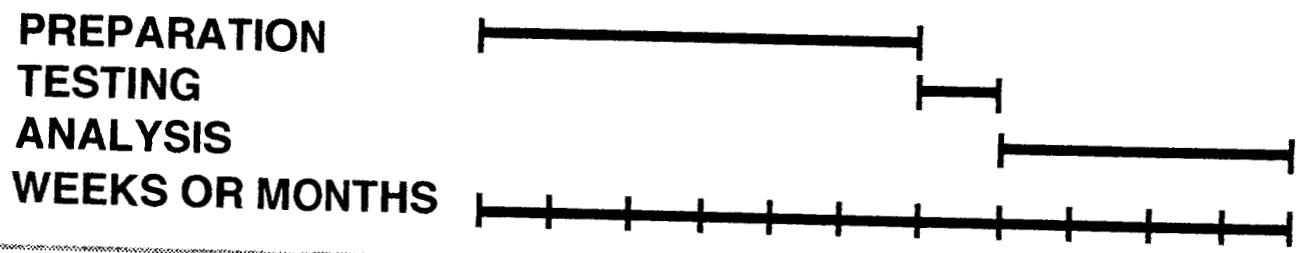


as of 5 April 95

THE MILITARY VALUE OF REDCAP IS NOT JUST FROM TESTING

THE PREPARATION TIME AND ANALYSIS TIME IS OF EQUAL OR GREATER VALUE

TYPICAL TEST PROGRAM TIMELINES



FALLACIES ON UTILIZATION

TEST	SIMULATOR PREP	SIMULATOR TEST	TEST REPORT & ANALYSIS
REDCAP/EMTE/AFEWES LINKAGE	60	14	42
REDCAP EF111 TEST	96	25	34
PMTC NOISE QUALITY	28	5	14
ESD TEST PROGRAM	48	10	75
WARLOCK TEST PROGRAM	80	28	28
B-2 M&S TESTING	104	60	104
TACTICAL A/C DECOY TEST	28	7	26
MLAT I	120	21	7
AVERAGE	71	21	41

ALL UNITS ARE IN DAYS

SIMULATOR USAGE

TEST TIME IS 15% OF SIMULATOR USAGE TIME

REDCAP Realignment - The TESTER's Perspective

ASSERTION

Projected workload for REDCAP is only 10% of its available capacity.

FACT

- REDCAP is being utilized at over 100% capacity. Current usage is 12/hours/day, 5 days/week.
- Projected workload of REDCAP is under-represented.
- Projected Workload was artificially defined as 72% of the FY92 & 93 average.
- FY92 & 93 were before Redcap Upgrades
- Utilization in 94 and 95 increased by 400%
- Anticipated Linking will increase workload

REDCAP Realignment - The SECDEF's BRACC Recommendations

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REDCAP IS MORE IMPORTANT THAN EVER BEFORE

IN A DECLINING DEFENSE ENVIRONMENT, REDCAP ACTIVITY IS INCREASING BECAUSE THE ELECTRONIC COMBAT COMMUNITY MUST FIND MORE ECONOMICAL METHODS OF TESTING

FLIGHT TESTING ON OPEN AIR RANGES TYPICALLY COSTS 10 TO 20 TIMES AS MUCH AS REDCAP TESTING

FLIGHT TESTING CANNOT ANSWER THE QUESTION OF HOW A SYSTEM WILL PERFORM AGAINST A SPECIFIC COUNTRY

REDCAP Realignment - The TESTER's Perspective

ASSERTION

AFFTC has capacity sufficient to absorb REDCAP's workload.

FACT

- AFFTC has no space to absorb this facility. AFFTC is currently modifying their MILCON to the ECITF to house REDCAP based on BRACC recommendations.
- Estimated additional MILCON costs are $6-7.8M for REDCAP alone.
- This does not include the additional people (with up to 25 years experience in IADS testing) needed to operate (and maintain) the facility. This also assumes workload estimates are accurate.

REDCAP Realignment -
The SECDEF's BRACC Recommendations

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REDCAP Realignment - The TESTER's Perspective

ASSERTION

REDCAP's basic Hardware-In-The-Loop infrastructure is duplicated at other Air Force T&E Facilities.

FACT

REDCAP has the only modern operational Threat Integrated Air Defense System (IADS) simulation.

There is no other place to test against the IADS. Not models, not ranges.

REDCAP Realignment - The SECDEF's BRACC Recommendations

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REDCAP Realignment - The TESTER's Perspective

ASSERTION

This action achieves significant cost savings and workload consolidation.

FACT

This action incurs significant COSTS as demonstrated in the ROI Analysis which follows in subsequent slides. No workload consolidation is possible as people with unique experience related to IADS would have to be added to staff REDCAP.

REDCAP Realignment - The SECDEF's BRACC Recommendations

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REDCAP Realignment - The TESTER's Perspective

ASSERTION

The total estimated one-time cost to implement this recommendation is $1.7 million.

FACT

The costs to move REDCAP are as follows:

Pack/ship/install and make operational at Edwards	$6.5M
Restore the existing REDCAP facility area	+ $1.3M
Total cost to move REDCAP	$7.8M
Cost to build an area to house REDCAP	$6.0-7.8M
Total cost to move & house	$13.8-$15.6M

REDCAP Realignment - The SECDEF's BRACC Recommendations

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REDCAP Realignment - The TESTER's Perspective

ASSERTION

The net of all costs and savings during the implementation period is a savings of $1.9 million.

FACT

The net of all costs and all savings during the implementation period is a net COST of $5.9M. The Air Force failed to account for electrical costs (3,380 Mwh/yr), computer maintenance costs, hardware materials costs, and Manpower costs.

REDCAP Realignment - The SECDEF's BRACC Recommendations

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REDCAP Realignment - The TESTER's Perspective

ASSERTION

Annual recurring savings after implementation are $0.9 million with a return on investment expected in one year.

FACT

Current cost/yr is $0.9M.

It includes:	If moved
140K of Vendor Maintenance	SAME
7600 Hours of labor	SAME

Does not include:

Personnel for surge capacity	12 Engineers 40 Operators
rent, utilities (~3,380 Mwh power),	?
Guard Force, etc..	?

Thus, the 0.9 Million in costs will still exist and there will be additional expenses.

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REDCAP Realignment - The TESTER's Perspective

ASSERTION

The net present value of the costs and savings over 20 years is a savings of $11.0 million.

FACT

The net present value of the costs and savings over 20 years is a COST of $1.3M. If MILCON costs are included 9.1M The Air Force failed to account for the following costs at Edwards AFB, CA:

Electricity -	$290K
Vendor Maint & Mat	140K
Manpower	?

Net present value of savings ($0.9M/yr) over 20 years is:	$8.5M
Net present value of these costs (above) over 20 years is:	- 3.9M
Implementation Period Costs	-5.9M
Net present value of COST	1.3M
Additional MILCON costs	7.8M
Total Net Present COST	9.1M

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REDCAP Realignment - The TESTER's Perspective

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Assuming no economic recovery, this recommendation could result in a maximum potential reduction of 5 jobs (3 direct jobs and 2 indirect jobs) over the 1996-2001 period in Erie County, New York economic area, which is less that 0.1 percent of economic area employment.

FACT

Currently, REDCAP employs 75 professionals at Calspan (50 direct, 25 indirect); if moved, all of these jobs would disappear. The indirect economic impact on Erie County, New York is unknown.

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REDCAP Realignment - The TESTER's Perspective

ASSERTION

This action will have minimal environmental impact.

FACT

This action will have the following environmental impacts:

1. An additional 747,000 kwh of electricity will have to be generated and transmitted to cool REDCAP (at Edwards AFB) above that required in Buffalo, New York because of desert temperatures.

2. A facility to house REDCAP will need to be constructed at Edwards AFB within the 100 year floodplain (according to MILCON documents for the ECITF). Note, to our knowledge, there is no additional environment impact statement being completed for the additional MILCON work being unilaterally added to house REDCAP and AFEWES prior to BRACC recommendations.

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REDCAP Realignment - The TESTER's Perspective

CONCLUSION

- Is REDCAP truly a "base, camp, post, station, yard, center, homeport,etc."?
- REDCAP's mission is of vital importance to national defense
- REDCAP is unique - there is no other way to test the modern weapons systems against these modern threats
- REDCAP cannot be operated in a more efficient manner:
  - Profit motivated corporation vs. government operator
  - No cost for rent, utilities,guard force
  - No cost for support of surge requirements
  - Location is more accessible to users
- The cost to move REDCAP far exceeds any "savings" from closing
  - savings are nil
  - move costs exceed $13.M
- Any other facility that needs a threat IADS can be linked to REDCAP using standard Distributed Interactive Simulation Protocols.

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Document Separator

Electronic Combat (EC) Community Concerns on Move "DOD BRACC Targets EC Testing"

JOURNAL OF ELECTRONIC DEFENSE
OFFICIAL PUBLICATION OF THE ASSOCIATION OF OLD CROWS

Cutting Room Floor

DOD BRACC Targets EC Testing

Editor's note: This article is an expanded version of a story which appears in the May "EC Monitor."

The US Department of Defense's (DOD's) March 2 recommendations to the current Base Realignment and Closure Committee (BRACC) includes plans to move key elements of the Air Force's current electronic combat developmental test and evaluation (ECDT&E) capability to new locations at Nellis AFB, NV, and Edwards AFB, CA. The plan has contributed to a contentious final round of the BRACC hearings.

The DOD recommendations propose to relocate 8 threat simulators and 52 government jobs from the Electromagnetic Threat Environment (EMTE) range at Eglin AFB, FL, to the Nellis Range Complex. Currently Nellis serves as an electronic combat training range. The estimated cost of this move is $2.2 million.

The DOD recommendation also includes moving the Real-Time Digitally Controlled Analyzer Processor (REDCAP) activity at Buffalo, NY, and the Air Force Electronic Warfare Environment Simulator (AFEWES) at Ft. Worth, TX, to the Air Force Flight Test Center at Edwards AFB. The DOD estimates the cost of moving AFEWES at $5.8 million and the cost of moving REDCAP at $1.7 million.

Criticism of the recommendations has been swift and vociferous. Skeptics argue that while the recommendations appear to suggest a coherent and inexpensive plan to consolidate Air Force open-air EC testing at Nellis and hardware-in-the-loop (HITL) testing at Edwards, they are inherently flawed for several reasons -- and represent a walk to the executioner's block for EC testing.

To explain what capabilities this plan proposes to move, it is important to understand what functions this equipment provides. In the late 1980s, the Air Force came under fire for a number of troubled electronic combat (EC) procurement programs, most notably the ALQ-161A for the B-1B bomber. In response to such procurement problems, the DOD launched the EC Test Process, a plan to ensure that all DOD Systems Program Offices test their EC systems rigorously throughout their development. Congress endorsed the EC Test Process in the FY94 National Defense Authorization Act, thereby requiring any EC system under development to meet an "appropriate, rigorous and structured test and evaluation regime" before receiving authorization to proceed to the low-rate initial production stage. The language went on to list the types of testing facilities, which included computer simulation and modeling facilities; measurement facilities; system integration laboratories; simulated threat HITL test facilities, namely REDCAP and AFEWES; installed system test facilities; and open-air ranges such as the Air Force's EMTE.

First, critics say that while the concept of moving resources from Eglin to Nellis does not in itself threaten Air Force ECDT&E, the Air Force cannot possibly move and then rebuild the EMTE capabilities at Nellis for the $2.2 million figure submitted to the BRACC. They argue that $2.2 million would only cover the actual move itself and would make no provisions to add the extensive command and control facilities the critics charge Nellis would require to upgrade the range from a training facility to full ECDT&E capability.

JED spoke with MG Richard Gillis, USAF (ret.), who has argued to the BRACC that the EMTE should remain at Eglin for several reasons. He has submitted itemized cost data to the BRACC indicating that the true cost of moving the EMTE equipment to Nellis and building the proper facilities for the equipment is actually $11 million. He argues that it is less expensive to maintain the current capabilities of Eglin, where the EMTE command and control facilities already exist.

Previous investigations of DOD ECDT&E consolidation appear to support Gillis's contentions. In 1994, the Board of Directors (vice-chiefs for all the services) studied the issue of consolidating all DOD ECDT&E. According to the study, they found that the most capable range in the DOD was the EMTE at Eglin. It also concluded that the most cost-effective DOD plan for joint EC and munitions test consolidation would be to relocate the Navy's China Lake and Pt. Mugu, CA, facilities to Eglin. Following that study, the Test and Evaluation Joint Cross Services Group, which recently studied the DOD ECDT&E consolidation issue for the BRACC, reached the same conclusion. This has led many to question why these findings were not part of the current DOD recommendations, and also why the Air Force would want to dismantle the EMTE range, which the DOD twice identified as its most capable EC and munitions test range.

The cost to move the AFEWES and REDCAP resources also appears to be in doubt. Sources close to the two facilities, citing itemized estimates, contend that it would cost $66.7 million to move AFEWES, rather than the $5.8 million estimated by the DOD BRACC recommendations, and at least $13.8 million to move REDCAP -- not $1.7 million. The sources explained that, from a cost point of view, the Air Force estimates would only hold true if there were no plans to put the HITL equipment back into service once it was moved out west.

One reason for the discrepancies is that the Air Force allegedly did not request itemized estimates for moving the equipment until after the DOD recommendations were made. According to a source familiar with the program, AFEWES contractor Lockheed-Ft. Worth Co. (Ft. Worth, TX), was not contacted by Air Force officials to determine the specific costs of moving AFEWES until March 22, three weeks after the DOD submitted its BRACC recommendations. Similarly, CALSPAN Corp. (Buffalo, NY), contractor for REDCAP, was not asked to provide a similar cost estimate until March 21, according to industry sources.

Furthermore, congressional sources indicate that the Air Force has not identified the cost data that it used to provide the estimates for the EMTE, AFEWES and REDCAP DOD recommendations. They claim that if the Air Force cost data were available, they should have been provided to the BRACC information libraries in both the House and the Senate. They indicate that no breakdown of the EMTE, REDCAP and AFEWES cost estimates exists at those sites. An April Government Accounting Office report specifically concerned with the DOD recommendations to the BRACC finds a similar conclusion regarding many Air Force estimates.

Congressional sources suspicious of Air Force intentions also indicated that under the current BRACC system, military value and operational cost savings are the major criteria by which the DOD recommendations are judged. They further stated that because of the high priority placed on cost savings over a given period of time, it is advantageous for the Air Force to underestimate the cost of the moves if it wants to ensure that the BRACC will accept the recommendations. In essence, not only are the up-front costs of a $5.8 million move cheaper than a $66.7 million move, but the payback will also occur significantly sooner.

However, the sources went on to say, if the Air Force underestimates the relocation costs too much, as has been alleged, then it will either have to "mothball" the equipment indefinitely or identify money elsewhere in its budget to put the equipment back into service. The sources added that given the DOD funding climate, the former option seemed more plausible.

What makes the "mothball" scenario more likely for the EMTE, REDCAP and AFEWES equipment, said other sources, is the lack of provision for moving any of the experienced personnel who run the equipment. Concerning the EMTE, the DOD recommendation calls for the transfer of 52 government positions, mostly from the 46th Test Wing at Eglin -- the people responsible for running the EMTE equipment. The sources argued that while the positions are being relocated to Nellis, it was likely that many of the technicians currently filling those positions would find other assignments at Eglin, since they are given that option. The sources therefore predicted that most of the positions will go to Nellis "empty." This brings into question where the Air Force plans to find the skilled personnel necessary to operate the equipment, since many agree that within the Air Force, the current expertise needed to run the EMTE equipment resides only at Eglin.

With regard to REDCAP and AFEWES, the DOD recommendations make no provision to move any contractor jobs from REDCAP or AFEWES to Edwards, since the BRACC concerns itself only with government positions. Operation of both sites relies almost exclusively on a contractor work force. This includes approximately 50 CALSPAN personnel who directly maintain and operate REDCAP and 100 Lockheed personnel who perform the

same functions for AFEWES. Critics argue that the expertise required to operate the equipment does not exist anywhere else. They also say that the Air Force has not come forward with any plan to move CALSPAN or Lockheed employees to Edwards. They say that if such a plan existed, it should have been discussed with the contractors. Currently, no such plan is known to exist.

Further clouding the issue of cost is the uncertainty surrounding the number of systems the Air Force plans to relocate. While the DOD recommendations cite 8 closed-loop simulators, Eglin sources contacted during the recent Dixie Crow Symposium provided a list of 10 systems slated to move as part of the recommendations. Meanwhile, another source has alleged that 17 systems have been identified following a site visit designated to determine which assets are to be removed. The same source provided *JED* with an internal Air Force document, dated March 28, from the 46th EC Test Squadron at Eglin. The document purports to list the capabilities that are to be removed from Eglin. These include:

testing of integrated EC systems such as F-15 TEWS and the US Army's Advanced Threat Radar Jammer for the Apache
full radar-warning-receiver (RWR) testing for programs which require high threat density, such as the F-16's ALR-56M and the Navy's ALR-67(V)3&4 Advanced Radar Warning Receiver
full RF precision direction finding development such as the High-Speed Antiradiation Missile (HARM) Targeting System and E-3 AWACS electronic support measures
EC jamming effectiveness testing for programs such as the EF-111 System Improvement Program
electronic countermeasures (ECM) technique development for such programs as the ALQ-131, -137, -184 pod optimization and the B-52 ALQ-172 defensive avionics suite
HITL ECM technique development for programs such as the exploitation of SA-8 surface-to-air-missiles and AC-130 Gunship ECM development
ECM tactics development for Combat Talon II and MH-53J Pave Low III electronic warfare suites
countermeasures effectiveness testing for the Navy and Air Force aircraft as well as dual infrared/RF decoys
quick reaction jammer and RWR software reprogramming such as Coronet Quick I and II
contingency deployment ECM system verification for aircraft such as AC-130 A/H and Combat Talon I and II
radar cross section/chaff bloom measurements for programs such Air National Guard F-16, C-130 radar cross section and defensive avionics assessment program.

The document goes on to say, "We are basically out of any business that requires more than one emitter of a particular type. This includes all closed-loop ECM testing, especially effectiveness testing and ECM technique evaluation measuring miss distances generated. This is most of the Electronic Combat testing being accomplished today." Critics are concerned that these Air Force ECDT&E testing capabilities will be lost if the DOD recommendations are approved.

Finally, critics contend that if the DOD recommendations are approved by the BRACC and President Clinton, the plan would put Congress in a "Catch 22." Specifically, a FY95 Senate Appropriations Committee Report directs the Air Force to study electronic networking solutions prior to consolidating any HITL simulation facilities. The reason for the mandate is to explore the relatively inexpensive possibility of electronically linking REDCAP and AFEWES to Edwards rather than moving the sites. Similarly, Congress directed the DOD to submit an EC master plan for congressional approval before moving any simulation equipment out of Eglin. However, the final drafts of these studies are not due to be presented until after Congress is scheduled to vote on the BRACC recommendations.

Following the DOD recommendations to the BRACC, the committee has until May 17 to hear any arguments concerning the DOD recommendation before it must present its final draft to President Clinton and Congress on July 1. The President must then accept or reject the plan in its entirety. The same is true for passage in Congress. If Congress is presented with a BRACC plan which includes the current recommendations, then it must decide whether to reject the entire BRACC '95 proposal or allow the recommendations to stand in defiance of its own mandates.

The potential conflict between the BRACC and congressional mandates is a subject of debate. Air Force sources cite an unnamed congressional staffer, who assured the service that the mandates would still have to be met even if Congress passed the BRACC '95 legislation.

However, according to knowledgeable congressional sources contacted by *JED*, if Congress is presented with the current EMTE, AFEWES and REDCAP recommendations and passes the BRACC '95 legislation, the legislation

would take precedence over the mandates, since the BRACC is an actual bill rather than a committee mandate. The sources also add that it was extremely unlikely that the conflict would cause Congress to reject the BRACC '95 legislation, which involves approximately 140 other military installations besides the EC test facilities.

With the congressional mandates in place, the inclusion of the EMTE, AFEWES and REDCAP in the DOD recommendation took many by surprise. Sources indicated that in light of the Test and Evaluation Joint Cross Service Group findings the DOD had only been giving serious consideration to consolidating range equipment between Eglin and the Navy's China Lake facility, not Nellis. However, sources allege that senior elements of the Air Force Materiel Command and the Test and Evaluation Directorate implemented their EMTE, AFEWES and REDCAP recommendations at the "11th hour." Such timing prevented any debate within the ECDT&E community concerning the wisdom of the moves.

For REDCAP and AFEWES, the April Government Accounting Office BRACC report already cited indicated that the two sites did not meet the minimum personnel requirements of the DOD base re-alignment guidelines and should not have been included in the DOD recommendations.

While the events seem confusing, the source of concern for many is that by allegedly failing to submit accurate cost data in the DOD recommendations and failing to ensure that the EMTE, AFEWES and REDCAP personnel will move with the equipment, the Air Force Materiel Command and the Air Force Test and Evaluation Directorate have not properly ensured that the EMTE, AFEWES and REDCAP equipment will ever be placed back into service once moved. Consequently, critics also condemn the negative effect the moves will have on the Air Force EC Test Process.

Skeptics suggest two reasons why the future of Air Force ECDT&E is in its current situation. At best, they say, the Air Force decided to implement a consolidation of ECDT&E equipment in a particularly careless manner. They allege that if the plan was to consolidate, it was underfunded, improperly staffed and, since the moves were added to the DOD recommendations at the 11th hour, the chance to debate the plan was never presented to the DOD ECDT&E community.

As an aside, sources added that, with only the F-22 coming down the road as a new program, the Air Force Flight Test Center at Edwards AFB is running out of missions for its Benefield Anechoic Facility. They added that moving EC HITL testing to Edwards will ensure the need for the facility, temporarily. However they allege that the Air Force plan does not account for who will run the equipment or how it will find the money to re-establish the full capabilities of REDCAP and AFEWES.

At worst, they suggest the March 2 DOD recommendations were a deliberate effort by certain high-ranking elements of the Air Force to weaken, if not kill, key elements of its EC Test Process.

Expounding on this second scenario, critics suggest that amid the shrinking defense budget, the battle between the acquisition and the testing elements of the Air Force has finally surfaced, with the acquisition elements in control. They suggested that the acquisitions camp finds the potentially costly price tag of testing (and retesting) too expensive for their constrained program budgets. Thus, System Program Offices (SPOs), especially the F-22, have sought to bypass currently mandated EC testing procedures in favor of their own programs in an effort to cut costs.

Last year, according to congressional sources, Congress requested that the F-22 System Program Office clearly define in an F-22 Electronic Combat Effectiveness Testing Report, what testing it planned to do at REDCAP and AFEWES. This plan, due March 1, had not been delivered at press time. The sources further allege that without REDCAP and AFEWES available to test the F-22 Integrated Electronic Warfare System (INEWS), Congress would be hard pressed to find an Air Force facility that could properly test the INEWS against simulated integrated air defense systems and missile threats -- leaving the SPO to find a way to test the system itself. The F-22 SPO did not respond to *JED* queries regarding these allegations.

Critics believe that if REDCAP and AFEWES are relocated to Edwards -- and are mothballed or lose capabilities due to the reasons cited above -- developmental EC systems testing would likely emphasize more expensive open-air testing, since that is the current focus of the Flight Test Center at Edwards. More importantly, critics argue that the costs associated with hardware fixes are extremely expensive once testing reaches the open-air phase. They cite current Air Force efforts to fix ALQ-161A as an example.

However, retired USAF Lt Gen Howard Leaf, director of Air Force test and evaluation, did agree to address some of these allegations. "The Air Force is participating in the Base Realignment and Closure (BRAC) process and is responding to consolidation recommendations forwarded to the Office of the Secretary of Defense (OSD)," said Leaf in a written response to *JED* queries. "Equipment and manpower positions that would be located under the BRAC recommendations and their receiving locations are being refined during site visits."

However, Leaf asserted that since "the majority of all Air Force developmental test and evaluation and a large portion of its operational test and evaluation are currently conducted at Edwards AFB and Nellis Range Complex, command and control facilities sufficient for test and evaluation exist." Further, Leaf said, "Hiring of additional personnel and appropriate training will be accomplished if required."

The DOD recommendations do not violate the intentions of Congress, Leaf said. "The Air Force has not moved any electronic warfare simulation equipment, and thus has not violated congressional direction."

In conclusion, Leaf said, "The Air Force remains strongly committed to the electronic warfare test process and our ability to implement it. Costs associated with reactivating needed test and evaluation capabilities realigned by the BRAC process are borne by the BRAC; these funds are set aside for this purpose only."

At press time, the executive board of the BRACC was scheduled to meet with GAO and DOD officials to specifically address test and evaluation issues. It remained unclear whether the issues raised by critics of the DOD recommendations for EMTE, AFEWES and REDCAP facilities would be heard at that meeting. -- *J. Knowles*

Congressional Direction Restricting Move of REDCAP

SAC FY-95 REPORT
8/1/94

Threat simulator development.—The Committee provides $45,664,000, an increase to the budget request of $5,589,000 and an amount $589,000 above the House recommendation.

The Committee deletes $4,000,000 to slow the pace of upgrades to the Air Force electronic warfare evaluation simulator [AFEWES]. The Air Force may make substantial adjustments in its test and evaluation infrastructure, so accelerated modernization efforts are premature at this time.

The Committee adds $9,589,000 to the budget request for the real-time electromagnetic digitally controlled analyzer and processor [REDCAP] project. The Committee directs that the full amount, $16,589,000, shall be made available only to complete the option C upgrade of the REDCAP facility, to initiate the option E REDCAP upgrade; and to perform data reduction updates.

The Committee provides $912,000, the budget request amount, only to continue activities under the Have Note Program.

The Committee also approves the requested amount, $2,000,000, only to fully fund ongoing activities at the Rome Laboratory Antenna Measurement Facility.

Furthermore, the Committee is aware of proposals to consolidate threat hardware-in-the-loop electronic combat test facilities at a single site. Data linking, rather than moving, facilities could prove to be far more efficient and cost effective. Therefore, at least 120 days prior to the approval of any effort to consolidate, transfer, realign, alter, or downsize any mission or activity at any threat hardware-in-the-loop electronic combat test facilities. the Secretary of Defense shall provide to the congressional Defense committees a

study clearly demonstrating that data linking is: (1) technically infeasible, or (2) less efficient and cost effective than consolidation.

RAND project Air Force. The Committee agrees with the House

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