# The Air National Guard Story

DCN 1227

DEPT OF THE AIR FORCE
NATIONAL GUARD BUREAU

**PAUL A. WEAVER JR**
BRIGADIER GENERAL
DEPUTY DIRECTOR, AIR NATIONAL GUARD

PENTAGON, RM 2E378
WASHINGTON, DC
20310-2500

DSN: 223-4750
COMM: (703) 693-4750
FAX: (703) 697-2943

20 APRIL 95

Dear Craig,

Thanks for the opportunity to brief you on the Air National Guard.

Enclosed are the requested documents.

Please let me know if I can help.

Paul Weaver

# How We Began

**1636**
**Massachusetts Bay Company**
**First Militia**

**1824**
**New York Militia**
**Takes Name "National Guard"**
**Honors LaFayette**

# 18 US Presidents Served In the National Guard

- They Include:
  - Washington
  - Jefferson
  - Madison
  - Grant
  - Roosevelt
  - Truman

# The Guard Was There

- Revolution
- War of 1812
- Mexican War
- Civil War
- Spanish-American War
- World War I
- World War II
- Korea
- Berlin Crisis
- Vietnam
- Grenada
- Panama
- Persian Gulf

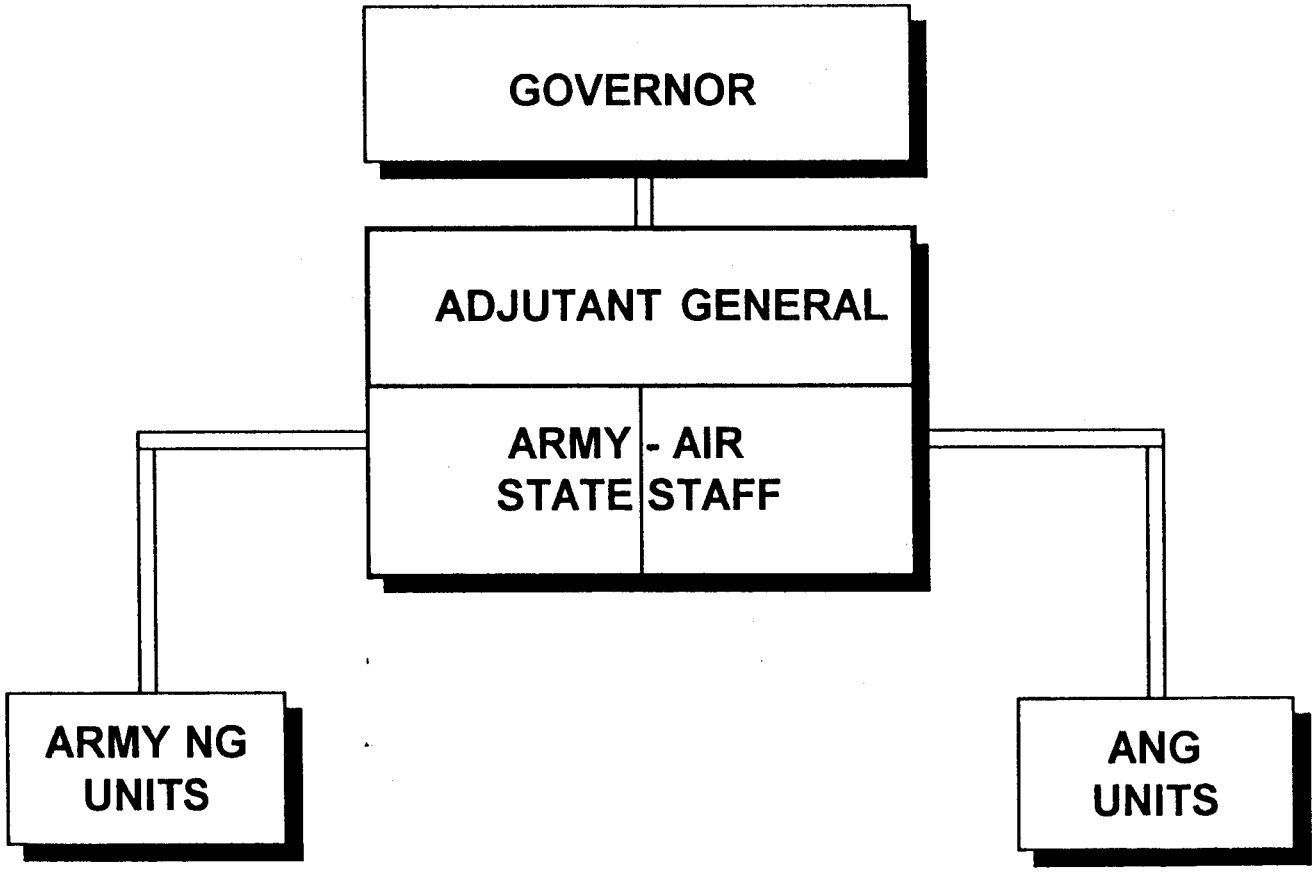
# ANG Evolution

- 1st Aero Company of New York Guard Established in 1915
- ANG Formed Out of Army National Guard Air Corps in 1946

# Dual Mission

- State
  - Protect Life & Property
  - Peace & Order
  - Civil Defense
- Federal
  - Support USAF Missions
  - Train for Wartime

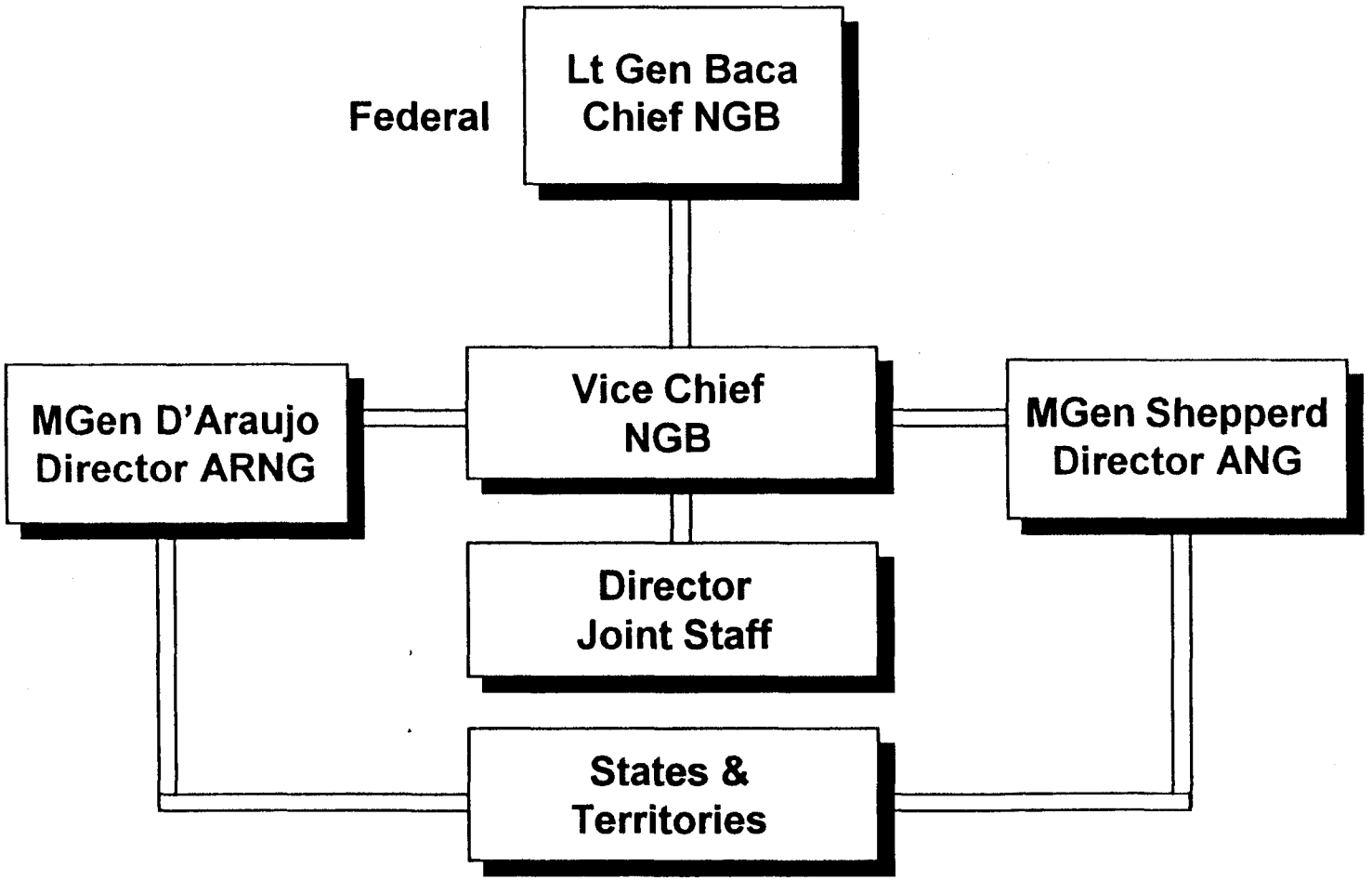
# National Guard State Organization



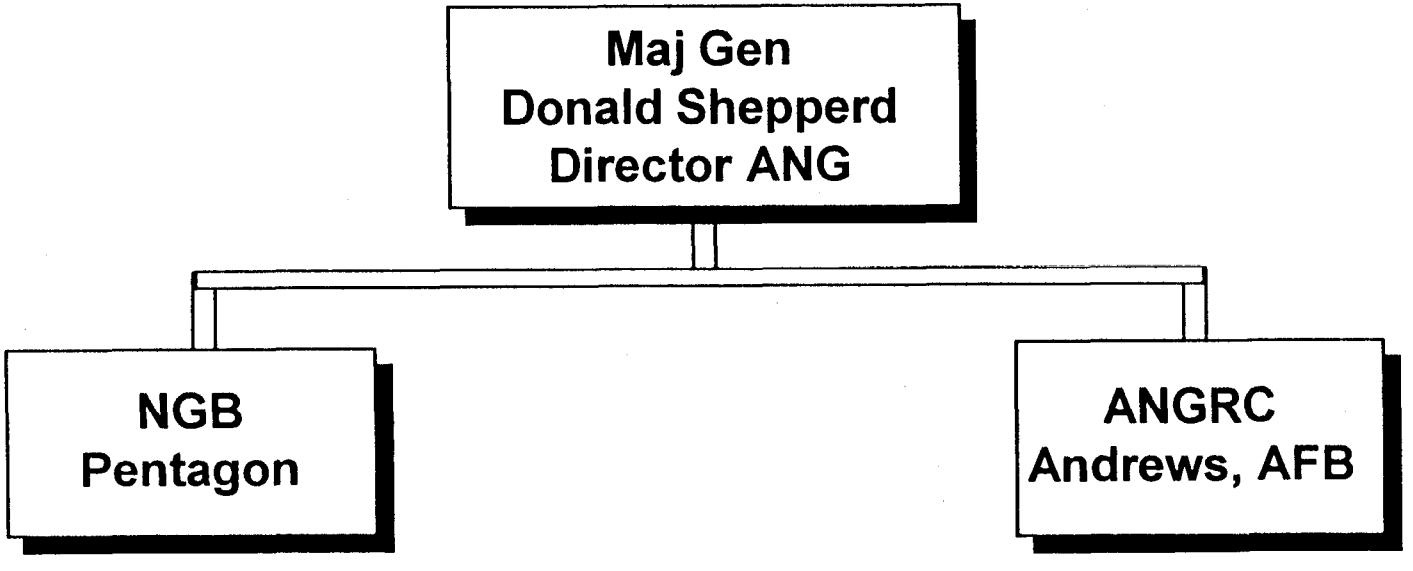
# National Guard Adjutants General

- Fifty-Four Adjutants General
  - 39 Army National Guard
  - 15 Air National Guard
- Appointed by Governor, Except
  - DC (President)
  - Vermont (Appointed by Legislature)
  - South Carolina (Elected by Popular Vote)

# National Guard Bureau



# Air National Guard

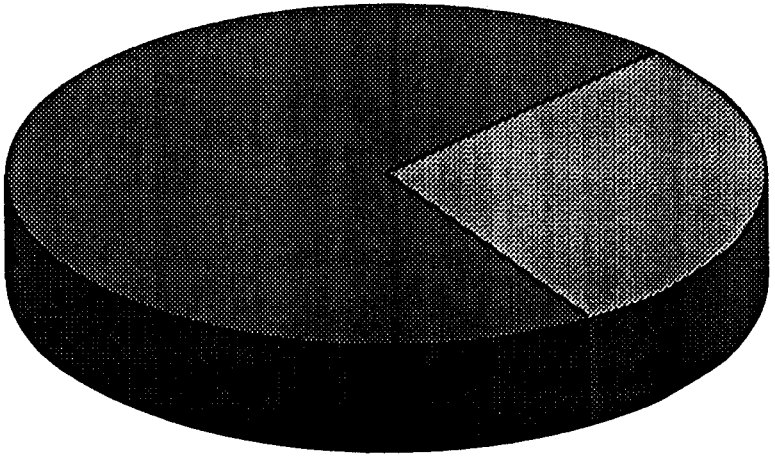



Planning
Programming
Policy
Air Staff Coord
Budget

Execution
Day to Day OPS
Resource Allocation

# National Guard Manpower

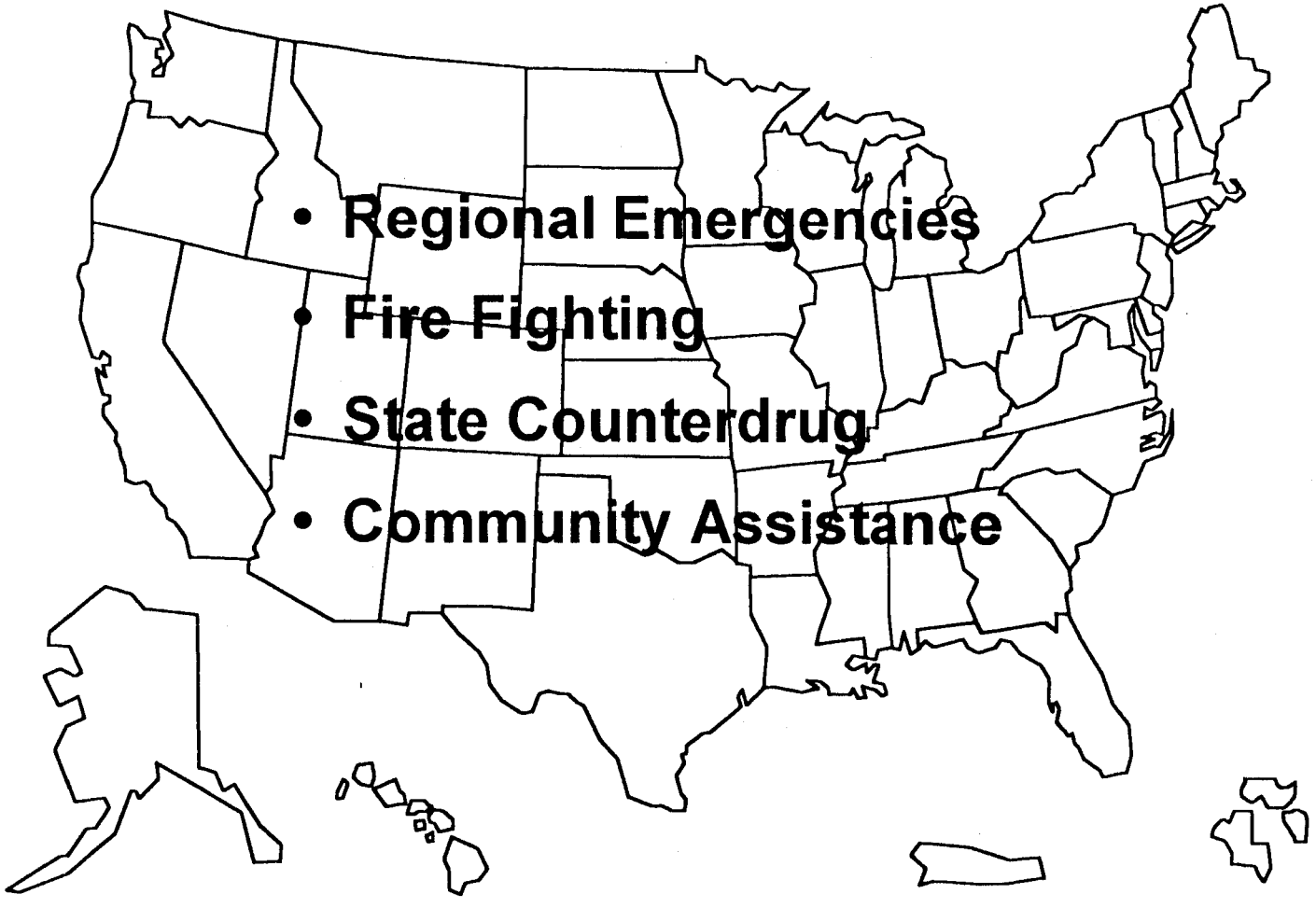
Army National Guard 77.6% 400,000



Air National Guard 22.4% 115,600

As of FY 95 PB

# ANG State Missions



- Regional Emergencies
- Fire Fighting
- State Counterdrug
- Community Assistance

# The Air National Guard Today

- 89 Flying Units
- 578 Mission Support Units
- 115,600 People
- Over 1,198 Aircraft

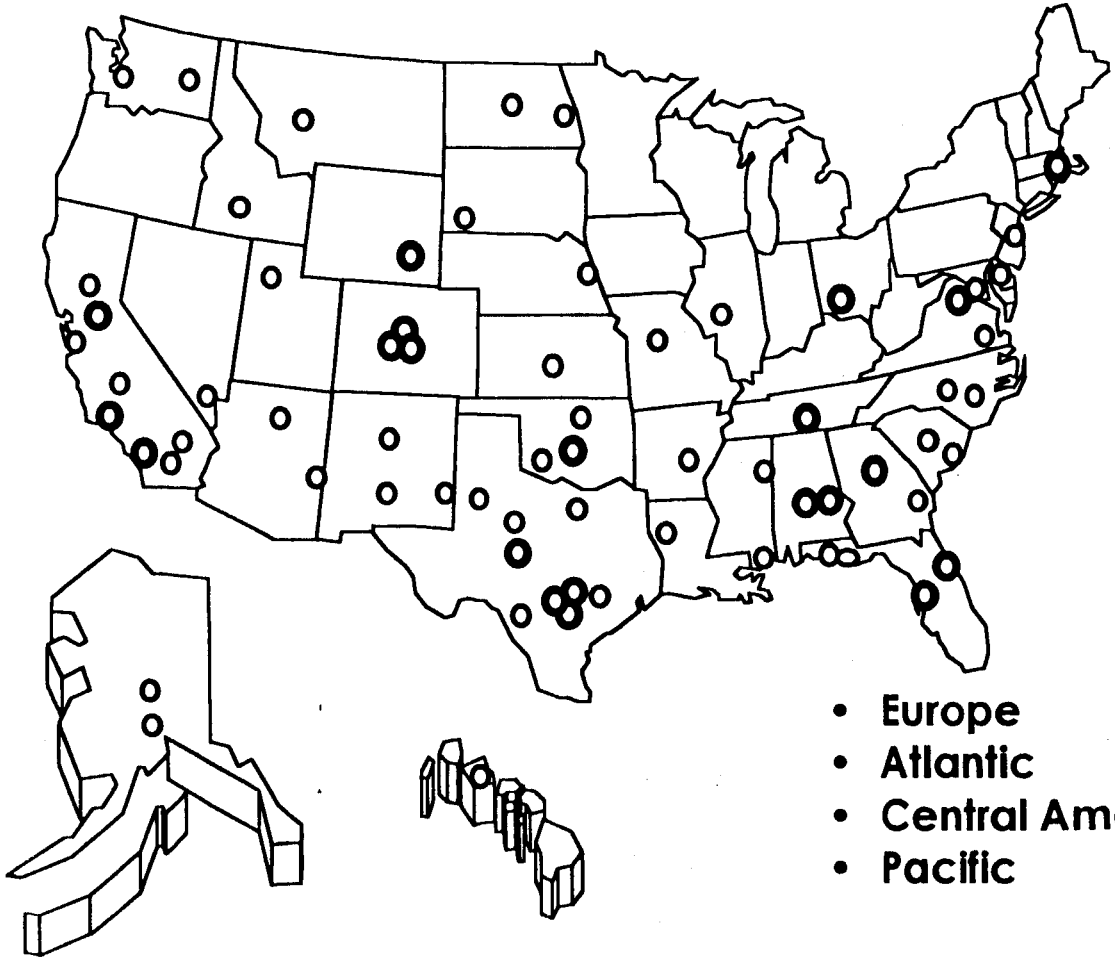
As of FY 95 PB

# Air National Guard

## Composition

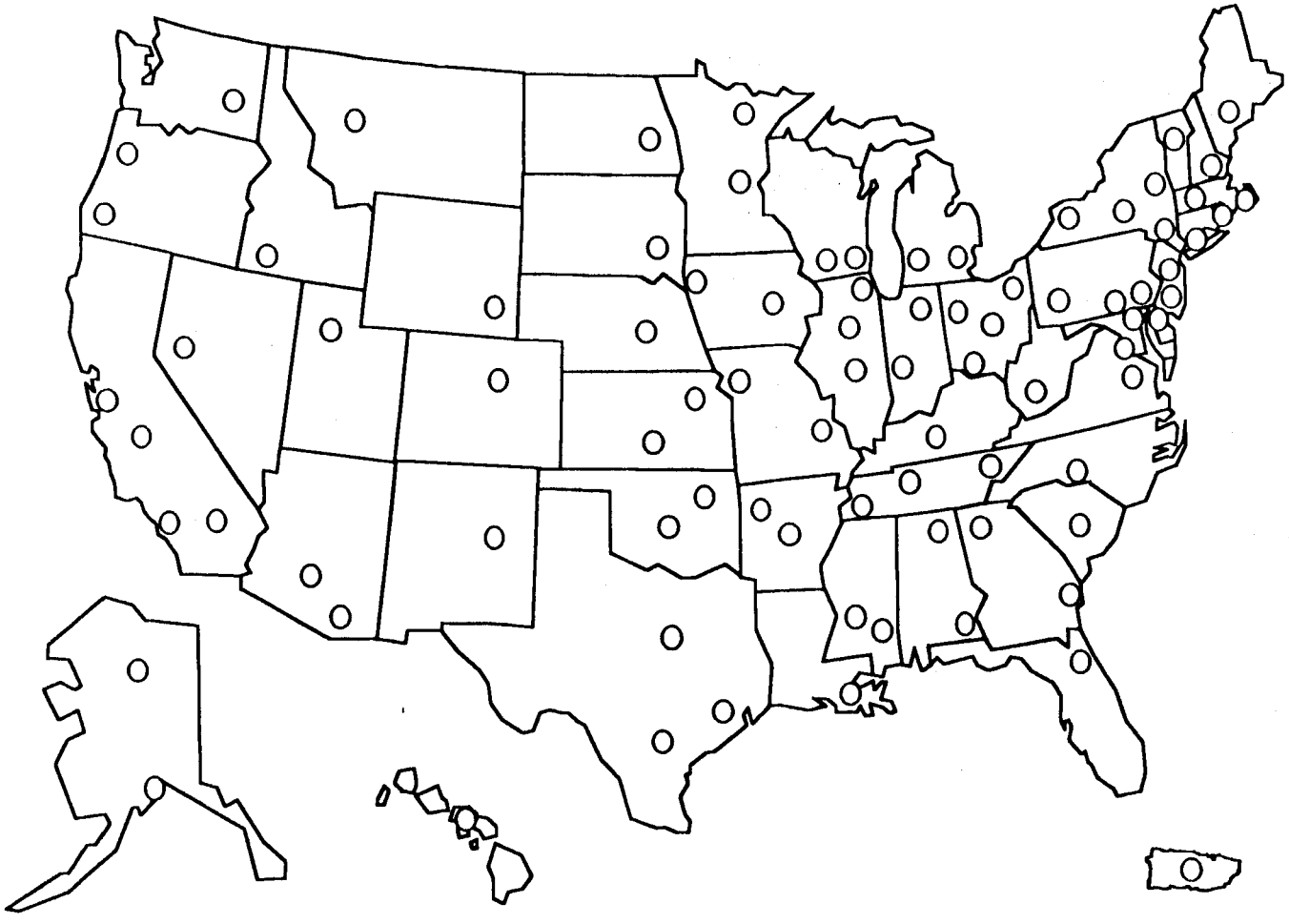
- KC-135
- C-130
- F-16
- C-5
- C-141
- F-15

# 86 Locations Worldwide



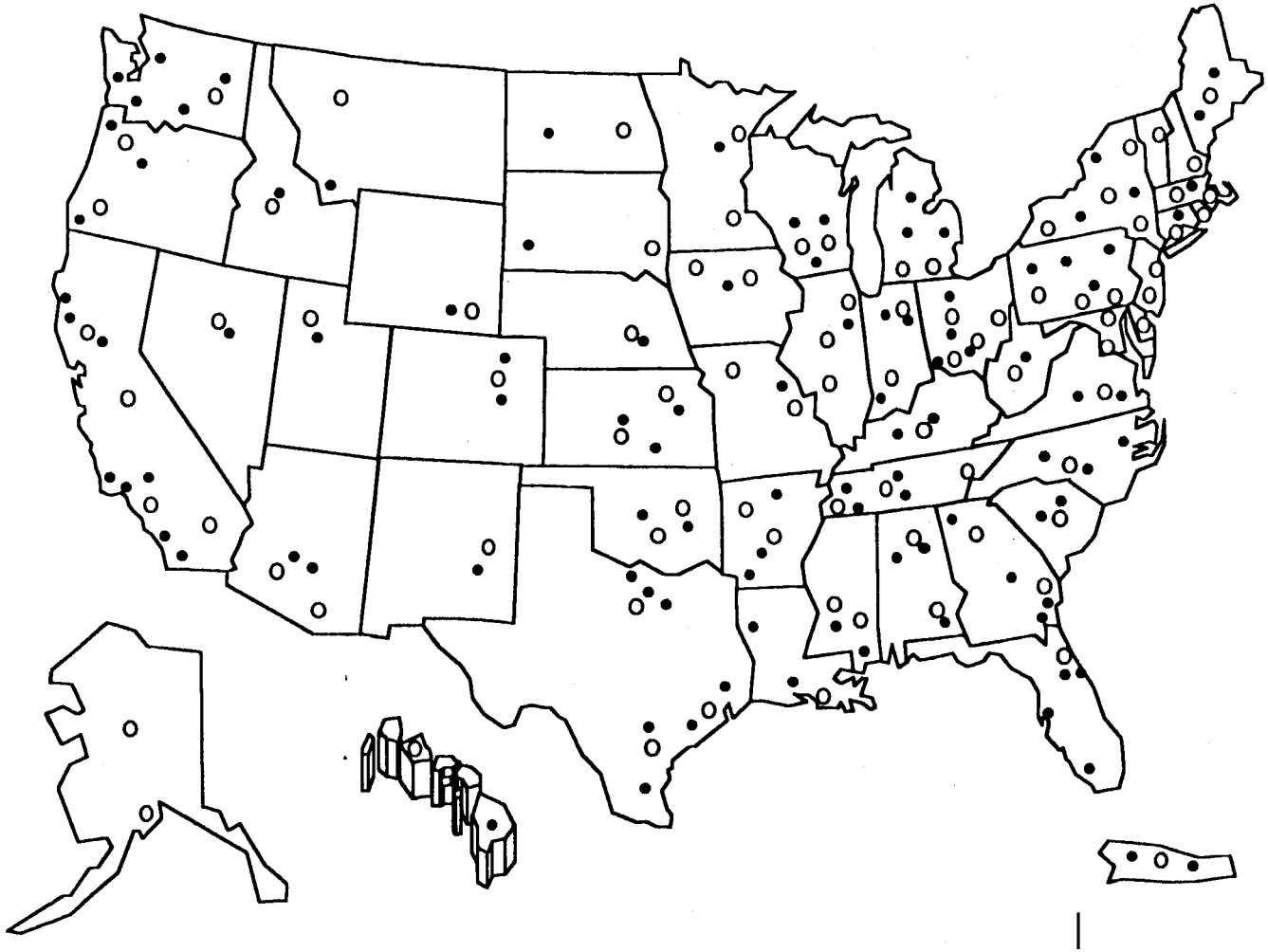
- Europe 8
- Atlantic 2
- Central America 1
- Pacific 6

# 89 Flying Units

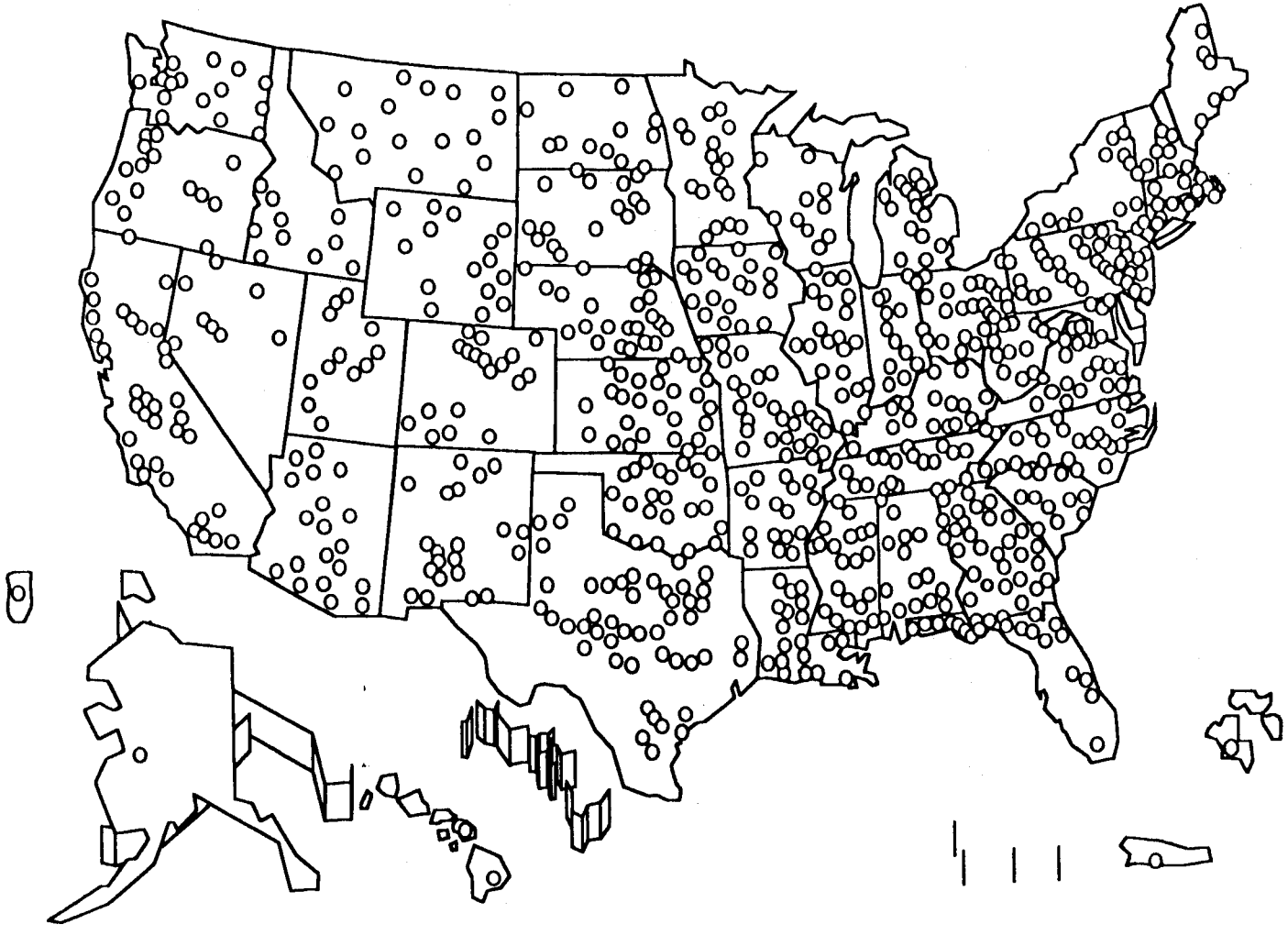


Air National Guard

# 89 Flying Units and 200 GSUs



# National Guard Armories



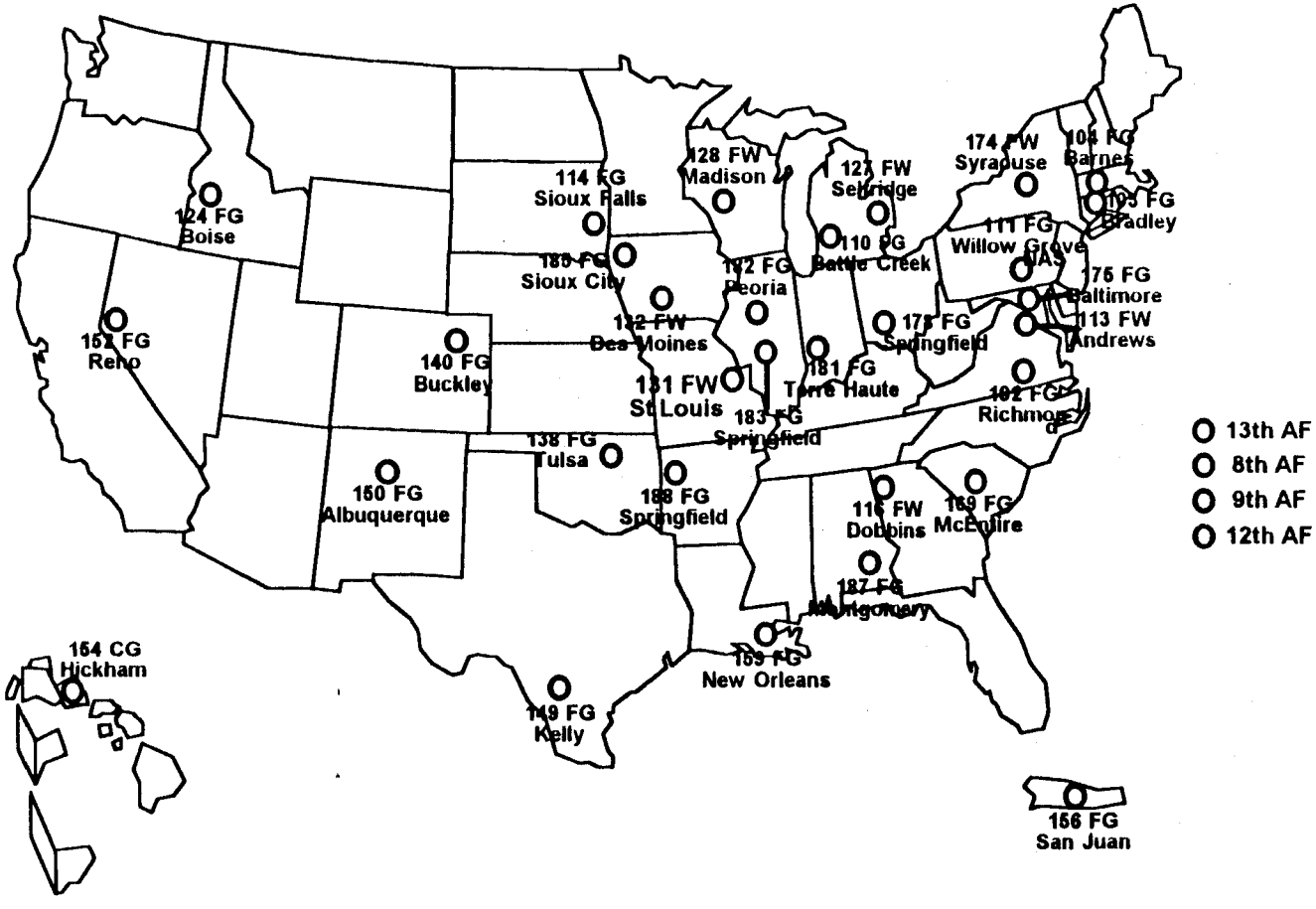
# Current ANG Structure

| | |
|---|---|
| • Civilian Airports | 66 |
| • USAF Bases | 10 |
| • Reserve Bases | 4 |
| • Navy Bases | 4 |
| • ANG Bases | 5 |
| • ANG Locations Supporting DoD Tenants | 52 |
| • ANG Locations Supporting GSUs | 67 |

# ANG Programmed % of Major Missions

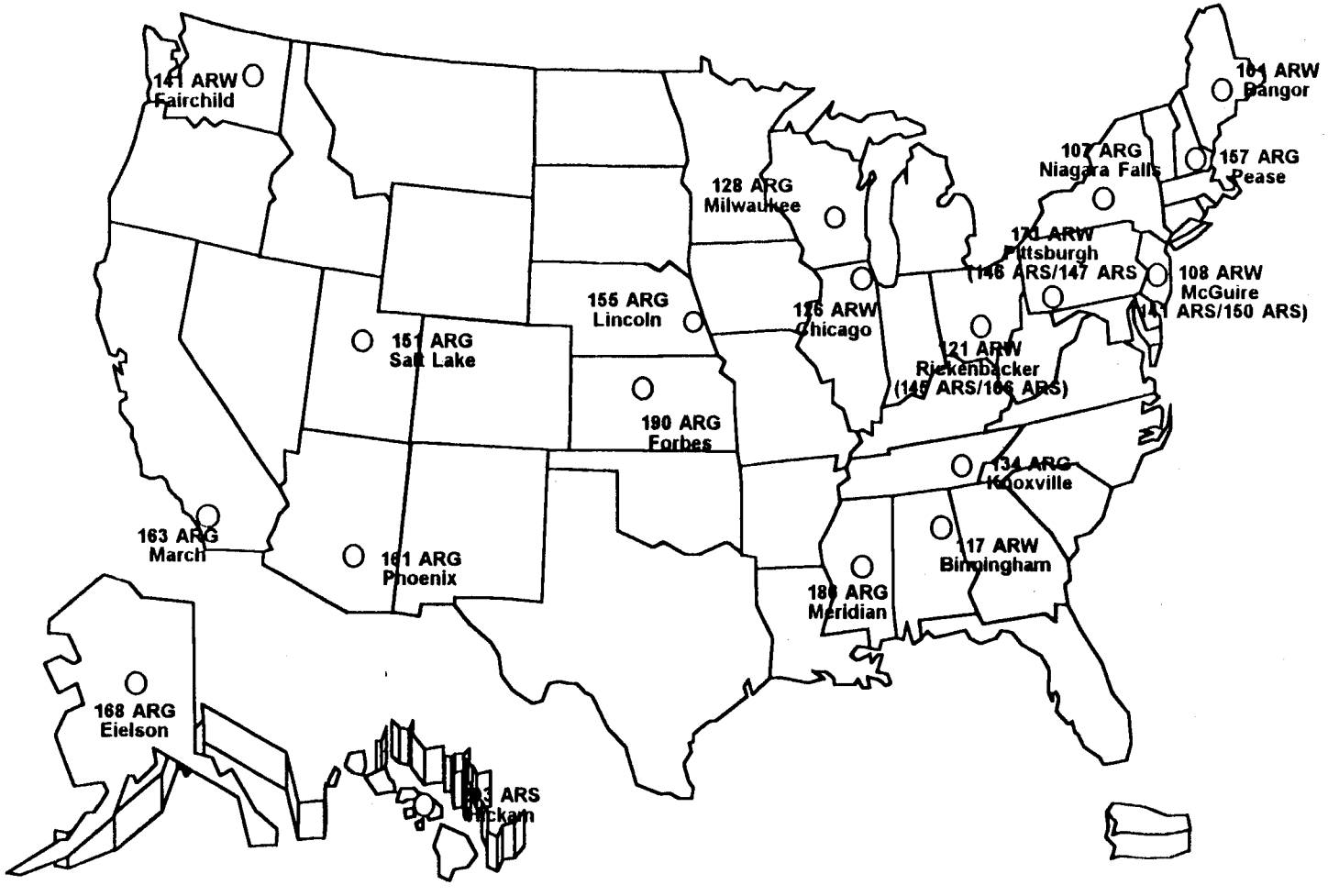
| ACC | ANG% |
|---|---|
| Fighter | 30 |
| Interceptor | 100 |
| Reconnaissance | 37 |
| Special Missions | 5 |
| Theater Airlift | 40 |
| Rescue | 27 |
| Combat Comm | 68 |
| Theater Air Control | 70 |
| **AMC** | |
| Strategic Airlift | 8 |
| Air Refueling | 33 |

# General Purpose Fighters

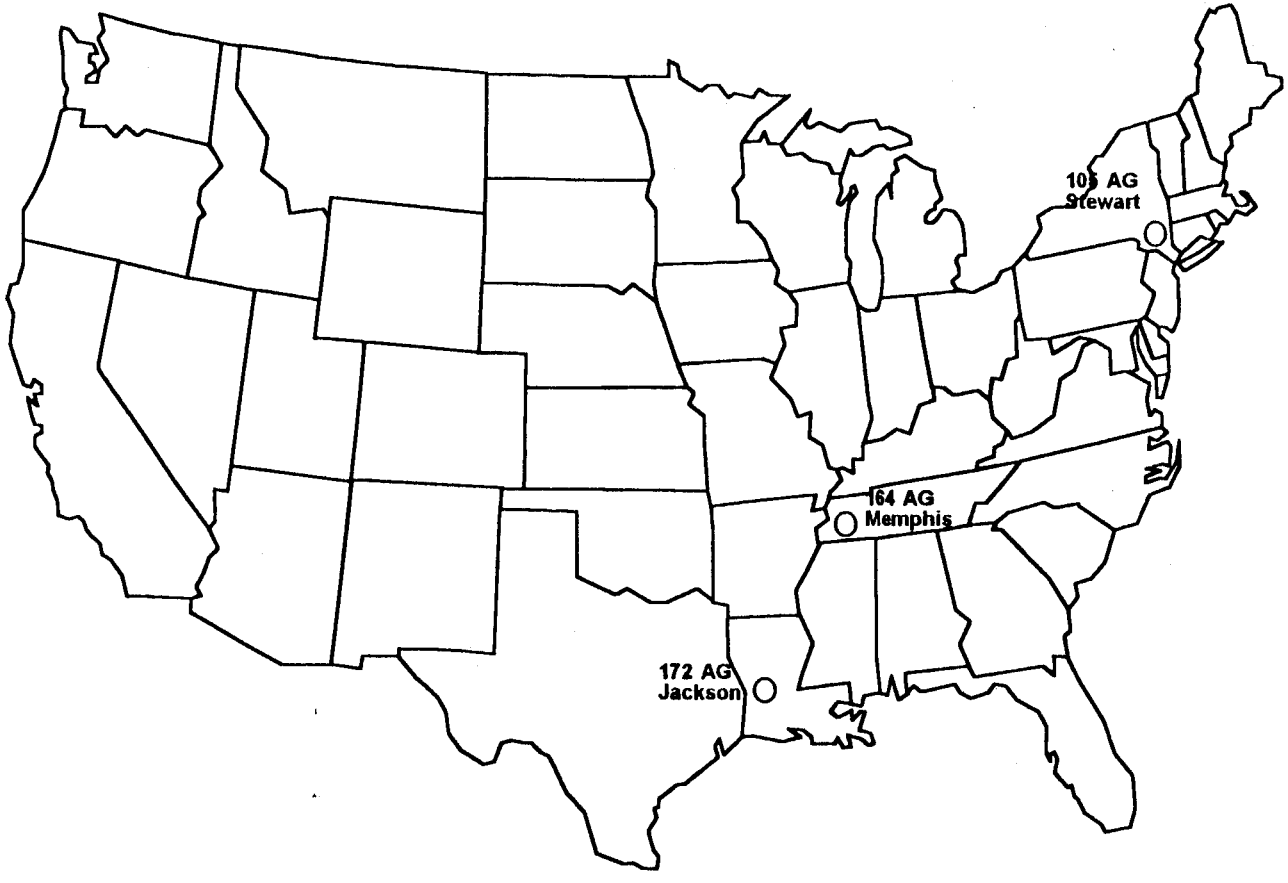


# Air Defense 1 AF

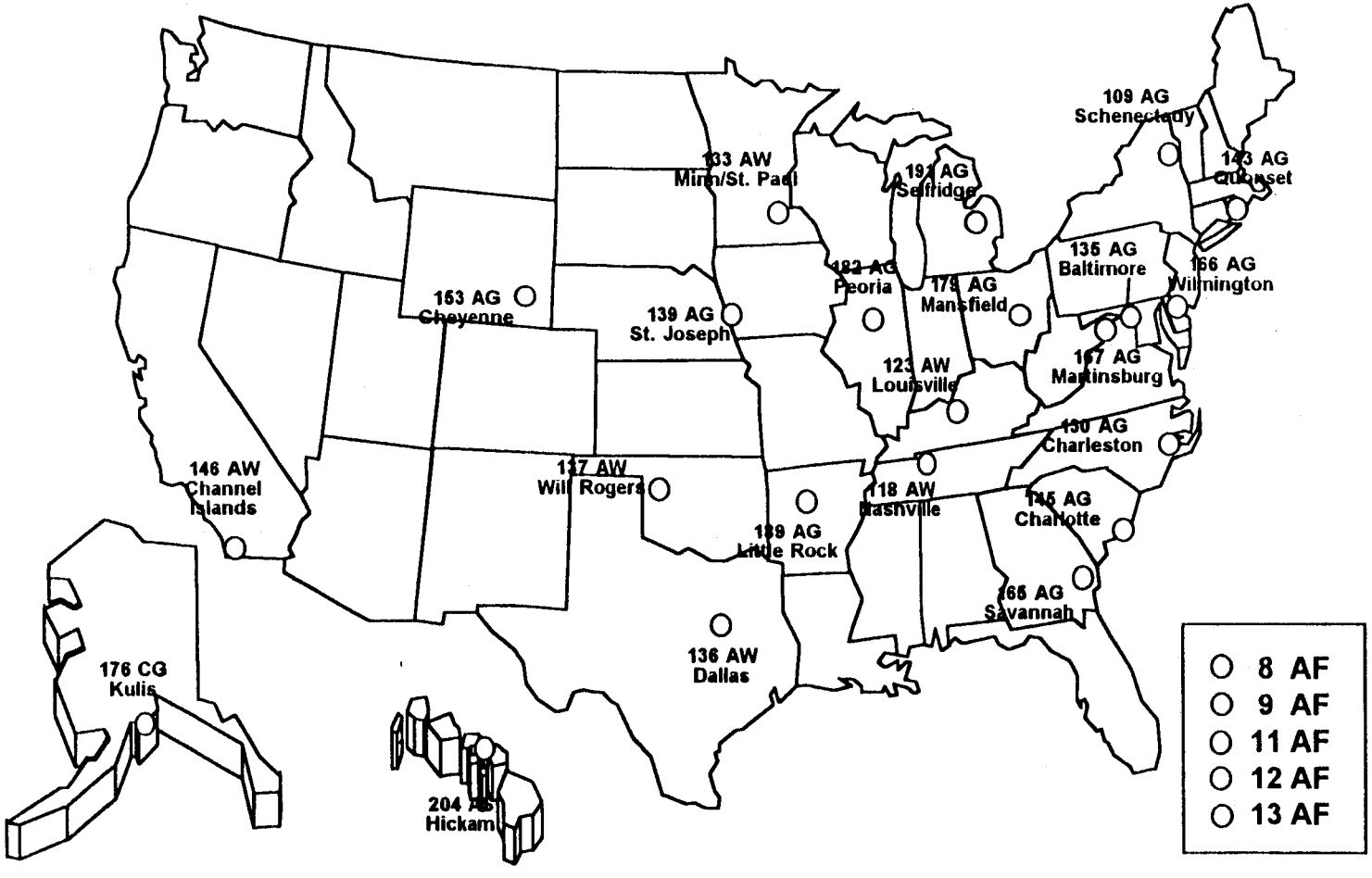
# Air Refuelers



# Strategic Airlift

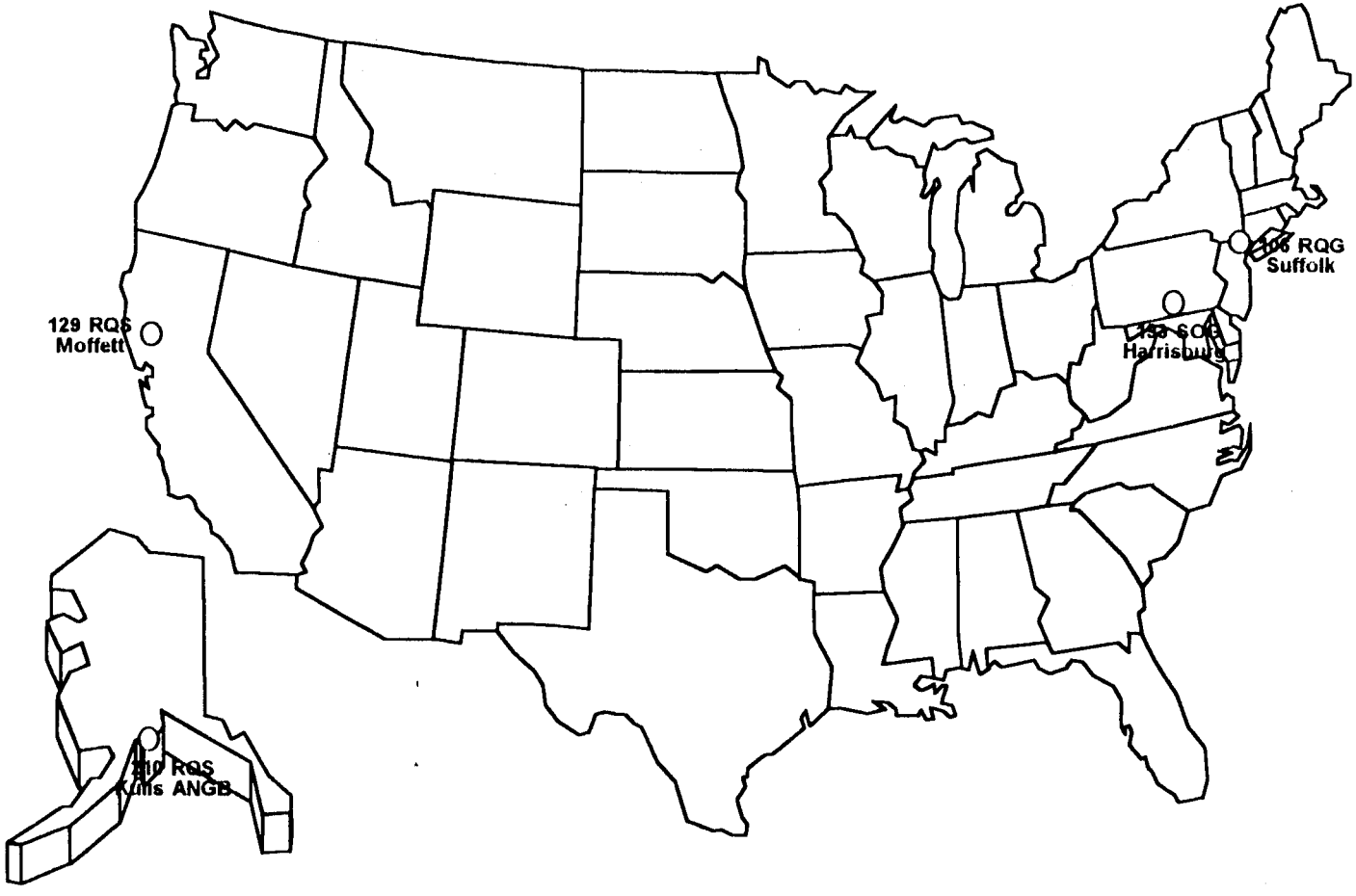


# Theater Airlift

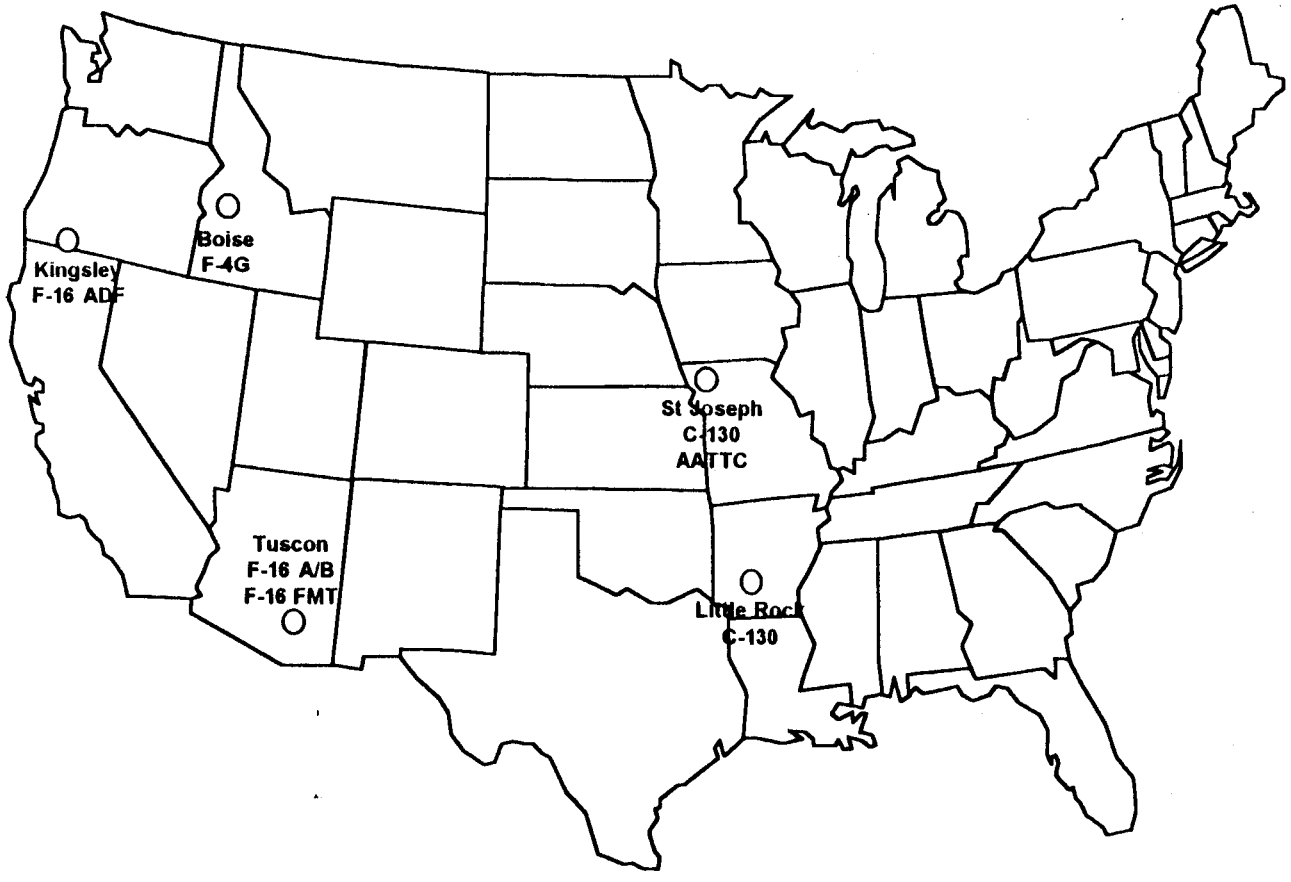


# Bombers

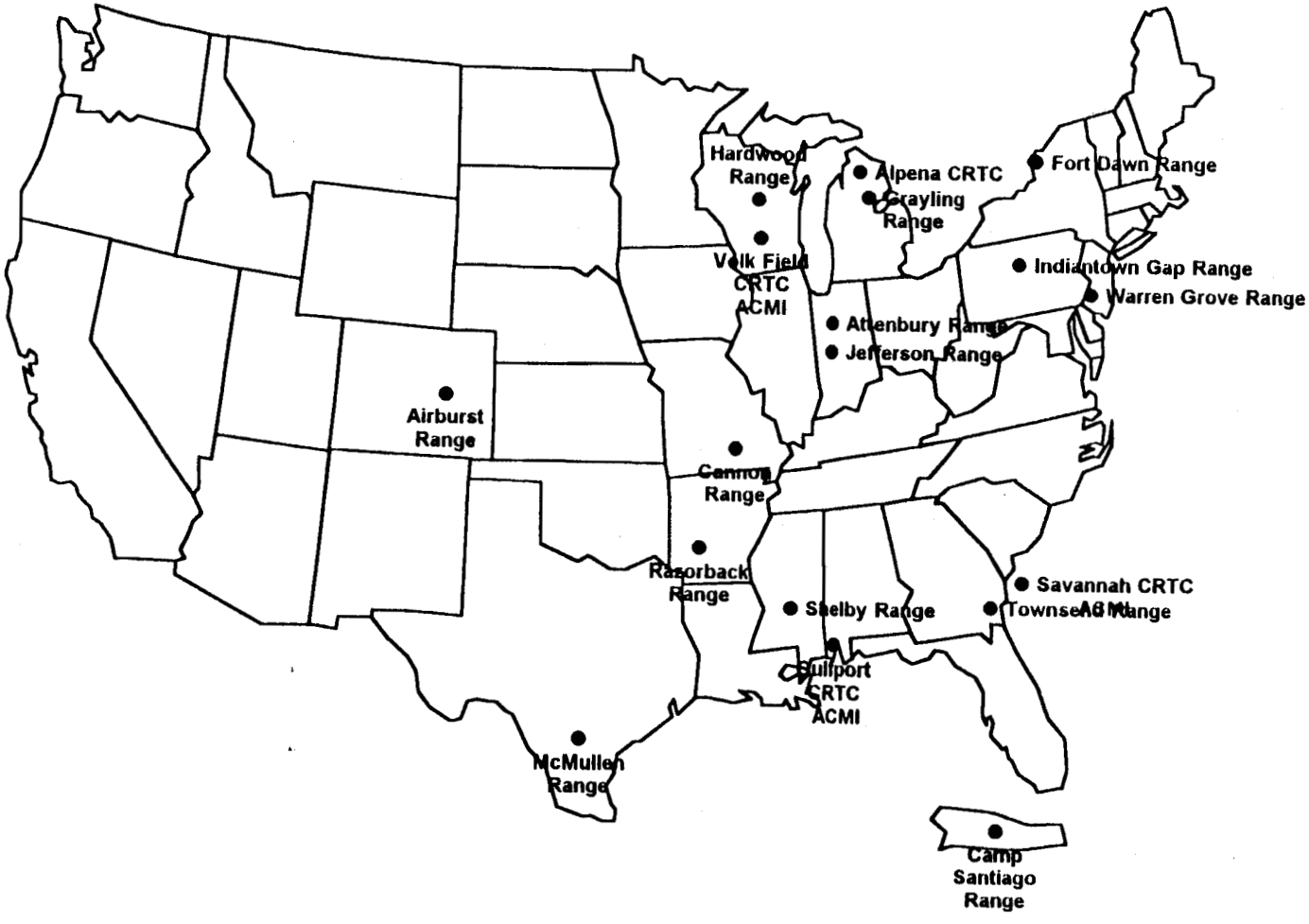
# Rescue and SOF



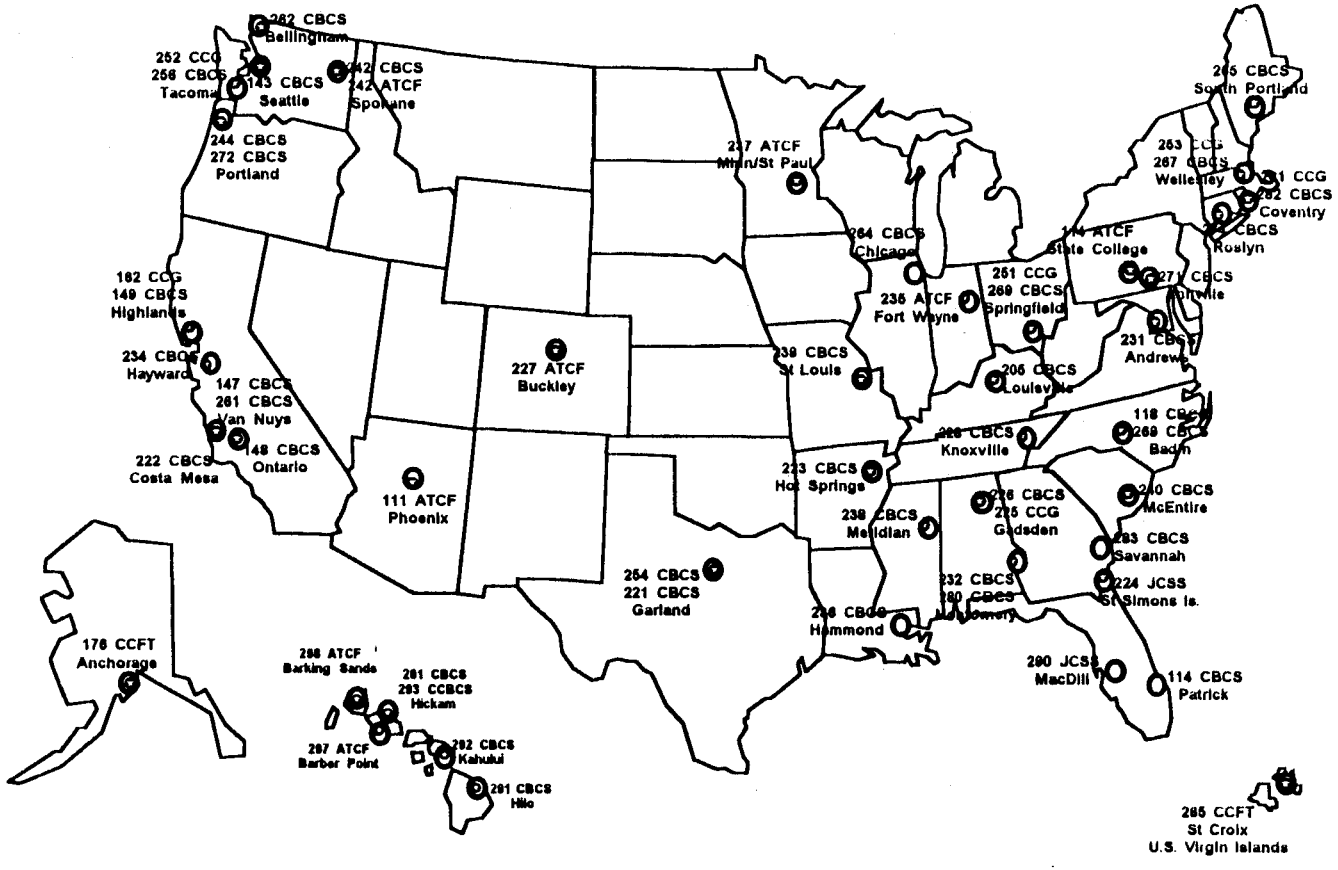
# Flying School Houses



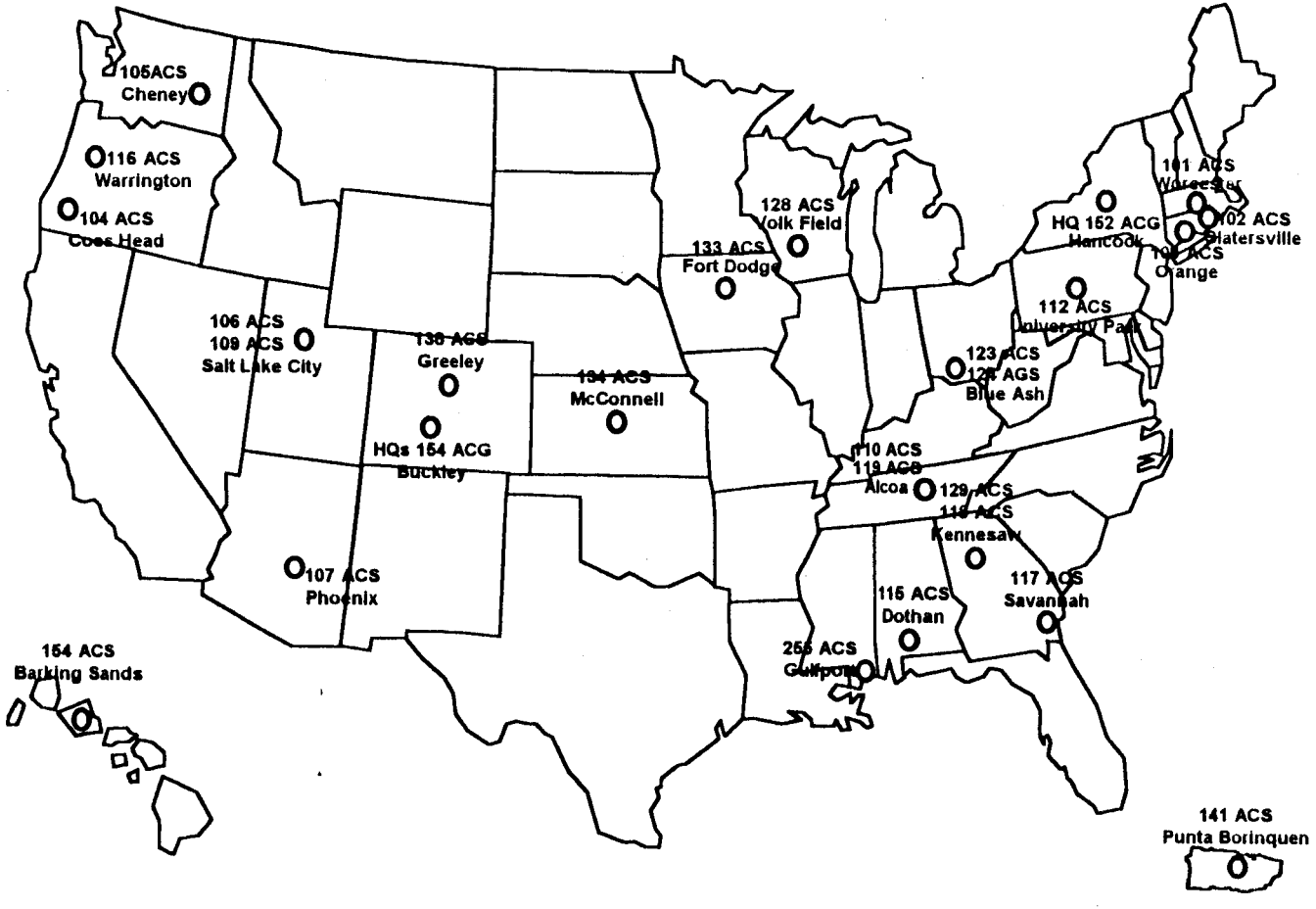
# ANG CRTC,ACMI, Gunnery Ranges



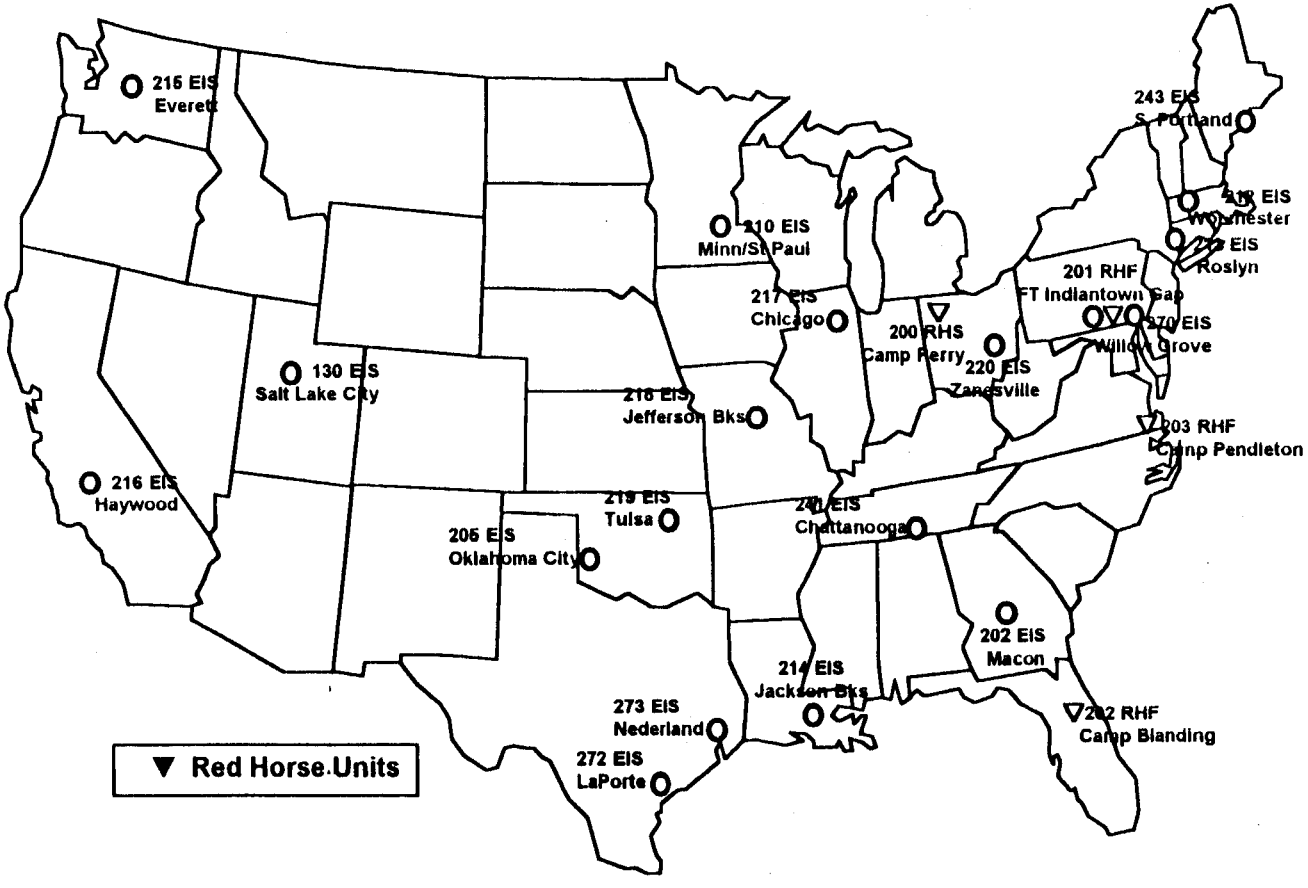
# Combat Communications and Communications Support Units



# Air Control Units



# Engineering Installations



# ANG Unit Personnel

- 75% Traditional Guardsmen
- 25% Fulltime

# Training

- 48 UTA's (One Weekend / Month)
- 15 Annual Training Days
- 48 AFTPs
- Extra Deployments and Exercises

# ANG Professional Military Education Center

- Airman Leadership School E-4
- NCO Academy E-5, E-6
- Academy of Military Science (Pre Commissioning School)
- Continuing Education
- Quality Educaton and Training

# ANG AFRES Test Center

- Off-the-Shelf MODS to Mature Weapons Systems
- Examples
  - A-10 LASTE MOD
  - F-16 Software OT&E
  - Night Vision Devices Testing

# Counterdrug Missions

- State (Title 32)
  - Direct Support of LEA's
  - Inside States and Territories
  - Drug Demand Reduction
- Federal (Title 10)
  - OCONUS Support of CINC's
  - Active Duty Control

# Recruiting

- AF Recruits Nationally, Cross Levels, Has Pipeline
- ANG Unit Recruits in Local Area Only
  - In Competition with Other Components
  - Affected by Economy & Demographics
- 10% Turnover/Year
- 66% Prior Service Recruits

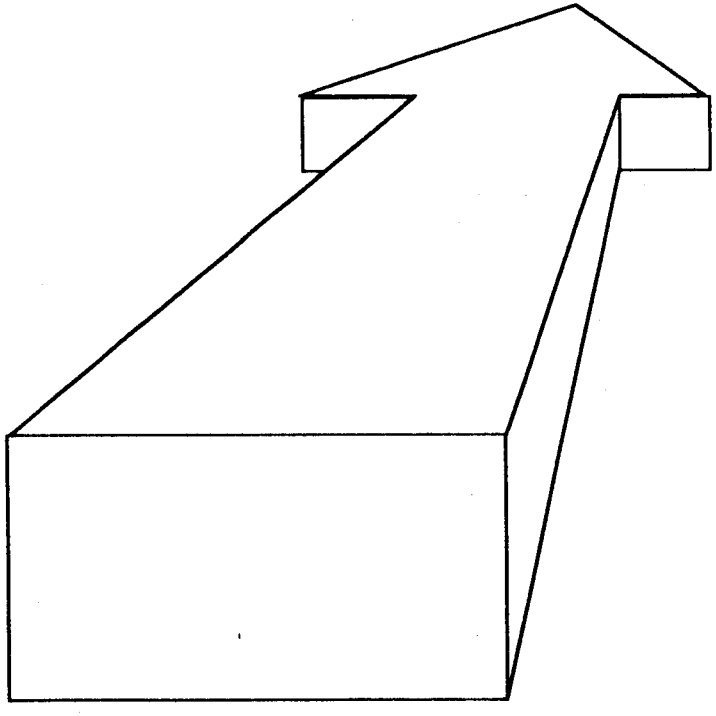
# Resources

- ANG Budget is Separate From AF Budget
- O&M Cuts = Manpower Cuts
- Personnel Availability is Key Resource
- State Funding Approx. 2%

# Accessibility

- When
  - Early
- Why
  - Proven Military Capability
  - Builds National Commitment
  - New Paradigm: "No Longer Only A Force in Reserve"

# Accessibility



Total MOB

Full MOB

Partial MOB

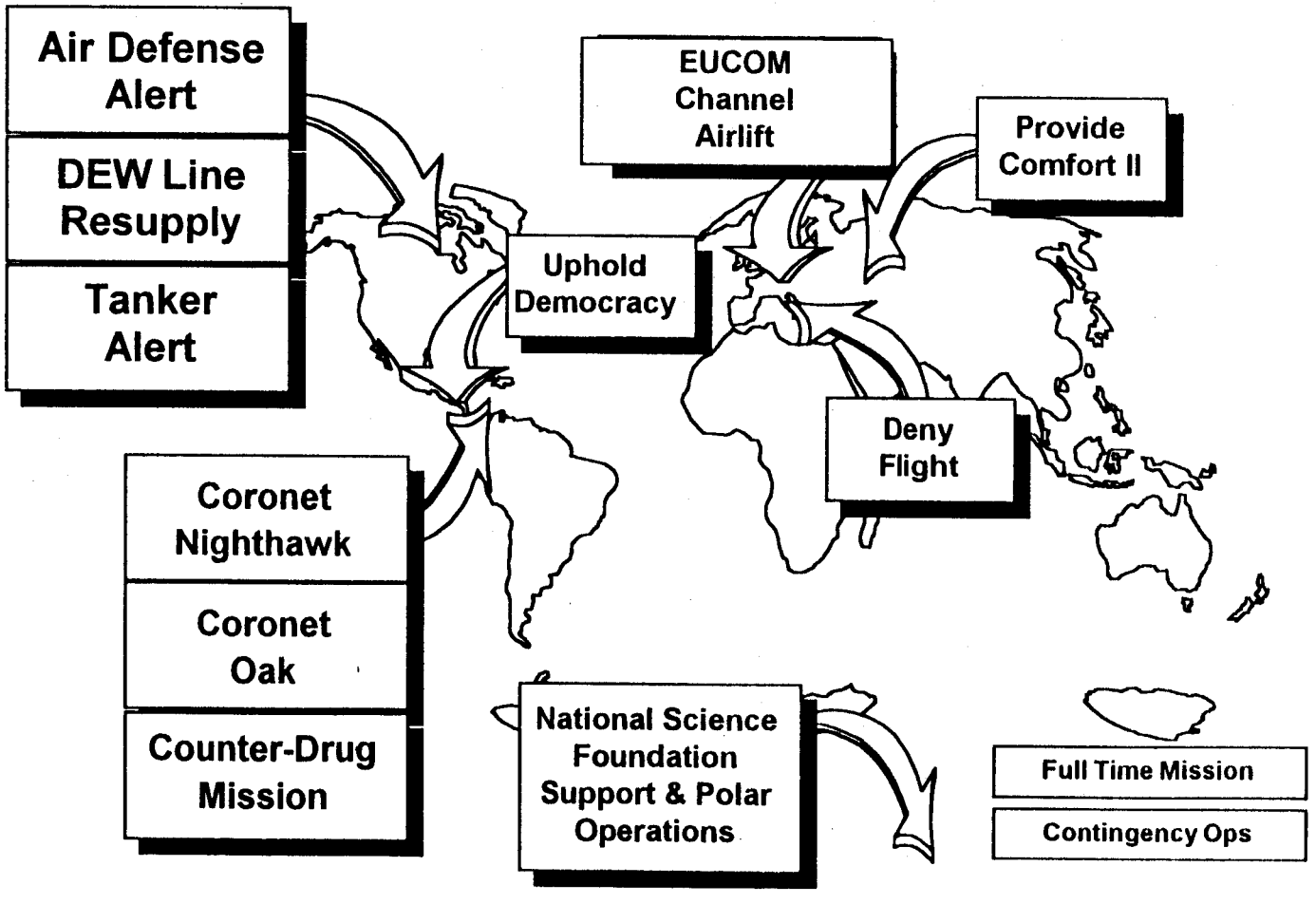
200K Call Up

Volunteerism

# Integration

- AF Staff Officers at NGB / ANGRC
- ANG Advisors at HQ USAF, MAJCOM, & NAF
- ANG Assistants to MAJCOM CCs & DCSs
- AF Advisors to Units
- AF Advisory Units
- Active Pilot Supplement

# Major ANG Operations During 1994



Air National Guard — A World Class Organization

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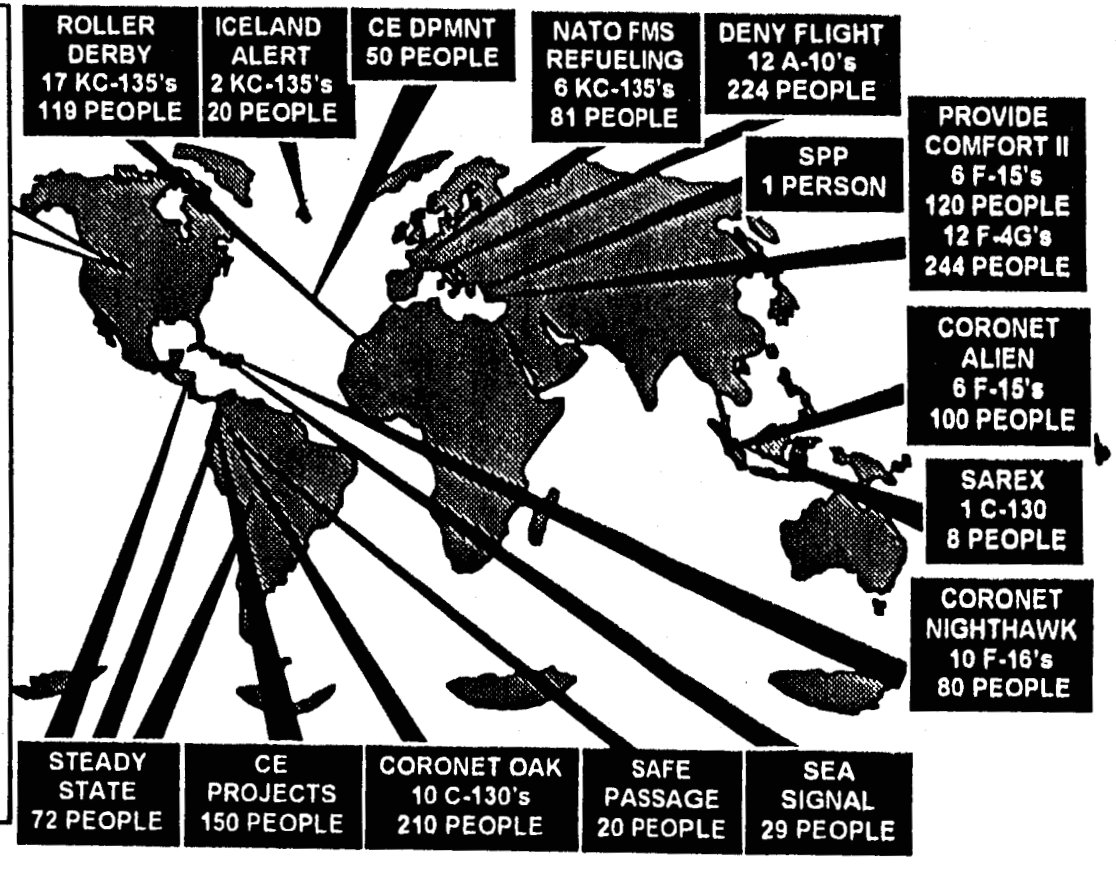
# CURRENT OPERATIONS DURING FEBRUARY 1995

**NE DUTY TANKER**
6 KC-135's, 35 PEOPLE
**SNOWBIRD**
22 F-16's, 260 PEOPLE
12 A-10's, 140 PEOPLE
**BUSINESS EFFORT**
21 KC-135's, 147 PEOPLE
**WINTER BASING**
18 F-16's, 184 PEOPLE
**SILVER FLAG**
460 PEOPLE
**ORE**
5 A-10, 75 PEOPLE
**COMBAT ARCHER**
14 F-16's, 139 PEOPLE
**ACMI**
8 F-15's, 48 PEOPLE
6 F-16's, 48 PEOPLE
**RED FLAG**
18 F-16's, 72 PEOPLE
**JTFEX**
6 F-16's, 65 PEOPLE
**CRTC**
5 F-16's, 50 PEOPLE
**AIR WARRIOR**
11 A-10's, 124 PEOPLE
5 F-16's, 60 PEOPLE
**COMBAT HAMMER**
7 F-16's, 80 PEOPLE



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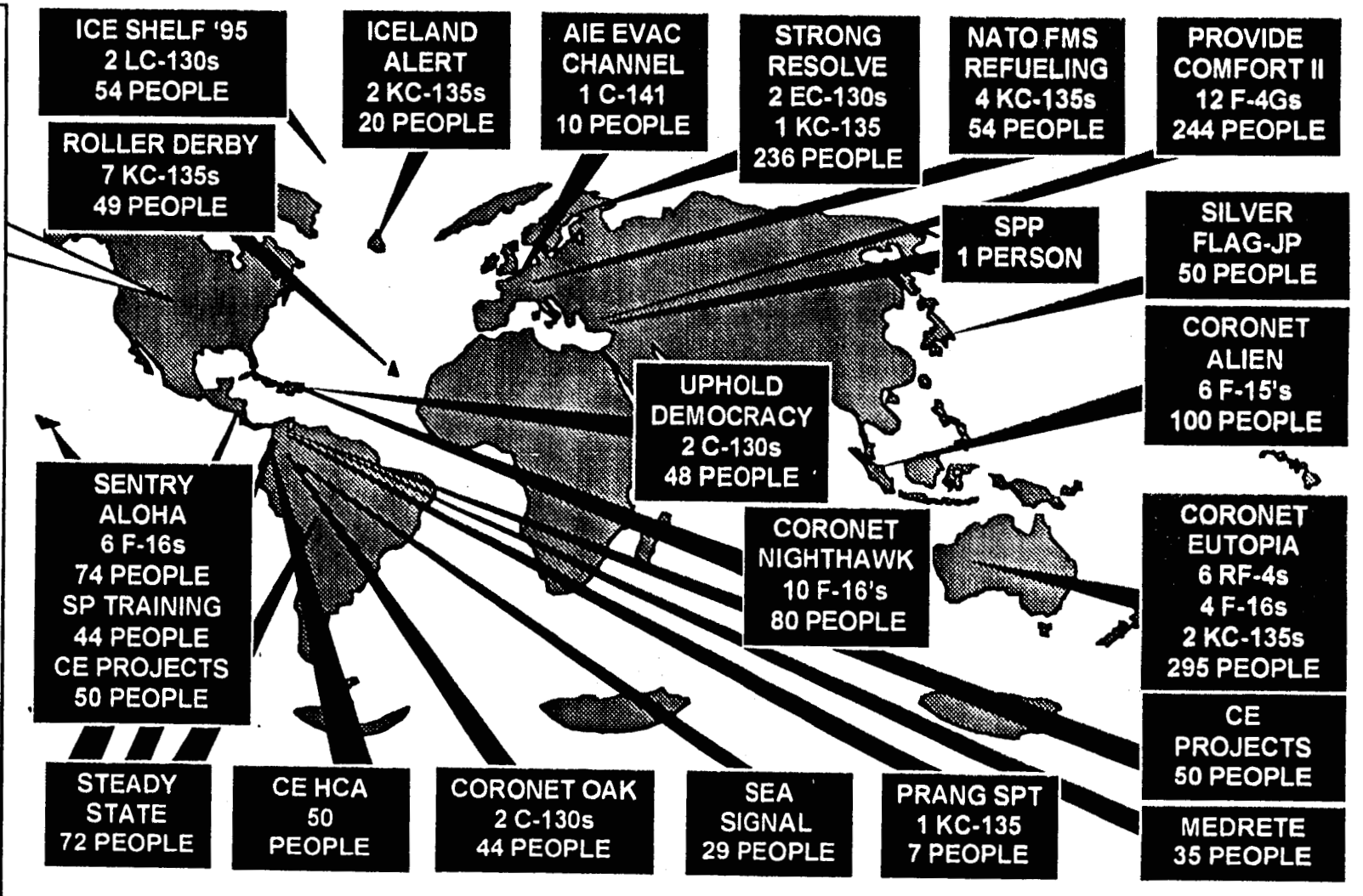
# CURRENT OPERATIONS DURING MARCH 1995

**COMBAT ARCHER**
8 F-16s, 80 PEOPLE
**COMBAT HAMMER**
7 F-16s, 80 PEOPLE
**GREEN FLAG**
16 F-16s, 1 EC-130
204 PEOPLE
**CRTC**
5 F-16s, 50 PEOPLE
**SNOWBIRD**
30 F-16s, 380 PEOPLE
8 A-10s, 120 PEOPLE
**BUSINESS EFFORT**
11 KC-135s, 77 PEOPLE
**NE DUTY TANKER**
4 KC-135s, 28 PEOPLE
**AMALGAM FALCON**
6 F-16s, 50 PEOPLE
**AIR WARRIOR**
7 F-16s, 84 PEROPLE
**SILVER FLAG**
300 PEOPLE
**SILVER FLAG ALPHA**
132 PEOPLE
**JSTE '95-2**
71 PEOPLE
**ROVING SANDS**
313 PEOPLE
**SP TRAINING**
88 PEOPLE
**CE PROJECTS**
100 PEOPLE



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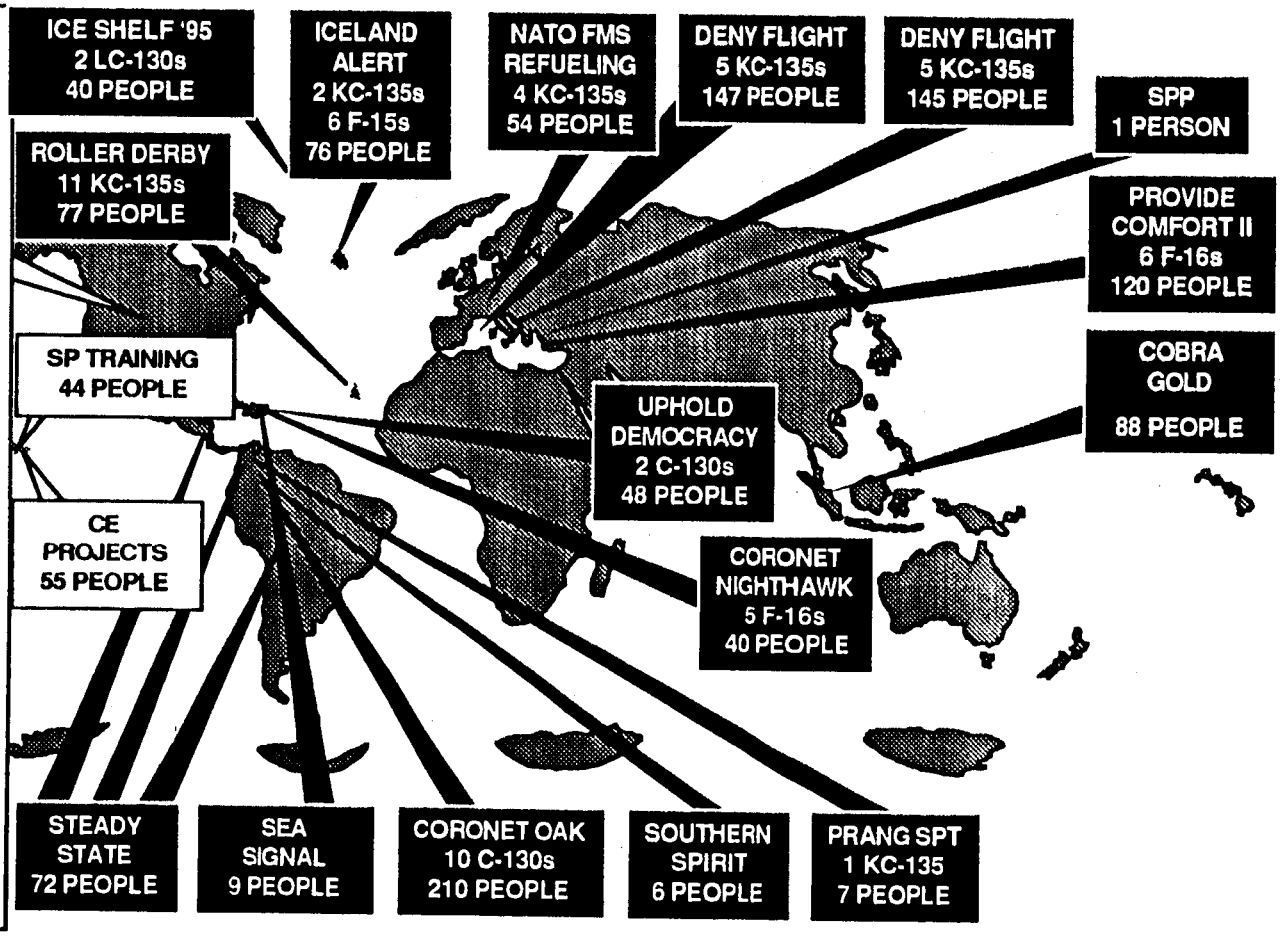
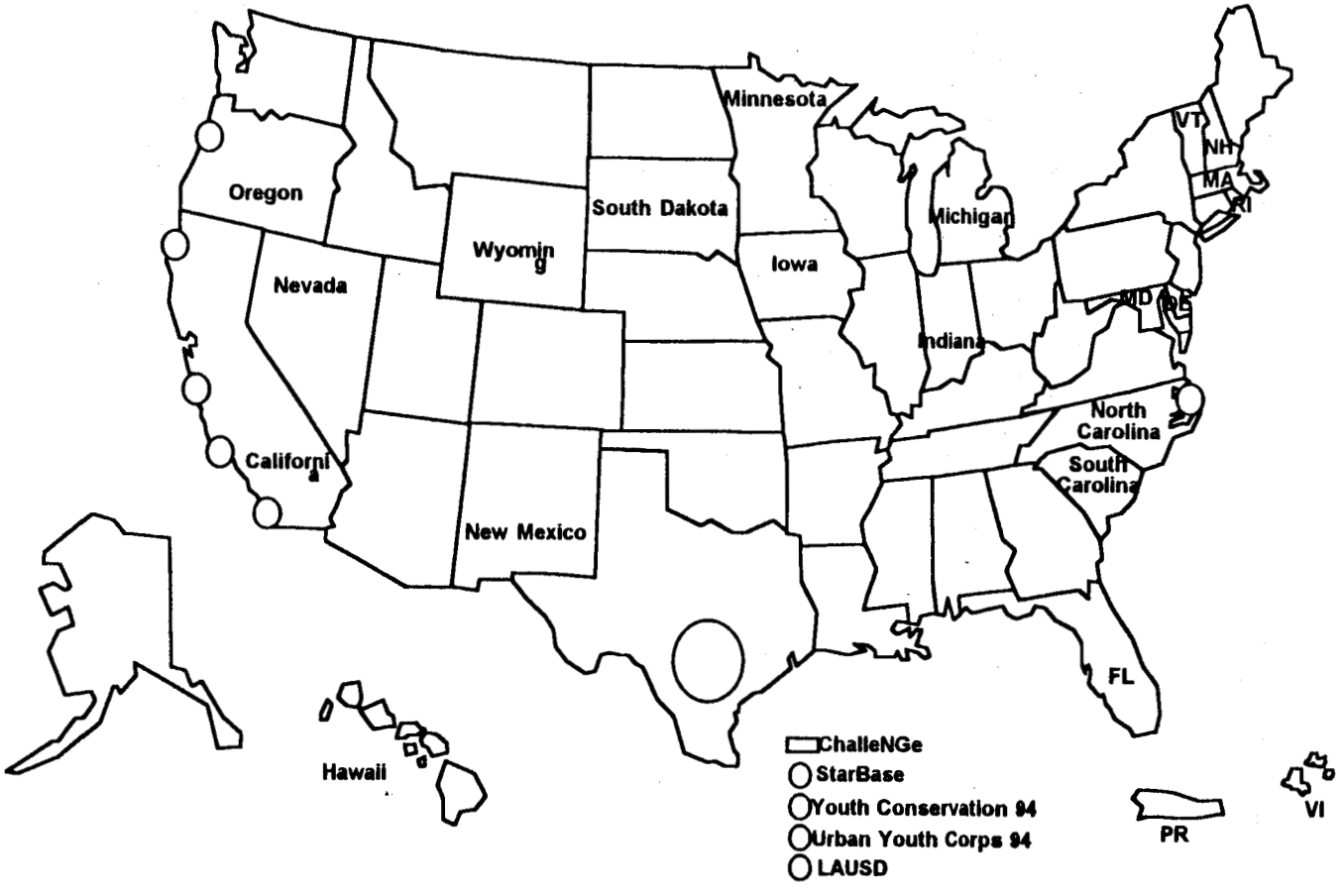
# CURRENT OPERATIONS DURING APRIL 1995

**COMBAT ARCHER**
16 F-16s, 160 PEOPLE
8 F-15s, 80 PEOPLE
**GREEN FLAG**
8 F-16s, 8 RF-4s
150 PEOPLE
**SNOWBIRD**
8 F-16s, 120 PEOPLE
8 A-10s, 120 PEOPLE
**BUSINESS EFFORT**
16 KC-135s, 112 PEOPLE
**NE DUTY TANKER**
4 KC-135s, 28 PEOPLE
**AMALGAM WARRIOR**
12 F-16s, 110 PEOPLE
**ROVING SANDS**
6 F-16s, 4 F-4Gs
3 RF-4s, 555 PEOPLE
**PROVIDE PROMISE**
20 PEOPLE
**INS SUPPORT**
9 PEOPLE
**CE PROJECTS**
160 PEOPLE
**READINESS CHALLENGE COMP**
28 PEOPLE
**FIGHTER WEAPONS**
6 F-16s, 54 PEOPLE
**LONGSHOT**
4 F-16s, 67 PEOPLE
**MAPLE FLAG**
8 F-16s, 72 PEOPLE
**GLOBAL YANKEE**
410 PEOPLE



# National Guard Youth Programs




DD/30 Jan 94

Document Separator

# CITY OF SUMTER
# AND
# SUMTER COUNTY

## THE SHAW - SUMTER COMMUNITY:
## PARTNERS IN PROGRESS
## WORKING FOR QUALITY

# INDEX


**A. THE SHAW - SUMTER COMMUNITY: PARTNERS IN PROGRESS -WORKING FOR QUALITY**

Summary of 20th Fighter Wing Awards

Favorable Attributes of the Shaw - Sumter Community

Actions to Improve the Military Value of Shaw AFB

Fact Sheet: Shaw Air Force Base, South Carolina

**B. RATIONALE FOR ORGANIZING THE 20TH FIGHTER WING: A COMPOSITE WING**

Fact Sheets: Proposed Additional Units

Flying Units:

EF - 111A Raven (Electronic Combat)

EC - 130H Compass Call (Electronic Combat)

C - 130 Hercules

F - 16C Fighting Falcon

A/OA -10 Thunderbolt II

F - 22A Advanced Tactical Fighter (ATF)

Non - Flying Units:

485th Equipment Installation Group (EIG)

5th Combat Communications Group (CCG)

823rd Red Horse Civil Engineering Squadron (RHCES)

**C. SUMTER BASE DEFENSE COMMITTEE MEMBERSHIP**

# ***WHAT DOES SHAW AFB MEAN TO SUMTER?***

## ***MISSION***

***20TH FIGHTER WING:***

- Fighter forces for SEAD, CAS, FAC
  - -- 3 x F-16 Falcon Squadrons
  - -- 1 x 0A/A-10 Thunderbolt II Squadron
- Command and Control
  - -- 1 x Air Control Squadron

***9TH AIR FORCE HEADQUARTER***

- US Central Command Air Forces
- fast development and employment of Air Forces to Southwest Asia

## ***BASE ASSETS***

***LAND:***

| | |
|---|---|
| Shaw AFB | 3400 acres |
| Poinsett Range | 13600 acres |

***AIRFIELD:***

| | |
|---|---|
| Two Parallel Runways | 150ft x 10,000ft |
| | 150ft x 8,000ft |
| Parking Apron | 449000 Sq. Yds |

***HOUSING:***

| | |
|---|---|
| Family Quarter | 1704 units |
| Dormitory Quarter | 2064 units |

***PERSONNEL:***

| | |
|---|---|
| Military | 6000 |
| Dependents | 13000 |
| | 19000 |
| Civilian Employees | 1100 |
| Total at Shaw | 20100 |
| Military Retirees | 33000 |
| ***GROSS TOTAL*** | **53,100** |

## ***PAYROLL***

| | |
|---|---|
| Military | $171 mil |
| Civilian | $ 24 mil |
| Expenditures (Services/Contracts/Equipment) | $ 58 mil |
| ***TOTAL ACTIVE EXPENDITURES*** | ***$253 MIL*** |

## ***OTHER INCOME***

| | |
|---|---|
| Military Retire Payroll within 50 mile radius | $472 mil |
| Secondary Jobs Created | 3600 |

## ***TOTAL ECONOMIC IMPACT*** ***$486 MIL***

# A

## THE SHAW - SUMTER COMMUNITY:

## PARTNERS IN PROGRESS - WORKING FOR QUALITY

### FOUNDATIONS FOR PROGRESS:

Shaw Air Force Base (AFB) has been a significant part of the City and County of Sumter, South Carolina for over fifty three years. The Base and the civilian community are proud of their tradition of working in partnership for a superior quality of life. That partnership is a symbol of excellence in supporting the Air Force mission while building civic pride in a community.

Since the formation of the Shaw - Sumter Community Council forty one years ago, the spirit of cooperation has been foremost in developing confidence, understanding, mutual respect and friendship. This spirit created an award winning base-community relationship that is nationally recognized by the International City Management Association. This spirit is reflected in the patriotic pride the people of Sumter take in supporting the military personnel and their families during periods of international crisis. Most recently during Operation Desert Storm, the people of Sumter displayed their overwhelming support for the deployed personnel while giving caring assistance to their families living on Shaw AFB and in the community. This caring spirit is on-going today for those families who have military members deployed to the Middle East and other regional crises around the world.

The base personnel return that support to the community by their unselfish work to improve the quality of education, medical care, spiritual life and humanitarian activities. The Base co-sponsored Project Save Our Schools (SOS) with the community to improve school facilities and educational programs. Sumter is especially appreciated of the disaster relief efforts by the base following Hurricane Hugo in 1989. The Air Force's ability to provide aid to many Sumterites strengthened the bonds of mutual respect and caring. The people of Sumter take a special patriotic pride in being a community partner with the Department of Defense, the United States Air Force and Shaw Air Force Base.

We are especially proud of the 20th Fighter Wing's operation and maintenance organization for being recognized as the **"BEST in the AIR FORCE"** by winning the coveted **Daedalian Award.** The Wing's excellence is acknowledged by receipt of the Air Force Outstanding Unit Award and awards for Manpower Management, Installation Excellence,, Maintenance Effectiveness, Explosive Ordinance Disposal, Civil Engineering Operations, AAFES Customer Service and four individual awards. They also won **"BEST in Air Combat Command"** awards for eleven squadrons and fifteen individuals. These awards are a point of pride for the entire Shaw-Sumter Community.

**THE QUEST FOR QUALITY:**

In the 1993 Department of the Air Force Analyses and Recommendations to the DOD Base Closure and Realignment Commission, two areas of concern were identified **enroachment of land and airspace adjacent to Shaw AFB and the Poinsett Weapons Range** and some less than favorable comments about the **ability of the community to support base forces, missions and personnel.** The SBDC is working to improve the military value of the base by reducing the current/future enroachment and to improve the community support to the base and its people. By improving these areas of mutual concern, the commitment to the highest quality of life will be achieved in the entire Sumter community. The following discussions will highlight clarification and actions to improve the Shaw-Sumter community:

**Military Value Improvement:**

Three significant efforts are underway that will improve the operational capability of Shaw AFB:

1. **Joint Compatible Land Use Study (JCLUS)**
   - **goal is to protect the base mission** while protecting the public safety and welfare
   - **identify noise-impacted areas** to the base, citizens and local governments
   - **recommends compatible land use** in areas impacted by noise
2. **Proposed Ordinance Amendments tot he Sumter Zoning Ordinance**
   - **establish compatible land use policy** throughout the County but with a special focus on that land adjacent to Shaw AFB and Poinsett Weapons Range
   - **implement recommendations from the 1993 JCLUS** for adoption to the ordinance-June 94
3. **Poinsett Weapons Range Expansion**
   - **Air Force leased range land from the State of South Carolina** which limits federal funding for facility improvements
   - **swap federal land on the closed Myrtle Beach AFB for State land**
   - **expand range from 8000 acres to 14000 acres** under federal government ownership
   - **allows federal funding** for facility improvements
   - **allows reorientation of flight patterns** to reduce noise levels on residential property
   - **completed on - April 5, 1994**

**Community Support Improvements:**

Overall the Sumter community support for the base was well recognized. The SBDC researched the ratings in each area. The results are as follows:

1. **Community Infrastructure:**
   - **Housing, Transportation and Shopping - Adequate**
   - **Off Base Recreation**
     - rated low because of geographic factors beyond the community's control ie: family park, beaches and winter sports
     - aquarium and pro-baseball in Columbia
     - Boating and fishing data was inaccurate (3 locations on Lake Marion, the Santee and Wateree rivers within 30 minutes; base recreation area on Lake Wateree within 45 minutes)
     - Ratings for boating/fishing should be rated Green
   - **Distance to Metropolitan Area**
     - Rated inaccurately (Greater Columbia, SC has a population >100,000;<1.0 hour of the base
     - Should be rated Green
   - **Local Crime Rates**
     - Violent and Property Crimes
       - skewed above the norm due to inaccurate reporting
     - Reporting is now in accordance with U.S. Justice Department (FBI) procedures
     - Law enforcement improvements are having positive effects
     - **1993 FBI statistics will show lower rates**
     - Sumter ranks favorably with other cities supporting southeastern bases

2. Education:
   - **Sumter schools received high marks for the quality of education**
     - High school English, Math, Language and Honors programs
     - Junior High/Elementary special education and gifted/talented student programs
     - Off-base Education (Vocational/Technical and Undergraduate/Graduate level) available at Central Carolina Technical College, Morris College, and University of South Carolina- Sumter

- **Pupil to Teacher Ratio**
  - Rated low based on data showing a pupil to teacher ratio > 30:1 (Red rating)
  - S.C. max ratio allowed (avg)= 28:1
  - S.C. allows grades 6-12 = 35:1; **Sumter actually (6-12)= 26:1**
  - **Current pupil to teacher ratio for grades K-12 is 16.2:1 with the average class < 22**
  - A Green rating
- **Students that go to College**
  - Report indicated < 40% (Red rating)
  - **1993/94 data indicates that > 50% of all high school graduates** entered undergraduate college courses (a Yellow rating)
- **Sumter School District 2 voters approved a $28.5 million bond referendum on September 25, 1993**
  - **Construct two new high schools**
  - Repair ten school buildings
  - Reduce Portable classrooms by 70%
  - Allows restructing of the school system (Elementary K-5, Middle 5-8, High 9-12)
    - Student loading reduced
    - Coarse availability improved
  - **Complete in fall 1996**

3. **Spousal Employment:**
- Sumter community rated low by unknown data source on ability of spouses to find employment in < 3 months and their inability to find employment commensurate with skill/experience
- SBDC review revealed
  - Majority of spouses seek employment in administrative/clerical and service sectors
    - 60-70% fill administrative/clerical
    - 10-12% seek manufacturing/production
  - Employment responsibility/compensation and availability vary due to geographic and economic factors based on business/industrial orientation, ie; agricultural, manufacturing, distribution or service
- **Employment Referral Services at Shaw AFB Family Support Center** work closely with the South Carolina Employment Security Commission
- **1994 information suggest > 50% find jobs <3 months**
- SBDC concluded, **"military dependents(spouses), as a separate employment group, fare as well or better than many local civilian applicants."**

**SUMMARY:**

The City of Sumter and Sumter County are privileged to be community partners with Shaw AFB and appreciate the opportunity to contribute to the missions of the Department of Defense and the United States Air Force. The Sumter community in cooperation with Shaw AFB is working to achieve the highest attainability quality of life in Shaw-Sumter community. We pledge complete support in making **PARTNERS IN PROGRESS - WORKING FOR QUALITY** a standard for success and pride into the 21st century.

## SUMMARY OF 20TH FIGHTER WING AWARDS

**AIR FORCE AWARDS:**

1993 Daedalions Maintenance Award
1993 Outstanding Unit Award (1992 and 1993)
1993 Air Force Manpower Management Award for Professional Excellence
1993 Commander in Chief's Installation Excellence Award (Units)
-20 SUPS, 20CRS, 20SG
1993 Air Force Maintenance Effectiveness Award (Unit)
-20 CRS
1993 Outstanding Explosive Ordinance Disposal Flight of the Year
-20 CES
1993 Operation Flight of the Year
-20 CES
1993 AAFES Commander Extraordinary Customer Service Award, Southeastern Region
- Shaw Base Exchange
1993 Individual Awards (4)

**AIR COMBAT COMMAND AWARDS:**

1993 ACC Awards to Units
- Eleven Squadrons
1993 ACC Awards to Individuals
- Fifteen Individuals

**HEADQUARTERS USAFE AWARDS:**

1993 Diamond Award (Individual)

## FAVORABLE ATTRIBUTES OF THE SHAW - SUMTER COMMUNITY:

### SHAW AFB:

- Strong Mission
- Excess Capability
- Excellent Infrastructure
- Excellent Facilities
- Strong Construction Program
- Favorable Community Relations

### SUMTER COMMUNITY:

- Good Infrastructure
  (Housing, Transportation, Shopping and Recreation)
- Excellent Schools
- Improving Crime Rates
- Improving Medical Care
- Expanding Job Opportunities
- Friendly Support for the Air Force Mission

# ACTION TO IMPROVE RETAINABILITY

**Mission Value**

- Reorganize to Electronic Warfare Mission
- Expand for SEAD, Strike and Close Air Support
- Expand for Mission Support
- Collocate Guard/Reserve Units
- Improve Facility Infrastructure

**Community Impact**

- Funding for Schools
- Improve- Expand Transportation

# Fact Sheet
# United States Air Force

20th Fighter Wing Public Affairs Office
517 Lance Ave., Suites 106/107
Shaw AFB, S.C. 29152-5041

(803) 668-3621
Fax (803) 668-2276

## SHAW AIR FORCE BASE, S.C.

Shaw Air Force Base, S.C., is home of the 20th Fighter Wing, Headquarters 9th Air Force/ United States Central Command Air Forces and several associate units. Shaw's units are assigned to Air Combat Command.

The base is located on more than 3,569 acres in Sumter, S.C. The base also has custodial responsibility for approximately 13,600 acres at Poinsett Weapons Range southwest of Sumter and for 23.5 leased acres at the Lake Wateree Recreational Area, 38 miles northwest of Sumter, near Camden, S.C.

Originally established as a small basic flying school, it was designated Shaw Field Aug. 7, 1941, in honor of Sumter County-native 1st Lt. Ervin David Shaw. Lieutenant Shaw was killed while flying a long-range reconnaissance mission over France during World War I. The base's first assigned aircraft was the single-engine BT-13 trainer.

Shaw's host unit from 1946 until 1951 was the 20th Fighter Wing. The base was assigned to 9th Air Force Dec. 1, 1950. The 363rd Fighter Wing arrived here April 14, 1951, and became the host unit later in the year when the 20th Fighter Wing departed for Virginia and then England. The 363rd Fighter Wing and its subordinate units inactivated Jan. 3, 1994, and were replaced by the 20th Fighter Wing that same day.

Shaw's current aircraft include C and D model versions of the Block 50 mini-D F-16 Fighting Falcon and the A/OA-10A Thunderbolt II "Warthog." The wing's 77th Fighter Squadron "Gamblers," 78th Fighter Squadron "Bushmasters" and 79th Fighter Squadron "Tigers" fly F-16s and are tasked with air-to-air, air-to-ground and suppression of enemy air defenses missions. The "Fighting Fifty-Fifth" Fighter Squadron flies A-10s with close air support and forward air control missions. The wing also operates the 726th Air Control Squadron which serves as a theater reporting center during war time or contingency operations.

Shaw is home to more than 6,000 active duty military members, 1,100 civilian employees and more than 13,000 family members. The base's annual regional economic impact exceeds $480 million.

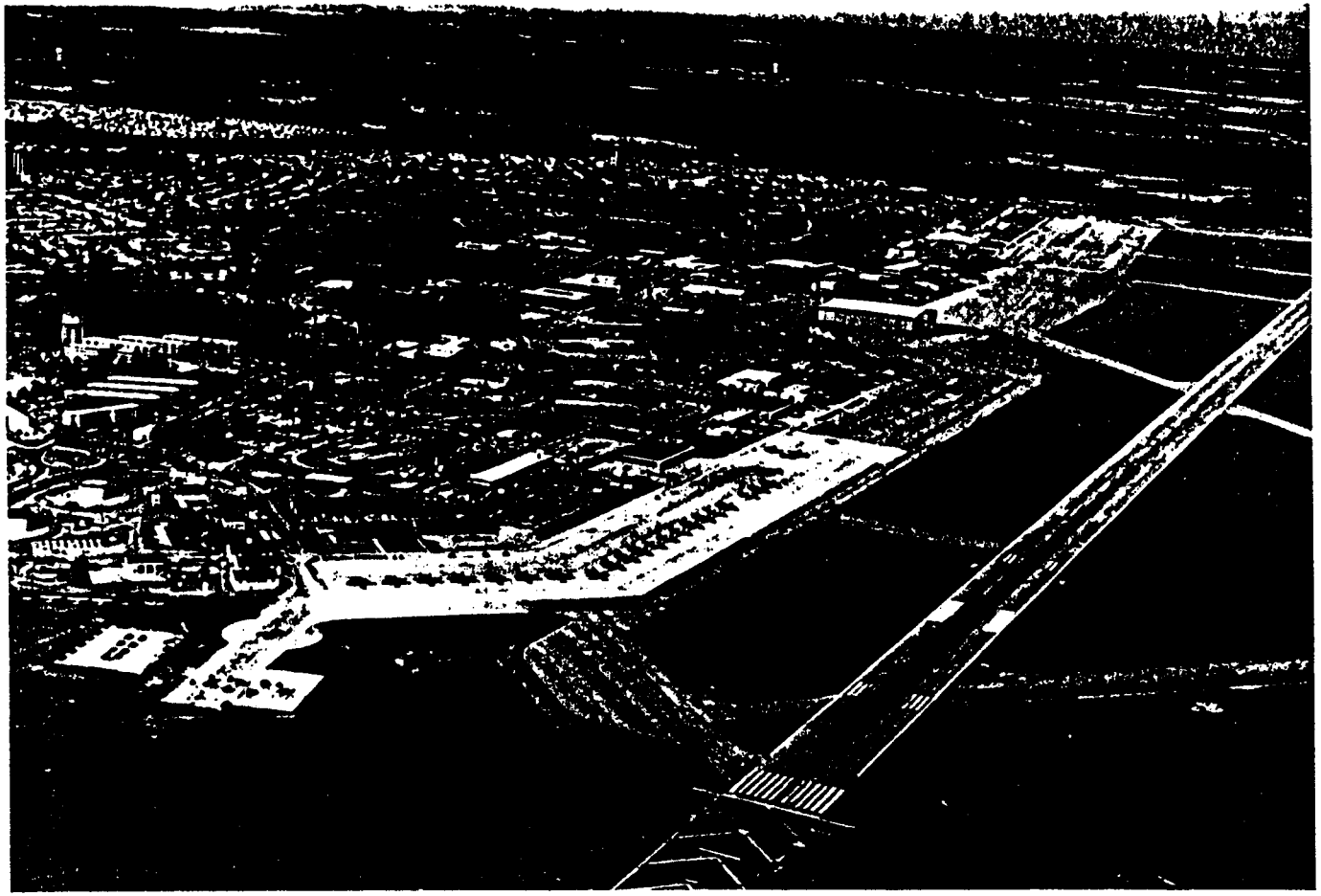
It's units have played significant roles in world history, participating in Operation Overlord, the invasion of Normandy; the defense of the Midway Islands; the assault on Iwo Jima; the Cuban Missile Crisis; the invasion of Grenada; Operation Just Cause; Operations Desert Shield and Desert Storm; Joint Task Force Proven Force; Operation Provide Comfort and Operation Southern Watch.

*(Current as of January 1994)* - MORE -

The host unit, the 20th, was redesignated as a fighter wing in 1991 in line with Air Force restructuring. The wing is the descendent of the Army's 20th Balloon Group, later fighter wing of World War II fame, was reorganized as an objective wing with its transfer to Shaw on Jan. 3, 1994. Within the wing is the commander, a general officer, his staff and four groups, each commanded by a colonel. The groups are operations, logistics, support and medical. The wing is responsible for providing fighter, close air support and forward air control aircraft to support theater operations during war time and contingency operations.

Headquarters 9th Air Force/United States Central Command Air Forces is one of six numbered Air Forces in Air Combat Command. It conducts daily training activities to keep its combat units ready for fast deployment abroad and high-intensity combat. It units comprise roughly 40 percent of the command's resources. In addition, its role as U.S. CENTAF makes it responsible for preparing detailed plans for deploying and employing Air Forces in combat within its area of responsibility.

Other associate units include the Army and Air Force Exchange Service; Air Force Audit Agency; Det. QD 20, USAF Judiciary Area Defense Council; SMALC Depot Task Force; Air Force Office of Special Investigations; 337th U.S. Air Force Recruiting Squadron; Field Training Detachment 307; 609th Air Operations Group; 609th Air Support Squadron; 609th Air Intelligence Squadron; 609th Air Communications Squadron; 682nd Air Support Operations Center Squadron; Defense Reutilization and Marketing Office; Det. 21, Defense Commissary Agency and the Defense Investigative Service. Geographically separated units include the 5th Combat Communications Group and 823rd RED HORSE Civil Engineering Squadron.



# B

## RATIONALE FOR ORGANIZING THE 20TH FIGHTER WING: A COMPOSITE WING

1. **MISSION:** The 20th Fighter Wing should become a composite air employment wing with the mission to train and equip air units to conduct joint theater air-ground operations in regional conflict areas under the command of a Regional CINC or Task Force Commander (TFC). The 20th Fighter Wing would provide units specifically trained and equipped to conduct Suppression of Enemy Air Defenses (SEAD) and to conduct Close Air Support (CAS)/Forward Air Control (FAC) in support of Joint air and ground forces. The 20th Air Control Group will be trained and equipped to provide tactical air-ground command and control systems to support deployed Air Force units and be able to provide Theater Air-Ground command and control systems in support of a Regional CINC or Joint TFC (i.e., commander USCENTAF).

2. **MISSION ENHANCEMENT:** The 20th Fighter Wing capabilities could be enhanced by improving the SEAD/Electronic Combat mission with additional units. Assign one squadron each of EF-111 Raven and EC-130 Compass Call aircraft. These added units would give the Wing the full capability to conduct SEAD/Electronic Combat operations. This would ensure that fully trained and regionally oriented EC forces to the commander 9th Air Force/US Central Command Air Force (USCENTAF). While these additional units could be geographically separated from Shaw AFB in peace time, they would be required to train with and be under the operational control of the commander 20th Fighter Wing. These units would be better supported, trained and organized if permanently assigned to Shaw AFB, South Carolina. Add one A/AO-10 squadron to increase CAS/FAC capability. Equip the 20th Air Control Group with state of the art capability to provide tactical air control. Add at least one mission support unit to enhance HQ Ninth Air Force/USCENTAF operations.

3. **ADDITIONAL FLYING MISSIONS ENHANCEMENTS:** The 20th Wing capabilities would be further increased by the assignment of up to six locally based air units with the special abilities listed below:

a. **Fighter**
   (1) Air to Ground Attack - F-16, F-15, A/OA-10
   (2) Air to Air Interceptor - F-16, F-15, F-22
   (3) Tactical Air Reconnaissance _ F/RF-16
   * ANG/AFRES fighter units could be collocated.

b. **Airlift**
   (1) Tactical Airlift C-130 with airlift control element

c. **Air Rescue**
   (1) Combat Rescue HC-130 and HH-60 with combat rescue control element

d. **Aerial Refueling**
   (1) Tanker KC-135
   (2) Tanker/Airlift KC-10

e. **Special Operations**
   (1) Gunship AC-130
   (2) Insertion MC-130, HH-60, HH-53 Pave Low

4. **ADDITIONAL NON-FLYING MISSION ENHANCEMENTS:** Several mission support units could be assigned to the base within the recognized 25% excess mission growth potential and with limited military construction. These units support U.S. Air Force worldwide requirements for communications, command and control of tactical air operations and civil engineering (heavy constuction). The later two units are under the direct supervision of HQ Ninth Air Force (HQ CENTAF) but are geographically seperated from the headquarters. The units are:

a. 485th Engineering Installation Group (EIG) currently assigned to Griffis AFB, NY (on BRAC 93 realignment list).
b. 5th Combat Communications Group (CCG) currently assigned to Robins AFB, GA (a HQ Ninth Air Force units)
c. 823rd Red Horse Civil Engineering Squadron (RHCES) currently assigned to Hurlburt Field FL (a HQ Ninth Air Force unit)

5. **BASE ATTRIBUTES TO SUPPORT MISSION ENHANCEMENTS:** The facilities on the Shaw AFB have excess capabilities to accept additional forces and units to meet mission enhancements. The base has benefited from the restoration and renovations required after Hurricane Hugo. The following attributes would favorably support the 20th Fighter Wing becoming a composite wing:

a. **Operational Effectiveness**
   (1) Dual parallel runways (10000 feet and 8000 feet)
   - recently repaired and repaved with new approach lighting
   (2) Parking Aprons with excess area (> 25000 yards)
   - recently repaired and replaced (1993)
   (3) Weather
   - Above 300'/1 mile > 90%
   - Above 3000'/3 miles > 75%
   - No need to deploy for training
   (4) Support for Additional Missions

| | |
|---|---|
| Fighter | Adequate |
| Bomber | Marginal |
| Airlift | Adequate |
| Tanker | Adequate |

(5) Training Areas

- Supersonic Military Operating Area (MOA) and Warning/Restricted Areas - < 150NM
- Low Altitude MOA (SAT/LOWAT) - <100NM
- Ranges
  - Scoreable within 100NM Poinsett, SC - 10NM
  - Scoreable within 250NM Townsend, GA < 150NM AF Dare County, NC < 250NM Grand Bay (Moody AFB), GA <250NM
  - Electronic Combat
    Poinsett, SC - 10NM
    Townsend, GA < 150 NM
    R-5306A (Cherry Point USMA, NC) < 250NM
    ** Pinecastle, FL (USN) < 300NM
  - ACMI
    W-157/158 (Beaufort USMC, SC) < 150NM
    ** 20th Fighter Wing primary use one week/month
  - Full Scale Live Drop
    Fort Bragg, NC <150NM
    Fort Stewart, GA <150NM
    Fort Benning, GA <250NM
    Fort Campbell, KY<400NM
  - Ground Forces with Impact Area
    Fort Bragg, NC <150NM
    Fort Stewart, GA <150NM
    Fort Benning, GA <250NM
    Fort Campbell, KY<400NM
- Special Use Airspace (SUA) and Training Areas
  - Fully Adequate
- Composite Force Training Airspace
  - Fully adequate
  - SUA with Bombing Ranges <150NM
  - Interservice participants <250NM
- VR/IR Routes
  - >10 within 100NM
- Airspace Availability
  - MOA/SUA/Ranges - fully adequate
  - Low Level Routes - fully adequate
- Airspace/Training Area Status
  - No charges anticipated
  - Fully adequate both now and in the future
- Airspace Enroachment (Civil/Comm Aviation)
  - MOA/Restricted Area -Generally compatible with some limitations
  - Bombing Ranges - Compatible

-- Low Level Routes - Limited regional incompatible

b. **Base Facilities/Land and Airspace**

1) Key Command and Support Facilities
- HQ 20th FW (new 1989) - Adequate
- 20th Support Group (new 1990) - Adequate
- 20th Air Operations Group - Adequate
- 20th Logistics Group - Adequate (renovated after Hurricane Hugo 1990)
- 20th Civil Engineering plant - Adequate
- 20th Medical Group - Adequate
  -- Medical/Dental - Will support larger operational forces
  -- Physiological Training Facility supports regional training for all services

2) Flying Operations Facilities
- Hangers all renovated and restored 1990 after Hurricane Hugo
- Squadron Operations Buildings
  -- 3x new construction 1991 after Hurricane Hugo
  -- 2x restored 1990 after Hurricane Hugo
  -- Additional buildings could be converted as needed
  ** Six squadrons were operational until 1991
- Flightline Crash Rescue/Fire Department
  -- New construction 1992
- Air Traffic Control
  -- Tower - state of the art (new construction FY94)
  -- RAPCON - state of the art (regional training facility)

3) Infrastructure Status (Electric, Water, Sewer)
- Can support > 25% increase without additional MILCON

4) Community Enroachment
- APZ - Limited incompatibility
- Noise - High in some areas now but will become limited in the future due to county zoning
- Airspace - Low incompatibility

c. **Ability to Support Future forces and Contingencies**

1) Contingency/Mobilization - Adequate
- C141 MOG = 3 to 4 (goal > 5)
- Wide body aircraft - can accept
- Fuel Hydrant System - Limited(improved with FY 94 MCP)
- Munitions Storage - < 500,000 NEW
- Hot Cargo - can accept

2) Geographic Location (Proximity to Other Service Locations) - Adequate
- Army/Marine < 150 miles (Fort Bragg, Fort Stewart, Beaufort USMC
- Rail Transportation - on base spur to main line (< 5 miles)
- Port Facilities within 150 miles (Charleston, SC; Savannah, GA; Wilmington, NC)

d. **Base Ability to Meet Airlift Mission:**

1) Airfield
- Runways/Taxiways - Adequate
- Parking Aprons - Adequate
- POL storage, delivery, resupply - Adequate (FY 94 MCP)
- Airspace Access for Training - Adequate
- Airspace Enroachment - Limited

2) Operational Considerations
- Weather - Adequate (>300'1, >90%; >3000'/3, >75%)
  – No need to deploy for training
- ATC delays - Minimal <= 5 min (actual)
  – meets requirements of < 15 min
- Mobility/Deployability - Optimum for deployable range and utilization for airlift missions

3) Training Areas
- DZ/LZ <200NM
  – Fort Bragg, NC; Fort Stewart, GA.
- US Army/USMC <500NM
  – Fort Bragg, NC; Fort Stewart, GA; Fort Benning, GA; Fort Campbell, KY.
- Full Airdrop < 500NM
  – Fort Bragg, NC; Fort Benning, GA; Fort Campbell, KY; North Field, SC.
- Numbers of VR/IR/SR- > 3 within 200NM
- AAR routes - 4 within 200NM
  – required for EC/MC/HC - 130 only
- Low Level Routes - Fully adequate

e. **Base Ability to Meet Tanker Mission**

1) Airfield
- Runway/Taxiway - Adequate
- Parking Apron - Adequate
- POL - Adequate storage with some limitation on delivery and resupply
  – limited Hydrant system (improved by FY 94 MCP)
  – resupply by rail

- Airspace Access - Adequate
- Airspace Emroachment - Limited

2) Operational Considerations
- Weather - Adequate
- ATC Delays - Minimal <=5 min (actual)
- Mobility/Deployability - Optimum for deployable range and for training
- Tanker saturation - Low in southeast US

3) Training Areas
- AAR routes - 4 within 200 NM
- Receiver availability - numerous fighter and airlift units in the region (USAF, USMC, USN, ANG/AFRES)

6. **Recommendation Flying:** Organize the 20th Fighter Wing into a Composite Wing for the air employment mission with special air assets for deployment/employment in regional crisis areas (Middle East/USCENTCOM or Europe/USEUCOM). Train, maintain and equip three (3) squadrons, F-16 C Block 50, for the suppression of enemy air defense (SEAD). Make the 20th Wing the East Coast Electronic Combat Wing under 9th Air Force. Either assign or attach one squadron each of EF-111 Raven and EC-130 Compass Call aircraft for training and deployment/employment to allow the Wing to conduct the full range of SEAD and Electronic Combat. Expand the Close Air Support(CAS)/ Forward Air Control (FAC) mission by assigning addition A/OA-10 aircraft to form a total of two (2) squadrons. The additional A-10's could train with and support US Army Forces. Assign one squadron of C-130 to support Wing and joint service deployment airlift requirements. Continue to train and equip the 20th Air Operations Group to provide command and control capabilities for theater air - ground operations. The special air assets that could be assigned to the 20th Wing are listed below in priority order:

a. **Electronic combat** (EC) EF-111 (Raven) squadron and a EC-130 (Compass Call) squadron to support joint SEAD and EC requirements. Squadrons could based at another geographic location but would be dedicated to the 20th Fighter Wing for training and employment.

b. **Close Air Support (CAS)/ Forward Air Control (FAC):** A-10 squadron to enhance the Wing's capability to support Army/USMC ground units.

c. **Airlift:** C-130 squadron, with an airdrop capability, to support wing deployment requirements and US Army/USMC units. Assign with appropriate Airlift Control Element.

d. **Air Rescue:** HC-130 squadron and a HH-60 squadron with appropriate command and control element to support joint combat search and rescue (CSAR) requirements.

e. **Aerial Refueling** KC-135 or KC-10 squadron to support rapid deployment and employment of the Wing's aircraft for regional crisis area operations.

f. **Air Reconnaissance:F/RF**-16 squadron to support joint air - ground operations in regional crisis areas.

g. **Air Superiority**: F-15C squadrons to support joint air-ground operation in regional Crisis areas. Upgrade to F-22 when available

*** Preferred Recommendation - a,b and c above -Enhanced Electronic Combat, CAS/FAC, and Airlift.

**7. Recommendations (Non-flying):** Shaw AFB could accomodate and support at least one mission support unit with worldwide or major regional conflict capabilities. Three possible units are listed in priority order:

a. **485th EIG** to support worldwide communications, electronic and automated information systems.

b. **5th CCG** to support regional USCENTAF and JCS operations with command and control communications.

c. **823rd RHCES** to support HQ Ninth Air Force/US CENTAF regional operations with rapidly deployable heavy construction and civil engineering services.

**Prepared By:**

Thomas R. Olsen
Major General, USAF Retired
1006 Golfcrest Road
Sumter, South Carolina 29154
803-773-7584

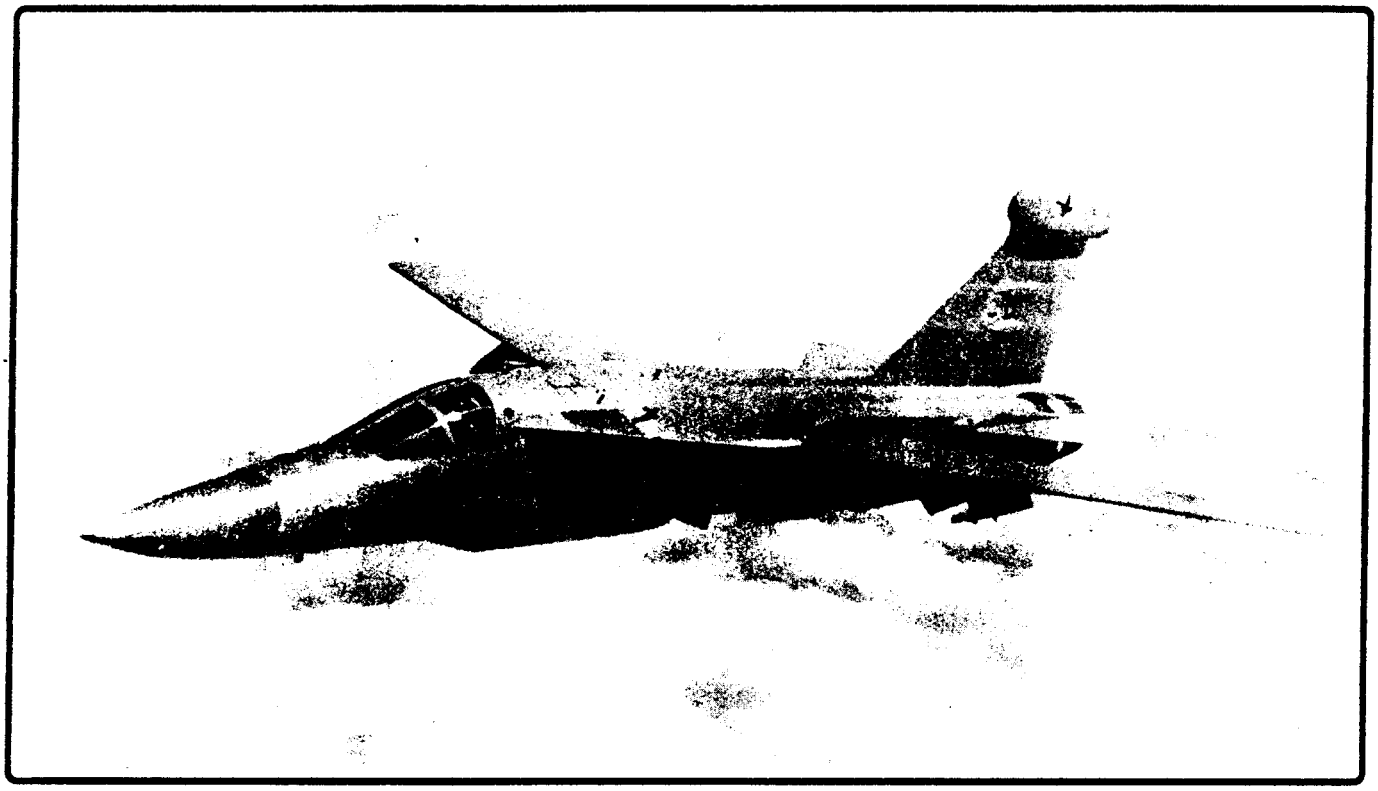
# FACT SHEET

92-24

UNITED STATES AIR FORCE

**Secretary of the Air Force**
Office of Public Affairs
Washington D.C. 20330-1690

# *EF-111A Raven*



## Mission

The EF-111A Raven is designed to provide electronic countermeasures support for tactical air forces. The EF-111A can detect, sort, identify and nullify different enemy radars.

## Features

The EF-111A is a modified F-111A. The F-111A is well-suited for modification to the role of an airborne electronic warfare platform because of its structural strength, maneuverability and performance — including the ability to penetrate enemy airspace and escape at supersonic speed. Because the aircraft is already available from the U.S. Air Force inventory, EF-111A production costs are greatly reduced.

Certain exterior modifications are required to convert the F-111A to EF-111A standards. A narrow canoe-shaped radome, about 16 feet long, is mounted on the fuselage, housing antennas for the high-powered jamming transmitters. Also, a fin-tip pod is mounted on the reinforced vertical stabilizer to house the receiving antennas and ancillary equipment, including a processor to detect hostile radar emissions. The total equipment weight is about 3.5 tons (3,150 kilograms).

Other modifications of the original F-111A structure include: general structural reinforcement, an improved environmental cooling system, and equipment for increased electrical output.

The cockpit of the Raven also has been rearranged. The right-seat crew member is an electronic warfare

officer responsible for navigation, terrain-following flight, and electronic warfare operations. The electronic warfare officer plans jamming tactics in advance, and then programs, operates and monitors the jamming system. Previous radar-jamming aircraft required several operators and more equipment to perform radar-jamming sessions.

The primary electronic countermeasures unit is the AN/ALQ-99E jamming subsystem. It is an improved version of the U.S. Navy's ALQ-99 jamming subsystem and frequency calibrator. Improvements to the Navy version include: capability to more rapidly identify and detect enemy transmissions; greater automation (and less reliance on human involvement and manual operations); expanded computer functions to provide more sophisticated and flexible jamming options; and more independent jamming signals over a wider range of frequencies. The EF-111A's system offers greater speed and capacity in locating and identifying uncharted radars, and defeating them.

The AN/ALQ-99E detects radar signals, processes them and compares them to known threat radar characteristics stored in an on-board computer. Jamming subsystem receivers scan across frequency bands under computer or manual control. When threats are identified, appropriate countermeasures are initiated either automatically by computer or with the electronic warfare officer's assistance. Information about new threats, not in the memory of the computer, can be fed into the system either through entries on the electronic warfare officer's cockpit keyboard or by programming the computer via a cassette that plugs directly into the plane. Changing the programming takes about five minutes if plug-in modules are used. The electronic warfare officer can test the information and, if necessary, make corrections using the keyboard and cockpit display unit.

A self-protection subsystem is designed to protect the EF-111A against radar-directed, anti-aircraft artillery, and missile or aircraft threats.

The EF-111A provides protection to tactical forces either by using a jamming orbit where it stands off from threat radars to cover friendly aircraft entering and leaving the threat areas, or by using the aircraft's high-performance capabilities to directly support attacking forces. In the direct support mission, the Raven may fly in an escort position or enter a threat area to the best jammer position. Ravens engaged in direct support often use the extensive night terrain-following capability built into the basic F-111 design.

The EF-111A is undergoing a number of upgrade programs to increase combat effectiveness. The aircraft are being updated with modern digital navigation and flight-control systems, which equip the airplane with ring-laser gyro and global-positioning navigation systems, as well as improved controls and displays. The radar and terrain-following flight systems are being updated. The Air Force has awarded a contract to Grumman Aerospace to design and install a major upgrade of the ALQ-99E jamming system. This upgrade, called the system improvement program, will enable the Raven to counter hostile radars well into the next century.

## Background

During Operation Desert Storm, all available Ravens were deployed to Middle East bases to support U.S. and allied combat operations. Well over 1,300 sorties were flown there, with many missions penetrating deep into enemy territory. All major allied air attacks were supported by Ravens that teamed with other Air Force and allied electronic combat units to cause a rapid collapse of the enemy air defense system. One EF-111A was lost during combat.

The program to convert several F-111A's to EF-111A electronic warfare prototypes and to evaluate their ability to provide electronic countermeasures jamming coverage for air attack forces began in 1972. Grumman Aerospace Corporation was awarded a contract to convert two existing F-111A's to EF-111A prototype configuration in January 1975. The first prototype flew in March 1977 and the second in May 1977.

The final EF-111A was delivered to Mountain Home Air Force Base in November 1985, but by mid-1994, all EF-111A's will relocate to Cannon Air Force Base, N.M.

## General Characteristics

**Primary Function:** Electronic countermeasures support.
**Contractor:** Grumman Aerospace Corp.

**Power Plant:** Two Pratt & Whitney TF-30-P-8109 engines.
**Thrust:** 21,000 pounds (9,450 kilograms) each engine.
**Length:** 76 feet (23 meters).
**Height:** 20 feet (6 meters).
**Wingspan:** 63 feet (19.1 meters) with wings fully extended.
**Speed:** 1,650 mph (Mach 2.2).
**Ceiling:** 50,000 feet (15,152 meters).
**Maximum Takeoff Weight:** 89,000 pounds (40,050 kilograms).
**Range:** 2,000 miles (1,740 nautical miles).
**Sensors:** AN/ALQ-99E jamming subsystem.
**Unit Cost:** $35 million.
**Crew:** Two (pilot and electronics warfare officer).
**Date Deployed:** June 1981.
**Inventory:** Active force, 40; ANG, 0; Reserve: 0.

POINT OF CONTACT:
**Air Combat Command; Public Affairs Office; 90 Oak Street; Langley AFB, VA 23665-2191; DSN 574-5007, or (804) 764-5007.**

Fact Sheet

# United States Air Force

355TH WING (ACC), PUBLIC AFFAIRS OFFICE, DAVIS-MONTHAN AFB, ARIZONA 85707
(602) 750-3204 DSN 361-3204

## COMPASS CALL

Compass Call is the designation for a modified version of Lockheed Corporation's C-130 Hercules aircraft configured to perform tactical command, control and communications countermeasures or C3CM. Specifically, the modified aircraft uses noise jamming to prevent communication or degrade the transfer of information essential to command and control of weapon systems and other resources. It primarily supports tactical air operations but also can provide jamming support to ground force operations.

Modifications to the aircraft include an electronic countermeasures system (Rivet Fire), an air refueling capability and associated navigation and communications systems. Rivet Fire has demonstrated its powerful effect on enemy command and control networks in Panama and Iraq.

In the world of Electronic Combat, the major players are the EF-111 Ravens, the F-4G Wild Weasels, F-16 Fighting Falcons and the EC-130H Compass Call. Forming the EC triad, these forces:

- Jam targets ;
- Insert deception to confuse;
- Destroy critical targets.

Compass Call integrates into tactical air operation at any level. Although Compass Call primarily supports interdiction and offensive counter-air campaigns, the truly versatile and flexible nature of the aircraft and its crew enable the power of EC to be brought to bear on virtually any combat situation.

The EC-130H aircraft carries a combat crew of 13 people. Four members are responsible for aircraft flight and navigation, while nine members operate and maintain the Rivet Fire equipment. The mission crew consists of an electronic warfare officer, who is the mission crew commander (MCC), an experienced cryptologic linguist is the mission crew supervisor (MCS), six analysis operators and an airborne maintenance technician (AMT).

(Current as of January 1994)

Aided by the automated system, the crew analyze the signal environment, designate targets and ensure the system is operating effectively. Targets can be designated before the mission takes off, acquired in flight or the MCC/MCS can receive additional tasking at any time from outside agencies (i.e. Airborne Warning and Control System, RC-135 and Airborne Command and Control System.)

Compass Call is tasked by all the unified commands and therefore subject to worldwide deployment in support of tactical air/ground forces on very short notice.

The Compass Call EC-130H is flown by the 355th Wing's 41st and 43rd Electronic Combat Squadrons, at Davis-Monthan Air Force Base Ariz

Both squadrons are self-contained with complete command, operations and maintenance functions, totaling 900 people and 13 aircraft.

# FACT SHEET

92-34

UNITED STATES AIR FORCE

**Secretary of the Air Force**
Office of Public Affairs
Washington D.C. 20330-1690

# C-130 HERCULES

## Mission

The C-130 Hercules primarily performs the intratheater portion of the airlift mission. The aircraft is capable of operating from rough, dirt strips and is the prime transport for paradropping troops and equipment into hostile areas.

## Background

Four decades have elapsed since the Air Force issued its original design specification, yet the remarkable C-130 remains in production. The initial production model was the C-130A, with four Allison T56-A-11 or -9 turboprops. A total of 219 were ordered and deliveries began in December 1956. Two DC-130A's (originally GC-130A's) were built as drone launchers/directors, carrying up to four drones on underwing pylons. All special equipment was removable, permitting the aircraft to be used as freighters, assault transports, or ambulances. The C-130B introduced Allison T56-A-7 turboprops and the first of 134 entered Air Force service in April 1959. C-130B's are used in aerial fire fighting missions by Air National Guard and Air Force Reserve units. Six C-130B's were modified in 1961 for snatch recovery of classified U.S. Air Force satellites by the 6593rd Test Squadron at Hickam Air Force Base, Hawaii.

## Features

In its personnel carrier role, the C-130 can accommodate 92 combat troops or 64 fully equipped paratroops on side-facing seats. For medical evacuations, it carries 74 litter patients and two medical attendants. Paratroopers exit the aircraft through two doors on

either side of the aircraft behind the landing-gear fairings. Another exit is off the rear ramp for airdrops.

The C-130 Hercules joins on mercy flights throughout the world, bringing in food, clothing, shelter, doctors, nurses and medical supplies and moving victims to safety.

C-130 Hercules have served other nations, airlifting heavy equipment into remote areas to build airports and roads, search for oil ,and transport local goods.

As a partial response to the overwhelming role played by the tactical airlift fleet in Operation Just Cause and in the Persian Gulf War, Congress has approved the procurement of more C-130H's to replace the aging E models.

## General Characteristics

**Primary Function:** Intratheater airlift.
**Contractor:** Lockheed Aeronautical Systems Company.
**Power Plant:** Four Allison T56-A-15 turboprops; 4,300 horsepower, each engine.
**Length:** 97 feet, 9 inches (29.3 meters).
**Height:** 38 feet, 3 inches (11.4 meters).
**Wingspan:** 132 feet, 7 inches (39.7 meters).
**Speed:** 374 mph (Mach 0.57) at 20,000 feet (6,060 meters).
**Ceiling:** 33,000 feet (10,000 meters) with 100,000 pounds (45,000 kilograms) payload.
**Maximum Takeoff Weight:** 155,000 pounds (69,750 kilograms).
**Range:** 2,356 miles (2,049 nautical miles) with maximum payload; 2,500 miles (2,174 nautical miles) with 25,000 pounds (11,250 kilograms) cargo; 5,200 miles (4,522 nautical miles) with no cargo.
**Unit Cost:** $22.9 million (1992 dollars).
**Crew:** Five (two pilots, a navigator, flight engineer and loadmaster); up to 92 troops or 64 paratroops or 74 litter patients or five standard freight pallets.
**Date Deployed:** April 1955.
**Inventory:** Active force, 98; ANG — 20 Bs, 60 Es and 93 Hs; Reserve, 606.

# FACT SHEET

92-48

**Secretary of the Air Force**
Office of Public Affairs
Washington D.C. 20330-1690

# *F-16 Fighting Falcon*

## Mission

The F-16 Fighting Falcon is a compact, multirole fighter aircraft. It is highly maneuverable and has proven itself in air-to-air combat and air-to-surface attack. It provides a relatively low-cost, high-performance weapon system for the air forces of the United States and allied nations.

## Features

In an air combat role, the F-16's maneuverability and combat radius (distance it can fly to enter air combat, stay, fight, and return) exceed that of all potential threat fighter aircraft. It can locate targets in all weather conditions and detect low flying aircraft in radar ground clutter. In an air-to-surface role, the F-16 can fly more than 500 miles (860 kilometers), deliver its weapons with superior accuracy, defend itself against enemy aircraft, and return to its starting point. An all-weather capability allows it to accurately deliver ordnance during non-visual bombing conditions.

In designing the F-16, advanced aerospace science and proven reliable systems from other aircraft such as the F-15 and F-111 were selected. These were combined to simplify the airplane and reduce its size, purchase price, maintenance costs and weight. The light weight of the fuselage is achieved without reducing its strength. The F-16 can withstand up to nine G's — nine times the force of gravity — with internal fuel tanks filled greater than any other current fighter aircraft.

The cockpit and its bubble canopy give the pilot unobstructed forward and upward vision, and greatly improved vision over the side and to the rear. The seat-back angle was expanded from the usual 13 degrees to 30 degrees, increasing pilot comfort and gravity force tolerance.

The pilot has excellent flight control of the F-16 through its "fly-by-wire" system. Electrical wires relay

commands, replacing the usual cables and linkage controls. For easy and accurate control of the aircraft during high G-force combat maneuvers, a side stick controller is used instead of the conventional center-mounted stick. Hand pressure on the side stick controller sends electrical signals to actuators of flight control surfaces such as ailerons and rudder.

Avionics systems include a highly accurate inertial navigation system in which a computer provides steering information to the pilot. The plane has UHF and VHF radios plus an instrument landing system. It also has a warning system and modular countermeasure pods to be used against airborne or surface electronic threats. The fuselage has space for additional avionics systems.

## Background

The F-16A, a single-seat model, first flew in December 1976. The first operational F-16A was delivered in January 1979 to the 388th Tactical Fighter Wing at Hill Air Force Base, Utah.

The F-16B, a two-seat model, has tandem cockpits that are about the same size as the one in the A model. Its bubble canopy extends to cover the second cockpit. To make room for the second cockpit, the forward fuselage fuel tank and avionics growth space were reduced. During training, the forward cockpit is used by a student pilot with an instructor pilot in the rear cockpit.

All F-16s delivered since November 1981 have built-in structural and wiring provisions and systems architecture that permit expansion of the multirole flexibility to perform precision strike, night attack and beyond-visual-range interception missions. This improvement program led to the F-16C and F-16D aircraft, which are the single- and two-place counterparts to the F-16A/B, and incorporate the latest cockpit control and display technology.

Currently, most active units have converted to the F-16C/D while existing F-16A/B aircraft will replace older aircraft in the Air National Guard and Air Force Reserve.

The F-16 is being built under an unusual agreement creating a consortium between the United States and four NATO countries: Belgium, Denmark, the Netherlands and Norway. These countries jointly produced with the United States an initial 348 F-16s for their air forces. Final airframe assembly lines were located in Belgium and the Netherlands. The consortium's F-16s are assembled from components manufactured in all five countries. Belgium also provides final assembly of the F100 engine used in the European F-16s. The long-term benefits of this program will be technology transfer among the nations producing the F-16, and a common-use aircraft for NATO nations. Through this program, the supply and availability of repair parts in Europe is increased and the F-16's combat readiness is improved.

USAF F-16 multimission fighters were deployed to the Persian Gulf in 1991 in support of Operation Desert Storm, where more sorties were flown than with any other aircraft. These fighters were used to attack airfields, military production facilities, Scud missile sites, and a variety of other targets.

## General characteristics

**Primary Function:** Multirole fighter.
**Builder:** General Dynamics Corp.
**Power Plant:** F-16A/B: one Pratt and Whitney F100-PW-200 turbofan engine with afterburner; F-16C/D: one Pratt & Whitney F100-PW-200/220 or General Electric F110-GE-100 turbofan engine with afterburner.
**Thrust:** F-16A/B, 24,000 pounds(10,800 kilograms); F-16C/D, 27,000 pounds(12,150 kilograms).
**Length:** 49 feet, 5 inches (14.8 meters).
**Height:** 16 feet (4.8 meters).
**Wingspan:** 32 feet, 8 inches (9.8 meters).
**Speed:** 1,500 mph (Mach 2 at sea level).
**Ceiling:** Above 50,000 feet (15 kilometers).
**Maximum Takeoff Weight:** 37,500 pounds (16,875 kilograms).
**Range:** More than 2,000 miles ferry range (1,740 nautical miles).
**Armament:** One M-61A1 20mm multibarrel cannon with 500 rounds; external stations can carry up to six AIM-9 infrared missiles, conventional air-to-air and air-to-surface munitions and electronic countermeasure pods.
**Unit cost:** F-16A/B: $9.5 million; F-16 C/D: $12.8 million.
**Crew:** F-16A/B: one; F-16C/D: two.
**Date Deployed:** January 1979.
**Inventory:** Active force, 804; Air National Guard, 634; Reserve, 150.

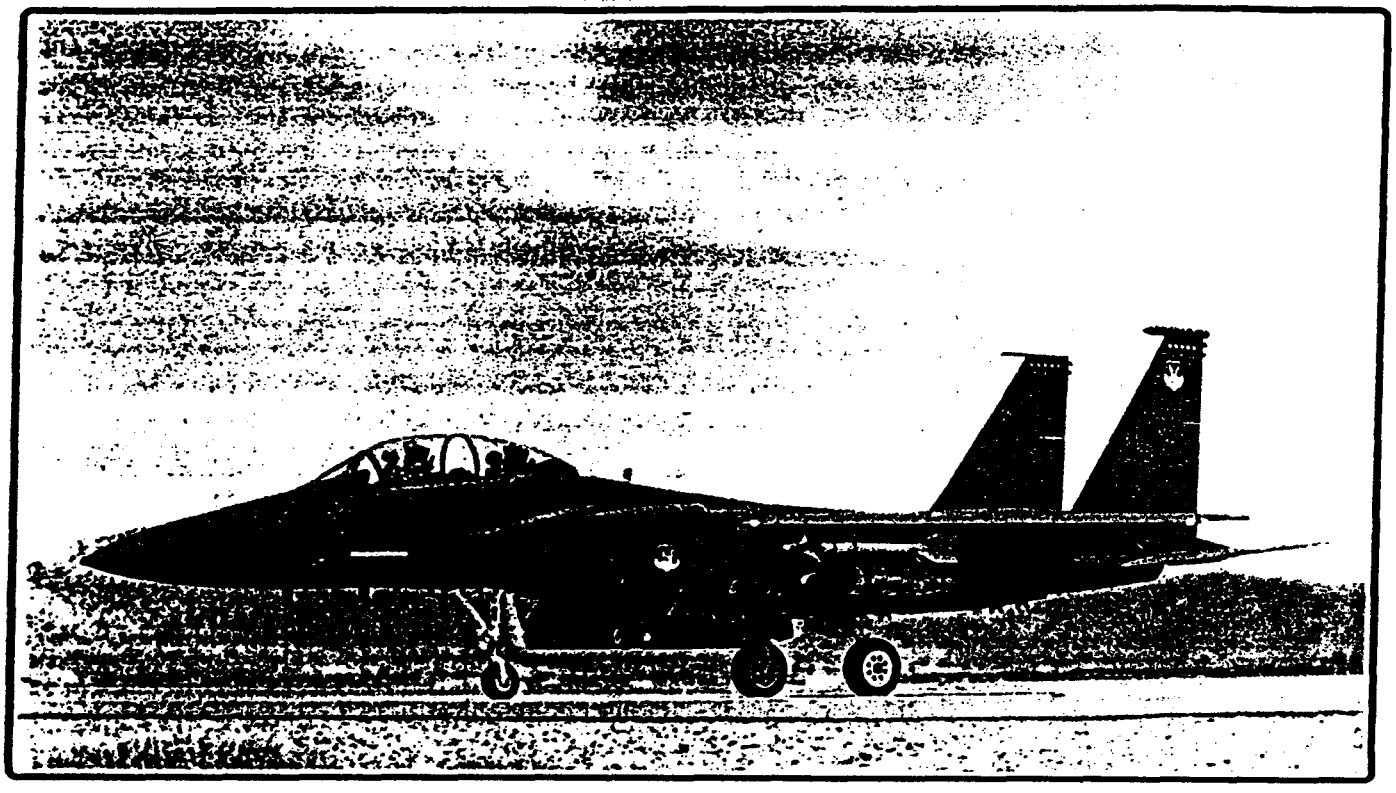
**Point Of Contact:**
**Air Combat Command; Public Affairs Office; 90 Oak Street; Langley Air Force Base, Va. 23665-5000; DSN: 574-5471 or (804) 764-5471.**

# FACT SHEET

92-61

**Secretary of the Air Force**
**Office of Public Affairs**
**Washington D.C. 20330-1690**

## *F-15 Eagle*



### Mission

The F-15 Eagle is an all-weather, extremely maneuverable, tactical fighter designed to gain and maintain air superiority in aerial combat.

### Features

The Eagle's air superiority is achieved through a mixture of unprecedented maneuverability and acceleration, range, weapons and avionics. It can penetrate enemy defenses and outperform and outfight any current or projected enemy aircraft. The F-15 has electronic systems and weaponry to detect, acquire, track and attack enemy aircraft while operating in friendly or enemy-controlled airspace. Its weapons and flight-control systems are designed so one person can safely and effectively perform air-to-air combat.

The F-15's superior maneuverability and acceleration are achieved through high engine thrust-to-weight ratio and low wing-loading. Low wing-loading (the ratio of aircraft weight to its wing area) is a vital factor in maneuverability and, combined with the high thrust-to-weight ratio, enables the aircraft to turn tightly without losing airspeed.

A multimission avionics system sets the F-15 apart from other fighter aircraft. It includes a head-up display, advanced radar, inertial navigation system, flight instruments, UHF communications, tactical navigation system and instrument landing system. It also has an internally mounted, tactical electronic-warfare system, "identification friend or foe" system, electronic countermeasures set and a central digital computer.

Through an on-going multistage improvement program, the F-15 is receiving extensive upgrade involving the installation or modification of new and

existing avionics equipment to enhance the tactical capabilities of the F-15.

The head-up display projects on the windscreen all essential flight information gathered by the integrated avionics system. This display, visible in any light condition, provides the pilot information necessary to track and destroy an enemy aircraft without having to look down at cockpit instruments.

The F-15's versatile pulse-Doppler radar system can look up at high-flying targets and down at low-flying targets without being confused by ground clutter. It can detect and track aircraft and small high-speed targets at distances beyond visual range, down to close range and at altitudes down to tree-top level. The radar feeds target information into the central computer for effective weapons delivery. For close-in dog fights, the radar automatically acquires enemy aircraft, and this information is projected on the head-up display.

An inertial navigation system enables the Eagle to navigate anywhere in the world. It gives aircraft position at all times as well as pitch, roll, heading, acceleration and speed information.

The F-15's electronic warfare system provides both threat warning and automatic countermeasures against selected threats. The "identification friend or foe" system informs the pilot if an aircraft seen visually or on radar is friendly. It also informs U.S. or allied ground stations and other suitably equipped aircraft that the F-15 is a friendly aircraft.

A variety of air-to-air weaponry can be carried by the F-15. An automated weapon system enables the pilot to perform aerial combat safely and effectively, using the head-up display and the avionics and weapons controls located on the engine throttles or control stick. When the pilot changes from one weapon system to another, visual guidance for the required weapon automatically appears on the head-up display.

The Eagle can be armed with combinations of four different air-to-air weapons: AIM-7F/M Sparrow missiles or AIM-120 Advanced Medium Range Air-to-Air Missiles on its lower fuselage corners, AIM-9L/M Sidewinder or AIM-120 missiles on two pylons under the wings, and an internal 20mm Gatling gun (with 940 rounds of ammunition) in the right wing root.

Low-drag, conformal fuel tanks were especially developed for the F-15C and D models. Conformal fuel tanks can be attached to the sides of the engine air intake trunks under each wing and are designed to the same load factors and airspeed limits as the basic aircraft. Each conformal fuel tank contains about 114 cubic feet of usable space. These tanks reduce the need for in-flight refueling on global missions and increase time in the combat area. All external stations for munitions remain available with the tanks in use. AIM-7F/M Sparrow and AIM-120 missiles, moreover, can be attached to the corners of the conformal fuel tanks.

## Background

The first F-15A flight was made in July 1972, and the first flight of the two-seat F-15B (formerly TF-15A) trainer was made in July 1973. The first Eagle (F-15B) was delivered in November 1974 to the 58th Tactical Training Wing, Luke Air Force Base, Ariz., where pilot training was accomplished in both F-15A and B aircraft. In January 1976, the first Eagle destined for a combat squadron was delivered to the 1st Tactical Fighter Wing at Langley Air Force Base, Va.

Other units equipped with F-15s include the 36th Fighter Wing, Bitburg Air Base, Germany; 325th Fighter Wing at Tyndall Air Force Base, Fla.; 33d Fighter Wing, Eglin Air Force Base, Fla.; 32d Fighter Squadron, Soesterberg AB, Netherlands; and the 3d Fighter Wing, Elmendorf Air Force Base, Alaska. In January 1982, the 48th Fighter-Interceptor Squadron at Langley Air Force Base became the first Air Force air defense squadron to transition to the F-15.

The single-seat F-15C and two-seat F-15D models entered the Air Force inventory beginning in 1979. Kadena Air Base, Japan, received the first F-15C in September 1979. These new models have Production Eagle Package (PEP 2000) improvements, including 2,000 pounds (900 kilograms) of additional internal fuel, provision for carrying exterior conformal fuel tanks and increased maximum takeoff weight of up to 68,000 pounds (30,600 kilograms).

F-15C's, D's and E's were deployed to the Persian Gulf in 1991 in support of Operation Desert Storm where they proved their superior combat capability with a confirmed 26:0 kill ratio.

## General Characteristics

**Primary Function:** Tactical fighter.
**Contractor:** McDonnell Douglas Corp.
**Power Plant:** Two Pratt & Whitney F100-PW-100 turbofan engines with afterburners.
**Thrust:** C/D models:– 25,000 pounds each engine (11,250 kilograms).
**Length:** 63 feet, 9 inches (19.43 meters).
**Height:** 18 feet, 8 inches (5.69 meters).
**Wingspan:** 42 feet, 10 inches (13.06 meters).
**Speed:** 1,875 mph (Mach 2.5-plus at sea level).
**Ceiling:** 65,000 feet (19,697 meters).

**Maximum Takeoff Weight:** C/D models: – 68,000 pounds (30,600 kilograms).

**Range:** 3,450 miles (3,000 nautical miles) ferry range with conformal fuel tanks and three external fuel tanks.

**Armament:** One M-61A1 20mm multibarrel gun mounted internally with 940 rounds of ammunition; four AIM-9L/M Sidewinder and four AIM-7F/M Sparrow missiles, or a combination of AIM-9L/M, AIM-7-F/M and AIM-120 missiles.

**Crew:** F-15A/C: one. F-15B/D: two.

**Unit cost:** $15 million.

**Date Deployed:** July 1972

**Inventory:** Active force, 403; ANG, 126; Reserve, 0.

POINT OF CONTACT:

**Air Combat Command; Public Affairs Office; 90 Oak St.; Langley Air Force Base, Va. 23665-5000. DSN: 574-5007. Commercial: (804) 764-5007.**

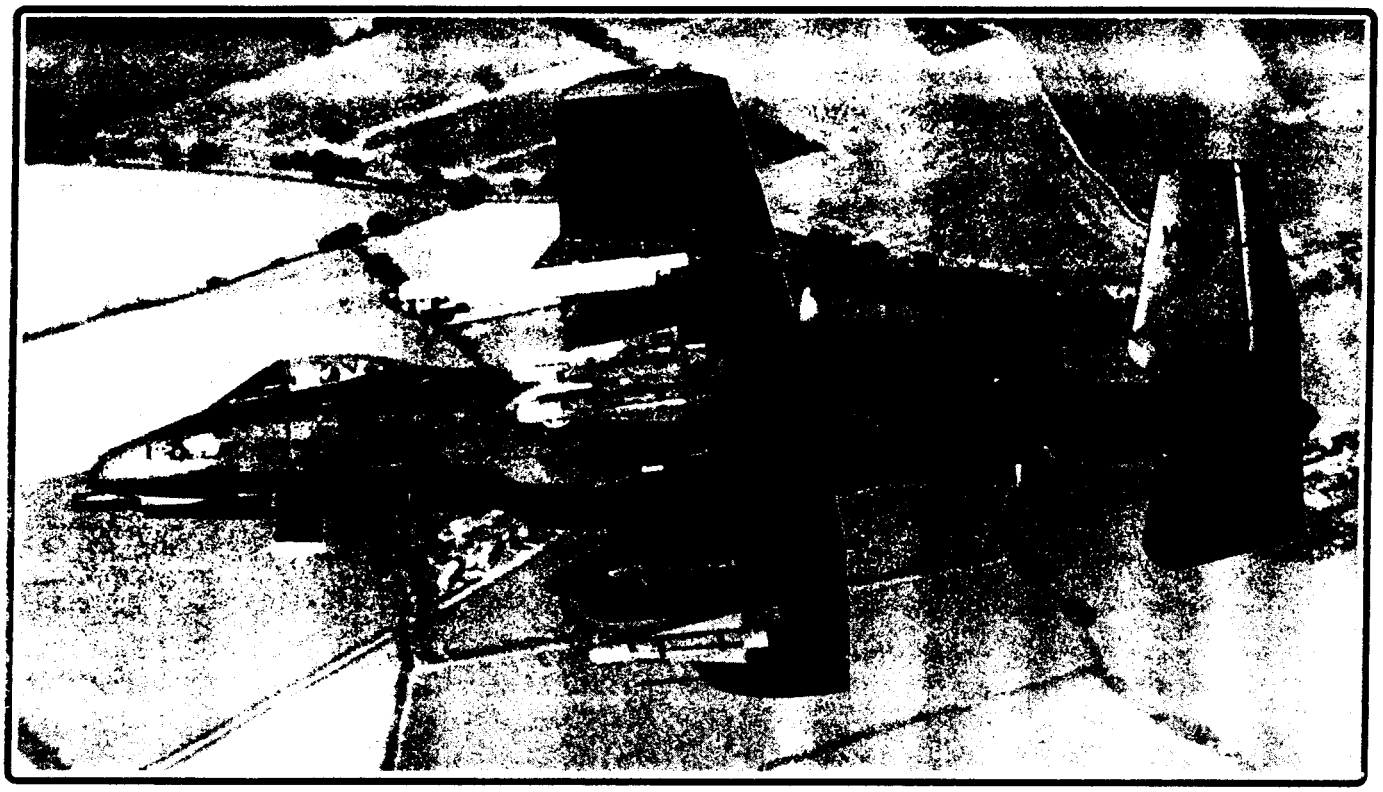
# FACT SHEET

92-40

UNITED STATES AIR FORCE

**Secretary of the Air Force**
Office of Public Affairs
Washington D.C. 20330-1690

## A-10/0 A-10 Thunderbolt II



### Mission

The A-10 and OA-10 Thunderbolt IIs are the first Air Force aircraft specially designed for close air support of ground forces. They are simple, effective and survivable twin-engine jet aircraft that can be used against all ground targets, including tanks and other armored vehicles.

### Features

The A-10 and OA-10 have excellent maneuverability at low air speeds and altitude, and are highly accurate weapons-delivery platforms. They can loiter near battle areas for extended periods of time and operate under 1,000-foot ceilings (303.3 meters) with 1.5-mile (2.4 kilometers) visibility. Their wide combat radius and short takeoff and landing capability permit operations in and out of locations near front lines.

Thunderbolt IIs have single-seat cockpits forward of their wings, and a large bubble canopy which provides pilots all-around vision. The pilots are encircled by titanium armor that also protects parts of the flight-control system. The redundant primary structural sections allow the aircraft to enjoy better survivability during close air support than did previous aircraft. The aircraft can survive direct hits from armor-piercing and high-explosive projectiles up to 23mm. Their self-sealing fuel cells are protected by internal and external foam. Their redundant hydraulic flight-control systems are backed up by manual systems. This permits pilots to fly and land when hydraulic power is lost.

The Thunderbolt II can be serviced and operated from bases with limited facilities near battle areas. Many of the aircraft's parts are interchangeable left and right, including the engines, main landing gear and vertical stabilizers.

Avionics equipment includes communications, inertial navigation systems, fire control and weapons delivery systems, and target penetration aids. Their weapons delivery systems include head-up displays that indicate airspeed, altitude and dive angle on the windscreen, and Pave Penny laser-tracking pods under the fuselage. The aircraft also have armament control panels, and infrared and electronic countermeasures to handle surface-to-air-missile threats.

The Thunderbolt II's 30mm GAU-8/A Gatling gun can fire 3,900 rounds a minute and can defeat an array of ground targets, to include tanks. Some of their other equipment includes an inertial navigation system, electronic countermeasures, target penetration aids, self-protection systems, and AGM-65 Maverick and AIM-9 Sidewinder missiles.

## Background

The first production A-10A was delivered to Davis-Monthan Air Force Base, AZ., in October 1975. It was designed specially for the close air support mission and had the ability to combine large military loads, long loiter, and wide combat radius, which proved to be vital assets to America and its allies during Operation Desert Storm. In the Gulf War A-10s, with a mission capable rate of 95.7 percent, flew 8,100 sorties and launched 90 percent of the AGM-65 Maverick missiles used there.

## General Characteristics

**Primary Function:** Close air support.
**Contractor:** Fairchild Republic Co.
**Power Plant:** Two General Electric TF34-GE-100 turbofans.
**Thrust:** 9,065 pounds (4079.25 kilograms) each engine.
**Length:** 53 feet, 4 inches (16.16 meters).
**Height:** 14 feet, 8 inches (4.42 meters).
**Wingspan:** 57 feet, 6 inches (17.42 meters).
**Speed:** 420 mph (Mach 0.56).
**Ceiling:** 1,000 feet (303 meters).
**Maximum Takeoff Weight:** 51,000 pounds (22,950 kilograms).
**Range:** 288 miles (250 nautical miles) carrying 9,500 pounds (4,275 kilograms) of weapons and with a 1.7-hour loiter time.
**Armament:** One 30 mm GAU-8/A seven-barrel Gatling gun; up to 16,000 pounds (7,200 kilograms) of mixed ordnance on eight under-wing and three under-fuselage pylon stations, including 500 pounds (225 kilograms) of retarded bombs, 2,000 pounds (900 kilograms) of general-purpose bombs, incendiary and Rockeye II cluster bombs, combined effects munitions, Maverick missiles and laser-guided/electro-optically guided bombs; infrared countermeasure flares; electronic countermeasure chaff; jammer pods; 2.75-inch (6.99 centimeters) rockets; and illumination flares.
**Crew:** One.
**Introduction Date:** March 1976.
**Unit Cost:** $8.8 million.
**Inventory:** Active force, 72 A-10s and 60 OA-10s; ANG, 84 A-10s, 24 OA-10s; Reserve, 87 A-10s.

POINT OF CONTACT:
**Air Combat Command; Public Affairs Office; 90 Oak Street; Langley Air Force Base, VA 23665-5562; DSN 574-5471, (804) 674-5471.**

# Fact Sheet DRAFT VERSION

## F-22 Advanced Tactical Fighter

***Mission***

The F-22 Advanced Tactical Fighter (ATF) is an air-superiority fighter with improved capability over current U.S. Air Force aircraft. From the inception of the battle, the F-22's primary objective will be to establish air superiority through the conduct of counter-air operations. The F-22 also has an inherent air-to-surface capability.

The F-22 will fly and fight in the advanced radar network and dense surface-to-air missile environments of combat throughout the world. It will use a first-look, first-shot, first-kill capability to detect and destroy enemy fighters of today -- and tomorrow.

***Design Goals***

The F-22 is being developed to counter the increasing sophistication and threat of hostile air superiority forces around the world. Its predecessor, the F-15, entered the Air Force inventory in 1975. Threats which the F-15 can no longer counter will be defeated by the lethal and survivable F-22, with its balance of increased speed and range, enhanced offensive and defensive avionics, and reduced observability. Emphasis on reliability, maintainability and other effectiveness factors will keep the fighter flying in the harshest combat conditions with quick combat servicing. The increased logistics supportability engineered into the F-22 means fewer resources will be required for each F-22 squadron at forward locations.

***Program Management***

The Air Force manages the program through the F-22 System Program Office at Air Force Materiel Command's Aeronautical Systems Center, Wright-Patterson AFB, Ohio.

The key ingredient of quality weapons systems is advanced technology, and the Air Force laboratories have a legacy of inserting technology into new aerospace systems. The Air Force has been preeminent for decades in performing research for aero propulsion and power, armament, avionics, solid state electronics, flight dynamics and materials. The Wright Laboratory (WL), part of Aeronautical Systems Center at Wright-Patterson, is the Air Force lead agency in this effort.

Because of WL's work, the F-22 will feature new technologies never seen before on one weapon system. Its four S's -- stealth, survivability, supersonic cruise and supportability -- are ensured because of the pioneering work of the laboratories. Development of the ATF prototypes proved the ability of new technologies to enable the Air Force to satisfy operational requirements of Air Combat Command -- thus maintaining our technological edge in air superiority.

Beginning in 1986, the F-22 program has been structured along the lines of the 1985 Packard Commission recommendations for improving the acquisition process. The F-22 program incorporated the prototyping concept, streamlined the acquisition process and conducted a competition between both airframe and engine teams prior to the selection of the contract winners in April 1991. The Air

Force and contractor F-22 team is setting the standard for future weapons acquisition.

***Prime Contractors***

The prime weapon system contractor team for the F-22 is headed by Lockheed Aeronautical Systems Co., Marietta, Ga. Lockheed is teamed with Boeing Defense and Space Group, Military Airplanes Division, Seattle, Wash., and Lockheed Fort Worth Co., Fort Worth, Texas. Pratt & Whitney Government Engines & Space Propulsion in West Palm Beach, Fla., is developing the F119 engine.

***Airframe Design***

The F-22 will have greater cruise efficiency and superior handling characteristics compared to most of today's fighters. Advances in low-observable technologies provide significantly improved survivability and lethality against air-to-air and surface-to-air threats. Fiber optics, advanced aerodynamic designs, and digital flight controls contribute to increased flight capabilities. The airframe will be lighter weight because of extensive use of high-strength, low-weight composite materials. Similar in size to the F-15, the F-22 will be 62 feet, 1 inch long, have a wingspan of 44 feet, 6 inches and measure 16 feet, 5 inches tall.

***Flight Dynamics***

**Legacy:** Research on early, electrical fly-by-wire systems which are basic to modern flight control began in the early 1960s. By 1966 flight dynamicists conducted an in-house electrical flight control program on the B-47 and six years later began flight testing a fly-by-wire system on a YF-4E. This was the first program within the U.S. Air Force to explore the advantages of "commanding" an aircraft totally through a system of electrical wires rather than conventional, complex mechanical systems with pulleys, linkages and pushrods.

The first aircraft designed as a fly-by-wire aircraft was the YF-16, and the first operational aircraft to incorporate fly-by-wire was the F-16. Current Air Force aircraft that use the fly-by-wire system are the B-2, C-17, F-16, F-117A and the ATF prototype, the YF-22A.

**Current efforts:** Other research involving systems integration which will be implemented in the F-22 includes:

- Two-dimensional engine exhaust nozzles that evolved via a program called the F-15 Short Takeoff and Landing/Maneuver Technology Demonstrator. The nozzles improve aircraft performance, maneuverability, control and safety during high angle of attack flight.
- Development of structures and manufacturing qualification inspection and repair methods for composite materials.
- The NC-131 flight simulation aircraft which refined ATF prototype flight control system and flight characteristics.

WL's Flight Dynamics Directorate continues to conduct advances in aerodynamic designs.

***Materials***

**Legacy:** Lightweight but strong composite materials were studied and developed by materials researchers beginning in the mid 1960s. During the past 25 years, work on advanced composites has led to some of the strongest, lightest

and stiffest, corrosion-resistant materials known to man. These properties make fiber-reinforced, composite materials valuable in design and construction of missiles, space vehicles and propulsion systems, as well as aircraft.

Organic matrix composites are used on the B-1B, F-15, F-16 and the EF-111. F-16 composite parts, for example, include the horizontal stabilizer skin, dorsal access panels and leading edge fairing, and the vertical tail fin skins, lower fin leading edge and rudder. Composites will account for more than 26 percent of the structure on the F-22.

**Current efforts:** Materials research impacts a wide variety of new technologies for the F-22 including:

- Improved materials for engine components which allow temperature tolerance increases from 1,600 to 2,500 degrees Fahrenheit.
- New forgings for bladed disks, called "blisks," that are lighter and stronger than conventional disks.
- Metal matrix composites and ceramic materials and coatings, as well as extremely high-temperature lubricants.
- New composites, such as thermoplastics and bismaleimides, that are lighter, stronger and more resistant to damage.

Breakthroughs in materials research continue in WL's Materials Directorate.

## *Propulsion*

F-22 engines will propel at supersonic cruise speeds without using afterburners -- a capability known as "supercruise." This capability greatly expands the F-22's operating envelope in both speed and range over current fighters which must use afterburner to operate at supersonic speeds. F-22 engines will have two-dimensional, convergent/divergent exhaust nozzles for unprecedented aircraft maneuverability. Advanced composite materials contribute great strength and durability to the engines, with a minimal weight penalty -- a factor crucial to the high thrust-to-weight ratio needed for supercruise.

**Legacy:** WL traditionally has led industry in propulsion research. For example, in the 1950s the laboratory sought a high bypass ratio engine. As a direct result of those efforts, the high bypass ratio TF-39 powers the C-5 airlifter with great efficiency.

**Current efforts:** Researchers in WL have developed new propulsion system technologies and evaluated future power needs of the Air Force, as well as other services. Their efforts include:

- Advanced compressors, combustors, fans and nozzles to make supersonic cruise possible.
- Support of technology demonstrators, which create a research data base, such as in the Joint Technology Demonstrator Engines, Advanced Propulsion Subsystem Integration, and Advanced Turbine Engine Gas Generator programs.

Research in engine technologies is conducted in WL's Aero Propulsion and Power Directorate.

## *Armament*

The F-22 will carry a full complement of medium- and short-range air-to-air armament, including the AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM) and the AIM-9 Sidewinder. These weapons will be carried internally and may be launched from revolutionary weapons racks that are

hydraulically operated. The F-22 also will be equipped with a proven design internal 20mm Gatling-type gun capable of firing 4,000 rounds per minute. The F-22 has a secondary role to attack surface targets. The aircraft will be capable of carrying two 1,000-pound Joint Direct Attack Munitions (JDAMs) internally and will use on-board avionics for navigation and weapons delivery support.

**Legacy:** The roots of munitions research can be traced to air armament efforts at Eglin Field, Fla., during the early stages of World War II when an aircraft and its armament were first regarded as an integral weapon system. Over the years, armament specialists there have focused on nonnuclear weaponry that makes a dramatic impact on the outcome of any given strike mission. These systems have included the Paveway laser-guided bomb, GBU-15 precision-guided missiles, and combined effects munition (CBU-87), the largest munitions project ever undertaken by the Air Force.

**Current efforts:** Work on armaments at Eglin AFB, Fla., is providing technologies for weapons system integration on the F-22, including:

- Computer modeling of internal carriage of weapons and their separation from the airframe.
- Advanced missile ejector technology.
- Advanced armament and gun technology.

WL's Armament Directorate develops munitions for use on new weapons systems. Because of WL's legacy of technology leadership and direct nurturing of the U.S. aircraft industrial base, it has been a key member of the team responsible for the F-22.

## *Avionics*

The F-22 possesses a sophisticated sensor suite that allows the pilot to track, identify and shoot the threat before it detects the F-22. Significant effort is being placed on cockpit design and avionics fusion to improve the pilot's situational awareness. Advanced avionics technologies allow the F-22 sensors to gather, integrate and display essential information in the most useful format to the pilot.

Designers of F-22 avionics are using technologies such as Very High Speed Integrated Circuits (VHSIC) in the development of advanced data processors. These advanced data processors will be assembled in highly integrated common modules linked by high-speed data buses to maximize aircraft performance and minimize pilot workload. The F-22 avionics system will make traditional "black box" systems obsolete.

F-22 avionics are augmented by technologies such as the Integrated Electronic Warfare System (INEWS), integrated Communications/Navigation/Identification (CNI) avionics, shared antennae for several avionics systems, and cockpit displays that show integrated data from not one, but several sensor systems. F-22 avionics software is being designed and written in the Department of Defense standard computer language, Ada.

**Legacy:** In 1958 the Air Force recognized a need and funded the private-sector breakthrough that moved microchip technology from the workbench to the Minuteman II guidance computer in just five years. Air Force labs also initiated the Digital Avionics Information System (DAIS) program to standardize avionics architectures and promote integration of computers, sensors and data links.

**Current efforts:** Because of the increased complexity of future battlefields, the F-22 requires better avionics than current fighters. The laboratory has introduced the revolutionary concept of integrated avionics using Very High Speed Integrated Circuits and common modules. This paved the way for:

- Pave Pillar avionics architecture using common modules throughout the weapon system, isolating faults down to the module level and reconfiguring around them.
- A modular system with built-in-test and software control requiring a minimum of external diagnostic equipment and capable of being repaired on the flight line.
- Integrated electronic warfare system, an electronic warfare capability integrated with the avionics suite.
- Supporting hardware like VHSIC modular processors, common signal processors and video data distribution.
- A sophisticated Communication, Navigation and Identification capability integrated with the avionics suite.

All these developments will increase the reliability and maintainability of the avionics system for the F-22. Additionally, since combat pilots with a first-look, first-shot, first-kill opportunity have an obvious advantage over competitors, avionics engineers addressed how to provide that technological "edge." Another part of the solution was a technology base for the Ultra Reliable Radar, which included:

- Solid-state, phased-array radar, using signal processors common to other sensors within the avionics suite.
- Electronically scanned array radar, thus eliminating the mechanical parts in older radars.

Further advancements in avionics like these are researched in WL's Avionics and Solid State Electronics directorates.

***Realiability, Maintainability and Supportability***

To ensure operational flexibility, the F-22 has better reliability and maintainability than any military fighter in history. Increased F-22 reliability and maintainability pays off in less manpower required to fix the aircraft and consequently less airlift required to support a deployed squadron. Additionally, reduced maintenance support provides the benefit of reduced life-cycle cost and the ability to operate more efficiently from prepared or dispersed operating locations. The F-22 exceeds current fighter sortie surge rates with a reduced support structure.

***Increased Lethality and Survivability***

The above characteristics provide a synergistic effect that ensures F-22 lethality against an advanced air threat. The combination of reduced observability and supercruise drastically shrinks surface-to-air engagement envelopes and minimizes threat capability to engage and shoot the F-22.

***Schedule***

The F-22 completed Demonstration/Validation (Dem/Val) in August 1991 when it entered Engineering and Manufacturing Development (EMD), formerly called Full-Scale Development. Dem/Val demonstrated the feasibility and capability of the technology, thus reducing the risk and maturing the technology

for the next phase. During EMD, detailed design and specifications are finalized, engineering drawings are prepared and pre-production aircraft are fabricated and tested. The EMD contract will procure nine aircraft for flight testing (seven single-seat and two dual-seat aircraft), two aircraft for stress testing and 27 engines. Flight testing of the EMD aircraft will begin in 1997.

***General Characteristics***

**Primary Function:** Fighter, air-superiority
**Airframe Builder:** Lockheed Aeronautical Systems Co., Boeing Military Airplanes Division, and Lockheed Fort Worth Co.
**Power Plant:** Two Pratt & Whitney F119-PW-100 turbofan engines with afterburners and two-dimensional thrust vectoring nozzles
**Thrust (each engine):** 35,000 pound class (approximately 155,000 Newtons)
**Length:** 62 feet, 1 inch (18.9 meters)
**Height:** 16 feet, 5 inches (5.0 meters)
**Wingspan:** 44 feet, 6 inches (13.6 meters)
**Speed:** Mach 2 class (approximately 1,500 miles per hour or 2,400 kilometers per hour sea level)
**Ceiling:** Above 50,000 feet (approximately 15 kilometers)
**Empty Weight:** 40,000 pound class (approximately 18,000 kilograms)
**Range:** More than 2,000 miles (approximately 3,200 kilometers)
**Armament:** One M61A2 20-millimeter multibarrel cannon; internal stations can carry AIM-9 infrared (heat-seeking) air-to-air missiles and AIM-120 radar-guided air-to-air missiles or 1,000-pound Joint Direct Attack Munitions; external stations can carry additional stores
**Crew:** F-22A: one. F-22B: two
**Initial Operational Capability:** 2004
**Projected Inventory: Active:** 442

(Source: Fact Sheets from Aeronautical Systems Center Public Affairs Office, July 1992, and Air Combat Command Public Affairs Office, November 1993)

# United States Air Force

## FACT SHEET

PUBLIC AFFAIRS, 416TH BOMB WING (ACC)
GRIFFISS AFB NY 13441 TEL (315) 330-305

### 485TH ENGINEERING INSTALLATION GROUP

The 485th Engineering Installation Group (EIG) is one of ten active duty units under the command of the Communications Systems Center, Air Force Communications Command, located at Tinker AFB, OK. Approximately 900 people are assigned to the 485th.

The 485th EIG was activated in 1966 as the 485th Ground Electronics Engineering Installation Agency. In 1970, it was redesignated the 485th Electronics Installation Squadron (EIS), and in 1972 the unit was relocated to Griffiss AFB, NY. Because of the record it had compiled in Southeast Asia, the 485th was the surviving unit when it combined with the 2019th Communications Squadron in 1977 to form the 485th Communications Installation Group. On 1 July 1981, it was again redesignated, this time as the 485th Engineering Installation Group.

The 485th's mission is unique within the Air Force. They provide the engineering and installation products and services during peace and war that satisfy Air Force and other customer requirements for communications, electronics, and automated information systems, facilities and equipment; and assist in defining those requirements.

The 485th has won several honors and distinctions including 6 Outstanding Unit Awards, 12 Vietnam Battle Streamers, 3 AFCC Commanders Achievement Awards and the Maj Gen Harold M. McClellan Award for outstanding communications and electronics work. These awards establish them as a recognized leader in satisfying customers' needs for quality information systems and services while providing for their people—a vision which will carry them into the 21st century.

# United States Air Force

## FACT SHEET

Office of Public Affairs, 5th Combat Communications Group, Robins AFB, Ga. 31098 (912) 926-2338 DSN 468-2338, FAX Ext. 3900

# 5th Combat Communications Group

The 5th Combat Communications Group, Robins Air Force Base, Ga., provides mobile and transportable command and control communications and air traffic control systems worldwide.

The group's four combat communications squadrons deploy in support of joint task force, combatant command and Air Force flying wing operations and exercises. The 5th CCG is an Air Combat Command unit reporting to 9th Air Force at Shaw AFB, S.C.

The 5th CCG has been based at Robins AFB since its activation July 1, 1964. It was originally called the 5th Mobile Communications Group and is still affectionately referred to as the 5th MOB. Today, the unit has approximately 900 people and can be a self-supporting combat unit. The group can provide its own site security, electrical power and vehicle maintenance.

On Sept. 8, 1988, the group activated three combat communications squadrons: the 51st CCS, 52nd CCS and 53rd CCS.

The 5th CCG supports United States Central Command Air Forces and Joint Chiefs of Staff operations and exercises in Southwest Asia, Central and South America and the Pacific theater. The group also responds to contingencies, emergencies and natural disasters both overseas and throughout the United States. During local training exercises, the 5th CCG deploys to a variety of sites around the Southeastern United States.

Over the past several years, the unit has participated in more than 500 deployments including Iceland, Egypt, Ecuador, Panama, Virgin Islands, Wake Island, Somalia, Kenya and Honduras.

During OPERATION DESERT STORM, the 5th CCG deployed more than 600 people to a dozen locations. As the first communications unit in theater, the squadrons provided air traffic control and communications support to six deployed wings and USCENTAF Headquarters. Group personnel have remained continuously deployed to Southwest Asia for more than three years, supporting the Cease Fire Campaign and United Nations resolutions.

The 51st CCS consists of approximately 250 people and provides communications and air traffic control support to an Air Force Headquarters, usually USCENTAF Headquarters. The 52nd and 53rd CCS, both with 200 people, provide deployed fighter bases with communications and air traffic control systems.

In spring of 1993, the group added the 5th Combat Communications Support Squadron and on June 18, 1993, the 54th Combat Communications Squadron. The support squadron provides assistance to the combat communications squadrons for deployments. The 54th CCS's mission mirrors its sister squadrons, the 52nd and 53rd CCS, providing communications and air traffic control systems to deployed fighter bases.

In addition, the group supports Headquarters Air Force and major air commands with temporary communications facilities and advises three Air National Guard Combat Communications Groups composed of more than 2,300 people in units throughout the Eastern U.S. from Maine to the Virgin Islands.

THE 823D RED HORSE CIVIL ENGINEERING SQUADRON
The Air Force Combat Engineers

The 823 RED HORSE Civil Engineering Squadron (Rapid Engineer Deployable - Heavy Operational Repair Squadron, Engineer) was established in July 1966 at Forbes AFB, Kansas. In October 1966 the unit deployed to Bien Hoa AB Vietnam, and from there they set up detachments throughout the country and performed heavy construction for the Air Force. In 1971 the squadron was deactivated for a year, and in June 1972 was reactivated as a Ninth Air Force unit and located at Eglin AFB Auxiliary Field 2. Today, the 823d, stationed at Hurlburt Field, Florida, has 404 personnel and over 200 vehicles and equipment items and is trained to conduct heavy engineering operations as an independent, self-sufficient unit in remote, hostile locations. The unit's engineers, services, supply, medical, logistics, and vehicle maintenance forces remain ready to launch a [illegible] force (RH-1) within 12 hours of notification; a second 94-person workforce [illegible] equipment, (RH-2) within 48 hours; and the remainder of the squadron, [illegible] equipment, (RH-3) within 6 days.

RED HORSE's wartime missions include [illegible] of cratered runways, expedient engineering methods, [illegible] aircraft arresting barrier installation, revetment erection [illegible] demolition, concrete, asphalt operations, and automated [illegible] In peacetime, RED HORSE provides a response force supporting [illegible] disaster recovery operations, and various Joint Chiefs of Staff [illegible]

The 823d's record of accomplishment [illegible] September 1989, with only 22 hours notice, the squadron [illegible] Shaw [illegible] and in only 17 days recovered the base from damage [illegible] August [illegible] deployed to Saudi Arabia for DESERT SHIELD/DESERT STORM [illegible] fourteen million dollars, representing [illegible] years [illegible] they provided 36 revetted hardstands [illegible] a taxiway [illegible] a theater munitions area [illegible] 6 miles of [illegible] foot by 400-foot concrete/asphalt parking apron [illegible] fighter squadron. In [illegible] 1992, 30 people deployed [illegible] In just 60 days they constructed two 800-foot [illegible] and constructed a range tower. Concurrent with [illegible] 1992 [illegible] on their Unit Effectiveness Inspection [illegible] ions and Engineering [illegible] both rated [illegible] responded to Homestead [illegible] within 24 hours [illegible] ways and airfields [illegible] field hospital, restored [illegible] community. The squadron responded [illegible] with three [illegible] In November 1992, 11 people were deployed [illegible] dirt airfields in Kenya and Somalia. On 17 December 1992, 76 squadron [illegible] Mogadishu, Somalia [illegible] Force personnel at the airport and embassy compound. In [illegible] Force tent cities and operating a field [illegible] they removed [illegible] raised base perimeter and treated over 400,000 gallons of salt water for their use. On 26 September 1993, 19 people were deployed to Mogadishu Airport with less than 18 hours notice to build personnel bunkers and erect revetments to protect critical resources for both the Air Force and Army. Our 18 personnel came under fire numerous times during this deployment but all returned home safely and proud of a job well done. The summer of 1993 found 64 Horsemen back in Southwest Asia for Eastern Castle 93. At one location concrete berms were constructed to house six each 50,000 gallon fuel bladders. The second site involved construction of two each 12,000 SF K-Spans and a 3/4 mile road. Both Eastern Castle 92 and 93 were conducted in 120 degree fahrenheit temperatures and severely stressed personnel and equipment. All projects were finished on or ahead of schedule and below budget.

In December 1993, the squadron was presented the Air Force Outstanding Unit Award for outstanding service to the United States from 16 March 1991 to 15 March 1993. Individuals were also recognized for excellence as Ninth Air Force Senior NCO of the Year and Airman of the Year, Air Force Military Manager of the Year and SAME Goddard Medal. The Horsemen and women of the 823d meet all challenges in keeping with their motto "CAN DO - WILL DO - HAVE DONE."

C

## SUMTER BASE DEFENSE COMMITTEE

| NAME | ADDRESS | PHONE |
|---|---|---|
| JIM ALEXANDER * | P.O. DRAWER 1229 | 775-1231 |
| TOM ALEXANDER | DRAWER 527, BISHOPVILLE- 29010 | 484-5434 |
| PHIL BALLENGER | P.O. DRAWER 1229, SUMTER | 775-1231 |
| BOBBY BOYKIN | P.O. BOX 1798 | 775-1211 |
| STEVE CREECH * | P.O. BOX 850, SUMTER | 773-3364 |
| JOE DAVIS * | P.O. BOX 1272, SUMTER | 775-6361 |
| FRANK EDWARDS | P.O. BOX 1145, SUMTER | 775-1201 |
| LOUIS FLEMING | 256 RED BAY ROAD, SUMTER | 775-7841 |
| BILLY GOODSON | P.O. DRAWER 1120, SUMTER | 775-6381 |
| CLIFF GOODWIN, III | P.O. BOX 758 | 469-8031 |
| CARL HOLMES | P.O. BOX 2001, SUMTER | 773-1838 |
| WILLIE JEFFERSON | P.O. BOX 156, MAYESVILLE- 29104 | 453-5482 |
| PHIL LEVENTIS * | 935 ANDIRON DR. | 773-0884 |
| CARL LIVINGSTON | 2395 HWY. 441, SUMTER | 499-3388 |
| LEON MCDONALD * | 143 HORSESHOE COVE, SUMTER | 778-7711 |
| MAC MCLEOD | ROUTE 1, PINEWOOD- 29125 | 452-5017 |
| BILL NOONAN | 141 N. MAIN, SUMTER | 436-2101 |
| TOM OLSEN * | P.O. BOX 1449, SUMTER | 773-3371 |
| HUBERT OSTEEN | P.O. BOX 1677, SUMTER | 775-6331 |
| WILLIAM S. RANDOLPH | 21 WRIGHT STREET, SUMTER | 773-4211 |
| STEVE RUST * | P.O. DRAWER 1229, SUMTER | 775-1231 |
| JOHN STOCKBRIDGE | P.O. BOX 1449, SUMTER | 773-1555 |
| C.J. TROYER | P.O. BOX 2847, SUMTER | 778-1669 |
| TALMADGE TOBIAS | P.O. BOX 1449, SUMTER | 773-3371 |
| DAVID WEEKS | RT. 5 BOX 328, SUMTER | 775-4228 |

* EXECUTIVE COUNCIL

# Document Separator

# *SUMTER BASE DEFENSE COMMITTEE*
# *DISCUSSION TOPICS*
# *BRAC COMMISSION STAFF*
# *AUGUST 10, 1994*

1. Will the SBDC be able to make data inputs to the Air Force Base Closure Executive Group (AFBCEG) through the BRAC Commission Staff (Aug - Nov, 1994)? Air Force Base Closure Working Group (AFBCWG)?

2. Will the SBDC be able to make data inputs to the Department of Defense, Deputy Assistant Secretary for BRAC and Economic Reinvestment through the BRAC Commission Staff (Dec 94 - Mar 94)?

3. When will FY 95 Air Force Force Structure Plan be available for review?

4. Will the SBDC be able to have dialog with the Air Force Team of the BRAC Commission Staff on a routine basis? Who will be the point of contact and telephone and Fax numbers?

5. What information will be available to the SBDC from the BRAC Commission Staff between now and March 1, 1995? After March 1, 1995?

6. When and how will the SBDC be able to make inputs to data used in the COBRA model analysis?

7. When will the SBDC be able to have full disclosure of the decisions made by the AFBCEG and AFBCWG?

   Will the SBDC have to request the information via the Freedom of Information Act?

8. How often will the BRAC Commission (Air Force Team) ask for clarifying or additional data from the SBDC?

9. When and how should the SBDC invite BRAC Commission Staff and Commissioners to visit Sumter and Shaw AFB?

10. How will the SBDC be informed that we will have the opportunity to make a presentation to the BRAC Commissioners prior to March 1, 1995?

    After March 1, 1995?

# DEFENSE BASE CLOSURE AND REALIGNMENT COMMISSION

PRESENTATION TO
SUMTER BASE DEFENSE COMMITTEE
AUGUST 10, 1994

Frank Cirillo, Air Force Team Leader



# ORIGIN OF BASE CLOSURES

- 1977 LEGISLATION, 10 U.S.C. 2687
  - STOPPED CLOSURES FOR A DECADE
- 1988 LEGISLATION, PUBLIC LAW 100-526
  - CONGRESS CODIFIED COMMISSION CHARTERED BY SECDEF
  - 86 CLOSURES AND 13 REALIGNMENTS
  - SUCCESSFUL PROCESS BUT HAD DEFICIENCIES
- 1990 -- SECDEF ANNOUNCED INTENT TO CLOSE ADDITIONAL BASES
  - CONGRESS SAID NO!
- 1990 LEGISLATION, PUBLIC LAW 101-510
  - CREATED COMMISSIONS IN 1991, 1993, AND 1995

## PUBLIC LAW 101-510

- ENACTED NOVEMBER 5, 1990
- DEFENSE BASE CLOSURE AND REALIGNMENT COMMISSIONS IN 1991, 1993, AND 1995
- EIGHT MEMBERS, NOMINATED BY PRESIDENT, CONFIRMED BY SENATE
- RECOMMENDATIONS TO BE BASED ON FORCE-STRUCTURE PLAN AND SELECTION CRITERIA
- SECDEF TO SUBMIT RECOMMENDATIONS TO COMMISSION BY APRIL 15 (NOW MARCH 1)
- GAO:
  - PROVIDE DIRECT AUDIT ASSISTANCE TO COMMISSION
  - REPORT ON PROCESS AND RECOMMENDATIONS BY MAY 15 (NOW APRIL 15)
- CERTIFICATION OF DATA



## PUBLIC LAW 101-510
(Continued)

- COMMISSION MEETINGS OPEN TO PUBLIC
- TESTIMONY BEFORE COMMISSION UNDER OATH
- COMMISSION CAN CHANGE SECDEF RECOMMENDATIONS
- PUBLIC NOTICE OF ADDS FOR CONSIDERATION
- COMMISSION REPORTS TO PRESIDENT BY JULY 1
- PRESIDENT HAS 15 DAYS TO ACCEPT OR REJECT COMMISSION'S REPORT
  - ACCEPTS: REPORT SENT TO CONGRESS WHICH HAS 45 LEGISLATIVE DAYS TO ENACT RESOLUTION OF DISAPPROVAL
  - REJECTS: REPORT TO COMMISSION WHICH HAS 30 DAYS TO RESUBMIT
  - REJECTS AGAIN: PROCESS ENDED FOR THAT YEAR

## ROLE OF THE COMMISSION

*"TO PROVIDE A FAIR PROCESS THAT WILL RESULT IN THE TIMELY CLOSURE AND REALIGNMENT OF MILITARY INSTALLATIONS INSIDE THE UNITED STATES."*
*[Section 2901(b), Public Law 101-510]*



## COMMISSION RESPONSIBILITIES

- *ENSURE FAIRNESS:*
  - *"IN CONSIDERING INSTALLATIONS FOR CLOSURE OR REALIGNMENT, THE SECRETARY SHALL CONSIDER ALL MILITARY INSTALLATIONS INSIDE THE UNITED STATES EQUALLY WITHOUT REGARD TO WHETHER THE INSTALLATION HAS BEEN PREVIOUSLY CONSIDERED OR PROPOSED FOR CLOSURE OR REALIGNMENT BY THE DEPARTMENT."*
    *[Section 2903(c)(3), Public Law 101-510]*
- *ENSURE OPENNESS:*
  - *"EACH MEETING OF THE COMMISSION, OTHER THAN MEETINGS IN WHICH CLASSIFIED INFORMATION IS TO BE DISCUSSED, SHALL BE OPEN TO THE PUBLIC."*
    *[Section 2902(e)(2)(A), Public Law 101-510]*

# THE BRAC PROCESS

President Nominates Commissioners (January 3, 1995)

↓

Senate Confirmation

↓

Secretary of Defense Delivers Recommendations to the Commission (March 1)

↓

Commission Conducts Hearings and Deliberations (March 1 - June 30)

↓

Commission Delivers Recommendations to President (July 1)

↓

President Considers Recommendations (July 1 - July 15)



# COMMISSION PROCESS

Secretary of Defense Delivers Recommendations to the Commission (March 1)

↓

Investigative Hearings (March - April)

↓

General Compliance Review

↓

(GAO Delivers Report on DoD Process - April 15)

↓

Base Visits (April - May)

↓

Regional Hearings (April - May)

↓

Specific Compliance Review

↓

Adds/Substitutions Hearing (Mid-May)

↓

List of Bases Added for Consideration Published in Federal Register (May 17)

↓

Base Visits and Regional Hearings for Added Bases (May - June)

↓

Final Deliberation Hearings (June)

↓

Commission Delivers Recommendations to the President (July 1)

# FORCE STRUCTURE

| | FY 1990 | 1991 Commission FY 1995 | 1993 Commission FY 1997 | Bottom-Up Review | 1995 Commission FY 1999 |
|---|---|---|---|---|---|
| Army Divisions (Active) | 28 (18) | 18 (12) | 18 (12) | 15+ (10) | ?? |
| Aircraft Carriers (Reserve/Training) | 16 (1) | 13 (1) | 13 (1) | 12 (1) | ?? |
| Carrier Air Wings (Active) | 15 (13) | 13 (11) | 13 (11) | 11 (10) | ?? |
| Battle Force Ships | 545 | 451 | 425 | 346 | ?? |
| Marine Corps Divisions (Active) | 4 (3) | 4 (3) | 4 (3) | 4 (3) | ?? |
| Tactical Fighter Wings (Active) | 36 (24) | 26 (15) | 26 (15) | 20 (13) | ?? |



# FINAL SELECTION CRITERIA

- MILITARY VALUE
  1. THE CURRENT AND FUTURE MISSION REQUIREMENTS AND THE IMPACT ON OPERATIONAL READINESS ON 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 AVAILABILITY 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.

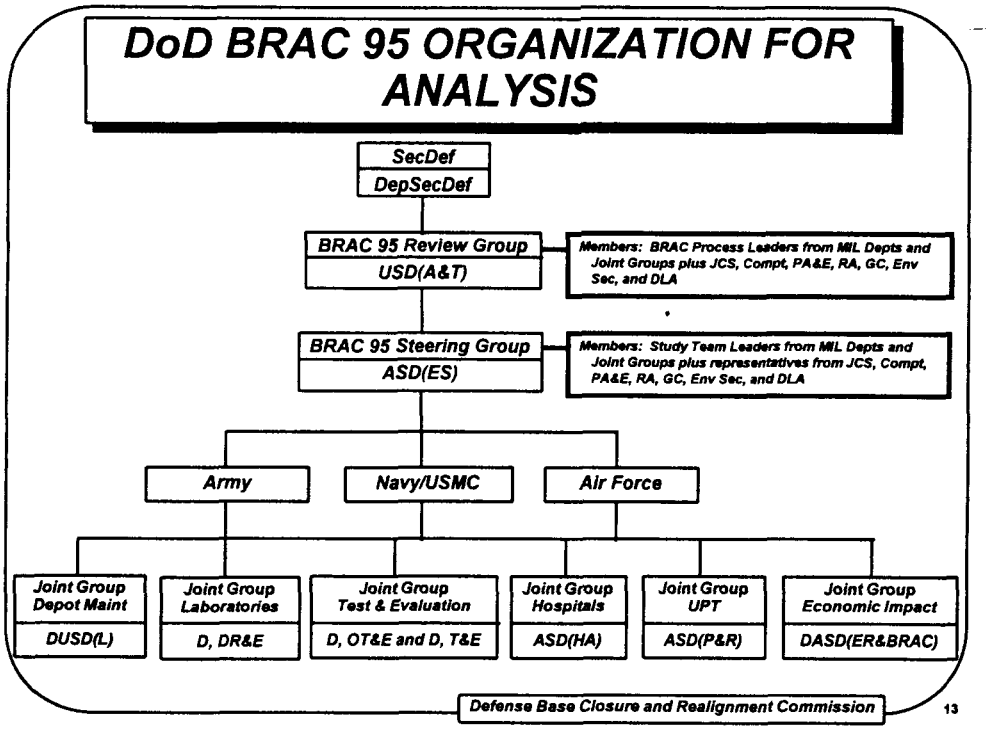
# 1993 BASE CLOSURE AND REALIGNMENT RECOMMENDATIONS

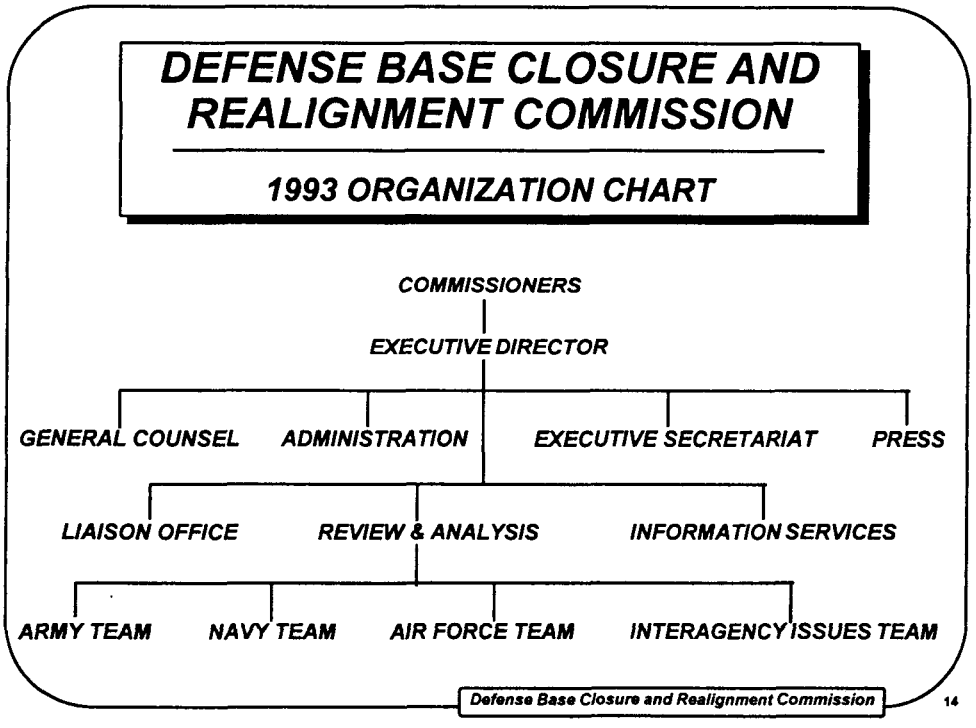
| | DoD SUBMITTAL | ACCEPTS | REJECTS | CHANGES | ADDS |
|---|---|---|---|---|---|
| ARMY | 10 | 6 | 2 | 2 | 3 |
| NAVY | 99 | 85 | 12 | 2 | 9 |
| AIR FORCE | 14 | 10 | 2 | 2 | 3 |
| DEFENSE LOGISTICS AGENCY | 14 | 9 | 4 | 1 | 0 |
| DEFENSE INFORMATION SYSTEMS AGENCY | 44 | 42 | 2 | 0 | 1 |
| TOTAL | 181 | 152 | 22 | 7 | 16 |



# BASE CLOSURE AND REALIGNMENT SUMMARY

| | 1988 | 1991 | 1993 | TOTAL |
|---|---|---|---|---|
| ARMY | | | | |
| CLOSURES | 74 | 5 | 1 | 80 |
| REALIGNMENTS | 12 | 24 | 10 | 46 |
| NAVY | | | | |
| CLOSURES | 7 | 16 | 74 | 97 |
| REALIGNMENTS | 1 | 18 | 22 | 41 |
| AIR FORCE | | | | |
| CLOSURES | 5 | 13 | 5 | 23 |
| REALIGNMENTS | 0 | 6 | 10 | 16 |
| DEFENSE AGENCIES | | | | |
| CLOSURES | 0 | 0 | 50 | 50 |
| REALIGNMENTS | 0 | 0 | 3 | 3 |
| TOTAL | | | | |
| CLOSURES | 86 | 34 | 130 | 250 |
| REALIGNMENTS | 13 | 48 | 45 | 106 |


DoD BRAC 95 ORGANIZATION FOR ANALYSIS
SecDef
DepSecDef
BRAC 95 Review Group
USD(A&T)
Members: BRAC Process Leaders from MIL Depts and Joint Groups plus JCS, Compt, PA&E, RA, GC, Env Sec, and DLA
BRAC 95 Steering Group
ASD(ES)
Members: Study Team Leaders from MIL Depts and Joint Groups plus representatives from JCS, Compt, PA&E, RA, GC, Env Sec, and DLA
Army
Navy/USMC
Air Force
Joint Group Depot Maint
DUSD(L)
Joint Group Laboratories
D, DR&E
Joint Group Test & Evaluation
D, OT&E and D, T&E
Joint Group Hospitals
ASD(HA)
Joint Group UPT
ASD(P&R)
Joint Group Economic Impact
DASD(ER&BRAC)
Defense Base Closure and Realignment Commission
13


DEFENSE BASE CLOSURE AND REALIGNMENT COMMISSION
1993 ORGANIZATION CHART
COMMISSIONERS
EXECUTIVE DIRECTOR
GENERAL COUNSEL
ADMINISTRATION
EXECUTIVE SECRETARIAT
PRESS
LIAISON OFFICE
REVIEW & ANALYSIS
INFORMATION SERVICES
ARMY TEAM
NAVY TEAM
AIR FORCE TEAM
INTERAGENCY ISSUES TEAM
Defense Base Closure and Realignment Commission
14

# RECENT EVENTS

- SUPREME COURT DECISION
- CONGRESSIONAL INITIATIVES TO DELAY 1995 ROUND
  - HANSEN AMENDMENT TO FY 95 DEFENSE AUTHORIZATION ACT
  - DEAR COLLEAGUE LETTER IN THE SENATE
- ARTICLES ABOUT EXTENDING PROCESS TO 1997
- RESIGNATION OF CHAIRMAN COURTER

## INTERACTION FOOT STOMPERS

- KNOW THE PROCESS
- KNOW THE HISTORY
- KNOW YOUR COMPETITORS
- KNOW AND PROFESS BASE MILITARY VALUE
- DO WHAT YOU CAN TO STAY OFF THE DOD LIST
- CONTRIBUTE TO THE PROCESS - NOT THE PROBLEM
  - BE PROACTIVE NOT HYPERACTIVE
  - BE TRUTHFUL - "UNDER OATH"
  - FY 95 CONFERENCE "CHANGE" ON REUSE PLANNING
- IT AIN'T OVER TIL...
- MILITARY VALUE-MILITARY VALUE-MILITARY VALUE



## RECENT EVENTS

- CHANGES FOR 1995 ROUND
  - FY 94 CHANGES
  - FY 95 CONFERENCE REPORT
- SUPREME COURT DECISION
- CONGRESSIONAL INITIATIVES TO DELAY 1995 ROUND
  - HANSEN AMENDMENT TO FY 95 DEFENSE AUTHORIZATION ACT
  - DEAR COLLEAGUE LETTER IN THE SENATE
- ARTICLES ABOUT EXTENDING PROCESS TO 1997
- RESIGNATION OF CHAIRMAN COURTER

# Document Separator

# BIOGRAPHY

## MAJOR GENERAL THOMAS R. OLSEN

## USAF, RETIRED

General Thomas R. Olsen, is the Executive Director of the Sumter Base Defense Committee. He has been active in efforts to retain Shaw Air Force Base in the Sumter community since he retired in November 1991 and has been in his current position since March 1, 1994.

A native a Houston, Texas, General Olsen earned his Bachelor of Science degree in Mechanical Engineering from Texas A&M University in 1956 and a Master of Science degree in International Relations from George Washington University. He received his commission through the Air Force ROTC program, entered active duty in January 1957 and completed pilot training in April 1958. As a Command Pilot with more than 4,400 flying hours, he flew A-10s, F-4s, F-86s, F-100s, F-102s, and F-111s. General Olsen served in assignments throughout the U.S. and around the world, including Germany, Japan, Korea, Vietnam The Netherlands and the Persian Gulf.

Before retiring, he was the Vice Commander, Headquarters Ninth Air Force, and Deputy Commander, U.S. Central Command Air Forces, Shaw Air Force Base. In Operations Desert Shield and Desert Storm he served as the second in command for all U.S. and Allied Air Forces that destroyed Iraqi forces that had occupied Kuwait. His military decorations and awards include the Defense Superior Service Medal, Legion of Merit, Distinguished Flying Cross, Meritorious Service Medal, Air Medal with 15 Oak Leaf Clusters and many others.

General Olsen currently resides at 1006 Golfcrest Road, Sumter, South Carolina with his wife Dorothy Taylor Olsen. They have two children, Major Richard Olsen, USAF, and Lisa Olsen Wesolick.

# PHIL P. LEVENTIS

Phil Leventis has served in the South Carolina Senate since 1980. He represents 81,000 people in Sumter County.

He was born and raised in Columbia. He graduated from the University of Virginia in 1969 in Aerospace Engineering. He served in the Air Force for 5 years and has been a Fighter Pilot in the South Carolina Air National Guard for the last 20 years. He is currently a Lt. Col. in the Air National Guard flying the F-16 fighter. He is President and General Manager of Dixie Beverage Company of Sumter.

He is married to Ellen Locker Leventis and they have three sons, ages 21, 20, 17, and one daughter, age 13. His wife served on active duty in the Army for four years including a tour in Viet Nam as a nurse. When they got married she was a Captain and he was a Second Lt.

In January 1991, Senator Leventis was called to active duty with the Air National Guard to serve in operation Desert Storm. He was an F-16 pilot in Saudi Arabia. He flew 21 combat mission over Kuwait and Iraq.

Senator Leventis is currently serving a fourth term in the State Senate. He is chairman of the Agriculture & Natural Resources committee and serves on numerous other committees. His primary area of involvement in legislative matters have been environmental initiatives, ethics and disclosure laws and budgetary funding and format issues. He is a democrat and currently ranks 9th in seniority of the 46 members.

# BIOGRAPHY

Louis Fleming was born on April 29, 1926, to Elouise McDaniel Fleming and Theodore Fleming , the seventh of eight children. He was educated at the primary, the elementary, and the high school level at Lincoln High School where he graduated in June 1944.

Drafted into the arm services on August 1, 1944, he served as a combat veteran of three wars (which included two tours in Korea and two tours in the Republic of View Nam). After twenty seven years of distinguished service, he was honorably dischared from active duty as a CW3 Chief Warrant Officer – United States Army.

He is married to Emma Richardson Fleming and they have enjoyed over forty years marriage. They have been blessed with six children and ten grand-children.

Fleming is a member of St. Jude Parish for more than fifty years where he is currently serving as a Eucharistic Minister, A Lector, and the Grand Knight of Council #316.

Subsequent to his retirement, Fleming has earned an Associate Degree in Business Marketing from Central Carolina Technical College and a Bachelor of Science Degree in Business Administration from Morris College.

Louis Fleming is currently serving his community as a member of Sumter County Council where has served for the past six years two and one half of which has been in the position of Vice Chairman.

C. C. "Cliff" Goodwin, III joined Goodwin Buick-Jeep-Eagle-Hyundai, in 1970, with his father C. C. Goodwin, Jr. He became a partner in Goodwin Volkswagen-Honda-Mitsubishi, also a family owned business, in 1985.

Prior to becoming a dealer, Cliff attended the public schools in Sumter, and graduated from Presbyterian College in 1970 with a B. S. degree in Business. He then served in the South Carolina Air National Guard.

Since then he has been active in various civic and service organizations including the Sumter Jaycees, United Way, Shaw/Sumter Community Council, Sumter Airport Commission, and S. C. Committee for Employer Support of the Guard and Reserve. Cliff is active in the Greater Sumter Chamber of Commerce and has served as Vice President and as Chairman of the Military Affairs Committee. He is the immediate Past President of the South Carolina Automobile Dealers Association.

He served as Co-Chairman of the Shaw 50th Anniversary Committee. Cliff is a Paul Harris Fellow in the Sumter Rotary Club and past president of the Sumter County Automobile Dealers Association and the Sumter Merchants Association. He and his family are members of the First Presbyterian Church.

He has two children, Beth 17, and Jennifer, 12.

# Document Separator

# COLONEL STEVEN K. RUST

480 Wright Drive Rome, NY 13440
Home: (315) 338-0558 Office: (315) 330-2005

**OBJECTIVE:** Executive Chamber of Commerce position which will enable me to positively impact the city's economic future through my innovative leadership skills.

## HIGHLIGHTS OF QUALIFICATIONS

- 26 years of dynamic leadership experience in management, supervision & research
- Confident leader able to motivate organizations or volunteer groups to excellence
- Diplomatic and effective business negotiator with international experience
- Exceptional talent in conflict resolution and innovative problem-solving
- Facilitator/enabler adept at molding diverse groups into one cohesive team
- Calm and decisive under pressure, adverse conditions, and in the public spotlight
- Energetic, committed community leader, inspiring confidence, trust & cooperation

## PROFESSIONAL EXPERIENCE

### Management/Administrative

- Managed three diverse military communities of 8500-13,000 people, one in Europe.
  - Annual budget & construction $100 million - total resources $300 million.
  - Managed 25% budget cuts without degradation of services.
- Procured $15 million in goods and services from Arab, German & British companies.
  - In the United Arab Emirates, personally negotiated the lease of an international airport, defused a sensitive licensing conflict with top local officials, and much more.

### Public Relations/Community Leadership

- Directed the military disaster relief effort for the city and county during Hurricane Hugo.
  - Received South Carolina Governor's Award of Appreciation.
- As ex-officio member, led school board to resolution of a very difficult personnel crisis.
- Facilitated the "first of it's kind in the nation" Memorandum of Understanding between a base and a city, formalizing the exchange of information vital to economic well-being.
- Instrumental in gaining approval of county-wide zoning by presenting crucial data at heated public hearings, and in behind-the-scenes work with County Council members.
- Worked on the Governor's Base Retention Commission and helped to arrange efforts toward the Myrtle Beach AFB/Poinsett Weapons Range land exchange.
- Helped prepare and present a package for local community participation in the finals of the All-American City competition.
- First active-duty military recipient of the Greater Sumter Chamber of Commerce Outstanding Achievement Award for distinguished service to the community.

## EDUCATION

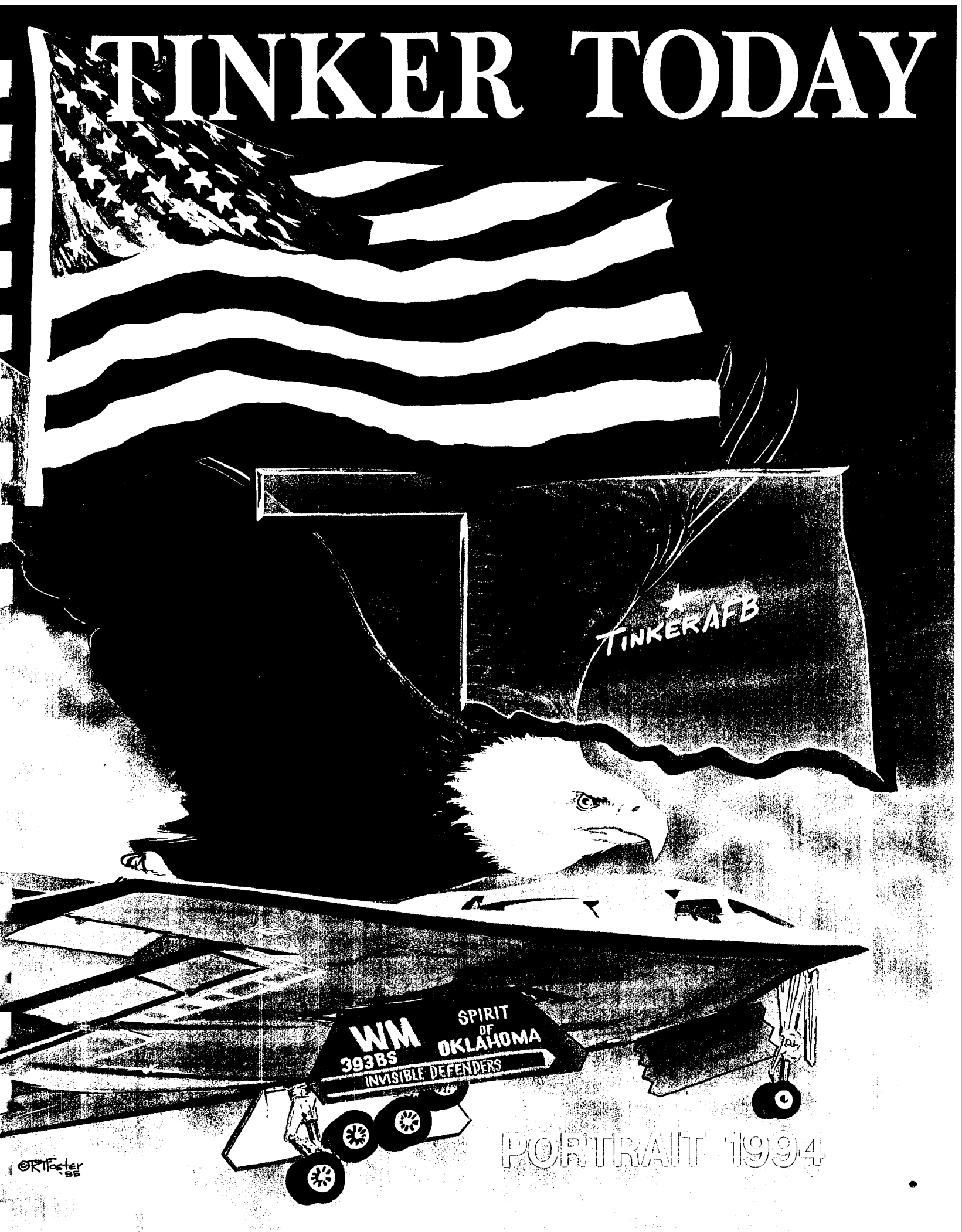
Bachelor of Sciences Degree - South Dakota State University - 1965
All professional military education programs, quality courses & specialized training

## REFERENCES

Available upon request.

# Document Separator

# TINKER TODAY




PORTRAIT 1994

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Covers provided by R.T. Foster, OC-ALC/TIPRS.

Special thanks to the many dedicated employees of Tinker Air Force Base who provided technical data.

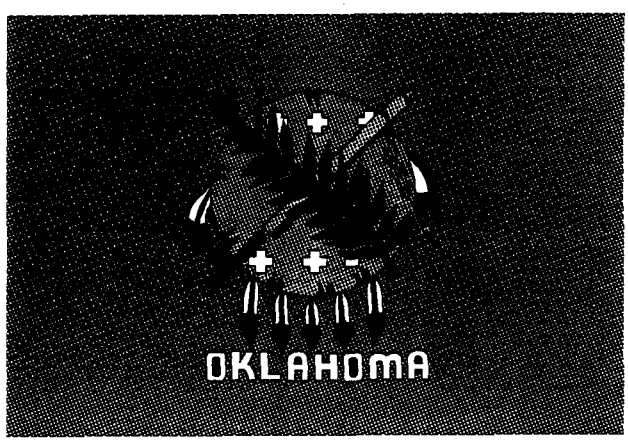


Comments or questions concerning this brochure should be directed to the Comptroller Directorate, Plans & Programs Branch (OC-ALC/FMPP), 3001 Staff Drive, Ste 1AG75A, Tinker AFB, OK 73145-3056.
Telephone: Commercial (405) 739-2181, DSN 339-2181.

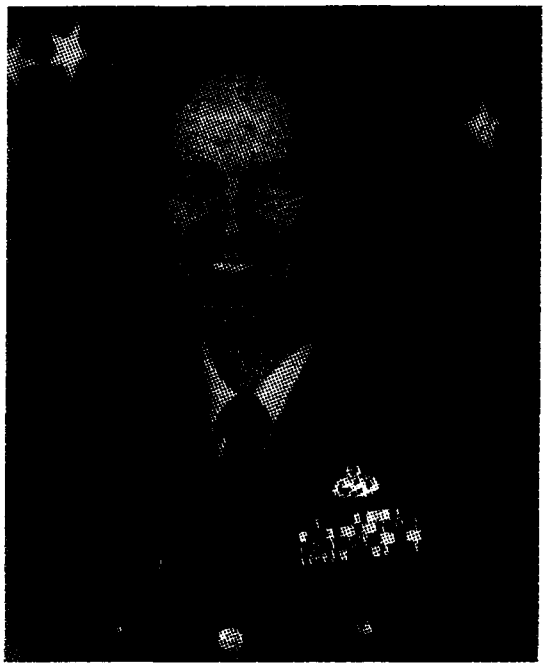

Tinker Today contains unclassified information describing the Oklahoma City Air Logistics Center (OC-ALC) and Tinker Air Force Base, as well as examples of the outstanding mission accomplishments achieved in FY94. Information is also provided regarding Tinker's economic impact region (EIR). The EIR comprises most of the area within a 50-mile radius of the base. Calculations based on the formula used by the Construction Engineering Research Laboratory include the following 11 Oklahoma counties in Tinker's EIR:

Canadian, Cleveland, Garvin, Grady,
Kingfisher, Lincoln, Logan, McClain
Oklahoma, Pottawatomie and Seminole

All statistics contained in this brochure are as of 30 September 1994.



# A Message From the Commander



***Major General Kenneth E. Eickmann***
***Oklahoma City Air Logistics Center***
***Installation Commander***

Tinker's work force exhibits a 50-year reputation for providing top quality support to its customers. With dedication and determination, Tinker's civilian and military men and women make huge contributions to the vital operational readiness of the nation's defense.

During that same period of time, Tinker and the state of Oklahoma have shared a long and successful partnership. The relationship with our neighbors in Oklahoma is world class. I heard about this great bond even before I took command in June 1994, and I've experienced it first hand.

With the same cooperative spirit we share with our Oklahoma neighbors, the Air Force shares its base with the Navy and other Department of Defense agencies. We call this interservicing, and it's making a tremendous impact on our nation and our state.

Tinker AFB leads the way in interservicing for the Department of Defense — and it's evident from the time a Navy security guard greets you as you enter the base or when you see Air Force personnel from the Oklahoma City Air Logistics Center performing depot maintenance on Navy aircraft. Integrating the Navy into the Tinker Team has produced spectacular, cost-saving and pace-setting results.

Two Air Force wings, two Navy squadrons, and the Navy's only strategic communications air wing are located across the runway from a depot maintenance facility. The Air Force's 552nd Air Control Wing and 507th Air Refueling Wing are equipped with aircraft managed and maintained at Tinker. Like the two Air Force wings, the Navy's Fleet Air Reconnaissance Squadrons THREE and FOUR receive depot support from the Oklahoma City Air Logistics Center.

Not only are we multi-service, we are also home to several DoD agencies as well. The Defense Information Systems Agency opened the Defense Megacenter Oklahoma City in 1994. The Defense Logistics Agency is responsible for the receipt, storage, issue, inspection and shipment of material and receives and ships thousands of items daily. The Defense Finance and Accounting Service is responsible for maintaining and processing accounting records, reports and disbursements made by all Air Force activities at Tinker.

Tinker has won many Department of Defense, Air Force, and command level awards as well as environmental awards from academia and the private sector. Most importantly, Tinker was recently selected as the base with DoD's best pollution prevention program.

The professional men and women at Tinker are meeting the challenges of a changing world and smaller Air Force, and with our neighbors at our side, we are prepared to handle the changes we face in 1995 and beyond.

# Economic Impact

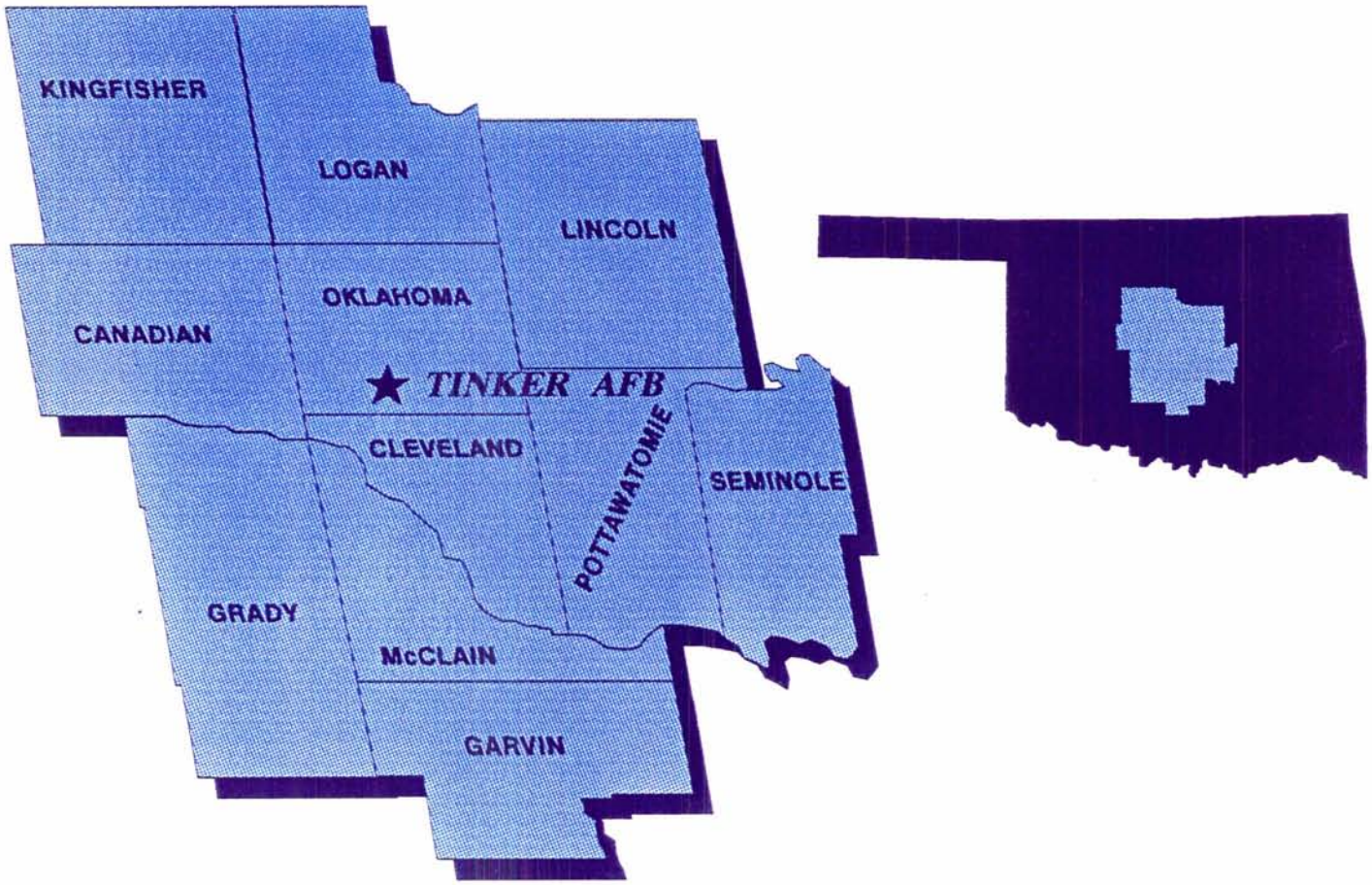
TOTAL ECONOMIC IMPACT IS $2.2 BILLION

TOTAL SECONDARY JOBS CREATED - 19,198

*ECONOMIC IMPACT REGION
(EIR) AREA IMPACT - $2.0 BILLION

SECONDARY JOBS CREATED WITHIN THE EIR - 17,116

## Tinker's Economic Impact Region




*EIR - Economic Impact Region (the area within 50 miles of the base)

# Tinker Today

Tinker AFB is a multi-mission/multi-faceted base which combines the best characteristics of an air base all in one central geographic location within the United States. The base serves Air Force, Navy, and Department of Defense organizations. Tinker is home to the Oklahoma City Air Logistics Center and a number of associate organizations, including the Navy E-6 Strategic Communications Wing ONE, the 552 Air Control Wing, the 507th Air Refueling Wing, the 38th Engineering Installation Wing, the 3d Combat Communications Group, the Defense Information Systems Agency, the Defense Accounting Office, the Materiel Systems Group, the Defense Printing Service Detachment Office, and the Defense Logistics Agency.

The population of Tinker AFB is approximately 30,000, making it comparable to a city. The base has its own police, fire department, hospital, churches, day care center and school, airport, recreational parks, restaurants, shops, bowling alley, golf course, movie theater, hotel, civil engineering, housing development, industrial areas, waste disposal plant, and library.

Tinker is a big business with a "mega-facility" industrial complex which commands state of the art capability. The versatile, flexible facilities can be reconfigured for any combination of aircraft, engines, and commodities. The base encompasses approximately 5,000 acres and conducts daily operations in 760 buildings. The buildings, facilities, and land acquired at a cost of $582 million, have an estimated replacement value of $3.2 billion. The indoor maintenance area covers 133 acres while the covered warehouse space comprises 89 acres.

The major organizations, modern, efficient facilities, advanced technological capabilities, and dedicated work force of Tinker Air Force Base provide a strong foundation designed to meet the ever-changing challenges of the future.

### *Tinker AFB Facility Data*

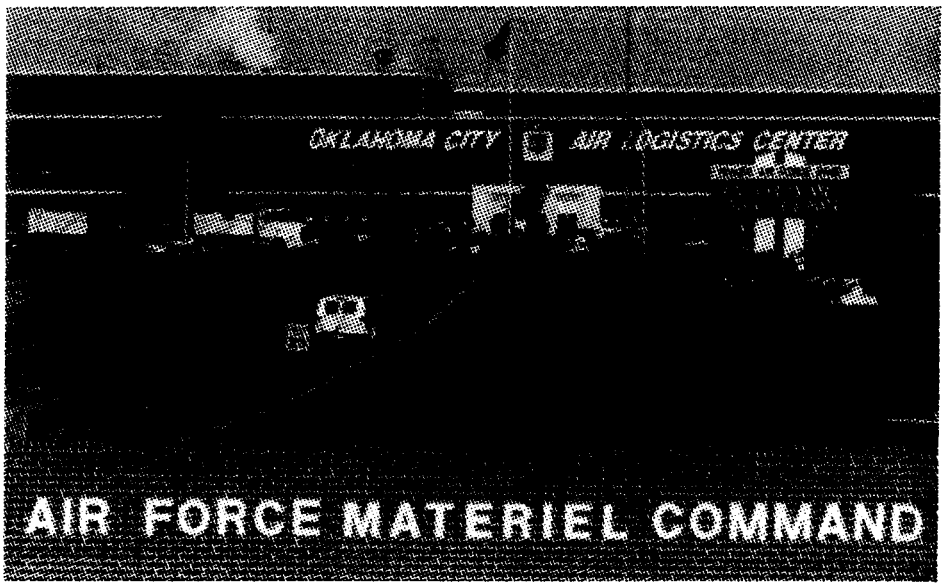
| | | |
|---|---|---|
| **Total Land Area** | **4,996** | **Acres** |
| **Runways** | **2** | |
| **Number of Buildings** | **760** | |
| **Building Floor Space** | **15.2** | **M Sq Ft** |
| **Military Family Units** | **730** | |
| **Dormitory Quarters** | **11** | |
| **Dormitory Capacity** | **717** | |
| ***Annual Utilities*** | | |
| **Electricity (Purchased)** | **333,523** | **MW/Year** |
| **Natural Gas (Purchased)** | **2,273,774** | **MBTU/Year** |
| **Water (Purchased)** | **67,836** | **K Gal/Day** |
| **Water (USAF owned deep wells)** | **2.8** | **M Gal/Day** |

### *Selected Tinker AFB Statistics*

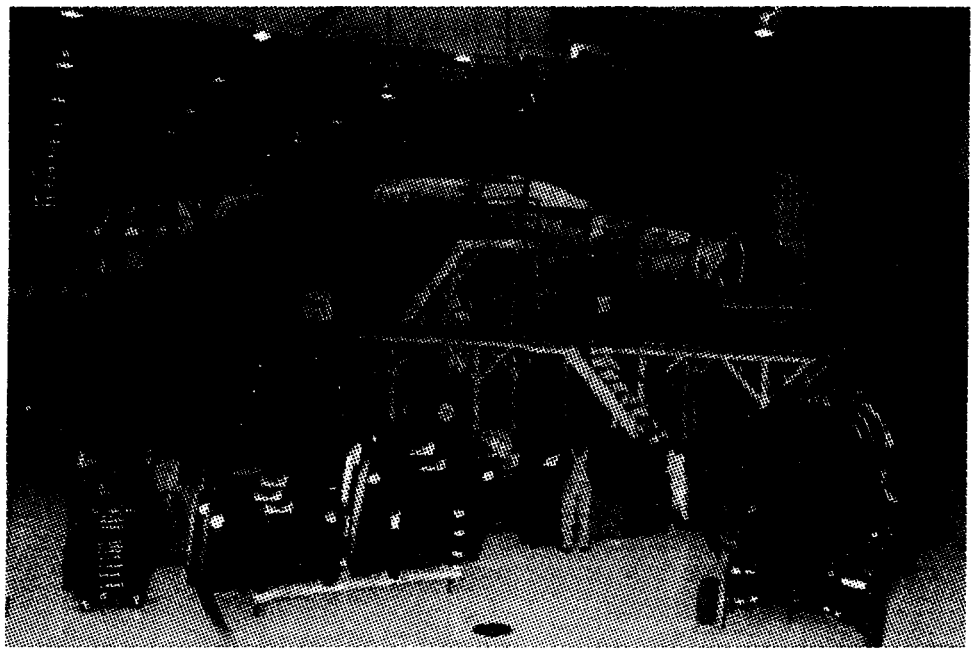
| | |
|---|---|
| **Flying Operations** | **76,238** |
| **Total Vehicles** | **2,073** |
| **CNG Vehicles** | **300** |
| **Computers Owned by OC-ALC** | **7,503** |
| **Computers Owned by DISA** | **232** |

# Oklahoma City Air Logistics Center

The Oklahoma City Air Logistics Center (OC-ALC), one of five depot repair centers in the Air Force Materiel Command, is Tinker's largest organization. OC-ALC is the only depot in the Air Force with two operational runways. The primary and crosswind runways are capable of handling any aircraft in the Department of Defense inventory. The extensive ramp space of 234 acres includes 19 acres of Navy ramp space. Encroachment is not an issue as the base is in compliance with area installation compatible use zone (AICUZ) ordinances.




*Oklahoma City Air Logistics Center, Building 3001*

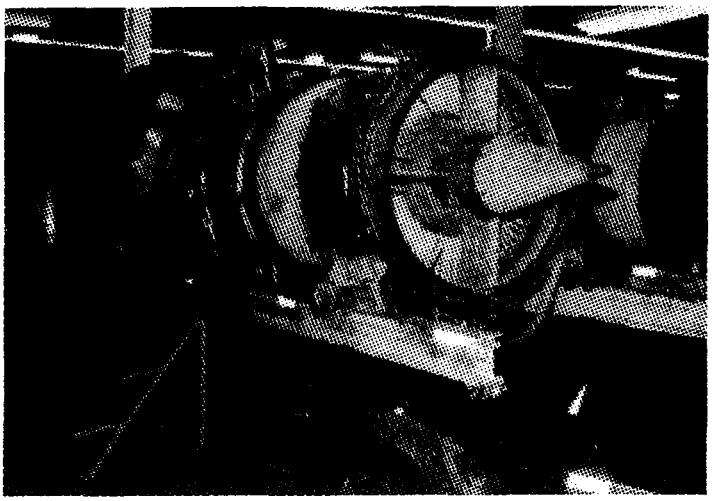


*B-1 Maintenance Facility*

OC-ALC is the worldwide management activity for a wide range of aircraft, engines, missiles, and commodity items. The Center provides worldwide logistics support for the following weapon systems and support aircraft: B-1, B-2, B-52, E-3, multi-purpose C-135 series, VC-25, KDC-10, KC-10, C-9, E-4, C-20, T-43, C-137, C-22, C-18, T-1, C-27, C-26, UV-18, C-12, C-23, C-21, E-9, T-41, TG-3, TG-4, TG-7, TG-9, C-150, T-3, and the Joint Primary Aircraft Training System (JPATS) and Non-Developmental Airlift Aircraft (NDAA) programs. OC-ALC also provides logistics support to the following air-to-ground (AGM) missiles: AGM-86B, AGM-86C, AGM-69A, AGM-84C, and the AGM-129A.

# . . . A Center of Excellence

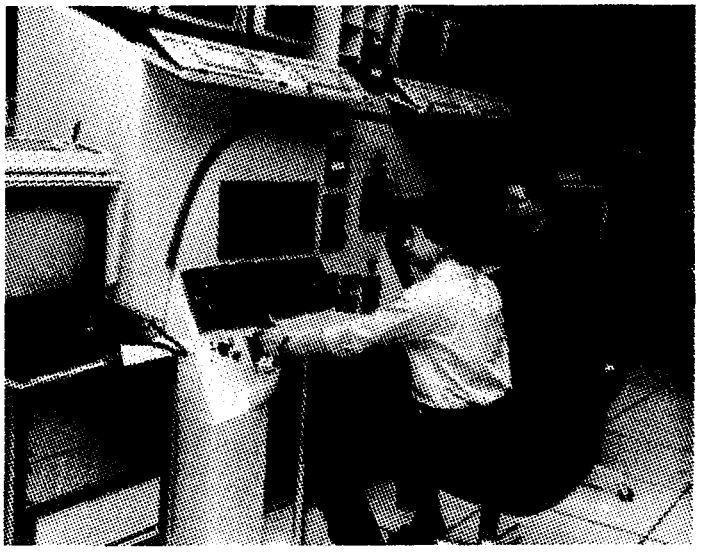
Fifteen different types of jet engines with a total inventory of 17,400 engines are also managed and repaired by the Center. These include the Air Force TF30, TF33, J57, J79, F101, F108, F110, and F118 engines, as well as the Navy TF30 and F110 engines. Two level maintenance support and base stock level support for various engines are phased in from 65 separate Air Force bases around the world making OC-ALC the largest Air Force jet engine intermediate repair maintenance center.



*Jet Engine Repair*

*Repairing Air Turbine Drives in Commodities*

Commodity management includes responsibility for over 50,000 different commodity items. OC-ALC repairs, overhauls, and manufactures this wide variety of aircraft and engine components in support of global defense requirements. Each year over 250,000 components are repaired for return to the field and numerous spares are produced. OC-ALC is the sole Air Force depot repair source for the constant speed drive, oxygen equipment, bearings, environmental controls, engine instruments, autopilots, and air driven accessories.



*B-1 Weapon Avionics*

# Associates

Tinker AFB is a multi-mission installation which serves Air Force, Navy, and Department of Defense organizations. Associate organizations play a major role at Tinker and constitute the bulk of its military population. The critical base functions of civil engineering, security police, hospital, motor pool, airfield operations, etc., are provided by a number of base support organizations under the 72d Air Base Wing.

*E-3 Sentry*

*3 CCG Field Exercise*

Air Combat Command (ACC) organizations located at Tinker AFB include the largest associate organization, the 552nd Air Control Wing (552 ACW), and the 3d Combat Communications Group (3 CCG). The 552 ACW operates the E-3 Sentry aircraft to provide command and electronic communications world wide. The 3 CCG organizes, trains, and equips personnel in 33 Air Force specialties to deploy, operate, and sustain communications and air traffic systems in support of military operations under hostile and bare-base conditions.

Tinker AFB is the homeport for the Navy's Strategic Communications Wing ONE (STRATCOMMWING ONE). Two Navy squadrons of E-6A Mercury aircraft maintain a crucial land-air-sea communications link with the ballistic missile submarines at sea. The Navy wing was activated in May 1992, bringing a large Navy presence to Tinker. The Navy has a total of 16 E-6A aircraft which are compatible in design to the E-3 Sentry aircraft. Fifteen of the aircraft are based at Tinker and one test aircraft is based at Patuxent River, Maryland.

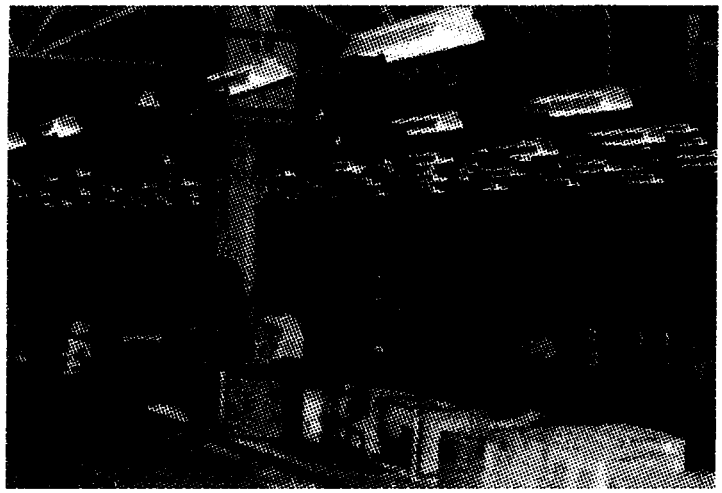
*Navy E-6A Mercury*

# . . . Partners in Excellence

The 507th Air Refueling Wing is Oklahoma's only flying reserve unit. The wing converted from F-16 fighters to KC-135 refueling aircraft (tankers) in the spring of 1994. The 507th supports the Air Mobility Command mission requirements by providing mid-air refueling support to all DoD aircraft and the NATO allies.

*507th Air Refueling Wing KC-135 Tanker*

The Defense Logistics Agency (DLA) assumed responsibility for the depot storage and transportation functions in August 1992. DLA accomplishes the distribution functions of receipt, storage, and issue.

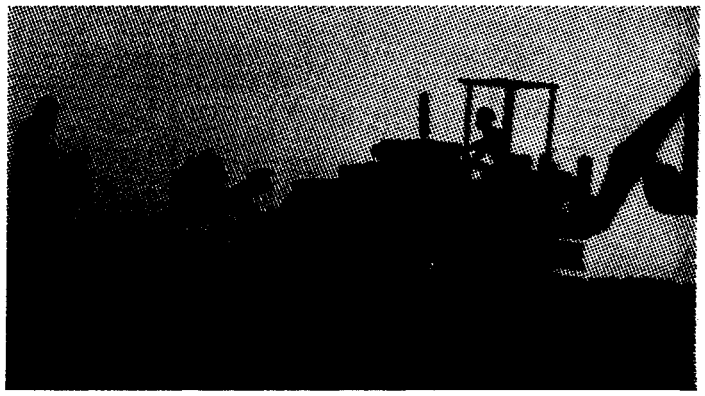


*Defense Logistics Agency Item Receipts*

Other major associates include the Defense Accounting Office, which processess all of Tinker's Air Force accounting records and reports, and the Defense Printing Service Detachment Office (Navy operated) which handles the majority of the printing needs of the base.

Communications and computer functions are provided for the base by the Defense Information Systems Agency (DISA), the Materiel Systems Group (MSG), and the 72d Communications Squadron (72 CS).

The 38th Engineering Installation Wing (38 EIW), headquartered at Tinker, has a worldwide mission and is the only wing in the Air Force that engineers, installs, removes, and relocates command, control, communications, and computer systems.



*38th Engineering Installation Wing Installing Communication Equipment*

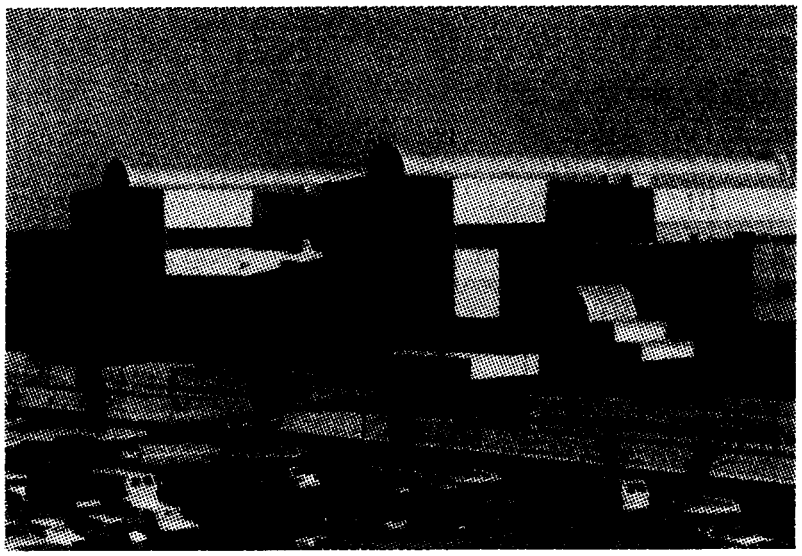
# Interservicing . . .

## *Tinker Air Force Base serves as a model for the Department of Defense for interservicing*

Air Force and Navy joint efforts at Tinker AFB serve as a prototype for future interservice and joint service ventures for all the military services within the Department of Defense. Locating the Navy Strategic Communications Wing ONE (STRATCOMMWING ONE) at Tinker AFB represents the future of consolidation, integration, and streamlining in the armed forces.

*E-6A Mercury*

STRATCOMMWING ONE maintains administrative and operational control over the Atlantic and Pacific Navy TACAMO (Take Charge And Move Out) squadrons. The mission of the Navy E-6A Mercury aircraft is to provide a reliable, survivable and endurable communications link between the National Command Authority and strategic forces.



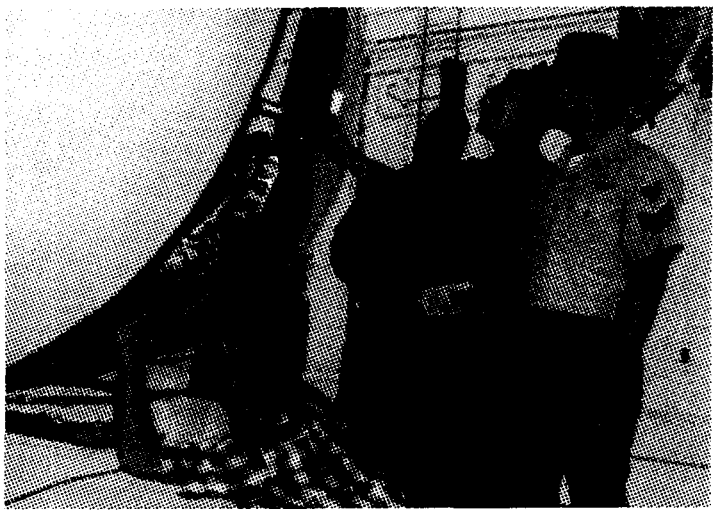
*Navy STRATCOMMWING ONE Facilities*

The decision to assign the Navy wing at Tinker was accomplished in concert with a review of benefits derived from collocation with the depot maintenance activity at OC-ALC and the 552nd Air Control Wing (552 ACW). OC-ALC is the source of repair for the 552 ACW E-3 Sentry aircraft and the F108-GE-100 engine (KC-135) which have a high percentage of commonality to the E-6A airframe, its CFM56 engine, and numerous subsystems.

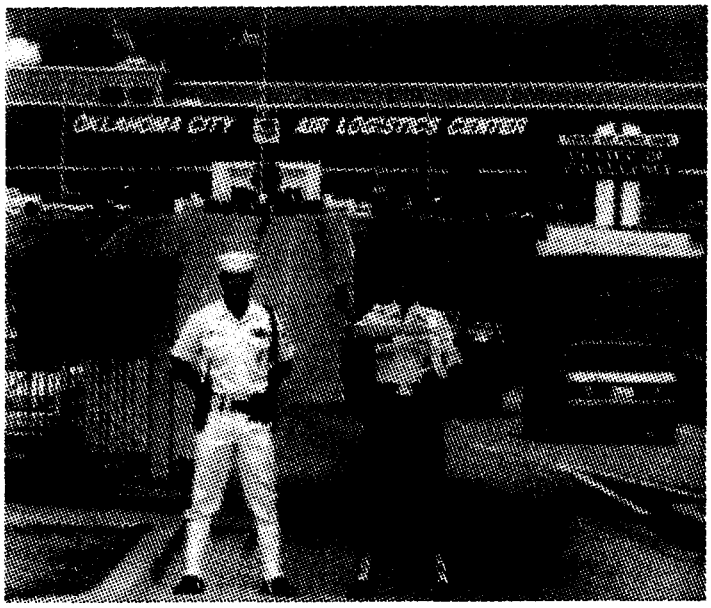
This collocation with similar airframe allows utilization of depot support already in place and allows the development of joint training programs for Navy and Air Force flight crews. The Navy also has access to our depot technical and engineering expertise. The 552 ACW and the Navy both benefit from the shared alert facility which has a state of the art security system.

# . . . at Its Best

This interservicing has resulted in both Air Force and Navy personnel integrated in the security police, hospital, chaplain, and maintenance organizations. The physical security program at Tinker is the first of its kind in the Department of Defense and serves as a model for other installations.



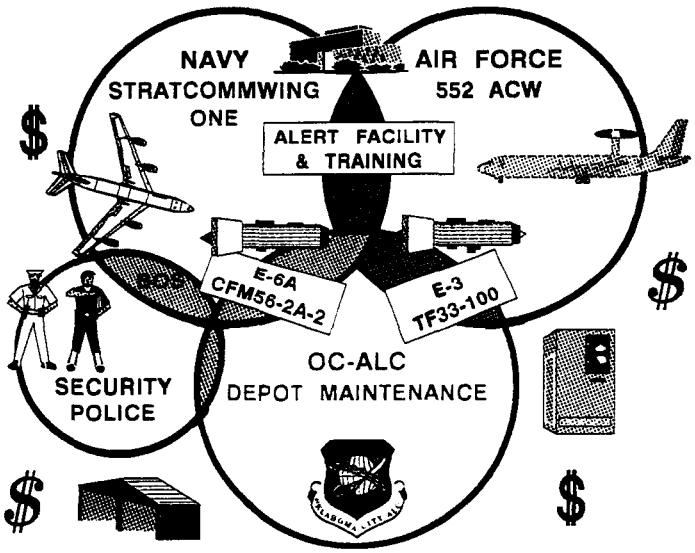
*Navy and Air Force Personnel Discuss Engine Maintenance*



*Air Force and Navy Security Police Manning Entrance to Tinker AFB*

This premier interservicing venture between the Navy and Air Force at Tinker AFB has resulted in numerous reduced costs through elimination of duplication of resources.

OC-ALC depot workload also includes the TF30-414A and the F110-400 engines that power the Navy F-14A and F-14D Tomcat aircraft. The CFM56-2A-2 engines that power the E-6A aircraft are scheduled to begin depot repairs at OC-ALC in FY95.

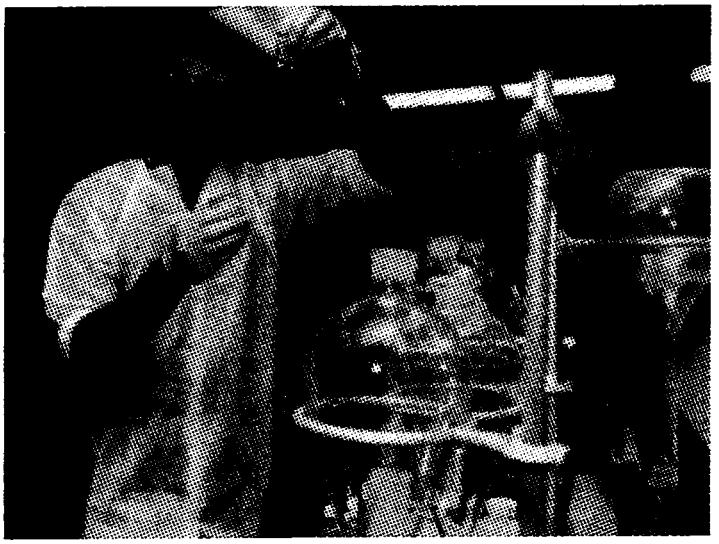



*Model Depicting Integration of OC-ALC Depot, 552 ACW, and Navy at Tinker AFB*

# Environmental Excellence

Tinker AFB spent more than $35 million on environmental programs in FY94. These dollars were spent on restoring the earth, once harmed by past industrial practices, and focusing on the future by testing and implementing innovative pollution prevention technologies. The majority of these dollars went to local contractors. Therefore, the economic impact of environmental programs at Tinker AFB on the local economy has been as sweeping and pervasive as the environmental progress the installation has made in the last decade.

The Environmental Management Directorate at Tinker AFB has promoted the growth of the private sector through technology transfer initiatives and the creation of technical coalitions with private industries, academic institutions, and other federal agencies. Tinker is the backbone of more than 10 of these coalitions. Tinker professionals work to spread valuable environmental knowledge and experience, creatively actuate precious tax dollars, and implement some of the most advanced state of the art environmental technologies available in the world today.



*Chemical Science Lab*

*Compressed Natural Gas Alternative Fuel Vehicles, "Earth Day '94"*

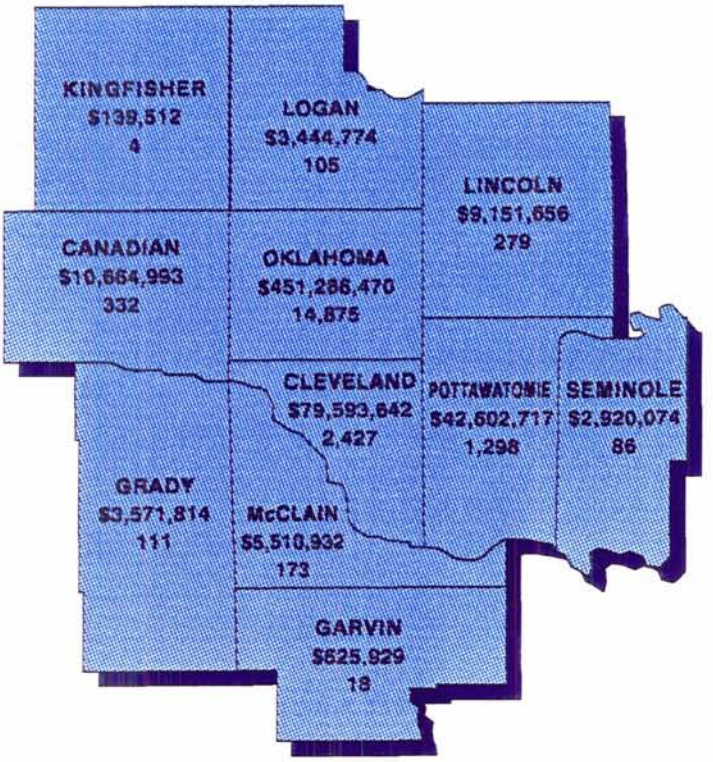
Tinker AFB received 38 awards for outstanding environmental efforts from 1990 to 1994. The base became the first Air Force installation to receive the Secretary of Defense Pollution Prevention Award for overall excellence in pollution prevention in April 1994. This award-winning environmental program confirms Tinker's pledge to be a "good neighbor" to its workers, base residents, and the surrounding communities. Tinker also recently won the Renew America National Award for Environmental Sustainability for Tinker's lead-based paint testing program. Other awards include the National Institute for Urban Wildlife Outstanding Conservation Award in December 1993 for base wide reforestation and the Energy Odyssey Award from Oklahoma Natural Gas in February 1993 for conversion of vehicles to Compressed Natural Gas to reduce emissions.

Tinker AFB has created a natural greenway with ponds, native grass prairies, wildlife and bird sanctuaries, and jogging and nature trails. This area improves the quality of life where Tinker people work and play, while preserving the ecology systems for the community.

# Personnel Summary

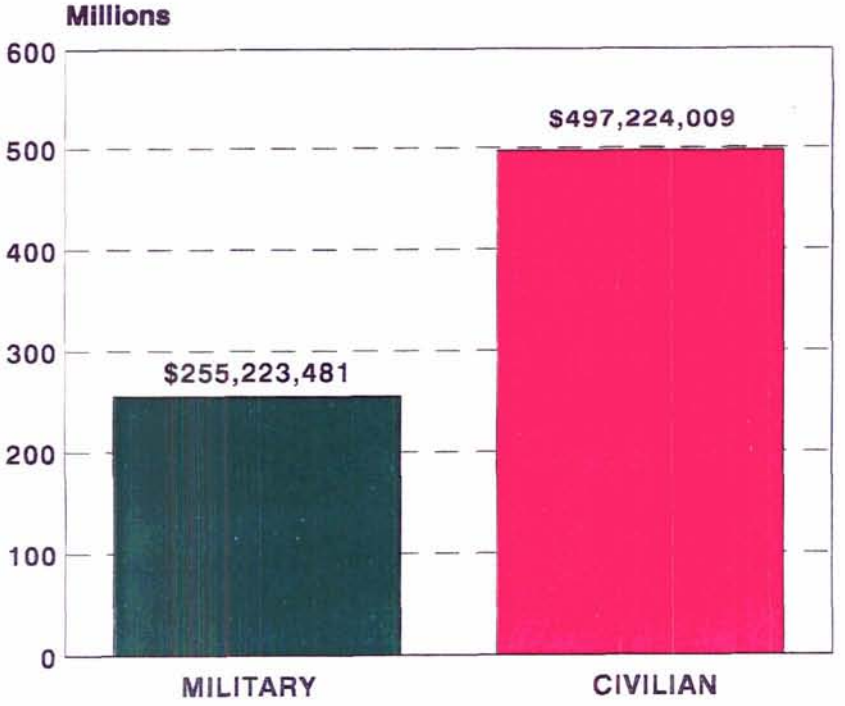
| CLASSIFICATION | LIVING ON BASE | | LIVING OFF BASE | | TOTAL | |
|---|---|---|---|---|---|---|
| **Appropriated Fund** | **Number** | **Dollars** | **Number** | **Dollars** | **Number** | **Dollars** |
| Military | | | | | | |
| AF Active-Duty Perm | 986 | 20,778,062 | 6,426 | 195,263,025 | 7,412 | 216,041,087 |
| Navy Active-Duty Perm | 0 | 0 | 1,158 | 27,959,394 | 1,158 | 27,959,394 |
| Guardsmen/Reserve | 0 | 0 | 1,564 | 11,223,000 | 1,564 | 11,223,000 |
| Total | 986 | 20,778,062 | 9,148 | 234,445,419 | 10,134 | 255,223,481 |
| Civilian | | | | | 13,735 | 497,224,009 |
| **Total Appropriated Fund** | | | | | **23,869** | **752,447,490** |
| **Nonappropriated Fund** | | | | | | |
| Civilian NAF | | | | | 482 | 4,889,661 |
| Army & Air Force Exchange Service (AAFES) | | | | | 341 | 4,785,040 |
| Commissary | | | | | 112 | 2,616,000 |
| Contract Civilians | | | | | 1,287 | 0 |
| Private Businesses: | | | | | | |
| SATO | | | | | 11 | 226,000 |
| Credit Union | | | | | 66 | 1,643,996 |
| First National Bank | | | | | 11 | 141,998 |
| **Total Nonappropriated Fund** | | | | | **2,310** | **14,302,695** |
| **Military Retirees** | | | | | | |
| Air Force | | | | | 12,053 | 188,160,000 |
| Army | | | | | 11,516 | 171,252,000 |
| Navy | | | | | 3,735 | 50,019,000 |
| Marines | | | | | 837 | 13,056,000 |
| Coast Guard | | | | | 191 | 3,564,000 |
| **Total Military Retirees** | | | | | **28,332** | **426,051,000** |

## *Personnel & Payroll Dollars Within Central Oklahoma*




Note: County totals do not include Air Force Reserve, Navy, Defense Finance and Accounting System or COD personnel/salaries.

## *Military & Civilian Payroll Within Central Oklahoma*

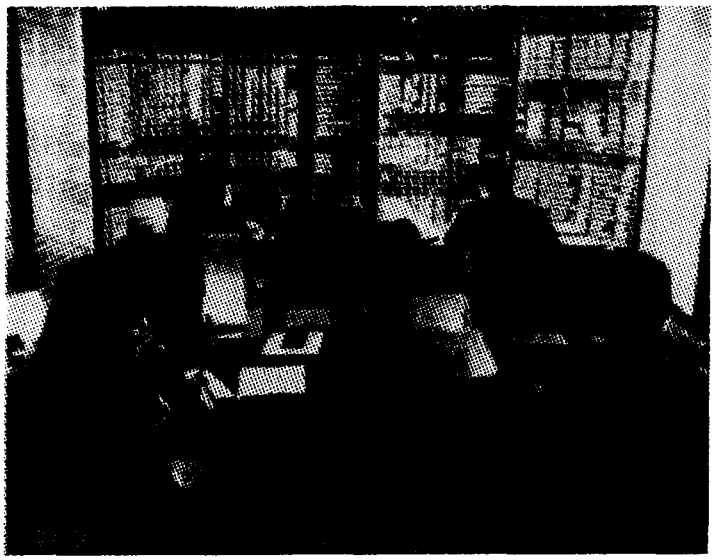


## Payroll Within Oklahoma County

| AREA | EMPLOYEES | DOLLARS EARNED | AVERAGE SALARY |
|---|---|---|---|
| Arcadia | 7 | $ 286,320 | $40,903 |
| Bethany | 102 | 3,311,991 | 32,471 |
| Choctaw | 1,005 | 33,097,319 | 32,933 |
| Del City | 2,594 | 78,590,196 | 30,297 |
| Edmond | 480 | 19,874,085 | 41,404 |
| Harrah | 372 | 12,072,910 | 32,454 |
| Jones | 105 | 3,460,415 | 32,956 |
| Luther | 30 | 983,210 | 32,774 |
| Midwest City | 4,153 | 123,739,060 | 29,795 |
| *Moore | 1,398 | 44,778,197 | 32,030 |
| Newalla | 376 | 12,601,062 | 33,514 |
| Nicoma Park | 37 | 1,056,525 | 28,555 |
| Oklahoma City | 5,299 | 152,040,389 | 28,692 |
| Spencer | 157 | 4,735,657 | 30,163 |
| Wheatland | 1 | 38,539 | 38,539 |
| Total | 16,116 | $490,665,875 | $30,445 |

NOTES:
1) Appropriated Fund salaries only. Nonappropriated Fund employees/salaries listed on page 12.
2) County totals do not include Air Force Reserve, Navy , Defense Finance & Accounting System, DISA or COD personnel/salaries. Personnel totals will differ from pages 12&13.

* Moore is in Cleveland County, but shown because of its proximity and high number of employees.

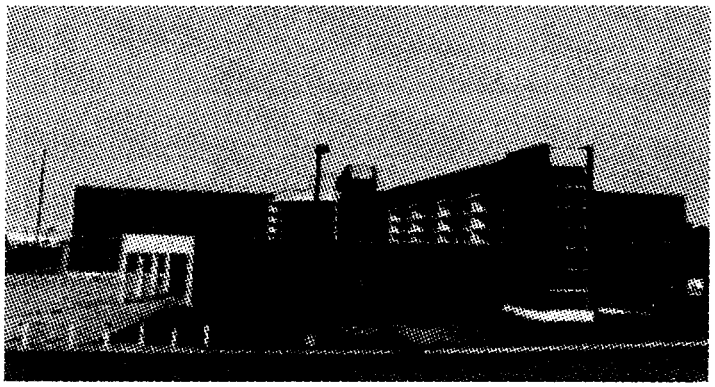


*Aircraft Control Center*

*Computer Software Training*

# Military Construction

Tinker's Congressionally Authorized/Appropriated Military Construction (MILCON) Program for FY95 totaled over $30 million. Major projects awarded for construction in FY94 include the Alteration of the Plating Shop in Bldg. 3001 and a project to upgrade the underground fuel storage tanks. Tinker's Military Construction Program for the past six years averaged over $32 million per year. A significant part of this money has gone into the local economy in the form of payments for labor and material.



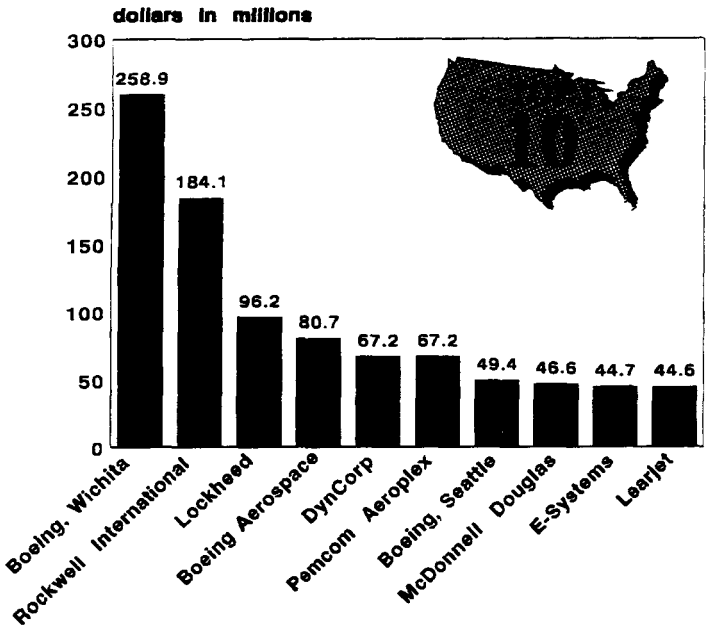
*Logistical Systems Operation Center (Completed Dec 94)*

*Childcare Center (Completed FY94)*

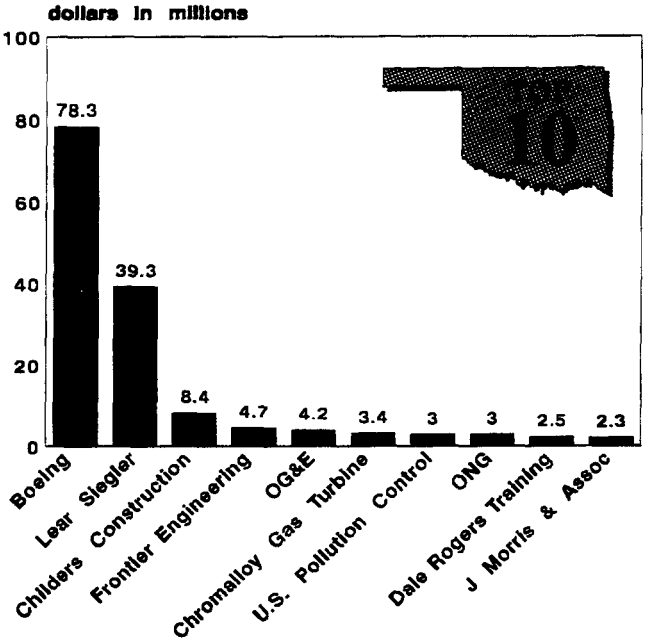
## Projects Under Construction

| FY APPROVED | PROJECT | ANTICIPATED COMPLETION | COST IN MILLIONS |
|---|---|---|---|
| 91 | Logistical Systems Operations Center | Dec 94 | $13.200 |
| 91 | Fuel Control Test Facility | Feb 95 | 13.600 |
| 92 | Add To/Alter Composite Medical Fac | Jun 95 | 4.600 |
| 93 | Upgrade Industrial Waste Treatment Fac | May 95 | 3.950 |
| 93 | Add To/Alter Depot Plating Shop | Nov 97 | 10.200 |
| 93 | Fire Training Facility | Aug 95 | 1.600 |
| 93 | Add To/Alter Dormitories - Phase II | Dec 94 | 4.050 |
| 93 | Depot Hazardous Waste Processing Fac | Aug 95 | 2.300 |
| 93 | Improve Appropriated Housing - Phase II | Mar 95 | 1.248 |
| 94 | Underground Fuel Storage Tanks | Aug 95 | 4.700 |
| 94 | Alter Hydrant Fueling System | Aug 95 | 4.129 |
| 94 | Seal Fuel Containment Dikes | Mar 95 | 0.620 |
| 94 | Indust Wastewater Regional Connection | Nov 95 | 5.400 |
| 94 | Engineering & Contract Support Fac (38 EIW) | Feb 96 | 5.900 |

### OC-ALC Ten Largest Contractors




### OC-ALC Ten Largest Oklahoma Contractors




The Directorate of Contracting awarded $1.9 billion and 54,461 contracts during FY94 to support OC-ALC's responsibilities at Tinker AFB and throughout the world. The Directorate of Competition Advocacy ensured that 60 percent of all FY94 contracts were awarded competitively, which met the base competition goal. Additionally, the Small and Disadvantaged Business Office helped eligible businesses receive $222.7 million in contracts.

Awards within the state of Oklahoma totaled $187.9 million. Approximately $169 million of these contract dollars were awarded to companies located within a 50-mile radius of Tinker AFB.

The base did very well in meeting several contracting socioeconomic goals. Tinker exceeded its goals for small business awards, woman-owned business awards, and awards to small disadvantaged businesses (SDB).

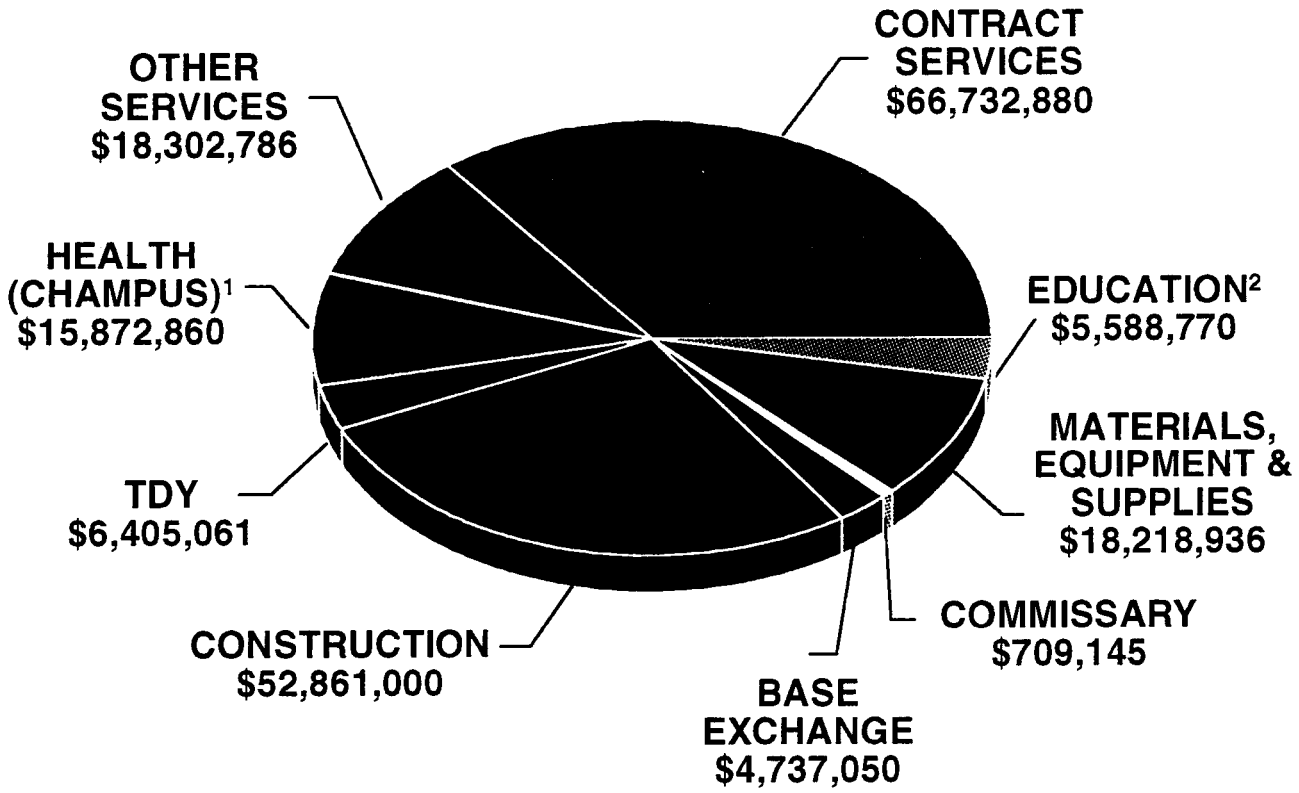
Results of efforts to develop additional small business sources for restricted aircraft and jet engine requirements included Electro-Methods Inc. for a savings of $137,000 and Delta Industries for a $5.3 million savings.

OC-ALC is the first ALC to have a requirement awarded under the Small Business Innovation Research (SBIR) Program. The task involved embedding remote sensors in composite materials as they cure to preclude damage to these expensive materials. Two contracts were awarded, one of which went to AVPRO, Inc. of Norman, Oklahoma.

National Institute for the Severely Handicapped (NISH) contractors have performed excellent work. Tinker currently has the two following contracts: The litter pickup contract worth $57,000 with Mid-Del Group Homes and the food services contract worth $2.5 million with the Dale Rogers Training Center in Oklahoma City. Dale Rogers won the Hennessey Award for the best military dining facility for FY94.

# Value of Resources & Expenditures

## Expenditures




1 Civilian Health and Medical Program of the Uniformed Services
2 Impact Aid equals $5,238,428 and Tuition Assistance equals $350,342

## Weapon Systems

| | |
|---|---|
| Aircraft (552nd ACW) | $5,291,300,000 |
| KC-135R Aircraft (507 ARW) | $ 556,000,000 |

## Capital Assets

| | |
|---|---|
| Buildings, Facilities, Land | $ 700,249,396 |
| Replacement Value of Buildings & Facilities | $3,455,329,000 |

## Base Operations & Maintenance

| | |
|---|---|
| Excluding Civilian Pay | $ 366,199,000 |

## Inventories

| Stock Funds | |
|---|---|
| Medical/Dental | $ 1,519,090 |
| General Support | 122,462,000 |
| System Support | 1,041,727,166 |
| Reparable Support Div (RSD) | 6,469,858,000 |
| Ground Fuels | 55,874 |
| Stock Fund Total | $7,635,622,130 |

# Community Partnership

Tinker Air Force Base's strong alliance with community partners dates back to more than 50 years of sharing world-class, mutually beneficial support. When a specific need exists for community support, help arrives quickly.

Local chambers of commerce formed a project through their Military Affairs Committees in late 1994 to give people from surrounding communities the opportunity to share Christmas with Tinker troops deployed during the holidays to Panama and Haiti. Donations from local communities filled a KC-135R aircraft and were delivered to the troops before Christmas. The Military Affairs Committees, which serve as community liaisons to the base, also donate thousands of dollars each year to awards programs which honor Tinker's outstanding military personnel.

*Blood Drive at Tinker AFB*

Support for the community by Tinker's military and civilian work force is also strong and dependable. Military and civilian employees volunteer thousands of off-duty hours annually to support projects such as the Combined Federal Campaign, Red Earth, United Way, Special Olympics, and the Oklahoma Blood Institute (OBI) blood drives. Tinker AFB employees donated more than 6,600 pints of blood to OBI during 1994 blood drives.

The following examples further describe the solid, ardent association between the base and the community:

- The local community passed a $10 million county bond issue and moved 260 homes to ensure clear, safe take off and landing zones north of the main runway, eliminating potential encroachment challenges.

- Department of Defense, Navy, and Air Force representatives, elected and appointed officials, political candidates and the general public have received more than 300 tours of the base and air logistics center since June 1993. These tours were hosted by the center commander and members of his senior staff.

- Tinker employees rallied to raise more than $800,000 for the Combined Federal Campaign in 1994.

- Oklahoma City Air Logistics Center entered into its first technology transfer agreement with private industry in November 1994. The signing of the Cooperative Research and Development Agreement between Tinker and Sabolich Prosthetic & Research Center represents the first medical involvement for practical application between an air logistics center and a private entity.

# GLOBAL REACH...

# GLOBAL POWER !

## TINKER AFB...WHERE TOMORROW IS TODAY

# Document Separator

# United States Air Force

# BIOGRAPHY

OFFICE OF PUBLIC AFFAIRS, HQ, OKLAHOMA CITY AIR LOGISTICS CENTER
TINKER AFB, OKLA. 739-2026

## MAJOR GENERAL KENNETH E. EICKMANN

Major General Kenneth E. Eickmann is commander, Oklahoma City Air Logistics Center, and installation commander of Tinker Air Force Base, Oklahoma, with a combined workforce of more than 22,000.

As Air Logistics Center commander, he is responsible for providing worldwide logistics support for assigned Air Force weapon systems which include the KC-135 aircraft, the B-1B, the B-52 and the B-2 Stealth Bomber. As Tinker installation commander, Eickmann is host to several associate organizations including Air Combat Command's 552nd Air Control Wing, the Navy's Strategic Communications Wing One, the Reserve 507th Air Refueling Group, the Defense Logistics Agency, the Defense Finance and Accounting Service and the Defense Information Services Organization.

The general was born July 18, 1945, in San Antonio, Texas, and graduated from high school in Austin, Texas, in 1963. He entered the Air Force in 1967 as a graduate of the University of Texas Reserve Officer Training Corps program, where he was the cadet corps commander. He has been a reliability and maintainability engineer on the F-106 and C-5 aircraft, the F100 engine systems manager, and a division chief at an air logistics center and at the air staff. He has been the principle military advisor to the assistant secretary of the Air Force for research, development, acquisition and logistics; director of maintenance at an air logistics center; the deputy chief of staff for the Pacific Air Forces; and the chief of staff/staff director for AFMC.

General Eickmann and his wife, Charlene, both Texans, are the parents of three children, Jeff, Brittne and Jason.

**EDUCATION:**

1967 Bachelor of science degree in mechanical engineering, University of Texas at Austin
1968 Master's degree in systems engineering, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio.
1972 Squadron Officer's School, Maxwell Air Force Base, Ala.
1978 Air Command and Staff College, Maxwell Air Force Base, Ala.
1980 Air War College, Maxwell Air Force Base, Ala.
1982 Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, D.C.
1989 The Executive Development Program, University of Michigan Graduate School of Business
1991 Air University Senior Executive Forum on Software Management, Maxwell Air Force Base, Ala.
1992 Systems Acquisition Management, Defense Systems Management College, Fort Belvoir, Va.
1993 John F. Kennedy School of Government, Harvard University, Cambridge, Mass.

**ASSIGNMENTS:**

1. June 1967 - December 1968, graduate student, AFIT, Wright-Patterson Air Force Base, Ohio.
2. December 1968 - December 1971, instructor, Maintenance Analysis Branch, Chanute Technical Training Center, Chanute Air Force Base, Ill.
3. December 1971 - July 1973, reliability and maintainability engineer, San Antonio Air Materiel Area, Kelly Air Force Base, Texas.
4. August 1973 - December 1974, aide to the commander, San Antonio Air Logistics Center, Kelly Air Force Base, Texas.
5. January 1975 - June 1975, development engineer, Maintenance Technology Division, deputy chief staff for maintenance, Headquarters Air Force Logistics Command, Wright-Patterson Air Force Base, Ohio.
6. June 1975 - January 1976, executive officer, deputy chief staff for maintenance, Headquarters AFLC, Wright-Patterson Air Force Base, Ohio.
7. February 1976 - August 1977, director of propulsion system on-condition maintenance, deputy chief of staff for logistics operations, Headquarters AFLC, Wright-Patterson Air Force Base, Ohio.
8. August 1977 - September 1978, student, Air Command and Staff College, Maxwell Air Force Base, Ala.
9. September 1978 - March 1979, chief, engineering support, directorate of special weapons, San Antonio Air Logistics Center, Kelly Air Force Base, Texas.
10. March 1979 - August 1981, F100 engine system manager, San Antonio ALC, Kelly Air Force Base, Texas.
11. August 1981 - June 1982, student, Industrial College of the Armed Forces, Fort McNair, Washington, D.C.
12. June 1982 - February 1983, deputy chief of the Logistics Concept Division, Directorate of Logistics Plans and Programs, Office of the Deputy Chief of Staff for Logistics and Engineering, Headquarters U.S. Air Force, Washington, D.C.
13. February 1983 - October 1983, chief of the Weapons Systems Program Division, Directorate of Logistics Plans and Programs, Office of the Deputy Chief of Staff for Logistics and Engineering, Headquarters U.S. Air Force, Washington, D.C.
14. October 1983 - June 1985, principle military advisor to the assistant secretary of the Air Force for development, acquisition and logistics, Headquarters U.S. Air Force, Washington, D.C.
15. June 1985 - November 1986, chief of the Propulsion Management Division, Directorate of Materiel Management, San Antonio ALC, Kelly Air Force Base, Texas.
16. December 1986 - August 1987, chief of the Fighter Propulsion Systems Division, Directorate of Materiel Management, San Antonio Air Logistics Center, Kelly Air Force Base, Texas.
17. August 1987 - July 1990, director of maintenance, Sacramento ALC, McClellan Air Force Base, Calif.
18. July 1990 - July 1992, deputy chief of staff for logistics, Headquarters Pacific Air Forces, Hickam Air Force Base, Hawaii.
19. July 1992 - July 1993, chief of staff (changed to staff director), Headquarters Air Force Materiel Command, Wright-Patterson Air Force Base, Ohio.
20. July 1993 - June 1994, director of logistics, Headquarters AFMC, Wright-Patterson Air Force Base, Ohio.
21. June 1994 - present, commander, Oklahoma City Air Logistics Center; installation commander, Tinker Air Force Base, Okla.

**MAJOR AWARDS AND DECORATIONS:**

Distinguished Service Medal
Legion of Merit with two oak leaf clusters
Defense Meritorious Service Medal
Meritorious Medal with two oak leaf clusters
Air Force Commendation Medal
Air Force Outstanding Unit Award with oak leaf cluster
Air Force Organizational Award with oak leaf Air cluster
National Defense Service Medal with service star

**OTHER ACHIEVEMENTS:**

Registered professional engineer and certified acquisition professional in acquisition logistics (Level III), program management (Level III) and systems planning, research, development and engineering (Level III).

**EFFECTIVE DATES OF PROMOTION:**

| | | | |
|---|---|---|---|
| Second Lieutenant | Jun 3, 1967 | Lieutenant Colonel | Apr 1, 1979 |
| First Lieutenant | Dec 3, 1968 | Colonel | Jul 1, 1981 |
| Captain | Jun 3, 1970 | Brigadier General | Jun 1, 1990 |
| Major | Jun 1, 1976 | Major General | Oct 1, 1992 |

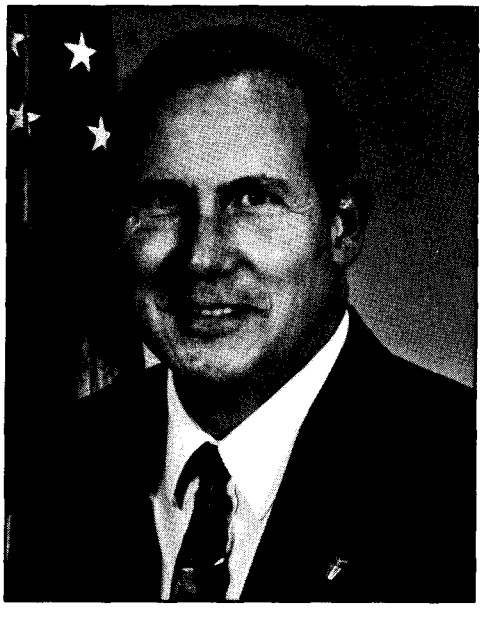
(Current as of July 1994)

# United States Air Force

# BIOGRAPHY

OFFICE OF PUBLIC AFFAIRS, HQ, OKLAHOMA CITY AIR LOGISTICS CENTER
TINKER AFB, OKLA. 739-2026

## GERALD L. YANKER



Gerald L. Yanker is Executive Director, Oklahoma City Air Logistics Center, Tinker Air Force Base, Oklahoma. He is responsible for assisting the commander in providing worldwide logistics support for assigned Air Force weapon systems. Yanker was born in Little Rock, Ark. May 9, 1945, and is a graduate of Little Rock Catholic High School. He is married to the former Ara Monee Burford of Little Rock, Ark. They have two children, Mark and Amy.

**EDUCATION:**

1967 Bachelor of Science Degree in Mechanical Engineering, University of Arkansas.
1973 Masters of Business Administration, Oklahoma City University
1985 Completed Air Command and Staff College
1987 Completed Air War College

**ASSIGNMENTS:**

1. **July 1967 - August 1973**, project engineer on aircraft accessories, Tinker AFB, Oklahoma
2. **August 1973 - May 1977**, aircraft performance engineer, Directorate of Operations, Headquarters Military Airlift Command, Scott AFB, Ill.
3. **May 1977 - July 1978**, Aerospace engineer, Air Force Acquisition Logistics Center, Wright-Patterson AFB, Ohio
4. **July 1978 - January 1982**, chief, propulsion logistics engineering, Wright-Patterson AFB, Ohio
5. **January 1982 - April 1982**, chief, logistics engineering division, AFALC, Wright-Patterson AFB, Ohio.
6. **April 1982 - September 1984**, chief, logistics support analysis within AFALC, renamed the Acquisition Logistics Division.
7. **September 1984 - September 1985**, division chief of equipment and facilities engineering in maintenance at Headquarters Air Force Logistics Command, Wright-Patterson AFB, Ohio
8. **September 1985 - July 1987**, deputy director of maintenance engineering, Headquarters AFLC, Wright-Patterson AFB, Ohio
9. **July 1987 - August 1988**, branch chief of propulsion engineering reliability, Tinker AFB, Oklahoma
10. **August 1988 - May 1989**, deputy director of Distribution, Tinker AFB, Oklahoma
11. **May 1989 - December 1989**, assistant deputy for aeronautical programs, ALD, Wright-Patterson, Ohio. There he had responsibility for all deputy program managers for logistics in Aeronautical Systems Division.
12. **December 1989 - April 1991**, assistant deputy chief of staff for maintenance, headquarters AFLC, Wright-Patterson AFB, Ohio

13. **July 1992 - August 1993**, deputy director, Directorate of Logistics, Headquarters Air Force Materiel Command, Wright-Patterson AFB, Ohio
14. **August 1993 - Present**, He assumed his present position as executive director, Oklahoma City Air Logistics Center, Tinker AFB

## MAJOR AWARDS AND MEMBERSHIPS:

Awarded the Air Force Meritorious Civilian Service Award in 1977
Member of the American Society of Mechanical Engineers
Member of the Air Force Association

(Current as of September 1993)

# Hanscom Air Force Base

## Expansion Capacity

*prepared for:*

**William F. Weld**
**Governor**

Gloria Larson, *Secretary*
Executive Office of Economic Affairs

Lark Jurev Palermo, *Commissioner*
Division of Capital Planning and Operations

**April 6, 1995**

# HANSCOM AIR FORCE BASE

Expansion Capacity

April 1995

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## Summary: Hanscom Air Force Base has the capacity to support major expansion

After a visit to Hanscom Air Force Base by a team from the Division of Capital Planning and Operations (DCPO), it is clear that the base possesses the infrastructure to receive, without difficulty, the additional personnel recommended by the Secretary of Defense on March 1.

The Commonwealth of Massachusetts possesses bonding authority of up to $100 million for capital improvements at Hanscom and stands ready to offset whatever modest costs are associated with Secretary Perry's recommendations.

But the DCPO team also concluded that the Hanscom Air Force Base has the capacity to support an even greater expansion. With the state's assistance, the base will have the ability to absorb 3,000 or more additional personnel with no disruption to existing operations.

## Hanscom Air Force Base

Hanscom, located in Bedford, and within a 15 mile radius of downtown Boston, consists of over 800 acres and contains over 3,500,000 SF of built space dedicated to the development of electronic systems technology.

Located on Rt. 128, "America's Technology Highway", Hanscom is ideally located to benefit from a well-established network of private sector defense-related research organizations. It offers the following:

- Existing built space available which can be readily adapted to meet a full range of uses
- Tracts of undeveloped land available for new construction
- Infrastructure in-place sufficient to support substantial growth
- Direct vehicular access to I-95/Rt. 128
- Direct air access to Hanscom Field on site

## Up to 470,000 SF of usable space can be made available to support base consolidation at Hanscom

The Massachusetts Division of Capital Planning and Operations (DCPO) has reviewed the existing available space and agrees that it can be renovated cost effectively by the Air Force to meet the various space requirements of the BRAC.

- Up to 370,000 sf available within existing buildings, readily adaptable to a variety of defense related uses.
- The Commonwealth is committed to providing an additional 150,000 SF or more in new construction to augment existing space to help meet the full needs of the BRAC and the Department of Defense.

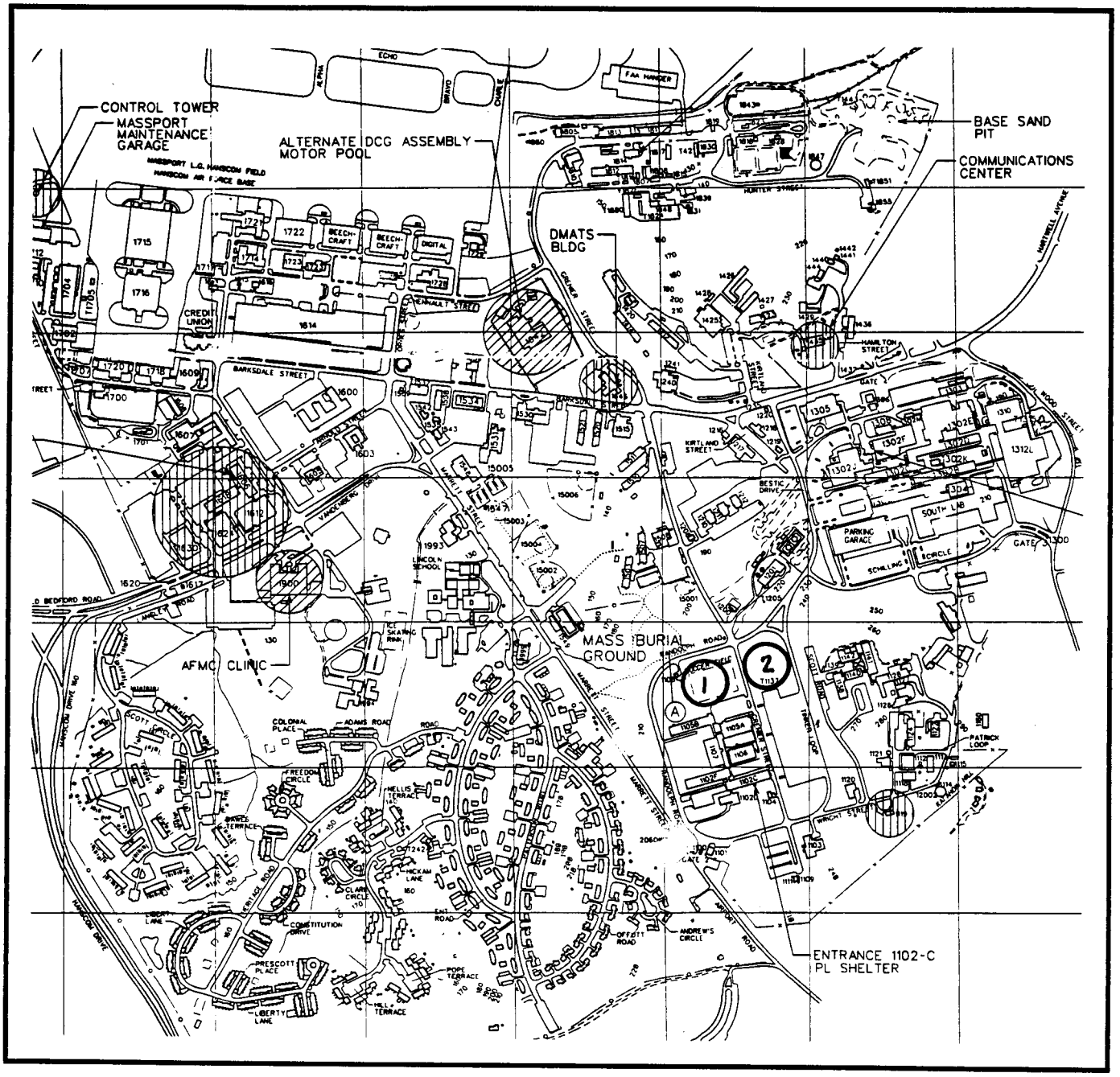
## Existing space suitable to house a variety of uses

- SCIF space (light and heavy)
- Laboratories (light and heavy)
- Administrative offices
- Support spaces, warehouse, and storage

## Immediate Implementation

The Commonwealth of Massachusetts, as part of its long term economic development strategy, is committed to the expansion of Hanscom Air Force Base and will work to meet the immediate needs of the Defense Base Closure and Realignment Commission (BRAC) and the Department of Defense.

- The Governor currently has legal authority to finance up to $100m in improvements at Hanscom including renovation of existing space and construction of additional new space.
- The Commonwealth will provide technical and management assistance so that critical planning and design activities can begin immediately and reduce time required for relocation.




## KEY

Space Available

New Construction

**Hanscom Air Force Base**
Site Plan

# Document Separator

# The Road to the Future: Systems Integration at Hanscom AFB

**Sanford L. Weiner**

**and**

**Harvey M. Sapolsky**

**Defense and Arms Control Studies Program**

Center for International Studies
Massachusetts Institute of Technology
292 Main Street, Cambridge, Massachusetts 02139

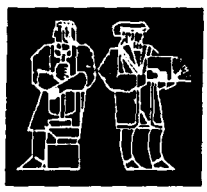
Hanscom AFB MA write-up

hours JSTARS located 1,000 important targets and controlled over 750 attack sorties. The only problem that developed was that the prototypes became too popular among the ground commanders. There was not enough capacity to meet all the requests. As the JSTARS commander recalled "every night we'd get into a battle . . . the VII Corps wanted to run it his way, and MARCENT wanted to run it their way".

### JSTARS Final Development

The initial six JSTARS aircraft are expected to undergo final field testing and then deployment in the near future. The first contract was for a total of 20 aircraft, but recent comments from OSD suggest that the high value placed on the system will lead to a full deployment of 40 or more planes. The U.S. has just recommended to NATO that it should also buy 12 planes for its forces.

Even during development the JSTARS computer systems were being upgraded to take advantage of rapidly moving commercial technology. Digital supplied new hardware developed around its world-class Alpha processing chip. Raytheon customized the hardware for military aviation use. MITRE oversaw the integration of the new computers with the other subsystems. This is an excellent example of how the Boston technical infrastructure speeds the use of advanced civilian technology for dual use applications.



## CONCLUSION: ESC AND THE FUTURE OF $C^4I$

JSTARS represents only one element in the battlefield of the future. In addition to deploying and upgrading current platforms, ESC is working on new advanced computing and information systems. Its largest challenge, though, will be to integrate these new systems into a broader network, where each system supports the others. Here cross-service interoperability will be of greatest importance.

Integrating new technology into existing programs and platforms has become a growing ESC role. For example, ESC is managing the complete revision of the command and control systems for NORAD at the Cheyenne Mountain command center. In addition, a major upgrade of the AWACS radar systems that will allow detection of targets with smaller cross-sections, such as cruise missiles, is under way.

But the ESC/MITRE technology groups are already looking further down the road. Aircraft-qualified, miniaturized supercomputers will soon be available. For both AWACS and JSTARS, a few supercomputers could replace the banks of specialized machines now

necessary. The extraordinary processing power would be another leap in flexibility. Yet with the considerable investment already in place, MITRE is carefully evaluating what the most cost-effective transition path would look like: integration from the present into the future.

The Gulf War revealed that new computerized capabilities did not interface well with functions that were still being carried out manually. Generating timely Air Tasking Orders for over 2,000 sorties/day was particularly difficult, and ESC is now working on a system to both automate this process, and integrate it with other related functions.

The war also underscored the need for more secure theatre-deployable communications systems, particularly those that are interoperable. This is one of about 15 current programs (Table 1) where ESC is the lead manager for joint developments. In fact ESC is more engaged in joint programs than any of the other equivalent service organizations. The Air Force in Fiscal Year 1995 will manage 52% of the total DoD $C^3$ budget, compared with 39% for the Army and Navy combined.

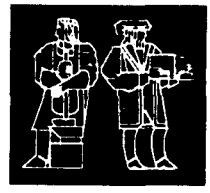


***Table 1 – ESC Joint Programs***

| Program | $M |
|---|---|
| Joint Services Imagery Processing System | 278 |
| Intelligence Data Handling Systems | 375 |
| Sentinel Training Systems | 27 |
| Joint Analysis Center | 70 |
| MATT Radio | 104 |
| Joint STARS | 4,770 |
| JTIDS | 696 |
| Milstar Terminals | 423 |
| DoD National Airspace System | 353 |
| Microwave/Precision Landing System | 46 |
| Tactical Secure Data Communication | 177 |
| Mission Support System | 293 |
| Joint Worldwide Intelligence Communication System | 100 |
| Joint Deployable Intelligence System | 50 |
| Ballistic Missile Defense $C^3$ | 50 |
| FA Radar | 300 |
| Total Value | 8,100 |

# Document Separator

# RESPONDING TO AN ECONOMIC CRISIS: A GRANT APPLICATION TO SUPPORT THE COMMUNITY-BASED ECONOMIC ADJUSTMENT AND DIVERSIFICATION OF MIDDLESEX COUNTY, MASSACHUSETTS

Reductions in defense spending have adversely affected the economies of non-entitlement communities within Middlesex County. These effects make these communities--as represented by the lead applicant town of Westford--eligible for economic planning assistance under both criteria (a)(2)(ii) and (a)(2)(iii) of 24 CFR part 570 of the Community Adjustment and Economic Diversification Planning Program. The following narrative: 1) documents the triggering events and provides an assessment of the anticipated impacts of DoD spending reductions on Middlesex County; 2) outlines a proposed strategy for response; and, 3) describes on-going and proposed coordination among affected non-entitlement communities, the Northern Middlesex Council of Governments (NMCOG), the Metropolitan Area Planning Council (MAPC) and federal and state economic adjustment programs.

## MIDDLESEX COUNTY, MASSACHUSETTS: COMMUNITY IMPACTS OF DOD-RELATED SPENDING REDUCTIONS

### *The Middlesex defense industrial base is being significantly affected by defense spending reductions*

Six large DoD prime contractors—Raytheon, GTE, General Electric (GE), Massachusetts Institute of Technology (MIT), Draper Labs, and Mitre—account for nearly all of the prime contract awards received by Middlesex County. The largest of these firms, and the communities in which they operate, have suffered the most from the federal government's defense downsizing.

Based in Lexington, Massachusetts, Raytheon is the largest defense contractor in Middlesex County, and all of Massachusetts. With slightly over 19,500 on its payroll (down from 31,000 in 1989), it is also the state's largest private employer. *On February 16, 1994, the US Army announced that they had decided to terminate their purchases of Raytheon's Patriot missile.* The termination of this contract has caused repercussions throughout Middlesex, which is the central location of Raytheon's production and operation facilities.

Before this announcement Raytheon had already begun a restructuring program that involved heavy layoffs of workers based in Middlesex County. Between 1990-1993, Raytheon saw its Middlesex-based prime contracts decline by nearly a third, from $2.2 billion to $1.5 billion. The Massachusetts Industrial Service Program (ISP), and several newspaper sources such as the Boston Globe and Boston Herald, have reported that Raytheon has laid off at least

1200 employees in several non-entitlement and entitlement communities in Middlesex. A sampling of these layoffs is listed below:

- June, 1991: Raytheon announced over 300 layoffs in Middlesex (Boston Globe, June 22, 1991)
- October, 1991: Raytheon announced 340 layoffs in Middlesex non-entitlement communities such as Marlborough, Northborough, Norwood, Sudbury, Wayland, and the entitlement community of Waltham. (Boston Globe, Oct. 2, 1991)
- May, 1992: Raytheon announced 700 layoffs, with a significant portion to take place in Middlesex County. (Boston Globe, May 28, 1992)
- March, 1993: Raytheon terminated over a hundred employees in the non-entitlement communities of Bedford, Lexington, Tewksbury, and Wayland (Boston Globe, March 20, 1993)
- June, 1993: Middlesex lost nearly three hundred Raytheon employees (Boston Herald, June 29, 1993)
- February, 1994: Raytheon announced over three hundred layoffs in Middlesex. (Boston Globe, Feb. 12, 1994)

Now, with the cancellation of the Patriot Missile system, Raytheon is embarking on a plan to downsize by an additional 4,400 workers.[1] A substantial portion of these layoffs will occur in Middlesex non-entitlement communities such as Bedford, Chelmsford, Dracut, Sudbury, Tewksbury, Wayland, Westford, and in Billerica which has a plant scheduled for closure. It is anticipated that as many as 2,600 Raytheon employees located in Middlesex County could lose their jobs.

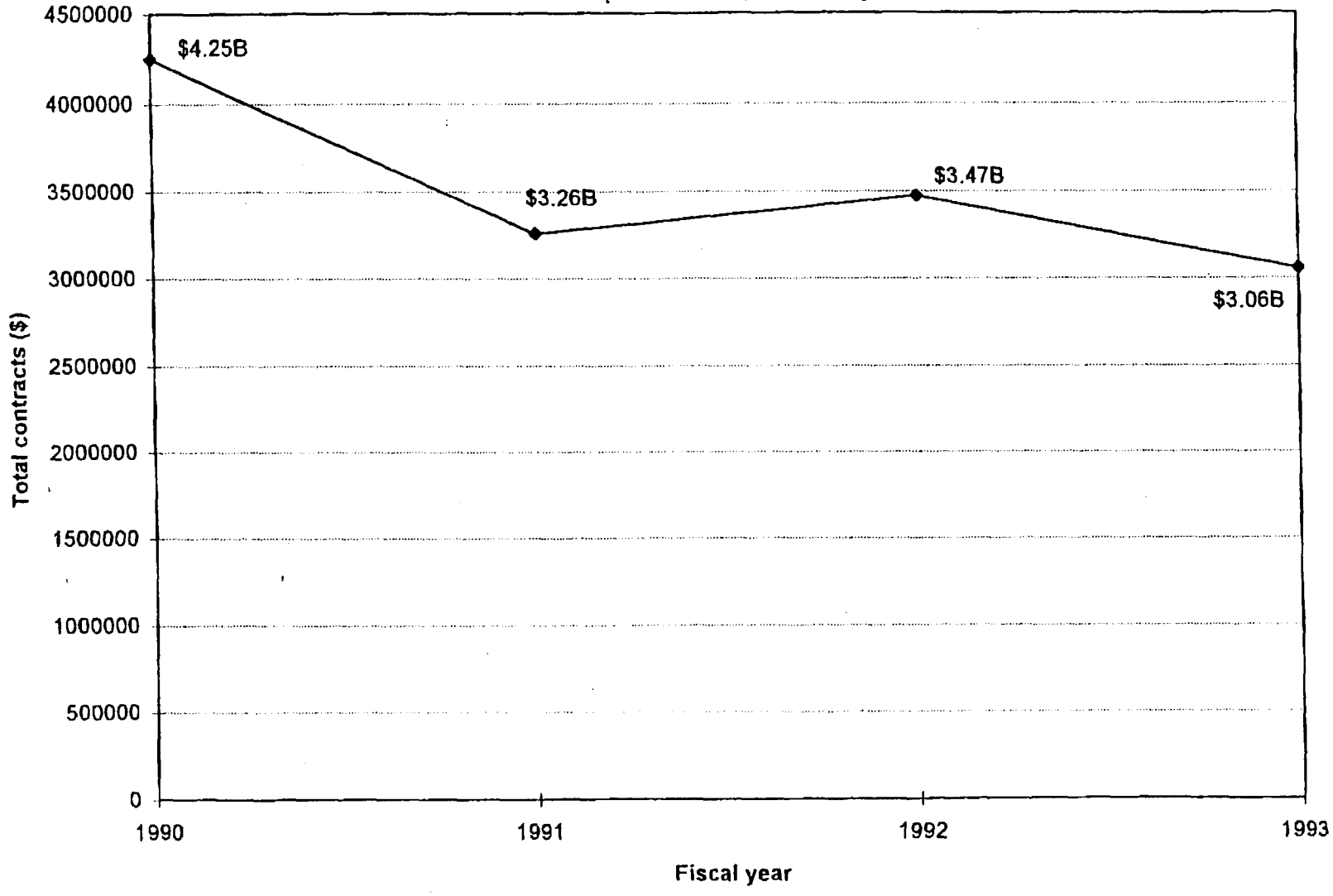
Raytheon is not the only firm undergoing painful restructuring. GTE—which provides communication equipment to the military -- was once the second largest prime contractor in Middlesex. In recent years, one of GTE's largest contracts with the Army ended. Since then, GTE has seen its prime contract awards dwindle from $2.2 billion in 1989 to just $260 million in 1993 -- a decline of almost *90 percent*.

General Electric in Middlesex County has incurred a loss of similar proportion. In 1988 GE in Middlesex received $115 million in prime contracts. By 1993 its prime contracts totaled $6 million—a drop-off of over *95 percent*.

Numerous other firms have also reduced their labor force. According to the Massachusetts Industrial Services Program (ISP), over the last two years, non-entitlement communities such as Ayer, Bedford, Lexington, Littleton, and Wilmington have seen companies such as Loral Systems, Martin Marietta, Textron Defense and others lay off over 1,400 workers. The consequences of defense contract losses are relatively more severe in these smaller communities than in larger communities. These small, defense-dependent economies are

[1] Despite the recent award of a $1 billion contract to build surveillance systems Raytheon officials have stated that the "restructuring" will continue. (Boston Herald, July 22, 1994)

**Figure 1: Middlesex County**
**Prime Contract Awards 1990-1993**
[$ in thousands, source: LMI]



less able to absorb the shocks generated by the continuing reductions. Unfortunately, these communities do not have the resources to quantify the effects of the cutbacks on their local economies. However, data on aggregate trends and their effects on Middlesex county as a whole are available.

### *A billion dollars in prime contracts lost*

According to the non-partisan Defense Budget Project (DBP), the Massachusetts economy is one of the most defense-dependent in the nation. It is particularly dependent in prime contract purchases of goods and services. For example, in 1989 Massachusetts' $8.8 billion in prime defense contracts (approximately 6 percent of the state domestic product[2]) was exceeded only by California and Texas—states with much larger economies.

This high level of prime contracts has made the state's labor-force particularly dependent on defense-related employment. The DoD-sponsored Defense Conversion Commission found that Massachusetts ranks third in the nation in terms of the proportion of total private sector jobs reliant on defense dollars. As further evidence of the state's vulnerability to defense cuts, the Council on Economic Priorities ranked Massachusetts *in the top ten* in both its "Vulnerability Index" and "Defense Dependency Index."[3]

Over the last five years reductions in defense prime contracts to Massachusetts companies have been dramatic. Between 1989 and 1993, prime contracts to Massachusetts dropped by nearly $3 billion (33 percent) from $8.8 billion to $5.9 billion. Only Connecticut had a larger reduction.

*Over $1 billion* of this $3 billion reduction occurred in Middlesex County. Figure 1 illustrates the level of prime contracts (awards over $25,000) in Middlesex County from 1990 to 1993. In 1990 Middlesex received $4.2 billion in defense prime contracts. This has since dropped to the 1993 level of $3.05 billion—a decline of 27 percent. Further spending reductions will continue to erode substantially the level of prime contracts within the state. Since Middlesex is the most important location for the defense industry in the state — with over half of all state prime contract awards — a significant portion of these cuts are expected to occur within the county.

The aggregate effect of this lost revenue on the local economy is uncertain. Some preliminary estimates have been compiled concerning the impact on employment. This is discussed below. However, the secondary and tertiary effects of these losses are unknown. For example, it is unclear how much has been lost in subcontracts, "indirectly" related industries, and state and local

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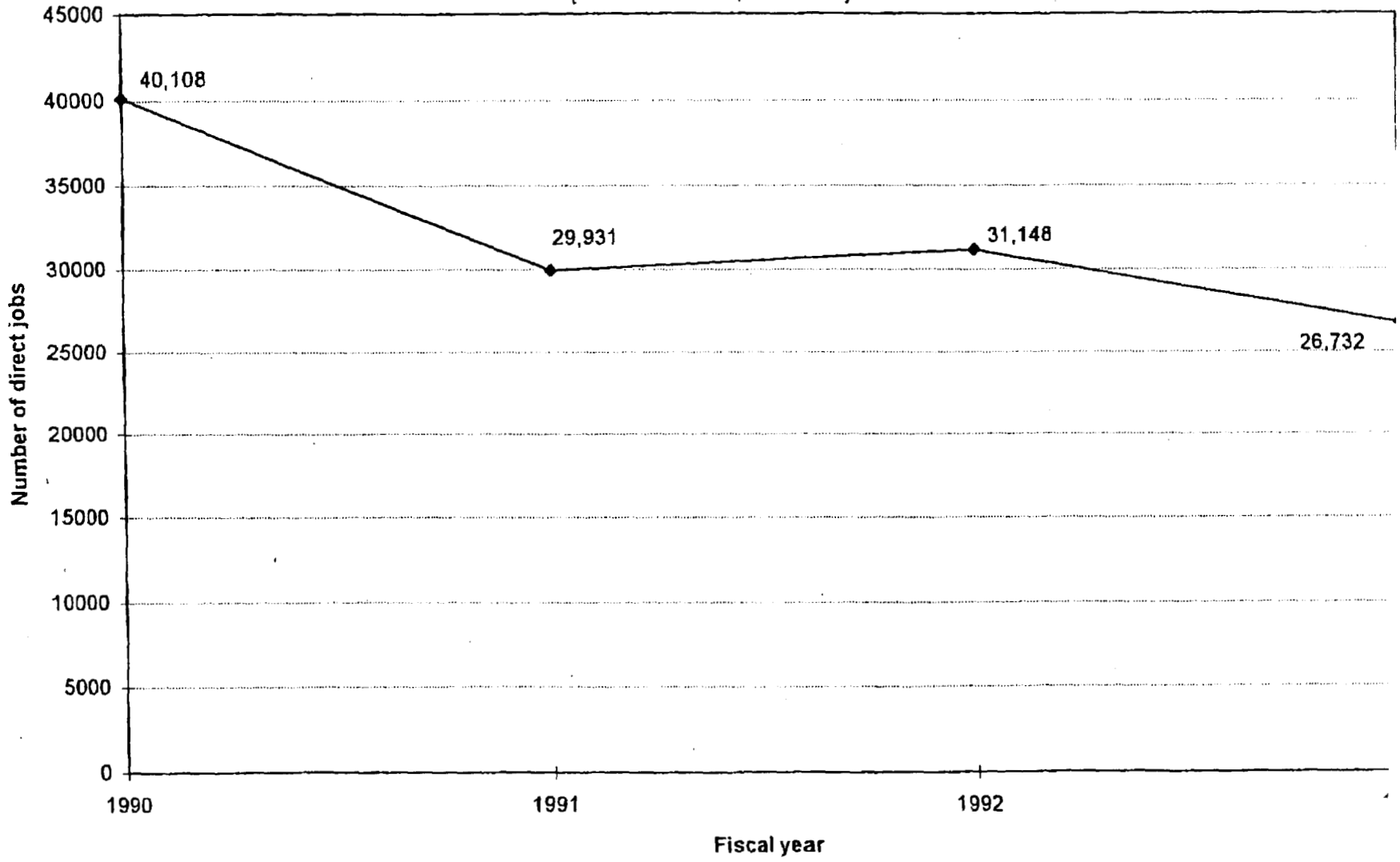
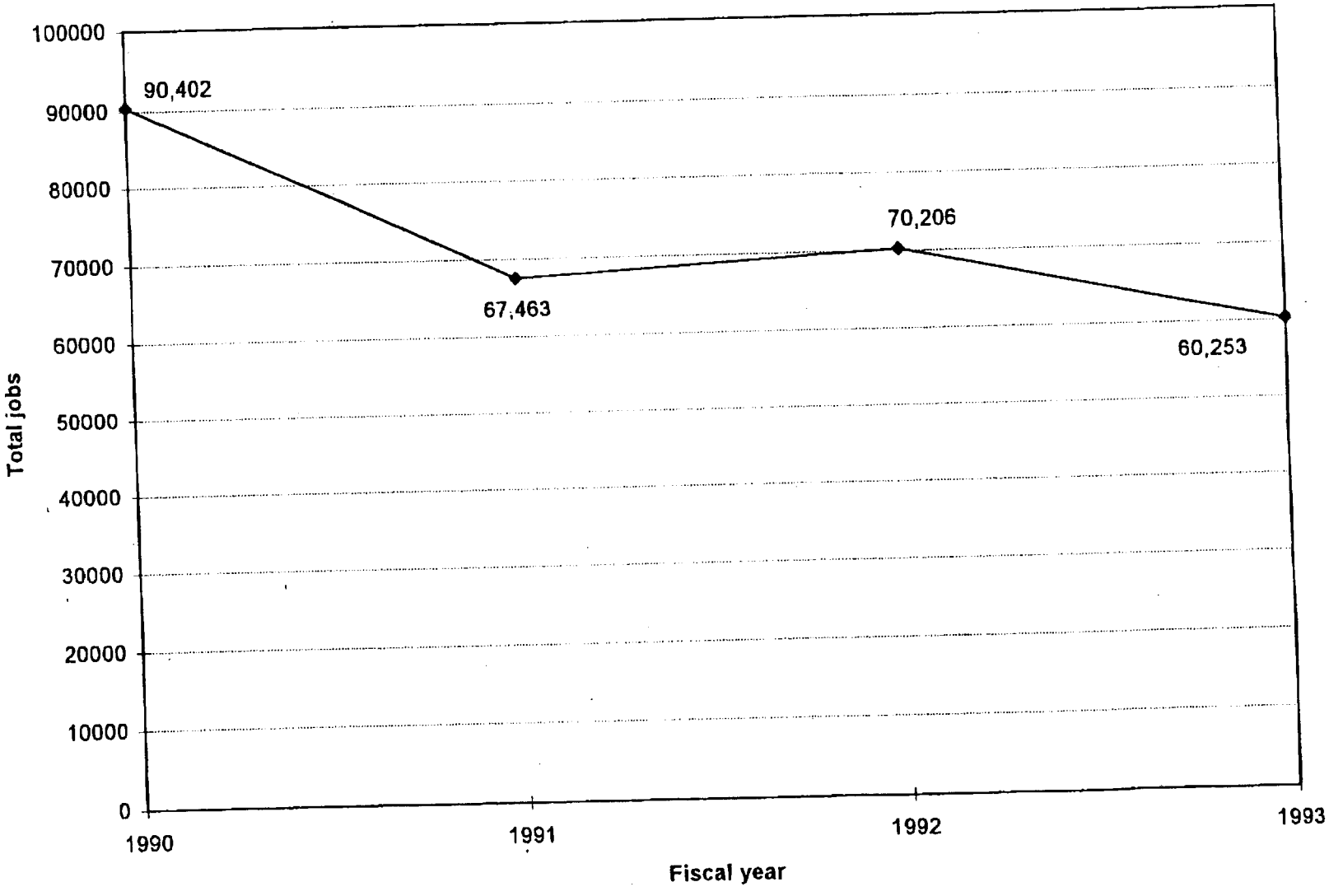
[2] This estimate is based on the state domestic product in 1991. Source: National Science Board, Science & Engineering Indicators, 1993.

[3] The Vulnerability Index (VI) is found by taking the percent level of state defense dependency (the proportion of employment and/or income derived from military facilities and contracts) and adding it to a state's unemployment percentage. The Defense Dependency Index (DDI) takes the VI and multiplies it by the ratio of forecasted cuts in total defense spending (DDI = VI * 10 * cuts/spending. A dollar of spending on uniformed services is not weighed the same as a dollar for defense contracts. This is because defense contract dollars are believed to possess greater multiplier effects). see Lall, Betty, and John Tepper Marlin, Building a Peace Economy. Westview Press: Boulder, CO. 1992.

**Figure 2: Middlesex County**
**Jobs Directly Related to Prime Contracts, 1990-1993**
[estimated number, source LMI]



## Figure 3: Middlesex County Total Jobs Related to Prime Contracts



revenues. What is certain is that prime awards will continue to decline, and the ripple effects this creates within communities will continue to multiply.

### *Declines in prime contracts will have significant effects on jobs*

The most immediate consequence of these cuts in prime contracts is lost jobs. The Logistics Management Institute (LMI) -- which collects defense-related economic data for the Department of Commerce—estimates that between 1990 and 1993 Middlesex lost almost 15,000 jobs directly related to prime contracts.

When subcontractor related jobs and other indirect jobs are factored in, LMI estimates that Middlesex has lost 30,000 jobs in this time period (Figures 2 and 3 illustrate these trends).

This is, however, an incomplete assessment. The LMI estimates do not include subcontractor layoffs and "indirect industry" layoffs related to the cancellation of prime contracts held by firms outside of Middlesex County. Moreover, these estimates do not project the layoffs that will occur as the federal government continues to reduce defense spending. In light of this, the Governor's Task Force on the Defense Industry utilized the Defense Budget Project's methodology to estimate the number of defense-related job losses in Massachusetts during the 1990s. The "Report on the Massachusetts Defense Industry," issued in March of 1994, forecasts that between 1992-1998 Massachusetts will lose 131,000 defense-related jobs. Given the importance of Middlesex County to the state's defense activity, it is reasonable to project that at least half of these lost jobs (65,000) will occur in Middlesex.

Many of these losses will occur in non-entitlement communities. Over the last two years, the ISP has documented the defense-related layoffs occurring in Middlesex. *According to ISP figures, if the current pattern of layoffs is maintained, half of future layoffs will occur in non-entitlement communities.* Moreover, if previous activity is any indication, then no segment of these communities' labor force will be spared. Cutbacks have been directed toward engineers, assembly workers and administrators alike.

### *The implications of the downsizing will be severe*

Given the degree of defense dependency in Middlesex County, the effects of downsizing on non-entitlement communities should not be underestimated. Local economies dependent on defense spending will suffer lost jobs, reduced production, idled capital investment and closed plants. Revenue from property taxes will dissipate, and as unemployment grows, demands on social services will escalate. Job loss and associated consequences may create other hard-to-manage crises such as increased crime, higher health costs, and increased homelessness.

The communities in Middlesex County now facing defense-related adjustment challenges may be least able to cope with these changes. Communities that have adapted to the particular needs of defense-related firms may have become accustomed to the particular qualities of the defense industry. For example, in the past, the defense industry has been relatively insulated from the often turbulent business cycles that effect the broader economy. These

communities may find they must climb a steep learning curve in order to devise a strategy to retain, attract and create businesses in non-defense-related industries. However, before a community can begin to devise a strategy that achieves these purposes, it must first understand:

- the magnitude and nature of the impact of the defense reductions in local economies;
- the strengths and weaknesses of these economies and their ability to adapt in a positive way to changing circumstances; and
- the particular needs of the different stakeholders in the local economy.

The proposed project will address these issues, and fashion an appropriate response to the loss of defense-related business in Middlesex County non-entitlement communities.

# STRATEGY FOR COMMUNITY ECONOMIC ADJUSTMENT AND DIVERSIFICATION

## SCOPE OF WORK

It is anticipated that the brunt of the defense cutbacks occurring in Massachusetts will be located in Middlesex County. The towns that will experience the effects of these cuts the strongest will be the smaller, non-entitlement communities that are dependent on businesses directly and indirectly-related to defense contracts. These defense-dependent communities will likely be the *least prepared* to begin to encourage the adjustment and diversification of their economies. This is due in part to the fact that these vulnerable communities lack sufficient resources to assess:

- the degree of defense-dependency in the local economy;
- what resources the community possesses that could be used to aid the adjustment process (e.g. land, financial, labor, etc.);
- what "external" resources are available (e.g. state, federal and quasi-public economic development agencies); and,
- what reforms and policies the communities should promote (e.g. zoning, permitting, etc.)

Although efforts are underway to develop a state-level response to the cutbacks--few, if any, similar efforts have been launched on the local-level. This is especially true for Middlesex non-entitlement communities. Through the auspices of the lead applicant town of Westford, the Northern Middlesex Council of Governments (NCMOG) and the Metropolitan Area Planning Council propose to initiate an effort to fill this breech. The study team will identify four to five non-entitlement communities (including Westford) that are particularly vulnerable to defense cutbacks. Using these towns as case studies, the study team will work to:

- understand more fully the effects of cutbacks on non-entitlement communities;
- determine the needs of these communities and other key entities (such as affected firms, labor, etc.);
- identify the capacity of non-entitlement communities to respond to the cutbacks; and,
- begin to fashion a strategy that non-entitlement communities may use to adjust and diversify their economies.

The Work Plan below illustrates how the project will meet these goals.

# WORK PLAN

## Phase 1 Identify critical issues facing communities

### *Task 1.1 Assess impacts of defense cutbacks*

A number of studies have been conducted during the last few years on the impact of defense cutbacks in the Commonwealth. For example, the Massachusetts Office of Defense Adjustment Strategy (ODAS) has launched a major study of the impact of defense cutbacks on prime and sub-contractors. The results of this study will provide the study team with a more complete understanding of the importance of defense-related business to the local economies within Middlesex County. In addition, it will inform local decision-makers as to the needs of defense-dependent firms.

The study team will draw on other sources as well. The Massachusetts Department of Employment and Training (DET) has examined the implications of defense cutbacks on employment in the Commonwealth. In addition, a great deal of relevant data has been collected by the U.S. Department of Defense, Department of Commerce and Defense Budget Project.

### *Task 1.2 Identify vulnerable non-entitlement communities*

The information collected in Task 1.1 will provide an indication of the likely impacts of defense cutbacks on non-entitlement communities in Middlesex County. The study team will review this information and conduct its own analysis to determine which towns appear to be particularly dependent on defense-related business and therefore vulnerable to cutbacks. This activity will serve two related purposes. First, the study team will develop a set of indicators that local decision-makers may use to monitor and assess the vulnerability of their local economy. These indicators may include assessments of the relation among the property tax base and defense-related dollars/real estate; total income related to defense-related business; the percentage of jobs directly and indirectly related to defense contracts; the number of defense-related workers that reside in the town; and others.

Second, the study team will use the results of this analysis to identify which non-entitlement communities will be the subject of more detailed case studies.

### *Task 1.3 Prepare case studies*

The purpose of this task is to develop a better understanding of the impact of defense cutbacks on non-entitlement communities. By examining specific cases, it will be possible to determine the implications of defense cutbacks in rich detail, including the nature and efficacy of the services, programs and policies used to respond to the cutbacks. The case studies will be prepared following a standard protocol delineating the specific issues to be addressed, people to be interviewed and data to be collected.

The case studies will assess the impact of lost defense business on non-entitlement communities. This will include towns in which prime and sub-contractors are located as well as those in which laid-off workers reside. The studies will document impacts with respect to local businesses, labor, property tax base and the provision of essential services. The capacity of these communities to marshal the resources necessary to address identified needs will also be described. At least one of the studies will focus on the lead applicant town of Westford. Other cases may examine vulnerable communities that are dependent on defense-manufacturing industries, R&D related firms and/or towns that serve as "bedroom communities."

### *Task 1.4 Conduct focus groups*

Three to five focus groups will be conducted to supplement the case studies. Focus groups will be organized around specific needs identified in prior tasks. For example, sessions might examine topics such as the quality and usefulness of public economic development services and programs (e.g. company assistance, local development, worker training and others).

Approximately seven to ten people--drawn from industry, labor, business organizations, community colleges, universities and state and local government--will be invited to participate at each session. The groups will comment on findings and outline responses to identified needs. Participants will be asked to identify obstacles that hinder the ability of non-entitlement communities to deal effectively with economic adjustment and diversification.

### *Task 1.5 Identify gaps in existing programs and resources*

The study team will profile relevant local and state programs and identify existing resource gaps. It is anticipated that the profile will focus on programs related to business formation and assistance, industrial recruitment, site reuse and development, financing, training and community development. The study team will determine whether affected communities (as well as other parties such as businesses and labor) are utilizing these services and will detail their experiences working with them.

### *Task 1.6 Assess the capacity of non-entitlement communities*

The purpose of this task will be to assess what resources vulnerable communities possess--or must develop--that can be used to assist the adjustment and diversification process. This task will identify the "policy tools" available to small non-entitlement communities that may help spur economic development (e.g. zoning and permitting reform). In addition, the assessment will catalogue the strengths and resources of particular communities and help to match them to appropriate adjustment strategies (e.g. using the skilled local workforce to attract emerging high-tech growth industries).

## Phase 2 Develop strategy

The project will culminate with the development of a strategic plan to help non-entitlement communities to respond to the cutbacks. This activity will be composed of two elements.

**1) Develop a planning manual for economic adjustment and diversification**

The study team will provide non-entitlement communities with a guide to help them understand the impacts of the defense cuts and the needs of affected parties. The guide will summarize the major problems facing vulnerable non-entitlement communities, identify gaps in state and local resources and provide local decision-makers with a framework to help them monitor and assess the health of their local economies.

**2) A planning manual for economic adjustment and diversification**

In addition, the study team will develop a manual to help non-entitlement communities formulate a local-level response. The manual will provide a planning matrix that describes critical issues in detail and a range of associated "tools" and resources that can be used to address them. The opportunities and constraints involved in using these "tools" will be explicitly defined. Case examples will be used to illustrate successful (and unsuccessful) use.

# A COORDINATED RESPONSE

Promoting the diversification and adjustment of local economies is a task too great for non-entitlement communities to undertake alone. Therefore, the study team plans to coordinate with appropriate federal agencies, state economic development organizations, non-entitlement communities, regional planning agencies and other entities in order to:

- identify critical issues facing non-entitlement communities;
- assess the impacts of defense cutbacks;
- formulate the strategy to help non-entitlement communities adjust and diversify their economies;
- develop a framework to encourage the continued cooperation of relevant development agencies and affected communities; and,
- build a coalition to ensure the successful implementation of the strategy.

In pursuit of these goals, the following activities will be initiated.

## *Enlist the support of several key agencies*

A network of relevant state and local agencies will lead, assist and advise project activities.

**The Northern Middlesex Council of Governments (NMCOG) and the Metropolitan Area Planning Council (MAPC):** The NMCOG and the MAPC are Middlesex County's two principal regional planning agencies. Together, their jurisdictions encompass nearly all of the County's non-entitlement communities. Through the auspices of the lead applicant town of Westford, these two agencies will form the project "study team" and will develop the adjustment strategy. The cooperative efforts of these two agencies will ensure that the full brunt of the County's planning resources are directed toward this issue, and that no non-entitlement community is excluded from the planning process.

**The Massachusetts Office of Business Development (MOBD) and the Executive Office of Communities and Development (EOCD):** MOBD is mandated to promote coordination among the myriad state and quasi-public development agencies that provide a range of services including investment financing, training assistance, industrial extension, land development and others. The County has been working closely with MOBD, which has convened a regional "defense adjustment working committee" composed of members of the NMCOG, the MAPC and companion agencies. Both MOBD and the EOCD will serve as information clearinghouses on state (and federal) programs and will help shepherd local governments through the process of accessing vital resources. Upon completion of the planning process, the County will work closely with the EOCD--which is responsible for administering the state's

Community Development Block Grant programs--to obtain follow-on grants to begin the implementation phase.

**The Office of Defense Adjustment Strategy (ODAS)**: As detailed in the Statement of Work, Middlesex County will leverage the work and resources of the Massachusetts "Defense Adjustment Strategy Project." This project is supported by a grant from the Office of Economic Assistance (OEA) and is managed by the state's Office of Defense Adjustment Strategy (ODAS).

The mission of ODAS is to assess the effect of defense spending reductions on the broader state economy, and to devise and implement a "defense conversion" strategy. Middlesex County will utilize and expand upon the information collected through ODAS. The County will share its findings with ODAS, and will work with ODAS to encourage Massachusetts to formulate a state-wide conversion strategy that complements the adjustment efforts of the County's non-entitlement Communities.

**Industrial Services Program (ISP)** The ISP is a small quasi-public agency that offers a range of economic adjustment services to both firms and workers. The ISP has been particularly active assisting defense-related businesses affected by budget cutbacks. The study team will seek the input of the ISP in both the assessment and strategy development phases. In addition, the study team will work as a "broker" to bring the ISP together with planners from vulnerable Middlesex non-entitlement Communities.

### *The project will encourage the continued input of the private sector*

The cooperation of private industry will be critical for the development and implementation of a community response plan. Both the NMCOG and MAPC possess close, working relationships with significant prime contractors (such as Raytheon) located within Middlesex County. The study team will seek the input of area defense firms throughout the process.

### *The study team will coordinate with other regional planning agencies*

Since the effects of the spending reductions are not isolated within Middlesex, the study team will remain in close consultation with neighboring regional planning agencies in Essex County. Essex has incurred significant losses, and its economy is closely linked to that of Middlesex. The study team will compare its results to the results of other regional assessments, and consult with these agencies in the development of the strategy.

### *The project will build a coalition to ensure the successful implementation of the strategy*

Economic development strategies frequently call for greater coordination among relevant policy-makers and affected parties. However, few guidelines exist that describe how to promote and maintain cooperation throughout the planning

(and the ensuing implementation) phase. Thus, a principal of objective of the project will be to develop a framework to help non-entitlement communities leverage their own economic development resources by coordinating with appropriate agencies.

### *The project will seek further adjustment assistance*

The objective of the project is to implement the economic adjustment and diversification strategy in several test communities. In order to aid this process, the study team will seek general defense adjustment grants from the DoD Office of Economic Assistance and the Department of Commerce Economic Development Agency. As needed, Middlesex will also seek targeted assistance such as worker retraining from the Department of Labor, land use for the homeless (under the McKinney Act) and a range of business development services from the SBA.

As discussed above, the study team will work closely with the EOCD to obtain federal and state grants that will be directed toward implementation.

# Document Separator

The [redacted]lth of Massachusetts
[redacted]e of Economic Affairs

William S. Smith
Director, Military Affairs
and Defense Industry Issues

One Armory Square
Springfield, MA 01105
(413) 784-1580
(413) 739-9175

One Ashburton Place
21st Floor
Boston, MA 02108
Tel. (617) 727-3206
Fax. (617) 727-8797

GOVERNOR
ARGEO PAUL CELLUCCI
LIEUTENANT GOVERNOR
GLORIA CORDES LARSON
SECRETARY

ıwealth of Massachusetts
Office of Economic Affairs
shburton Place, Room 2101
on, Massachusetts 02108

TELEPHONE:
(617) 727-8380

FACSIMILE:
(617) 727-4426

March 28, 1995

Mr. James L. Owsley
Team Leader, Joint Cross Service Group
Defense Base Closure and Realignment Commission (BRAC)
1700 N. Moore Street, Suite 1425
Arlington, VA 22209

Dear Mr. Owsley:

We met earlier this month to discuss Hanscom Air Force Base.

During our conversation, you requested several documents. First, I have enclosed a copy of the very recently published "Data Book" for Hanscom. Second, you had asked about Hanscom's location relative to defense industry layoffs. Therefore, I have included a recent proposal to federal government from local citizens in Middlesex County, Massachusetts -- the county where Hanscom is located. This proposal points out that Middlesex County lost nearly 14,000 jobs related to declining defense contracts between 1990 and 1993. Finally, I have also included a study published recently by the Massachusetts Institute of Technology (MIT) raising concerns about the loss of systems integration expertise that would result if Hanscom were re-located.

We also discussed in our meeting the state assistance package that was offered to the Department of Defense to accommodate an expansion of Hanscom. On February 9, 1995, Governor Weld signed into law a $100 million bond authorization designated for capital improvements at Hanscom in the event of an "enhancement or expansion" under BRAC 1995. We will soon transmit to the BRAC Commission a more specific proposal on how such bond authority could be used to make an expansion at Hanscom a cost effective option for the Department of Defense. If you have any questions, please feel free to call. Thank you.

Sincerely,

Bill Smith

William S. Smith

100% recycled

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DEFENSE AND ARMS CONTROL STUDIES PROGRAM
Massachusetts Institute of Technology
292 Main Street (6th Floor)
Cambridge, Massachusetts 02139

FOR IMMEDIATE RELEASE

Contact: Harvey Sapolsky
(617) 253-5265

# MIT DEFENSE AND ARMS CONTROL STUDIES PROGRAM RELEASES STUDY ON HANSCOM AIR FORCE BASE: CITES RISKS OF RELOCATION

MIT's Defense and Arms Control Studies Program released a study of Hanscom Air Force Base titled: "The Road to the Future: Systems Integration at Hanscom AFB." The study concluded that if the Pentagon were to decide to relocate Hanscom "the true costs and loss of capability might be unacceptably high."

The study pointed to high technology firms, universities, and research institutions that surround Hanscom and contribute to the technical base of the Electronic Systems Center (ESC) at Hanscom. The authors concluded that because ESC was heavily dependent upon local contractors for systems integration expertise, a relocation might sever the base from an important source of its expertise.

Among the study's conclusions:

* The Hanscom area has a history of military and technological innovation from the Colonial militia's success at Lexington and Concord to today's Route 128 corridor. This legacy of innovation is an important factor to the success of Hanscom.

* The technology base in the area has provided ESC with its most important strength: integrating disparate technologies into world-class electronic systems. Moreover, it is in the area of systems integration where ESC is most dependent upon local firms for in-house engineering support. The study found that 85 percent of ESC in-house engineering support came from local contractors. The expertise of contract employees of the MITRE Corporation, a Bedford, MA-based contractor, would be particularly difficult to replace if large numbers of these specialists chose to remain in the Boston area. The loss of a portion of this support due to a relocation may cause significant disruptions in Air Force $C^4I$ programs -- programs that are increasingly important in the current environment.

(more)

* ESC managed programs have demonstrated unparalleled success in battle. Systems such as AWACS and JSTARS, which were developed at ESC, contributed to the disproportionate casualty rates during the Persian Gulf War. With such "proven...effectiveness", it seems likely that if the Hanscom team were left in place, they would "continue to improve this vital warfighting capability." A relocation would cast uncertainty over the Air Force's $C^4I$ development programs.

The authors of the study were Harvey Sapolsky, Director of the Defense and Arms Control Studies Program, and Sanford Weiner, a Research Associate at the Program. The study's conclusions are important and timely because the Pentagon is currently analyzing the military value of all of the nation's military bases as part of the 1995 base closure process.

###

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DEFENSE AND ARMS CONTROL STUDIES PROGRAM
Massachusetts Institute of Technology
292 Main Street (6th Floor)
Cambridge, Massachusetts 02139

# THE ROAD TO THE FUTURE: SYSTEMS INTEGRATION AT HANSCOM AFB

*Executive Summary*

Hanscom Air Force Base's Electronic Systems Center (ESC) makes its critical contribution to the Defense Department's $C^4I$ programs through its concept development and systems integration role. Over the past thirty years, ESC has developed an integrated product team of technical expertise that is enhanced because it is embedded in the larger high technology community of the Boston area.

ESC's role is changing due to several recent developments, including declining force structure in the post-Cold War environment, the evolution of $C^4I$ to a premier battlefield management role, and the increased emphasis on commercial technology and joint programs. ESC's background and experience makes it well placed to adjust to these new developments.

ESC is best symbolized by three roads. ESC's location on the Lexington/Concord Battle Road is an enduring symbol of the importance of intelligence in military engagements. In the present, ESC is located on the famous Route 128 technology highway. This academic/high technology infrastructure has provided breakthroughs in a number of key technologies and systems integration advances. The interaction and intellectual cross-fertilization within this critical mass of technology professionals in the region is a key factor in the flourishing of innovation.

In the recent past two ESC systems, AWACS and JWICS, illustrate the achievements of this network. The breakthrough that made the AWACS possible was not simply the advances made at Hanscom on radar technology but, more importantly, the ability of ESC/MITRE teams to integrate disparate technologies into a system and then create the capability for that system to communicate with others.

ESC has also given the world a glimpse of the future battlefield with the fielding of the JSTARS system. JSTARS demonstrates, once again, not only ESC's ability to improve and refine specific technologies but to integrate them into a system that will reshape modern

warfare. A number of local firms, particularly MITRE, played important roles during each stage of the development process.

While still in the development phase, two JSTARS were deployed to the Persian Gulf in January 1991. The Gulf War Airpower review testified to the remarkable impact of these systems' capabilities upon the operating forces: "In Desert Storm, JSTARS stole the show."

ESC is looking even further down the road and is exploring breakthroughs in a number of key areas including: miniaturized supercomputers, AWACS detection of cruise missiles, and interoperable theatre-deployable communications systems. ESC is the Defense Department leader in joint service programs, managing 52 percent of the total DoD $C^4I$ budget. The demand for these joint $C^4I$ programs is likely to be strong for the foreseeable future.

If the Hanscom team were to be left in place, there would likely be continuous improvements in U.S. warfighting in general and $C^4I$ developments in particular. A decision to relocate Hanscom may not only disrupt ongoing development work for the foreseeable future, it may sever ESC from the local technology network that has been providing such crucial assistance in the area of systems engineering and integration. Building a new technical team at a new location could be a long and difficult task.

# The Road to the Future: Systems Integration at Hanscom AFB

**Sanford L. Weiner**

**and**

**Harvey M. Sapolsky**

**Defense and Arms Control Studies Program**

Center for International Studies
Massachusetts Institute of Technology
292 Main Street, Cambridge, Massachusetts 02139

# The Road to the Future: Systems Integration at Hanscom AFB

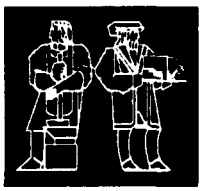
**Sanford L. Weiner and Harvey M. Sapolsky***

Hanscom Air Force Base is a unique facility, an air base without aircraft. Hanscom is the home of the Electronic Systems Center, which creates new weapons systems as the Air Force's Global Product Center for Command, Control, Communications, Computer, and Intelligence ($C^4I$). The Electronic Systems Center (ESC) does not manufacture new systems, but rather contracts with private firms to build them. Although many of these contractors are nearby in the Boston area, the manufacturing network stretches across the country.

ESC's own critical role in the development process is ***concept development and systems integration,*** matching technological trends with Air Force mission requirements. To carry out this role ESC has evolved an integrated product team approach that combines the expertise of uniformed officers, Air Force civilians, and contractor scientists and engineers. Within the base, 2,200 uniformed personnel work side-by-side with 2,000 Air Force civilians, and 6,400 contract employees. A key element in the team organization is the partnership ESC has with the MITRE Corporation, which was established as a not-for-profit Federal Research and Development Center to provide systems integration support to the Air Force.

ESC's capabilities are enhanced because it is embedded in the larger high-technology community of the Boston area, and regularly draws on the high-quality science and engineering talent available in a variety of disciplines and companies. From advanced radar design to innovative computer software, ESC's achievements integrate systems by bringing skilled professionals together.

## ESC's ROLE IN THE NEW ENVIRONMENT

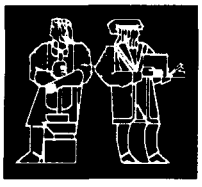


All the components of the Department of Defense, including the Air Force, are facing a rapidly changing environment for the tasks they must perform and the conditions under which they will perform them. The new environment impacts on ESC's role and the value of its contributions in a number of ways. The broadest influence is the post-Cold War national security environment, which is leading to a downsized budget and force structure for the foreseeable future. This will put the emphasis on lean strategies for carrying out the ongoing missions.

* *Sanford Weiner is a Research Associate and Harvey Sapolsky is Director, MIT Defense and Arms Control Studies Program, Center for International Studies, Massachusetts Institute of Technology.*

The future battlefield environment is also evolving rapidly. Just as prior military doctrine emphasized the substitution of firepower for manpower, we are now seeing the substitution of smart weapons for mass firepower. However, smart weapons achieve their precision because they are part of a long information chain of command and control. The new weapons put a premium on real time surveillance and target acquisition, and communicating that data directly to the fire control system. This means that maximizing weapons effectiveness now requires the joint integration of formerly separate systems. Optimizing systems individually, which was sufficient in the past, will no longer deliver the performance now desired.

The direct implication of these battlefield trends is that $C^4I$ is really no longer a logistics or support function, but rather is now on the critical path for the effectiveness of the forces on the battlefield. As the official Air Force Survey of Airpower in the Gulf War put it:



*In World Wars I and II, an air commander could often do little more than send his aircrews off and then pray for their safe return. Now, the aircrews, in concert with systems such as AWACS, ABCCC, and JSTARS can implement a concept of operations developed by senior commanders and consult both with those commanders and with one another while the operation is in progress. The potential this mode of command gives to air units is tremendous. The whole air campaign, including air-to-air engagements and air-to-ground attacks, can be directed from the air itself, and elements of the campaign, such as interdiction, can be modified in real time to suit a changing situation.*

Two other Department of Defense initiatives will also influence the development process. The first of these is the preference for commercial technology, especially in computers, rather than equipment specially designed for military applications. The growing use of this generic technology will again put a premium on ESC's systems integration expertise to fine tune the technology for specific mission needs.

DoD has also emphasized the increasing need for joint development programs and tactical interoperability. ESC's background and experience leaves it well placed to implement this directive as well, since it is the DoD leader in managing joint $C^4I$ programs such as JSTARS.

* * *

The Hanscom/ESC role in the Air Force future is best symbolized by three roads. Hanscom is located on the original Battle Road from Lexington to Concord, which represents the proud heritage of the American military. The base is also adjacent to Route

128, Massachusetts' famed Technology Highway, with its dense infrastructure of technical expertise. ESC has made effective use of its central position in this complex to design and produce currently deployed systems such as AWACS, which manifests America's technological edge.

The third road is the highway net in Kuwait and Iraq, where Gulf War enemy deployments were brilliantly illuminated by the new JSTARS technology developed by ESC. Still under development, the impressive JSTARS capabilities illustrate the critical role of $C^4I$ on the battlefield of the future.

## HERITAGE: THE BATTLE ROAD

The battles of Lexington and Concord along the Battle Road mark not only the opening salvo of the American Revolution, but also the key importance of good intelligence from the inception of America's armed forces. The British commander in April 1775 intended a surprise raid from Boston that would capture the Colonial leaders, seize their stores of munitions in Concord, and nip the revolt in the bud (Figure 1).

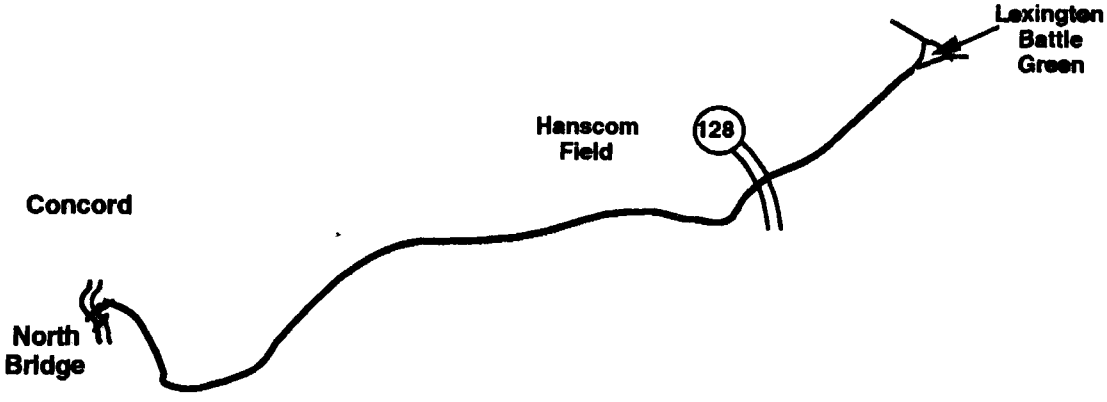
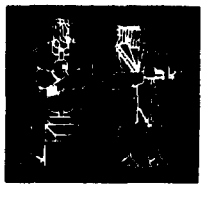



***Figure 1 - The Battle Road***

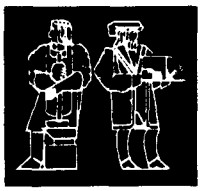
However, the colonists gained a precise advance warning of British troop movements and were thus able to counter them effectively. The famous two lamps hanging in the tower of the Old North Church indicated that the British would be cutting directly across Boston Harbor by boat. Paul Revere and William Dawes then carried the warning on horseback inland to Lexington. The patriots effectively mustered the colonial militia and achieved tactical surprise. The intended raid became a British rout, and the message that patriots could stand their ground against professional British soldiers spread throughout the colonies, sparking the revolution.



## THE PRESENT: ESC ON THE TECHNOLOGY HIGHWAY

The ingenuity displayed in Lexington in 1775 has its counterpart in the post-World War II partnership between the Air Force and the academic/high-tech infrastructure concentrated in the Boston area. In the immediate postwar era, the center of the partnership was between the Air Force organizations which preceded ESC and MIT's Lincoln Laboratory (which is now collocated at Hanscom). The Air Force/Lincoln team pioneered modern radar technology and the fundamentals of digital computing.

The major product of this collaboration in the 1950s was the first continental air defense system, labeled the Semi-Automatic Ground Environment (SAGE) System. This



system was precedent-setting in three separate ways. First, the technology integrated widely dispersed electronic subsystems to a degree never before possible. Second, this technological advance created a new military capability which had not been available before. Third, these efforts required an integrated team approach which was also unusual. All of these characteristics are part of ESC's institutional memory and have been carried into the present. In 1958 the MITRE Corporation was created from Lincoln Laboratory project staff specifically to provide the high level engineering support needed to carry out the system integration for SAGE and similar projects.

Over time the original project teams have expanded to take advantage of all the professional scientific and engineering resources that can be found in the area. ESC/MITRE recruit and train staff drawn not just from MIT and Harvard but also from the broader academic/scientific community including Boston University, Tufts, Northeastern, Boston College, the University of Massachusetts, and other institutions. ESC has major development contracts with Raytheon, Digital Equipment Corporation, GTE, and Textron Defense Systems, and other local high-tech companies. The careful blend of expertise, however, also requires links with dozens of smaller, often unique, engineering and technical firms. They provide support in areas such as configuration management, software development, manufacturing and quality assurance, new electronic sensors and information management.

The important relationships, though, are broader and more far-reaching than just the direct contractual ones. The value added in this network comes from the high quality of the professional talent drawn to solving these challenges. The key for the teams staying at the technological edge is that they are embedded within and constantly interact with the rich high-technology community centered on Route 128, which now numbers over 2,000 firms (Figure 2).

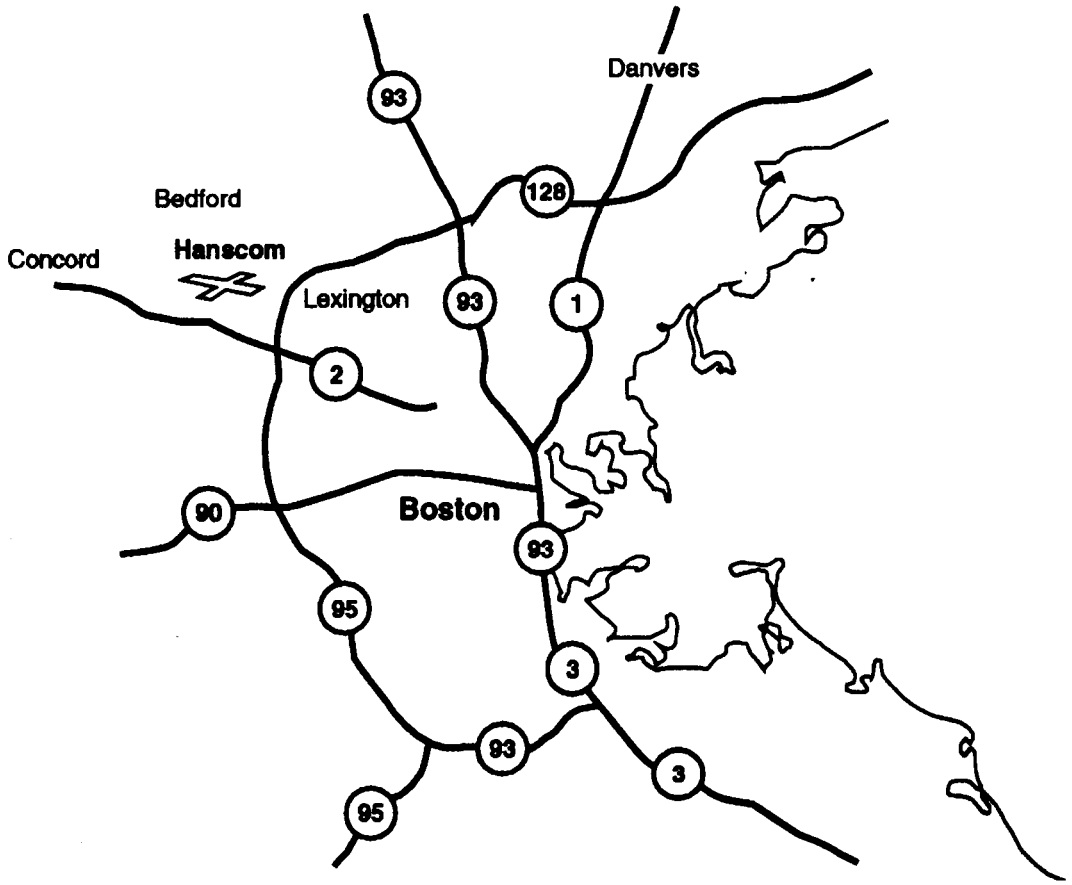
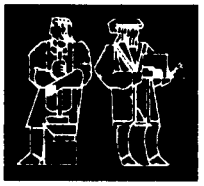


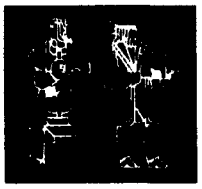

***Figure 2 - Route 128 - America's Technology Highway***

Greater Boston is a world leader in advanced computing, software development, radar imaging, and numerous other relevant technologies. The region contains the nation's greatest concentration of telecommunications firms. Professional staff from academia, small engineering firms, and high-tech companies are constantly cross-fertilizing the new concepts that will become the technological frontier. Some of this activity takes place in specific professional activities such as the local IEEE sessions, but much of it happens in the informal ways that can only occur when a critical mass of professionals is present. Even in the era of the information highway, some interactions still work best on a personal, face to face basis and require a concrete highway.

Two currently deployed Air Force systems, AWACS and JWICS, illustrate the achievements of this network over the last two decades. The Airborne Warning and Control System (AWACS), like SAGE before it, has expanded the range of Air Force capabilities since its initial deployment in 1977. Ground based radar defenses had always had difficulty detecting low flying incoming enemies. Thus the potential for an airborne radar system not subject to these limitations was apparent. The difficulties lay in simultaneously managing several different technologies to create one integrated system that could be carried on a single aircraft.



The needed improvements in radar detection capacity derived from basic research at Lincoln Lab and ESC's Rome Laboratory dating back to the 1950s. However there was considerable skepticism that the technology had advanced far enough to reliably detect aircraft over land against the background clutter. In fact it took several rounds of an iterative development process involving ESC/MITRE, the prime airframe contractor, and the prime radar contractor, before the desired performance was achieved. The second key ESC/MITRE role was to match the radar developments with new air to ground high speed communications links, and new computing capabilities. The system required newly developed hardware/software that could perform both signal detection analysis, and data management and display functions.



The integration of these disparate technologies produced an unprecedented advance in the ability to detect potential targets and display them for U.S. forces. AWACS as currently deployed can track over 300 aircraft over land or water at any one time, up to 250 miles away. In addition it can communicate target locations directly to the appropriate fighter aircraft. AWACS is now a worldwide symbol of technological superiority — where once a carrier would have been automatically sent to a crisis area to indicate U.S. resolve, we now often send AWACS instead.

ESC has also been responsible for the Joint Worldwide Intelligence and Communications System (JWICS). This system provides for secure, worldwide video conference capabilities for real time command and control. CONUS commanders can now interact directly with the field commanders, and get a direct video feed from the battlefield. Such capability is also of great utility in uncertain peacekeeping environments, and has been employed in both Somalia and Haiti.

## JSTARS AND THE FUTURE ELECTRONIC BATTLEFIELD

The Gulf War took place in 1991, when the Joint Surveillance Target Attack Radar System (JSTARS) was still under development. Yet the two JSTARS prototypes rushed into service for Desert Storm made a dramatic impact on our surveillance of enemy ground positions. The Gulf War thus provided a vivid preview of the new capabilities made possible by ESC's team approach. JSTARS is an excellent illustration of both the ***process*** of systems integration that creates these new weapons, and their potential for ***reshaping*** the battlefield.

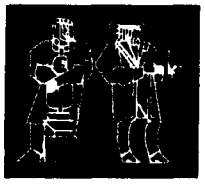
## JSTAR Systems Integration

The first task for military-oriented systems development is monitoring the evolving conceptions of potential significant missions among the user commands. In the mid-1970s the Defense Science Board sponsored a series of "Assault Breaker" studies that analyzed alternative ways to counter a Warsaw Pact offensive in Central Europe. The studies highlighted the potential of being able to attack enemy tank concentrations fifty to one hundred miles behind the front line, before they could join the actual battle. If accurate reconnaissance could be performed at these distances, then major impact on the subsequent battle might be achieved.

The success of AWACS had made the concept of mobile, far-ranging, early warning radar desirable. The question again was whether further advances in technology had been achieved that could be matched against this potential new mission. Detecting slow moving tanks or trucks on the ground was far more demanding than seeing fast moving aircraft above it. The background clutter problem in particular was much more severe. The overall detection sensitivity had to be tenfold better than the AWACS standard to make the new system viable.

Both Lincoln Laboratory and the Rome Laboratory had continued their work on advanced radar technology. Their successes made the new system conceivable but with considerable remaining uncertainties. Some of these were resolved by the PAVE MOVER experiments where a prototype radar mounted on an F-111 imaged ground objects and communicated the data to a ground command (Figure 3).

From about 1980, ESC took on the task of defining a joint integrated system for both the Air Force and Army users. (In fact the original conception involved - using airborne warning to impact the ground battle - was a joint idea in its essence.) The basic task was envisioning the various possible components as an integrated system and defining an accuracy for the overall system.



The effective accuracy for any weapon system depends on the combined result of the errors introduced by each system component. Thus, a moving platform will have some error in knowing its own position at any one time. (Satellite navigation systems will be reducing this error for both AWACS and JSTARS.) The radar will also have errors in its location of a particular target. The system must then predict where moving targets will be several minutes later when a weapon could intercept them. Finally the weapon itself will have an associated error in hitting the target.

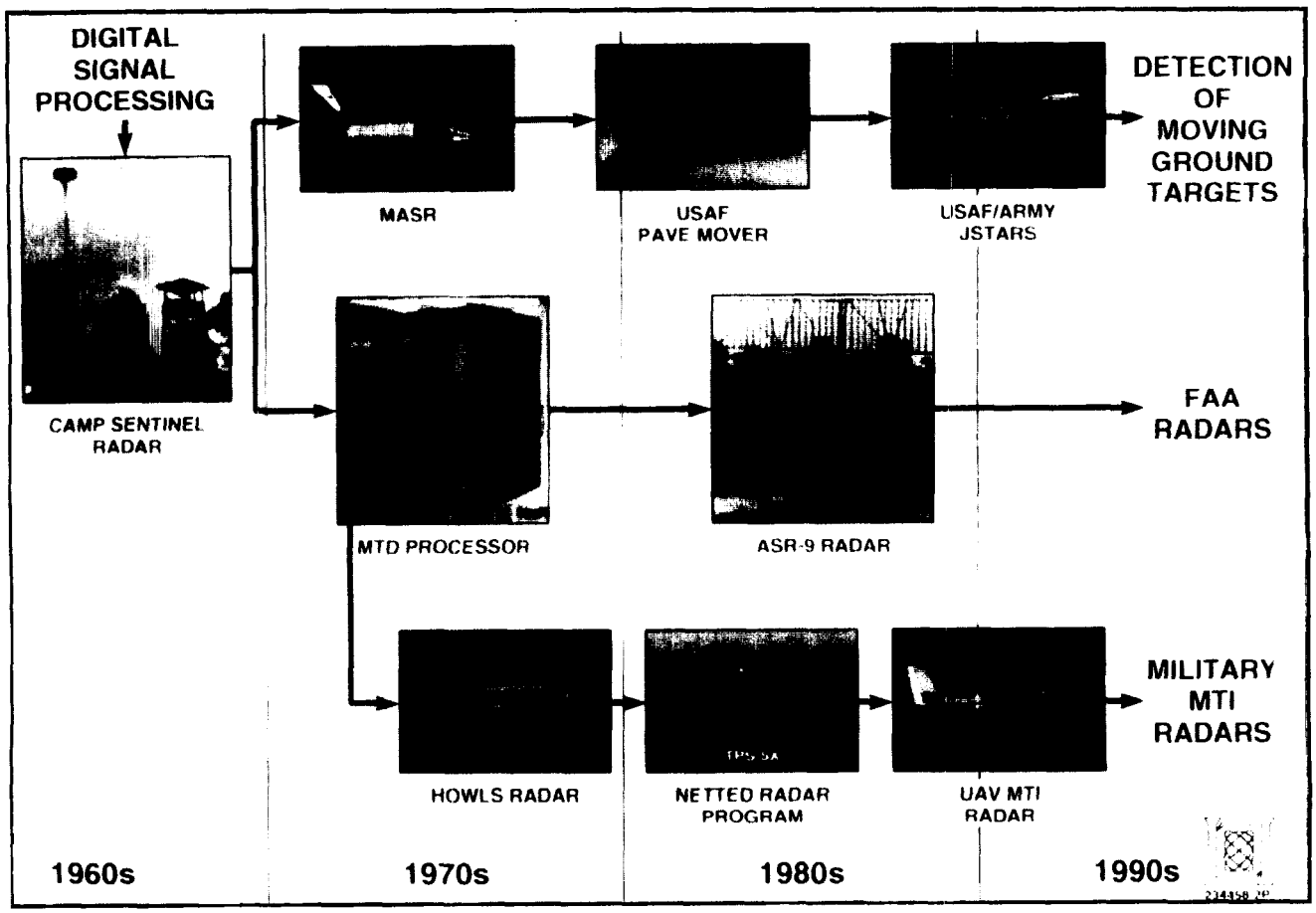



***Figure 3 - Evolution of MTI Radars for Detection of Moving Targets***

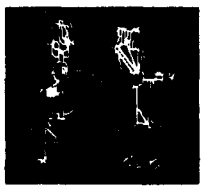
The combined errors produced a net estimate of precision for the entire system; i.e., the probability that sighting a particular target would result in the target being killed. Within this framework systems engineering was devoted to analyzing the cost effectiveness of reducing the error in any one component, compared with other components. The goal was to find out where further development would have the most impact on overall accuracy. MITRE, for example, arranged extensive field tests of trucks with different radar signatures moving across a variety of terrains, to get better empirical estimates of the radar detection problem.

The next broad systems consideration was to analyze the variety of scenarios and platforms that might carry these advanced radars. The analysts began with one of the most demanding scenarios, where Air Force aircraft would detect a tank column, send the signal to an Army surface-to-surface missile and provide direct fire control for the missile. Consideration was also given to flying the radars on Army helicopters or fixed wing aircraft and numerous other Air Force platforms. In 1984 the final joint service agreement for JSTARS provided for an Air Force managed, modified Boeing 707 to provide target information to a ground station for forwarding to fighter/bombers and ground commanders.

Feedback from the AWACS deployments suggested that the ground stations for that program were too demanding of the local logistical support in some parts of the world. An ESC team thus redefined the JSTARS parameters once more, to move all the computing and analysis capabilities onto the aircraft itself, thus allowing for a simple, highly mobile ground station.

Local components of the ESC team continued to play an active role after Grumman began the formal development process in 1985. One of the original software contractors, for example, was a local high-tech start-up company located a few miles from the base. Analytical Systems Engineering, in Burlington, reviewed and evaluated the contractors' design studies in comparison to the program goals. MEI Technology and Systems Resources Corp. provided engineering support for configuration management. Dynamics Research Corp., in Wilmington, designed another key component of the operating software. Each of these small engineering firms expanded the capabilities of the Joint STARS program office to manage the fast growing development.

MITRE also played a key role in the design of the development process. Grumman had originally planned a series of discrete, parallel efforts that would have left the system unusable until all the work was totally completed. MITRE successfully pressed for an iterative process where the whole system could function first at fifty to sixty percent of design goals, and then be successively upgraded. This change proved crucial when the development process was interrupted so that the two prototypes could fly to the Persian Gulf.



### JSTARS In Combat

> *In Desert Storm, JSTARS stole the show. Anyone who has seen the JSTARS moving target indicator radar displays, for example, of the Iraqi retreat from Kuwait City, will know why. Indeed, the screen images can be saved, combined, and then run sequentially, and the effect is magical. The enemy's forces deploy, scatter, and then regroup right in front of the viewer's eyes. JSTARS is visual; it shows you where your enemy is and what he's doing now. It should not surprise anyone that JSTARS was in great demand during Desert Storm.*

This quotation from the Gulf War Airpower Review testifies to the remarkable impact on the operating forces when an entirely new capability is available for the first time. In fact the two JSTARS prototypes rushed to the battlefield were demonstrating only the basic system capabilities: the development process was several years from completion. Each of the prototypes flew eleven-hour missions on alternate days. In between the team of ESC and contractor engineers implemented on-the-spot technical fixes, particularly in the computer software.

The two JSTARS E-8s were deployed to Saudi Arabia on 12 January 1991 and went into operation on 14 January, along with five Army ground stations. They played an important role in repulsing the Iraqi surprise attack on Khafji which began on 29 January. On that day JSTARS detected a convoy moving south from Kuwait City (Figure 4). It passed the target to the Airborne Battlefield Command and Control Center which called in coalition aircraft. The coalition forces reportedly destroyed 58 of the 61 vehicles in the convoy. Later that day JSTARS surveillance showed that the Iraqi forces in the Khafji incursion were not yet being provided with major reinforcements. This information clarified the tactical situation and greatly assisted the ground commanders in planning their counterattack.

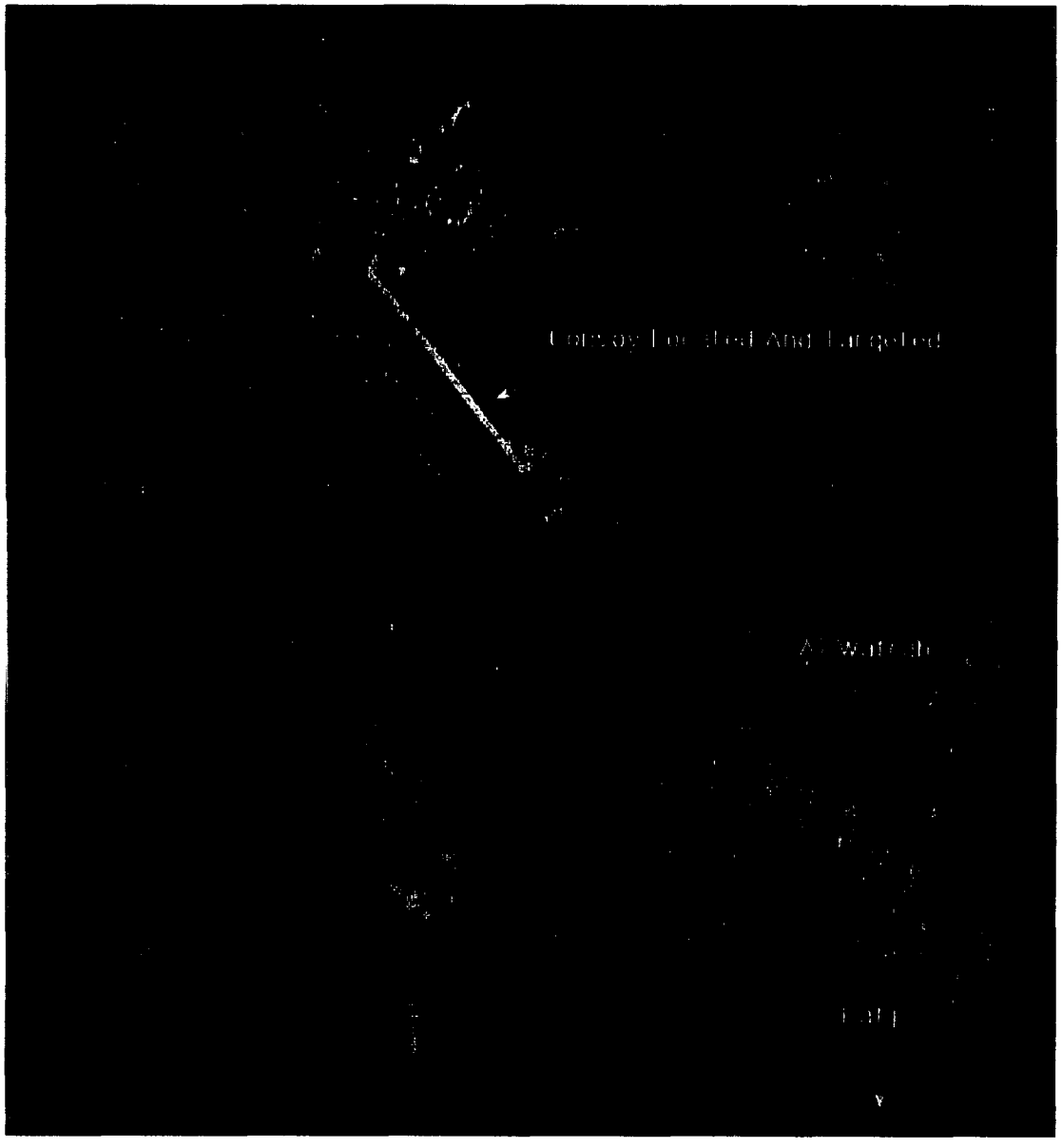


***Figure 4 - JSTARS Image of Iraqi Units Approaching Khafji, 29 January 1991***

The next day, 30 January 1991, JSTARS and other reconnaissance aircraft detected two Iraqi divisions marshalling for a follow-on attack. Their intention seems to have been to trap and then cut off the coalition forces. Instead with the early warning, coalition airpower systematically attacked and decimated the divisions throughout the night; by daybreak the Iraqis were retreating in disarray. B-52s, F-15s, F-16s, F-18s, and A-10s all participated in this effort. This example powerfully vindicated the original mission concept of the "Assault Breaker" studies from the 1970s: to head off enemy reinforcements before they could enter the ground engagement. Postwar analyses have stressed the importance of the Khafji fighting on Iraqi strategic planning. Having discovered that divisions on the move would be destroyed from the air, the Iraqis never again took the offensive.

Finally, during the fast moving ground war in February, JSTARS again proved remarkably effective in charting "the mother of all retreats" (Figure 5). Overall in 535 flying

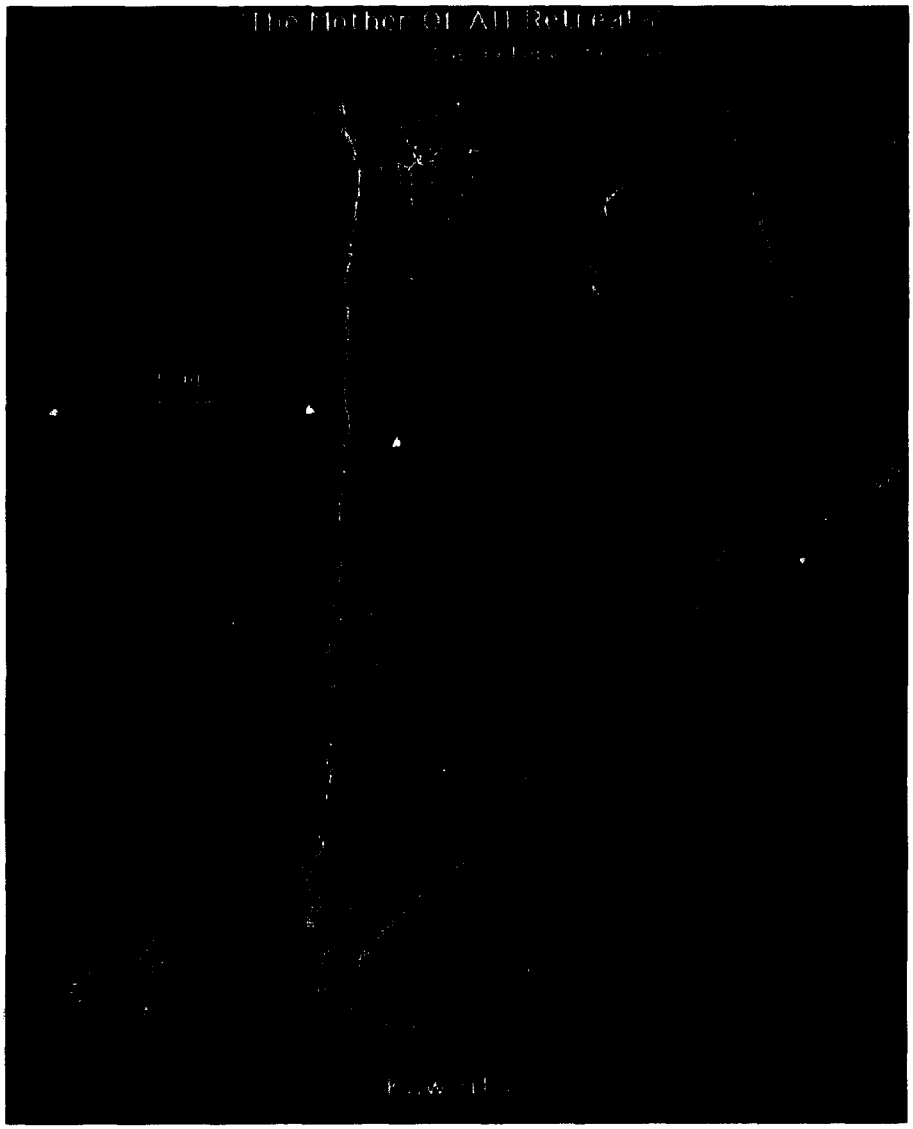


***Figure 5 - JSTARS Image of Iraqi Retreat 28 February 1991***

hours JSTARS located 1,000 important targets and controlled over 750 attack sorties. The only problem that developed was that the prototypes became too popular among the ground commanders. There was not enough capacity to meet all the requests. As the JSTARS commander recalled "every night we'd get into a battle . . . the VII Corps wanted to run it his way, and MARCENT wanted to run it their way".

### JSTARS Final Development

The initial six JSTARS aircraft are expected to undergo final field testing and then deployment in the near future. The first contract was for a total of 20 aircraft, but recent comments from OSD suggest that the high value placed on the system will lead to a full deployment of 40 or more planes. The U.S. has just recommended to NATO that it should also buy 12 planes for its forces.

Even during development the JSTARS computer systems were being upgraded to take advantage of rapidly moving commercial technology. Digital supplied new hardware developed around its world-class Alpha processing chip. Raytheon customized the hardware for military aviation use. MITRE oversaw the integration of the new computers with the other subsystems. This is an excellent example of how the Boston technical infrastructure speeds the use of advanced civilian technology for dual use applications.

## CONCLUSION: ESC AND THE FUTURE OF $C^4I$

JSTARS represents only one element in the battlefield of the future. In addition to deploying and upgrading current platforms, ESC is working on new advanced computing and information systems. Its largest challenge, though, will be to integrate these new systems into a broader network, where each system supports the others. Here cross-service interoperability will be of greatest importance.

Integrating new technology into existing programs and platforms has become a growing ESC role. For example, ESC is managing the complete revision of the command and control systems for NORAD at the Cheyenne Mountain command center. In addition, a major upgrade of the AWACS radar systems that will allow detection of targets with smaller cross-sections, such as cruise missiles, is under way.

But the ESC/MITRE technology groups are already looking further down the road. Aircraft-qualified, miniaturized supercomputers will soon be available. For both AWACS and JSTARS, a few supercomputers could replace the banks of specialized machines now

necessary. The extraordinary processing power would be another leap in flexibility. Yet with the considerable investment already in place, MITRE is carefully evaluating what the most cost-effective transition path would look like: integration from the present into the future.

The Gulf War revealed that new computerized capabilities did not interface well with functions that were still being carried out manually. Generating timely Air Tasking Orders for over 2,000 sorties/day was particularly difficult, and ESC is now working on a system to both automate this process, and integrate it with other related functions.

The war also underscored the need for more secure theatre-deployable communications systems, particularly those that are interoperable. This is one of about 15 current programs (Table 1) where ESC is the lead manager for joint developments. In fact ESC is more engaged in joint programs than any of the other equivalent service organizations. The Air Force in Fiscal Year 1995 will manage 52% of the total DoD $C^3$ budget, compared with 39% for the Army and Navy combined.

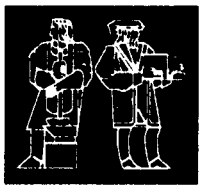
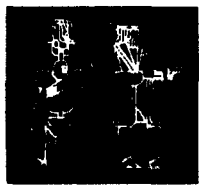


***Table 1 – ESC Joint Programs***

| Program | $M |
|---|---|
| Joint Services Imagery Processing System | 278 |
| Intelligence Data Handling Systems | 375 |
| Sentinel Training Systems | 27 |
| Joint Analysis Center | 70 |
| MATT Radio | 104 |
| Joint STARS | 4,770 |
| JTIDS | 696 |
| Milstar Terminals | 423 |
| DoD National Airspace System | 353 |
| Microwave/Precision Landing System | 46 |
| Tactical Secure Data Communication | 177 |
| Mission Support System | 293 |
| Joint Worldwide Intelligence Communication System | 100 |
| Joint Deployable Intelligence System | 50 |
| Ballistic Missile Defense $C^3$ | 50 |
| FA Radar | 300 |
| Total Value | 8,100 |

The essence of ESC's work, then, is integration. First matching parallel technologies with future mission requirements, then integrating technical subsystems into new weapons platforms. Now the work increasingly involves linking across platforms and services, to achieve effective theatre battle management. Yet the larger the technical system that needs to be integrated, the more it depends on the varied skills of the integrated professional team, which must see the whole picture from its central position.



The demand for $C^4I$ integrators continues to be strong. ESC's Air Force contracts have continued at an even pace, despite the budget tightening. Joint programs and foreign military sales have increased significantly, to over $1 billion/year, the closest thing there is to a market test of customer interest (Figure 6).

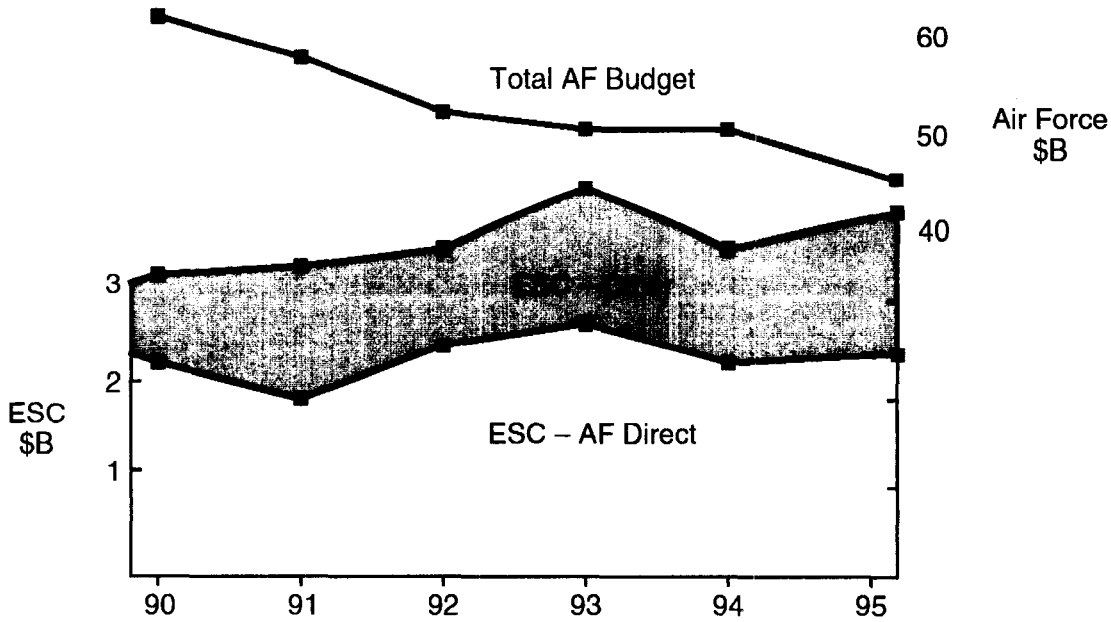
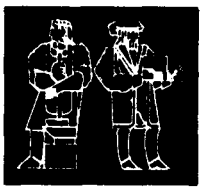



***Figure 6 - Impact of Joint Programs on Budget – ESC vs Air Force***

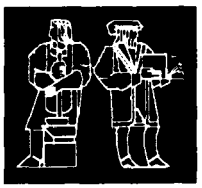
Because most of ESC's costs are related to staff, not infrastructure, relocating the same efforts somewhere else would save little money. But the true costs and loss of capability might be unacceptably high. Even if the whole ESC/MITRE partnership moved en masse, there would still be expensive disruptions of all the ongoing development work.

Moreover, building a new team from a different technical base could be a long and difficult task. ESC now depends on local contractors for 85% of its inhouse engineering support. Many of these would not be willing to move, or able to get their staff to move with them.

The current ESC integrated network, by contrast, has evolved over thirty years, and has proved its effectiveness. The Duke of Wellington once said, "I've spent most of my career wondering what was on the other side of the hill". With AWACS and JSTARS, ESC has changed the commander's vision of the battlefield forever. We now are beginning to know what is over the other side of the hill. The Hanscom team left in place can continue to improve this vital warfighting capability.



The Defense and Arms Control Studies (DACS) Program is a graduate-level, research and training program based at the MIT Center for International Studies. It traces its origins to two initiatives. One is the teaching on international security topics that Professor William Kaufmann began in the 1960s in the MIT Political Science Department. The other is the MIT-wide seminars on nuclear weapons and arms control policy that Professor Jack Ruina and Professor George Rathjens created in the mid 1970s.



The Program's teaching ties are primarily but not exclusively with the Political Science Department at MIT. The DACS faculty, however, includes natural scientists and engineers as well as social scientists. Of particular pride to the Program is its ability to integrate technical and political analyses in studies of international security issues.

Several of the DACS faculty members have had extensive government experience. They and the other Program faculty advise or comment frequently on current policy problems. But the Program's prime task is educating those young men and women who will be the next generation of scholars and practitioners in international security policy making. The Program's research and public service activities necessarily complement that effort.

The Center for International Studies is a major unit of the School of Humanities and Social Sciences at MIT and seeks to encourage the analysis of issues of continuing public concern. Key components of the Center in addition to DACS are Seminar XXI, which offers training in the analysis of international issues for senior military officers, government officials, and industry executives; and the MIT Japan Program, which conducts research and educational activities to further knowledge about Japanese technology, economic activities, and politics.

**Defense and Arms Control Studies Program**

**Massachusetts Institute of Technology**

292 Main Street (E38-603)

Cambridge, Massachusetts 02139

(617) 253-8075

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MASSACHUSETTS

## FOREWORD

The ESC Data Book & Economic Impact Calculation is a summary of selected management information regarding the Electronic Systems Center as well as the Hanscom AFB complex. The data contained in this booklet is the most current available; variable time frames have been selected to allow for the best presentation of the particular topics. Therefore, data is for FY94 or as of 30 September 1994. Some FY95 data has been projected/estimated. Although the statistics reflected herein are current and accurate as of the cutoff date, they should be used carefully and as unofficial data only. In addition, selected information on the Rome Laboratory, Griffiss AFB, NY; 38th Engineering Installation Wing, Tinker AFB, OK; Standard Systems Group, Maxwell AFB, Gunter Annex, AL; and Materiel Systems Group, Wright-Patterson AFB, OH have been included as separate sections in this booklet. The section on Rome Laboratory includes data for the Directorate of Electromagnetics and Reliability located at Hanscom AFB, MA. However, contracting data associated with this directorate is included with the ESC procurement data. This publication also includes the Hanscom Economic Impact Calculation for FY94. The data contained within this calculation provides information concerning the economic influence of Hanscom AFB on the New England economy.

This booklet was prepared by the 66th Mission Support Squadron, Directorate of Information Management, Products and Services Division (66 MSS/IMM), 5 Eglin Street, Hanscom AFB, MA 01731-2125. Forward any comments or suggestions directly to the 66 MSS/IMM in writing.

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# INTRODUCTION

# HISTORY OF
# HANSCOM AIR FORCE BASE
# BEDFORD, MASSACHUSETTS

Hanscom Air Force Base was built in 1941 on a large, flat, swampy area at the junction of the towns of Bedford, Concord, Lexington, and Lincoln as a strategic base to provide for the air defense of America.

Built by the U.S. Government, the airfield was officially established as a Massachusetts facility and later named in honor of Laurence G. Hanscom, an aviation enthusiast and political editor of the Worcester TELEGRAM who died in a plane crash in 1941.

During World War II, the federal government operated Hanscom AFB as a training base through a "right of entry" granted by Massachusetts. Although this right expired when the war ended, the Army Air Forces were granted certain rights under a lease arrangement which lasted until the early 1950s. Under this arrangement, Hanscom AFB was used jointly by the military and the Commonwealth.

By the end of World War II, the Massachusetts Institute of Technology had acquired a prominent position in electronics research. Many of the scientists and technicians employed by the government during the war were connected with MIT. The Army Air Forces wanted to employ the best available talent for the pursuit of its electronic research programs. In their hiring attempt, recruiters first intended to hire MIT graduates for jobs at either Wright Field, Ohio, or Watson Laboratories, New Jersey. This proved impractical because the majority of those interviewed were not interested in leaving the Boston area.

As an interim measure, the Air Technical Service Command decided to set up a field station in a government building in Cambridge, Massachusetts. In a short time, the Air Force's commitment to the Boston area greatly expanded.

In 1948, an Air Force drive was underway to transfer the Cambridge station to Rome, New York. At the request of the Cambridge station, Massachusetts made several attempts to keep the research station in the Boston area. Among these was an offer to the Air Force of sufficient land at Hanscom AFB, free of charge, to erect a permanent laboratory installation.

While the various governmental agencies argued the merits of the relocation to Hanscom, Reserve training began on the base. In July 1949, a modern Reserve program was created when Hanscom AFB was selected as one of 23 Air Force Reserve Training centers in the U.S. Under this program, the 987th Troop Carrier Wing was assigned for training and remained at Hanscom AFB until its members were called to active duty in Korea in 1951.

Also in 1951, Massachusetts renewed its efforts to have Cambridge Laboratories relocated to Hanscom. In January 1951, the Commonwealth proposed informally to the Chief of Staff of the Air Force that the Air Force assume greater control of the airport at Bedford or

fully operate it. In response, Air Force headquarters forwarded a proposed agreement, lease, and deed, which were approved by Massachusetts in May 1952.

Once final approval was given, the 6520th Test Support Wing was activated on Hanscom to furnish support to the research services as well as operate the test aircraft. Soon afterwards, both the Cambridge Research Center and the MIT Lincoln Laboratory buildings were completed at Hanscom.

The Electronic Systems Division (ESD) was established at Hanscom on April 1, 1961 by combining the Air Force Command and Control Development Division and the Electronic Systems Center (both Hanscom organizations). September 1973 marked the end of an era of flying missions at Hanscom. In June 1976, the Air Force Cambridge Research Center was redesignated the Air Force Geophysics Laboratory of the Phillips Laboratory and, in December 1990, became the Geophysics Division of the Phillips Laboratory.

ESD was redesignated the Electronic Systems Center (ESC) on July 1, 1992, as part of the establishment of the new Air Force Materiel Command. On October 1, 1993, ESC expanded, taking control of Standard Systems Center, now redesignated Standard Systems Group, at Gunter Annex, Maxwell AFB, Alabama; and Communication Systems Center at Tinker AFB, Oklahoma, which was redesignated the 38th Engineering Installation Wing. On January 1, 1994, ESC also took over operation of Materiel Systems Center, now redesignated Materiel Systems Group, Wright-Patterson AFB, Ohio, making ESC the true center of excellence for Air Force command, control, communications, computers, and intelligence (C4I).

Thus, the presence of ESC at Hanscom AFB is the result of the evolution and development of electronics technology and the electronics oriented community in the Boston area consisting of educational institutions, private industry, and military research and development installations.

## MISSION
## OF
## ELECTRONIC SYSTEMS CENTER

Electronic Systems Center (ESC) is the Air Force's center of excellence for the development and acquisition of command, control, communications, computer, and intelligence systems. It is a product organization of Air Force Materiel Command and is located at Hanscom Air Force Base, Massachusetts.

Formerly known as Electronic Systems Division, ESC became part of Air Force Materiel Command on 1 July 1992 when Air Force Systems Command and Air Force Logistics Command were merged as part of an Air Force reorganization to better meet the challenges of the future.

Hanscom Air Force Base owns neither runway nor aircraft. Hanscom Field, adjacent to the base, was turned over to the Massachusetts Port Authority and is now operated as a civilian airport. Although no military aircraft have been stationed at Hanscom since 1973, the base uses the main runways at Hanscom Field, and during FY94, over 3,000 separate takeoffs and landings were made by military aircraft.

ESC develops and acquires systems that combine computers, radars, information displays, and communications gear. These systems monitor enemy forces and allow U.S. commanders to make quick decisions based on the latest information and quickly transmit those decisions to troops in the field.

Among the systems developed by the Electronic Systems Center are the Airborne Warning and Control System (AWACS), the Ballistic Missile Early Warning System, the North American Aerospace Defense command center in Cheyenne Mountain, Colorado, and the Joint Surveillance Target Attack Radar System (Joint STARS).

ESC does not design or manufacture equipment; civilian contractors do that. In its system acquisition mission, ESC serves as manager; determining the eventual user's operational needs, defining systems to best meet those needs, soliciting proposals from industry, selecting contractors to build the product, monitoring the contractor's progress, and eventually testing the equipment to ensure it meets the user's requirements.

With its annual funding profile of over $3.3 billion, Hanscom AFB has a substantial economic impact on the Massachusetts and New England economy. Compared with the sales of Massachusetts firms, Hanscom AFB would rank among the top four industrial organizations in the state and sixteenth in New England. The Hanscom complex, including MITRE Corporation and MIT Lincoln Laboratory, has nearly 13,000 military and civilian employees with an annual payroll of more than $633 million.

## HANSCOM AFB ORGANIZATIONAL SYMBOLS

| | |
|---|---|
| Commander, Electronic Systems Center | ESC/CC |
| Executive Director | ESC/CD |
| Inspector General | ESC/IG |
| Senior Enlisted Advisor | ESC/CCC |
| Protocol | ESC/CCP |
| Commander's Action Group | ESC/CCX |
| Acquisition Logistics | ESC/AL |
| Acquisition Security | ESC/AS |
| Air Base Decision Systems | ESC/AV |
| Airborne Warning and Control Systems | ESC/AW |
| Air Force Band of Liberty | ESC/BA |
| Small Business | ESC/BC |
| Acquisition Environmental Management | ESC/CE |
| Engineering and Program Management | ESC/EN |
| Financial Management and Comptroller | ESC/FM |
| History | ESC/HO |
| International Programs | ESC/IA |
| Intelligence and C3CM Systems | ESC/IC |
| Intelligence | ESC/IN |
| Peace Shield | ESC/IS |
| Staff Judge Advocate | ESC/JA |
| Joint STARS | ESC/JS |
| MILSTAR | ESC/MC |
| Manpower | ESC/MO |
| Public Affairs and Communication Services | ESC/PA |
| Contracting | ESC/PK |
| Quality Initiatives | ESC/QI |
| Safety | ESC/SE |
| Space and Missile Warning Systems | ESC/SR |
| Joint Tactical Information Distribution System | ESC/TD |
| Communications and Airspace Management | ESC/TG |
| Surveillance and Control | ESC/TN |
| Staff Meteorologist | ESC/WE |
| Plans and Advanced Programs | ESC/XR |
| Mission Planning | ESC/YV |
| Special Projects | ESC/ZJ |

| | |
|---|---|
| Commander, 66th Air Base Wing | ABW/CC |
| Command Post | ABW/CP |
| Plans Office | ABW/XP |
| Chaplain | ABW/HC |
| Social Actions | ABW/SA |
| 66th Logistics Squadron | ABW/LG |
| 66th Medical Group | ABW/SG |
| Commander, 66th Support Group | SPTG/CC |
| 66th Security Police Squadron | SPTG/SP |
| 66th Civil Engineer Squadron | SPTG/CE |
| 66th Services Squadron | SPTG/SV |
| Communications Division | SPTG/SC |
| Civilian Personnel Division | SPTG/DPC |
| Commander, 66th Mission Support Squadron | MSS/CC |
| Education and Training Flight | MSS/DPE |
| Family Support Flight | MSS/DPF |
| Military Personnel Flight | MSS/DPM |
| Center Support Flight | MSS/DPO |
| Information Management | MSS/IM |
| Commander, HQ Squadron Section | MSS/CCQ |

Note: Organizational symbols reflect ESC Organizations as of 1 October 1994.

# PROFILE OF HANSCOM AFB WORKFORCE

**Joint STARS**

## AUTHORIZED MANPOWER
## ESC TREND

| | FY90 | FY91 | FY92 | FY93 | FY94 | Projected FY95 |
|---|---|---|---|---|---|---|
| ACQUISITION MISSION | 2,483 | 2,403 | 2,391 | 2,126 | 2,258 | 2,140 |
| BASE OPERATING SUPPORT | 1,217 | 1,308 | 1,313 | 1,231 | 1,276 | 1,216 |
| **ESC SUBTOTAL** | **3,700** | **3,711** | **3,704** | **3,357** | **3,534** | **3,356** |
| 38TH ENG INSTALLATION WING | * | * | * | * | 3,694 | 3,697 |
| ECAC | 50 | ** | ** | ** | ** | ** |
| MATERIEL SYSTEMS GROUP | * | * | * | * | 743 | 652 |
| ROME LAB | 1,240 | 1,163 | 1,128 | 1,055 | 992 | 939 |
| STANDARD SYSTEMS GROUP | * | * | * | * | 1,771 | 1,735 |
| **SUBTOTAL** | **1,290** | **1,163** | **1,128** | **1,055** | **7,200** | **7,023** |
| ***TOTAL*** | ***4,990*** | ***4,874*** | ***4,832*** | ***4,412*** | ***10,734*** | ***10,379*** |

*** Organizations were not part of ESC.**
**** Not Assigned to ESC.**

## AUTHORIZED MANPOWER COMPOSITION
## FY94

| | OFFICER | ENLISTED | CIVILIAN | TOTAL |
|---|---|---|---|---|
| ACQUISITION MISSION | 772 | 171 | 1,315 | **2,258** |
| BASE OPERATING SPT--ESC | 58 | 212 | 201 | **471** |
| BASE OPERATING SPT--ABW | 26 | 323 | 312 | **661** |
| BASE OPERATING SPT--MED SQ | 34 | 95 | 15 | **144** |
| ROME LAB--GRIFFISS AFB | 83 | 27 | 725 | **835** |
| ROME LAB--HANSCOM AFB | 13 | 8 | 136 | **157** |
| 38TH ENG INSTALLATION WING | 270 | 2,015 | 1,409 | **3,694** |
| MATERIEL SYSTEMS GROUP | 25 | 32 | 686 | **743** |
| STANDARD SYSTEMS GROUP | 233 | 936 | 602 | **1,771** |
| ***TOTAL*** | ***1,514*** | ***3,819*** | ***5,401*** | ***10,734*** |

## AUTHORIZED MANPOWER
## ACQUISITION MISSION SKILLS BREAKOUT

Of all the acquisition mission manpower spaces in FY94, the first five skill areas shown account for 70% of the acquisition mission spaces. The remaining professional skill areas account for 5% of the spaces, and the nonprofessional skills account for 25% of the spaces.

| PROFESSIONAL SKILLS | FY90 | FY91 | FY92 | FY93 | FY94 |
|---|---|---|---|---|---|
| SCIENTIFIC & ENGINEERING | 775 | 727 | 726 | 646 | 672 |
| COMPUTER & COMMUNICATIONS | 193 | 187 | 186 | 165 | 188 |
| PROGRAM CONTROL & COMPTROLLER | 381 | 369 | 367 | 326 | 342 |
| CONTRACTING & MANUFACTURING | 298 | 288 | 287 | 255 | 269 |
| LOGISTICS | 107 | 104 | 103 | 92 | 97 |
| INTELLIGENCE | 13 | 13 | 13 | 11 | 10 |
| OTHER | 115 | 115 | 112 | 100 | 119 |
| **SUBTOTAL** | **1,862** | **1,803** | **1,794** | **1,595** | **1,697** |
| **NONPROFESSIONAL SKILLS** | | | | | |
| CLERICAL | 366 | 354 | 352 | 313 | 323 |
| CONTRACTING | 84 | 81 | 81 | 72 | 79 |
| OTHER | 171 | 165 | 164 | 146 | 159 |
| **SUBTOTAL** | **621** | **600** | **597** | **531** | **561** |
| ***TOTAL*** | ***2,483*** | ***2,403*** | ***2,391*** | ***2,126*** | ***2,258*** |

## ASSIGNED STRENGTH -- HANSCOM COMPLEX

| Classification | LIVING ON-BASE | LIVING OFF-BASE | TOTAL |
|---|---|---|---|
| **APPROPRIATED FUND MILITARY** | | | |
| Active-Duty Permanent Party | 874 | 938 | 1,812 |
| ANG/Reserve Permanent Party | 57 | 23 | 80 |
| Traditional Guardsmen/Reserve | 0 | 1,695 | 1,695 |
| **SUBTOTAL** | **931** | **2,656** | **3,587** |
| **APPROPRIATED FUND--CIVILIAN** | | | |
| Senior Executive Service | | | 8 |
| General Schedule | | | 1,797 |
| Federal Wage Board | | | 143 |
| Other | | | 3 |
| **SUBTOTAL** | | | **1,951** |
| **NON-APPROPRIATED FUND--CONTRACT, CIVILIAN, & PRIVATE BUSINESS** | | | |
| Civilian NAF | | | 252 |
| Civilian BX | | | 91 |
| Contract Civilians (LL 2,694 & MITRE 2,670) | | | 5,364 |
| Private Businesses on-base by type: | | | |
| 56 Credit Union/ 19 BX Concessionaires | | | 75 |
| Technical Support Contractors | | | 1,121 |
| Other Tenant Organizations | | | 335 |
| **SUBTOTAL** | | | **7,238** |
| ***TOTAL STRENGTH - HANSCOM COMPLEX*** | | | ***12,776*** |
| **ACTIVE DUTY MILITARY DEPENDENTS** | 1,532 | 1,347 | **2,879** |
| **MILITARY RETIREES** (within 50 mile radius of Hanscom) | | | |
| Air Force | | | 9,236 |
| Army | | | 9,516 |
| Navy | | | 10,174 |
| Marines | | | 1,661 |
| Coast Guard | | | 1,096 |
| ***TOTAL RETIREES*** | | | ***31,683*** |

## HANSCOM ASSIGNED STRENGTH

| ASSIGNED CIVILIAN | |
|---|---|
| SENIOR EXEC SERVICE | 8 |
| GENERAL SCHEDULE | 1,760 |
| WAGE SUPERVISOR | 22 |
| WAGE LEADER | 7 |
| WAGE GRADE | 105 |
| OTHER EMPLOYEES | 3 |
| STUDENT AIDS | 0 |
| **TOTAL** | **1,905** |

| ASSIGNED MILITARY | |
|---|---|
| OFFICERS | 950 |
| ENLISTED | 862 |
| **TOTAL** | **1,812** |
| ***TOTAL ASSIGNED*** | ***3,717*** |

## HANSCOM GRADE STRUCTURE

**GENERAL SCHEDULE**

| *GS* | *NO.* |
|---|---|
| 1 | 0 |
| 2 | 2 |
| 3 | 0 |
| 4 | 19 |
| 5 | 178 |
| 6 | 107 |
| 7 | 104 |
| 8 | 13 |
| 9 | 64 |
| 10 | 11 |
| 11 | 166 |
| 12 | 487 |
| 13 | 347 |
| 14 | 173 |
| 15 | 89 |
| ***TOTAL GS*** | ***1,760*** |

**MILITARY BY GRADE**

| *GRADE* | *NO.* |
|---|---|
| LT GEN | 1 |
| MAJ GEN | 0 |
| BRIG GEN | 0 |
| COL | 40 |
| LT COL | 118 |
| MAJ | 184 |
| CAPT | 411 |
| 1ST LT | 111 |
| 2D LT | 85 |
| CMSGT | 14 |
| SMSGT | 18 |
| MSGT | 112 |
| TSGT | 122 |
| SSGT | 216 |
| SGT | 39 |
| SRA | 166 |
| A1C | 136 |
| AMN | 32 |
| AB | 7 |
| ***TOTAL MILITARY*** | ***1,812*** |

## HANSCOM CIVILIAN STRENGTH
## LENGTH OF SERVICE vs AGE DISTRIBUTION

| | YEARS OF SERVICE | | | | | |
|---|---|---|---|---|---|---|
| **AGE** | **0-4** | **5-19** | **20-24** | **25-29** | **30+** | **TOTAL** |
| 34 AND BELOW | 33 | 242 | 0 | 0 | 0 | 275 |
| 35-39 | 9 | 203 | 22 | 0 | 0 | 234 |
| 40-44 | 9 | 174 | 89 | 7 | 0 | 279 |
| 45-49 | 15 | 141 | 127 | 88 | 4 | 375 |
| 50-54 | 6 | 111 | 50 | 69 | 57 | 293 |
| 55-59 | 5 | 94 | 26 | 45 | *69 | 239 |
| 60-61 | 0 | 33 | *11 | *8 | *19 | 71 |
| 62 AND ABOVE | 0 | *41 | *18 | *20 | *60 | 139 |
| ***TOTAL*** | ***77*** | ***1,039*** | ***343*** | ***237*** | ***209*** | ***1,905*** |

*** Eligible for Voluntary Retirement total is 246 or 12.91% of workforce.**

## DEPENDENTS OF MILITARY ASSIGNED TO HANSCOM AFB

| OFF-BASE | 0-4 | 5-14 | 15-18 | 19+ | Total Children | Total Spouses | Total Dependents in House | Total Dependents |
|---|---|---|---|---|---|---|---|---|
| Airmen Dependents | 45 | 82 | 28 | 6 | 161 | 212 | 426 | 533 |
| Officer Dependents | 82 | 140 | 40 | 13 | 275 | 311 | 724 | 814 |
| **OFF-BASE TOTAL** | **127** | **222** | **68** | **19** | **436** | **523** | **1,150** | **1,347** |
| **ON-BASE** | | | | | | | | |
| Airmen Dependents | 119 | 167 | 36 | 10 | 332 | 341 | 780 | 917 |
| Officer Dependents | 82 | 110 | 37 | 12 | 241 | 234 | 585 | 615 |
| **ON-BASE TOTAL** | **201** | **277** | **73** | **22** | **573** | **575** | **1,365** | **1,532** |
| ***GRAND TOTAL*** | ***328*** | ***499*** | ***141*** | ***41*** | ***1,009*** | ***1,098*** | ***2,515*** | ***2,879*** |

# HANSCOM AFB
# GENERAL DATA

**Airborne Warning and Control System**

## REAL ESTATE AND FACILITIES

| | ACQUISITION COST--FOR LAND ONLY | ACRES | BUILDINGS (SQ FT) |
|---|---|---|---|
| **HANSCOM AFB, MA** | | | |
| Fee Owned | $292,507 | 528 | 4,430,636 |
| Easement, Right of Way | | 7 | |
| Leased | | 59 | |
| Donated | | 252 | |
| **SITES** | | | |
| Ipswich, MA | 1,165 | 65 | 11,285 |
| Prospect Hill, MA | 196 | 6 | 4,824 |
| Sagamore Hill, MA | 500 | 32 | 10,139 |
| Fourth Cliff, Plymouth, MA | 1,756 | 56 | 23,546 |
| ***TOTAL*** | ***$296,124*** | ***1,005*** | ***4,480,430*** |

**Hanscom AFB also provides limited civil engineering support to the following sites. Hanscom, however, does not "own" these locations. They were transfered to Hanscom for support when other Air Force bases in New England closed.**

| | | | |
|---|---|---|---|
| Loring Rec Annex - Dow Pines, ME | N/A | 376 | 20,452 |
| Irish Ridge, Fairfield, ME | 5,000 | 4 | N/A |
| Patten Communications Site, ME | 5,786 | 24 | N/A |
| Searsport Defense Fuel Sup Point, ME | 140,085 | 1,266 | 16,884 |

| **BUILDINGS** | NUMBER | SQ FT |
|---|---|---|
| Maintenance and Production | 25 | 187,809 |
| Operational and Training | 12 | 118,218 |
| Research, Development and Test | 45 | 1,922,795 |
| Supply | 12 | 150,760 |
| Hospital and Medicine | 2 | 44,487 |
| Administration | 17 | 317,438 |
| Community | 90 | 734,539 |
| Utilities and Grounds | 12 | 37,578 |
| Housing | 212 | 917,012 |
| ***TOTAL*** | ***427*** | ***4,430,636*** |

## BASE HOUSING

| TYPE OF HOUSING | NUMBER | TOTAL |
|---|---|---|
| ***FAMILY HOUSING*** | | |
| Flintlock Ridge | 395 UNITS | |
| Musket Meadows | 200 UNITS | |
| Battle Road Glen | 100 UNITS | |
| Patriot Village | 163 UNITS | |
| | | **858 UNITS** |

| ***Family Housing*** | 2-BR | 3-BR | 4-BR | Total |
|---|---|---|---|---|
| Officers | 124 | 169 | 93 | **386** |
| Enlisted | 164 | 220 | 88 | **472** |
| | **288** | **389** | **181** | ***858*** |

| | | |
|---|---|---|
| ***MOBILE HOME PARK*** | | **98 LOTS** |
| ***BACHELOR QUARTERS*** | | |
| Officers | 14 BED SPACES | |
| Enlisted | 306 BED SPACES | |
| | | **320 BED SPACES** |
| ***VISITOR QUARTERS*** | | |
| VIP | 14 SUITES | |
| VOQ | 77 BED SPACES | |
| | | **91 BED SPACES** |
| ***TEMPORARY LODGING FACILITY*** | 41 UNITS | **196 BED SPACES** |

## VALUE OF RESOURCES AND EXPENDITURES

| | |
|---|---|
| **CAPITAL ASSETS** (As of 30 September 1994) | |
| Land, Buildings, and Real Property | ***$836,700,000**** |
| **EQUIPMENT** (As of 30 September 1994) | |
| Appropriated Fund | $83,101,391 |
| Non-appropriated Fund (NAF) | 1,746,790 |
| ***TOTAL*** | ***$84,848,181*** |
| **INVENTORIES** (As of 30 September 1994) | |
| 1. Stock Funds | $6,872,418 |
| 2. Sales Outlets | |
| a. Base Exchange (BX) | 3,075,665 |
| b. Commissary | 869,291 |
| c. NAF Activities | 170,959 |
| ***TOTAL*** | ***$10,988,333*** |
| **RETAIL SALES** (Fiscal Year 1994) | |
| BX | $8,519,995 |
| Commissary | 20,996,385 |
| NAF Activities | 2,501,139 |
| ***TOTAL*** | ***$32,017,519*** |
| **BASE OPERATIONS AND MAINTENANCE OUTLAYS** (Fiscal Year 1994; Excludes Civilian Pay) | ***$117,752,831*** |

*** (Represents capital asset replacement value.)**

## FORCE STRUCTURE

**AIRCRAFT ASSIGNED**
There are no military aircraft currently assigned to Hanscom AFB.

**RUNWAYS** (owned and operated by Massachusetts Port Authority)

| | |
|---|---|
| E/W | 7,000 ft long |
| NE/SW | 5,000 ft long |

***NOTE: Although there are no military aircraft permanently assigned to Hanscom AFB, and the runways are owned and operated by Massachusetts Port Authority, military aircraft do have access to these runways. During FY94, various types of military aircraft accomplished over 3,000 separate takeoffs and landings at Hanscom AFB. (This information was provided by 66 ABW, Transient Alert Branch.)**

## VEHICLES AND COMPUTERS

| **VEHICLES** | **Number** |
|---|---|
| Owned | 379 |
| Leased | 23 |
| ***TOTAL*** | **402** |

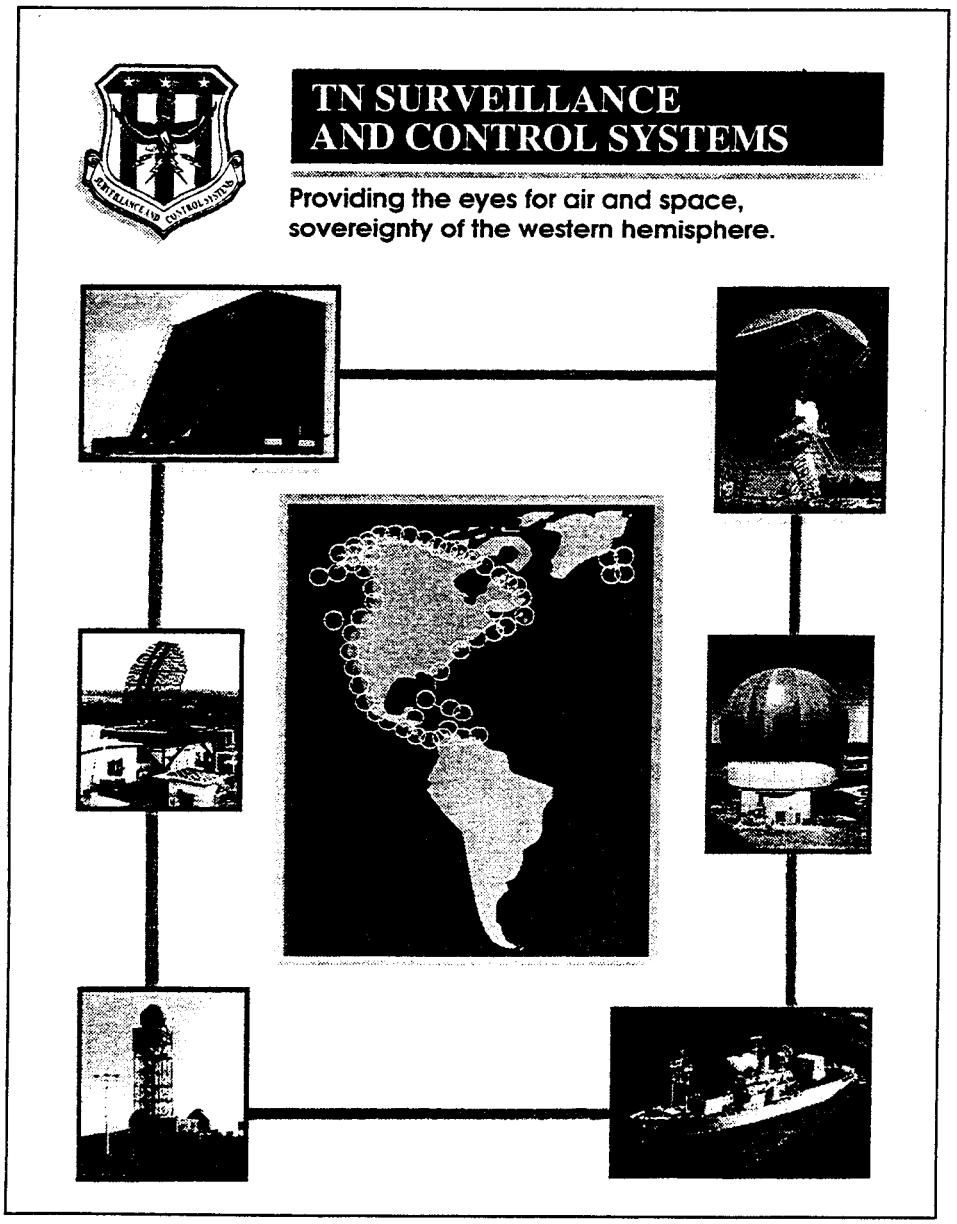
| **COMPUTERS** | **Number** |
|---|---|
| Owned | 3,358 |
| Leased | 0 |
| ***TOTAL*** | **3,358** |

## MEDICAL DATA

| | |
|---|---|
| **MILITARY TREATMENT FACILITY** | |
| CLINIC PATIENT VISITS | **35,816** |
| DENTAL COMPOSITE TIME VALUES | **56,878** |
| IMMUNIZATIONS | **5,628** |
| X-RAY FILMS EXPOSED | **6,117** |
| LAB PROCEDURES | **408,603** |
| PHARMACY PRESCRIPTIONS FILLED | **104,525** |
| OPTOMETRY REFRACTIONS | **2,786** |

| | |
|---|---|
| **BRIGHTON MARINE HMO (HANSCOM FACILITY)** | |
| USFHP ENROLLMENT | |
| ADULT MEMBERS | **2,838** |
| PEDIATRIC MEMBERS | **975** |
| CLINIC PATIENT VISITS | **20,838** |
| PHARMACY PRESCRIPTIONS FILLED | **16,866** |

# MISSION DATA



## ESC FUNDING
## ($ IN MILLIONS)

| | FY90 | FY91 | FY92 | FY93 | FY94 | FY95* |
|---|---|---|---|---|---|---|
| **MISSION** | | | | | | |
| 3600-RDT& E + | 874.2 | 783.5 | 1133.2 | 801.2 | 710.3 | 640.0 |
| OSD | 123.6 | 92.3 | 109.1 | 80.9 | 30.7 | 66.8 |
| BMD/SDI | 30.5 | 12.7 | 18.7 | 16.8 | 9.6 | 16.1 |
| 3080-OTHER | 913.5 | 559.4 | 553.8 | 364.4 | 194.6 | 236.7 |
| 3010-AIRCRAFT | 15.5 | 0.6 | 235.4 | 756.5 | 662.0 | 845.7 |
| 3400-O&M | 25.7 | 72.2 | 25.4 | 4.3 | 21.4 | 53.6 |
| **MISSION SUBTOTALS** | **$1983.0** | **$1520.7** | **$2075.6** | **$2024.1** | **$1628.6** | **$1858.9** |
| FMS ** | 256.8 | 985.2 | 214.5 | 820.1 | 1182.8 | 742.0 |
| OTHER AGENCY FUNDS | 396.9 | *** | *** | *** | 1.1 | *** |
| **MISSION TOTAL** | **$2636.7** | **$2505.9** | **$2290.1** | **$2844.2** | **$2812.5** | **$2600.9** |
| **BASE SUPPORT** | | | | | | |
| 3400-O&M # | 110.7 | 103.2 | 132.0 | 102.6 | 112.4 | 140.0 |
| 3300-MILCON | 3.2 | 0.0 | 4.4 | 0.0 | 0.0 | 0.0 |
| MILITARY PAYROLL | 102.3 | 108.5 | 112.7 | 112.5 | 80.8 | 83.2 |
| OTHER MFH & OSD | *** | *** | *** | 14.5 | 12.9 | 6.4 |
| **SUPPORT TOTAL** | **$216.2** | **$211.7** | **$249.1** | **$229.6** | **$206.1** | **$229.6** |
| **ESC (HANSCOM) TOTAL** | **$2852.9** | **$2717.6** | **$2539.2** | **$3073.8** | **$3018.6** | **$2830.5** |
| 38TH ENG INSTALL WING | 167.3 | 176.4 | 204.4 | 201.2 | 236.2 | 216.1 |
| MATERIEL SYSTEMS GRP | *** | *** | 119.2 | 148.4 | 212.8 | 213.9 |
| ROME LABORATORY | 373.0 | 327.0 | 317.0 | 333.0 | 367.0 | 377.0 |
| STANDARD SYSTEMS GRP | 213.7 | 210.2 | 281.3 | 299.5 | 346.3 | 164.3 |
| ***ESC TOTAL*** | ***$3606.9*** | ***$3431.2*** | ***$3461.1*** | ***$4055.9*** | ***$4180.9*** | ***$3801.8*** |

\+ Does not include OSD/SDI funds; they are recorded separately.
\# ESC (Hanscom) only. Does not include 38EIG, MSG, RL, SSG funding.
* The FY95 figures are an estimate based on the latest available information.
** Obligation forecast of FMS funds.
*** Not Available.

**APPROVED PROGRAM -- MISSION FUNDS BREAKDOWN**
**($ IN MILLIONS)**

| DEPUTY | FY92 | FY93 | FY94 |
|---|---|---|---|
| AIR BASE DECISION & MAC C2 IPS (AV) | $168.1 | $184.9 | $148.2 |
| AIRBORNE WARNING & CONTROL (AW) | 300.1 | 195.7 | 179.3 |
| ENGINEERING & PROGRAM MANAGEMENT (EN) | 42.3 | 49.4 | 28.3 |
| PROJECT PLANNING (FM) | 50.3 | 6.6 | 4.4 |
| INTELLIGENCE & C3CM (IC) | 61.4 | 65.4 | 47.4 |
| JOINT STARS (JS) | 474.2 | 934.9 | 835.5 |
| MILSTAR (MS) | 321.5 | 5.8 | 23.8 |
| SPACE & MISSILE WARNING (SR) | 175.0 | 188.0 | 154.8 |
| JTIDS (TD) | 108.8 | 61.5 | 40.0 |
| COMM & AIRSPACE MANAGEMENT SYSTEMS (TG) | 141.0 | 107.8 | 70.7 |
| AIR SURVEILLANCE & CONTROL (TN) | 157.7 | 124.0 | 20.0 |
| PLANS & ADVANCED PROGRAMS (XR) | 34.4 | 22.8 | 15.1 |
| MISSION PLANNING (YV) | 40.8 | 76.8 | 61.1 |
| ***TOTALS*** | ***$2075.6*** | ***$2023.6*** | ***$1628.6*** |

NOTE: Released Direct Authority excluding Foreign Military Sales (FMS).

## CONTRACT ACTION SUMMARY
## ($ IN MILLIONS)

These charts show the total number and obligation value of contractual actions awarded by the ESC Deputy for Contracting during FY94. This includes awards for ESC and the on and off-base tenants it services.

### SUMMARY OF ALL FY94 -- CONTRACTING ACTIONS

| | SMALL BUSINESS | | LARGE BUSINESS | | ALL OTHER* | | TOTAL | |
|---|---|---|---|---|---|---|---|---|
| | # Actns | $ Oblig | # Actns | $ Oblig | # Actns | $ Oblig | # Actns | $ Oblig |
| **System** | 867 | $172.1 | 760 | $1,547.0 | 324 | $1,008.1 | 1951 | $2,727.2 |
| **R&D** | 328 | 31.8 | 140 | 64.2 | 196 | 16.8 | 664 | 112.8 |
| **Operational** | 31,468 | 60.0 | 2,190 | 29.1 | 2,967 | 15.1 | 36,625 | 104.2 |
| ***TOTAL*** | ***32,663*** | ***$263.9*** | ***3,090*** | ***$1,640.3*** | ***3,487*** | ***$1,040.0*** | ***39,240*** | ***$2,944.2*** |

* Not-for-Profit/Universities/Intragovernmental/Foreign Military Sales/Work outside U.S. by overseas firms.

## CONTRACT ACTION SUMMARY
## DOLLAR RANGE DISTRIBUTION
## ($ IN MILLIONS)

The data displayed is for actions processed by the Deputy for Contracting during FY94. This includes Systems, Operational Contracting, Geophysics Laboratory, and Tenant contracts.

| $ DOLLAR RANGE | NUMBER CONTRACT ACTIONS | PERCENTAGE OF NUMBER OF CONTRACT ACTIONS | DOLLARS OBLIGATED | PERCENTAGE OF DOLLARS OBLIGATED |
|---|---|---|---|---|
| System / R&D | | | | |
| 0.000 -- 0.024 | 427 | 1.1 | $4.7 | .1 |
| 0.025 -- 0.099 | 706 | 1.8 | 38.5 | 1.3 |
| 0.100 -- 0.349 | 599 | 1.5 | 113.0 | 3.76 |
| 0.350 -- 0.499 | 120 | .3 | 49.5 | 1.63 |
| 0.500 -- 0.999 | 186 | .5 | 132.4 | 4.4 |
| 1.000 -- 4.999 | 227 | .6 | 486.3 | 16.2 |
| 5.000 -- 9.999 | 48 | .12 | 332.2 | 11.1 |
| 10.000 -- 24.999 | 38 | .1 | 586.1 | 19.55 |
| 25.000 -- 50.000 | 14 | .04 | 442.8 | 14.7 |
| 50.000 & over | 5 | .02 | 716.4 | 23.8 |
| **SUBTOTAL** | **2,370** | **6.08** | **2,901.9** | **96.54** |
| Operational* | 36,625 | 93.92 | 104.2 | 3.46 |
| ***TOTAL*** | ***38,995*** | ***100.00%*** | ***$3,006.1*** | ***100.00%*** |

* No dollar range breakout provided.

**CONTRACT SUMMARY**
**TYPE OF ACTIONS**
**($ IN MILLIONS)**

| Type of Action | Contract Actions | Percent of Number of Contract Actions | Dollars Obligated | Percent of Dollars Obligated |
|---|---|---|---|---|
| *FIXED PRICE* | | | | |
| Firm | 37,196 | 94.8 | $972.1 | 33.00 |
| Escalation | 8 | 0.02 | 0.6 | 0.02 |
| Incentive | 145 | 0.37 | 337.3 | 11.50 |
| **TOTAL FIXED PRICE** | **37,349** | **95.19%** | **$1,310.0** | **44.52%** |
| *COST REIMBURSEMENT* | | | | |
| Cost (No Fee) | 172 | 0.44 | $434.2 | 14.80 |
| Sharing | 2 | 0.01 | 0.4 | 0.01 |
| Fixed Fee | 381 | 0.97 | 148.5 | 5.00 |
| Incentive Fee | 44 | 0.11 | 222.3 | 7.56 |
| **TOTAL COST REIMBURSEMENT** | **599** | **1.53%** | **$805.4** | **27.37%** |
| TIME & MATERIAL | 62 | 0.16 | 25.1 | 0.85 |
| LABOR HOUR | 477 | 1.20 | 277.6 | 9.40 |
| AWARD FEE | 98 | 0.25 | 84.4 | 2.86 |
| **SUBTOTAL** | **38,585** | **98.33%** | **$2,502.5** | **85.00%** |
| *FOREIGN MILITARY SALES (FMS)* | 172 | 0.43 | 434.0 | 14.70 |
| INTRAGOVERNMENTAL/ UNCATEGORIZED | 483 | 1.24 | 7.7 | 0.30 |
| ***OVERALL TOTAL*** | ***39,240*** | ***100.00%*** | ***$2,944.2*** | ***100.00%*** |

## HANSCOM AFB CONTRACTORS
## LARGE BUSINESS

Identified below are the 15 **Large Business** firms which received the greatest dollar value of Hanscom AFB awards in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | GRUMMAN AEROSPACE | $710,511,400$ |
| 2 | THE BOEING COMPANY | 144,721,439 |
| 3 | RAYTHEON | 110,380,891 |
| 4 | GEC MARCONI | 85,960,078 |
| 5 | GTE PRODUCTS CORPORATION | 64,621,941 |
| 6 | LOCKHEED | 59,779,647 |
| 7 | WESTINGHOUSE ELECTRIC | 49,328,302 |
| 8 | ITT RESEARCH INSTITUTE | 46,739,808 |
| 9 | ROCKWELL INTERNATIONAL | 32,445,122 |
| 10 | LORAL COMMAND & CONTROL | 31,768,275 |
| 11 | MARTIN MARIETTA | 28,690,083 |
| 12 | CSC/DEFENSE SYSTEMS DIVISION | 26,101,544 |
| 13 | BECHTEL | 24,995,746 |
| 14 | CTA | 24,719,274 |
| 15 | LITTON, INC | 24,563,380 |

## HANSCOM AFB CONTRACTORS
## SMALL BUSINESS

Identified below are the 15 **Small Business** firms which received the greatest dollar value of Hanscom AFB awards in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | INFOTECH DEVELOPMENT, INC * | $33,420,332 |
| 2 | MEI ASSOCIATES * | 18,909,316 |
| 3 | SENCOM CORPORATION | 16,189,983 |
| 4 | ASSURANCE TECHNOLOGY CORPORATION | 12,416,345 |
| 5 | HORIZONS TECHNOLOGY, INC | 11,915,942 |
| 6 | SYSTEMS RESOURCES CORPORATION * | 11,308,629 |
| 7 | ANALYTICAL SYSTEMS ENGINEERING CORP | 11,269,761 |
| 8 | ABACUS TECHNOLOGY CORPORATION * | 10,226,047 |
| 9 | BTG | 6,736,123 |
| 10 | SUPPORT SYSTEMS ASSOCIATES | 6,643,592 |
| 11 | LAGUNA INDUSTRIES * | 6,498,400 |
| 12 | SYSTEMS PLANNING CORPORATION | 5,171,427 |
| 13 | TECOLOTE RESEARCH, INC | 4,870,964 |
| 14 | I-NET * | 3,722,241 |
| 15 | MANAGEMENT CONSULTANTS & RESEARCH | 3,424,260 |

*** Small Disadvantaged Firms**

## HANSCOM AFB CONTRACTORS
## UNIVERSITIES AND NOT-FOR-PROFIT

Identified below are the 15 **Universities and Not-for-Profit** firms which received the greatest dollar value of Hanscom AFB awards in FY94.

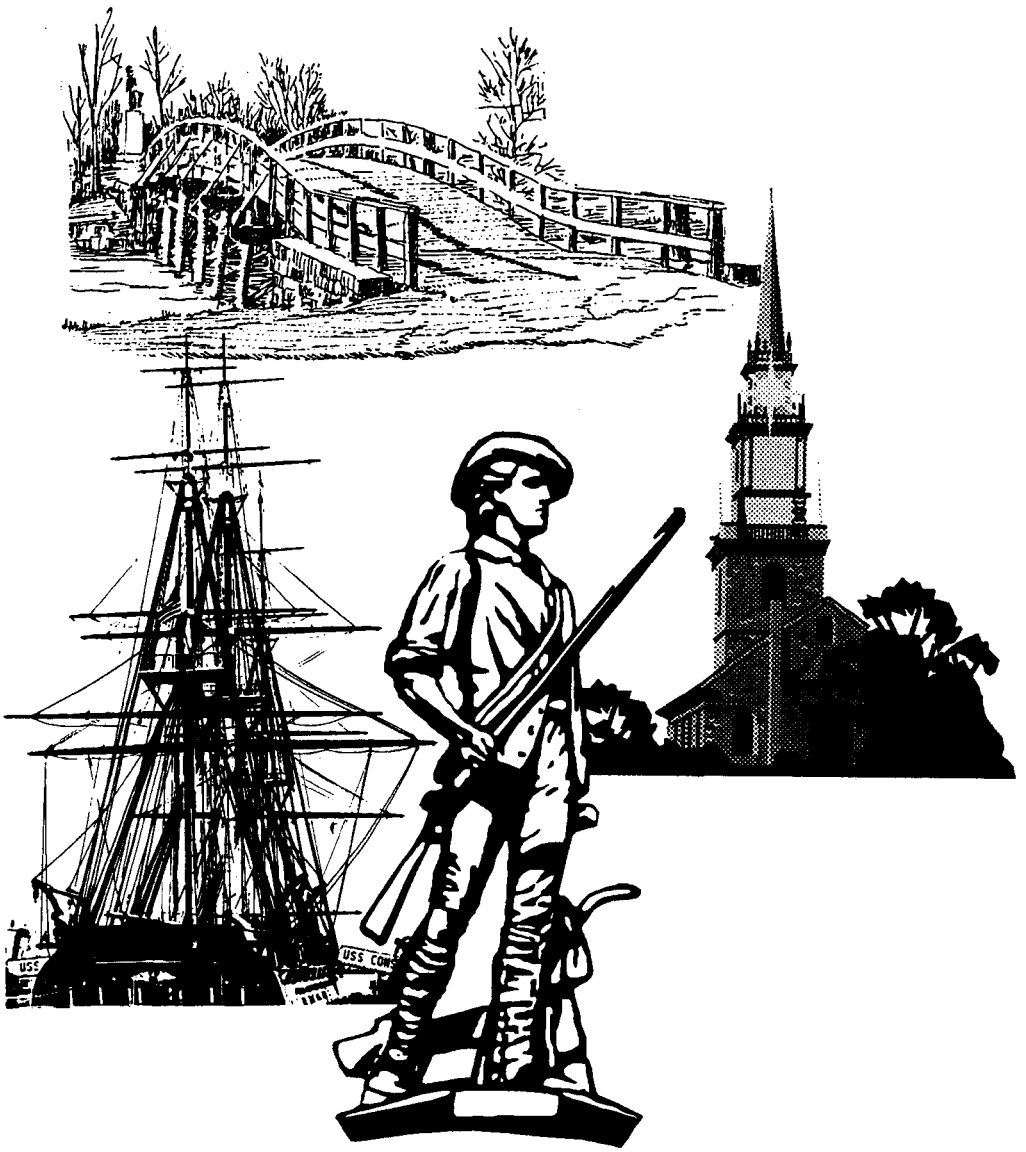
| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | MIT / LINCOLN LABS | $294,947,035 |
| 2 | THE MITRE CORPORATION | 228,389,655 |
| 3 | CARNEGIE MELLON UNIVERSITY | 37,740,340 |
| 4 | OPEN SOFTWARE FOUNDATION | 4,471,857 |
| 5 | BOSTON COLLEGE | 2,984,785 |
| 6 | SRI INTERNATIONAL | 2,899,447 |
| 7 | UTAH STATE UNIVERSITY | 2,603,000 |
| 8 | RIVERSIDE RESEARCH INSTITUTE | 1,730,653 |
| 9 | MASSACHUSETTS INSTITUTE OF TECHNOLOGY | 1,674,138 |
| 10 | WENTWORTH INSTITUTE OF TECHNOLOGY | 936,500 |
| 11 | UNIVERSITY OF CALIFORNIA | 904,629 |
| 12 | UNIVERSITY OF MASSACHUSETTS | 890,354 |
| 13 | MORGAN MEMORIAL GOODWILL INDUSTRIES | 812,940 |
| 14 | HARVARD UNIVERSITY | 807,787 |
| 15 | NORTHEASTERN UNIVERSITY | 782,512 |

## HANSCOM AFB CONTRACTORS
## INTRAGOVERNMENTAL AND FMS

Identified below are the 10 firms which received the greatest dollar value of Hanscom AFB **Intragovernmental and Foreign Military Sales (FMS)** awards in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | THE BOEING COMPANY | $336,168,457 |
| 2 | HUGHES AIRCRAFT COMPANY | 47,305,131 |
| 3 | AT & T | 13,175,473 |
| 4 | ABACUS TECHNOLOGY CORPORATION | 10,082,584 |
| 5 | BOSTON EDISON | 7,546,534 |
| 6 | THE MITRE CORPORATION | 6,823,213 |
| 7 | GLS ASSOCIATES, INC | 5,999,332 |
| 8 | EG & G, INC | 5,390,361 |
| 9 | WHITTAKER ELECTRONICS | 3,301,554 |
| 10 | GENERAL ELECTRIC COMPANY | 2,169,957 |

# MASSACHUSETTS IMPACT DATA



## PAYROLL--HANSCOM COMPLEX

| CLASSIFICATION | LIVING ON-BASE | LIVING OFF-BASE | TOTAL |
|---|---|---|---|
| **APPROPRIATED FUND MILITARY** | | | |
| Active-duty Permanent Party | $27,498,457 | $36,795,543 | $64,294,000 |
| ANG/Reserve Permanent Party | 3,700,000 | 1,311,000 | 5,011,000 |
| Traditional Guardsmen/Reserve | 0 | 11,498,500 | 11,498,500 |
| **SUBTOTAL** | **$31,198,457** | **$49,605,043** | **$80,803,500** |
| **APPROPRIATED FUND CIVILIAN** | | | |
| Senior Executive Service | | | $1,010,964 |
| General Schedule | | | 84,143,640 |
| Federal Wage Board | | | 4,004,921 |
| Other | | | 348,483 |
| **SUBTOTAL** | | | **$89,508,008** |
| **NONAPPROPRIATED FUND, CONTRACT CIVILIAN, & PRIVATE BUSINESS** | | | |
| Civilian NAF | | | $2,878,315 |
| Civilian BX | | | 1,122,618 |
| Contract Civilians | | | 276,131,000 |
| (LL $133,983,000/MITRE $142,148,000) | | | |
| Private Businesses on-base by type: | | | |
| Credit Union $1,786,000 | | | 3,096,508 |
| BX Concessionaires $442,000 | | | |
| Brighton Marine Clinic $868,508 | | | |
| Technical Support Contractors | | | 169,086,438 |
| Other Tenant Organizations | | | 11,132,455 |
| **SUBTOTAL** | | | **$463,447,334** |
| ***TOTAL PAYROLL-HANSCOM COMPLEX*** | | | ***$633,758,842*** |

## MILITARY RETIREES

(Retirement pay of retirees living within a 50 mile radius of Hanscom AFB)

| | |
|---|---|
| AIR FORCE | $127,092,000 |
| ARMY | 109,896,000 |
| NAVY | 127,812,000 |
| MARINES | 15,600,000 |
| COAST GUARD | 17,649,624 |
| ***TOTAL RETIREES*** | ***$398,049,624*** |

**DISTRIBUTION OF HANSCOM AFB GOVERNMENT EMPLOYEES BY MASSACHUSETTS CONGRESSIONAL DISTRICTS**

| DISTRICT | MILITARY | CIVILIAN |
|---|---|---|
| 1 | 12 | 86 |
| 2 | 2 | 11 |
| 3 | 17 | 63 |
| 4 | 7 | 51 |
| 5 | 232 | 794 |
| 6 | 1,126 | 313 |
| 7 | 155 | 250 |
| 8 | 31 | 91 |
| 9 | 22 | 83 |
| 10 | 7 | 40 |
| **TOTAL MASS** | 1,611 | 1,782 |
| **TOTAL OUT OF STATE** | 201 | 429 |
| ***TOTAL*** | ***1,812*** | ***2,211*** |

**Note: The number of federal civilian employees serviced by Hanscom AFB Finance Office differs from strength totals used by Directorate of Personnel.**

**DISTRIBUTION OF HANSCOM AFB GOVERNMENT EMPLOYEES PAYROLL BY MASSACHUSETTS CONGRESSIONAL DISTRICTS ($ IN THOUSANDS)**

| DISTRICT | MILITARY PAYROLL | CIVILIAN PAYROLL | TOTAL |
|---|---|---|---|
| 1 | $574 | $4,390 | $4,964 |
| 2 | 65 | 671 | 736 |
| 3 | 840 | 3,768 | 4,608 |
| 4 | 255 | 3,363 | 3,618 |
| 5 | 10,067 | 43,153 | 53,220 |
| 6 | 33,835 | 16,668 | 50,503 |
| 7 | 6,630 | 16,193 | 22,823 |
| 8 | 1,268 | 5,314 | 6,582 |
| 9 | 944 | 3,162 | 4,106 |
| 10 | 289 | 2,301 | 2,590 |
| **MASSACHUSETTS** | **54,767** | **98,983** | **153,750** |
| **OUT OF STATE** | **9,527** | **22,239** | **31,766** |
| ***TOTAL*** | ***$64,294*** | ***$121,222*** | ***$185,516*** |

**Note: Military payroll figures are based on military members assigned to Hanscom AFB multiplied by average payroll by rank.**

## DISTRIBUTION OF FCRC CONTRACT EMPLOYEES BY MASSACHUSETTS CONGRESSIONAL DISTRICTS

| DISTRICT | MITRE CORP EMPLOYEES | LINCOLN LAB EMPLOYEES | TOTAL |
|---|---|---|---|
| 1 | 30 | 110 | 140 |
| 2 | 8 | 11 | 19 |
| 3 | 50 | 56 | 106 |
| 4 | 97 | 189 | 286 |
| 5 | 1,096 | 942 | 2,038 |
| 6 | 417 | 302 | 719 |
| 7 | 433 | 528 | 961 |
| 8 | 105 | 144 | 249 |
| 9 | 80 | 63 | 143 |
| 10 | 23 | 32 | 55 |
| **MASSACHUSETTS** | **2,339** | **2,377** | **4,716** |
| **OUT OF STATE** | **331** | **317** | **648** |
| ***TOTAL*** | ***2,670*** | ***2,694*** | ***5,364*** |

**DISTRIBUTION OF FCRC CONTRACT EMPLOYEES PAYROLL BY MASSACHUSETTS CONGRESSIONAL DISTRICTS ($ IN THOUSANDS)**

| DISTRICT | MITRE CORP PAYROLL | LINCOLN LAB PAYROLL | TOTAL |
|---|---|---|---|
| 1 | $1,553 | $4,386 | $5,939 |
| 2 | 479 | 443 | 922 |
| 3 | 2,534 | 2,892 | 5,426 |
| 4 | 6,219 | 10,465 | 16,684 |
| 5 | 57,865 | 48,569 | 106,434 |
| 6 | 21,244 | 14,796 | 36,040 |
| 7 | 23,836 | 27,681 | 51,517 |
| 8 | 4,786 | 5,862 | 10,648 |
| 9 | 4,209 | 3,051 | 7,260 |
| 10 | 1,214 | 1,263 | 2,477 |
| **MASSACHUSETTS** | **123,939** | **119,408** | **243,347** |
| **OUT OF STATE** | **18,209** | **14,575** | **32,784** |
| ***TOTAL*** | ***$142,148*** | ***$133,983*** | ***$276,131*** |

## CONTRACT AWARDS TO MASSACHUSETTS INDUSTRY
## CONTRACTING SUMMARY
## ($ IN MILLIONS)

This chart shows the total value of contracts awarded to Massachusetts firms and colleges by the ESC Deputy for Contracting and the RL Directorate for Contracting. The ESC Contracting figures include awards for Hanscom AFB and the on and off-base tenants it services.

| | ESC | | RL | | TOTAL | |
|---|---|---|---|---|---|---|
| | # Actions | $ Obligated | # Actions | $ Obligated | # Actions | $ Obligated |
| **Large Business** | 1,329 | $169.8 | 45 | $12.2 | 1,374 | $182.0 |
| **Small Business** | 8,281 | 118.3 | 38 | 5.8 | 8,319 | 124.1 |
| **Universities/ Not-for-Profit** | 197 | 536.7 | 26 | 4.8 | 223 | 541.5 |
| **Intragovernmental/ FMS** | 28 | 8.8 | 0 | 0 | 28 | 8.8 |
| ***TOTAL*** | ***9,835*** | ***$833.6*** | ***109*** | ***$22.8*** | ***9,944*** | ***$856.4*** |

## MASSACHUSETTS CONTRACTORS SERVING HANSCOM AFB
## LARGE BUSINESS

Identified below are the 10 **Large Business** firms which received the greatest dollar value of Hanscom AFB awards in FY94 for performance in the Commonwealth of Massachusetts.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | RAYTHEON | $110,380,891 |
| 2 | GTE PRODUCTS CORPORATION | 40,702,754 |
| 3 | ANALYTICAL SCIENCES CORPORATION | 1,846,685 |
| 4 | DYNAMICS RESEARCH CORPORATION | 1,460,246 |
| 5 | XENERGY | 539,062 |
| 6 | TEXTRON DEFENSE SYSTEMS | 435,000 |
| 7 | BOSTON PARTNERSHIP | 431,572 |
| 8 | PHYSICAL SCIENCES, INC | 245,000 |
| 9 | GENERAL RESEARCH CORPORATION | 142,710 |
| 10 | ATMOSPHERIC RADIATION | 135,000 |

## MASSACHUSETTS CONTRACTORS SERVING HANSCOM AFB
## SMALL BUSINESS

Identified below are the 15 **Small Business** firms which received the greatest dollar value of Hanscom AFB awards in FY94 for performance in the Commonwealth of Massachusetts.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | MEI ASSOCIATES * | $18,909,316 |
| 2 | SENCOM CORPORATION | 16,189,983 |
| 3 | SYSTEMS RESOURCES CORPORATION * | 11,308,629 |
| 4 | ANALYTICAL SYSTEMS ENGINEERING CORP | 11,269,761 |
| 5 | ROADS CONSTRUCTION, INC | 3,283,293 |
| 6 | D & K SHARP, INC | 3,229,142 |
| 7 | RADEX, INC | 2,146,900 |
| 8 | ALPHATECH, INC | 1,958,635 |
| 9 | VISIDYNE, INC | 1,634,177 |
| 10 | ATMOSPHERIC ENVIRONMENTAL RESEARCH | 1,617,525 |
| 11 | SPECTRAL SCIENCES, INC | 1,537,400 |
| 12 | ARCON CORPORATION | 1,382,034 |
| 13 | ALBENESE BROTHERS CONSTRUCTION, INC | 1,244,000 |
| 14 | ALL STATE BOILER WORKS, INC | 1,167,244 |
| 15 | AMPTEK, INC | 1,060,490 |

*** Small Disadvantaged Firms**

## MASSACHUSETTS CONTRACTORS SERVING HANSCOM AFB
## INTRAGOVERNMENTAL AND FMS

Identified below are the 5 **Intragovernmental and Foreign Military Sales (FMS)** firms which received the greatest dollar value of Hanscom AFB awards in FY94 for performance in the Commonwealth of Massachusetts.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | BOSTON EDISON | $7,546,534 |
| 2 | THE MITRE CORPORATION | 6,823,213 |
| 3 | TECHNICAL COMMUNICATIONS CORPORATION | 871,362 |
| 4 | BOSTON GAS COMPANY | 542,929 |
| 5 | SENCOM, INC | 423,680 |

## MASSACHUSETTS CONTRACTORS SERVING HANSCOM AFB
## UNIVERSITIES AND NOT-FOR-PROFIT

Identified below are the 10 **Universities and Not-for-Profit** firms which received the greatest dollar value of Hanscom AFB awards in FY94 for performance in the Commonwealth of Massachusetts.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | MIT / LINCOLN LABS | $294,947,035 |
| 2 | THE MITRE CORPORATION | 228,389,655 |
| 3 | OPEN SOFTWARE FOUNDATION | 4,471,857 |
| 4 | BOSTON COLLEGE | 2,984,785 |
| 5 | MASSACHUSETTS INSTITUTE OF TECHNOLOGY | 1,674,138 |
| 6 | WENTWORTH INSTITUTE OF TECHNOLOGY | 936,500 |
| 7 | UNIVERSITY OF MASSACHUSETTS | 890,354 |
| 8 | HARVARD UNIVERSITY | 807,787 |
| 9 | NORTHEASTERN UNIVERSITY | 761,217 |
| 10 | BOSTON UNIVERSITY | 660,000 |

## ELECTRONIC SYSTEMS CENTER AT HANSCOM
## FOURTH LARGEST IN MASSACHUSETTS

| RANKING | COMPANY | FY94--($) SALES |
|---|---|---|
| 1 | DIGITAL EQUIPMENT CORPORATION | $14,371,369,000 |
| 2 | RAYTHEON COMPANY, INC | 9,201,197,000 |
| 3 | THE GILLETTE COMPANY, INC | 5,410,800,000 |
| **4** | **HANSCOM AIR FORCE BASE** | **3,346,100,000** |
| 5 | EG&G, INC | 2,697,948,000 |
| 6 | POLAROID CORPORATION | 2,244,900,000 |
| 7 | NEW ENGLAND ELECTRIC SYSTEMS, INC | 2,233,978,000 |
| 8 | SIEBE, INC | 1,694,200,000 |
| 9 | CABOT CORPORATION | 1,614,315,000 |
| 10 | NEW ENGLAND POWER COMPANY, INC | 1,549,014,000 |
| 11 | OSRAM SYLVANIA, INC | 1,500,000,000 |
| 12 | NORTON COMPANY, INC | 1,484,800,000 |
| 13 | BOSTON EDISON COMPANY, INC | 1,482,253,000 |
| 14 | MASSACHUSETTS ELECTRIC COMPANY | 1,468,540,000 |
| 15 | THERMO ELECTRON CORPORATION | 1,249,718,000 |
| 16 | TRAFALGAR HOUSE, INC | 1,184,000,000 |
| 17 | STAPLES, INC | 1,121,781,000 |
| 18 | EASTERN ENTERPRISES | 1,099,847,000 |
| 19 | BULL H N INFORMATION SYSTEMS, INC | 1,091,000,000 |
| 20 | DATA GENERAL CORPORATION | 1,077,869,000 |

This ranking is based on a comparison of Hanscom AFB's FY94 funding profile with the FY94 gross annual sales volume of leading firms in Massachusetts. Hanscom's funding profile is comprised of ESC's FY94 approved Program; Rome Lab at Hanscom salaries and budget; Phillips Lab, Lincoln Lab, and MITRE salaries; and commissary, Base Exchange and TDY expenditures.

Source: D&B-Dun's Market Identifiers

**ELECTRONIC SYSTEMS CENTER AT HANSCOM**
**SIXTEENTH LARGEST IN NEW ENGLAND**

| RANKING | COMPANY | FY94--($) SALES |
|---|---|---|
| 1 | GENERAL ELECTRIC COMPANY, INC | $60,562,000,000 |
| 2 | UNITED TECHNOLOGIES CORPORATION | 20,736,000,000 |
| 3 | XEROX CORPORATION | 14,601,000,000 |
| 4 | DIGITAL EQUIPMENT CORPORATION | 14,371,369,000 |
| 5 | RAYTHEON COMPANY, INC | 9,201,197,000 |
| 6 | TEXTRON, INC | 9,078,300,000 |
| 7 | A N C HOLDINGS, INC | 5,700,000,000 |
| 8 | ASEA BROWN BOVERI, INC | 5,600,000,000 |
| 9 | PECHINEY CORPORATION | 5,464,121,000 |
| 10 | THE GILLETTE COMPANY, INC | 5,410,800,000 |
| 11 | DUN & BRADSTREET CORPORATION | 4,710,399,000 |
| 12 | CARRIER CORPORATION | 4,480,000,000 |
| 13 | BTR DUNLOP HOLDINGS, INC | 3,800,000,000 |
| 14 | NORTHEAST UTILITIES | 3,629,093,000 |
| 15 | PITNEY BOWES, INC | 3,542,881,000 |
| **16** | **HANSCOM AIR FORCE BASE** | **3,346,100,000** |
| 17 | TYCO INTERNATIONAL LTD, INC | 3,114,500,000 |
| 18 | COMBUSTION ENGINEERING, INC | 3,058,100,000 |
| 19 | GTE PRODUCTS OF CONNECTICUT | 2,833,300,000 |
| 20 | EG&G, INC | 2,697,948,000 |
| 21 | UNITED TECHNOLOGIES CORPORATION | 2,624,400,000 |
| 22 | PRAXAIR, INC | 2,438,000,000 |
| 23 | OLIN CORPORATION | 2,423,000,000 |
| 24 | CONNECTICUT LIGHT AND POWER COMPANY | 2,366,050,000 |
| 25 | THE STANLEY WORKS, INC | 2,273,100,000 |
| 26 | POLAROID CORPORATION | 2,244,900,000 |
| 27 | NEW ENGLAND ELECTRIC SYSTEM | 2,233,978,000 |
| 28 | WITCO CORPORATION | 2,142,555,000 |
| 29 | ECHLIN, INC | 1,944,463,000 |
| 30 | SIEBE, INC | 1,694,200,000 |

This ranking is based on a comparison of Hanscom AFB's FY94 funding profile with the FY94 gross annual sales volume of leading firms in New England. Hanscom's funding profile is comprised of ESC's FY94 approved program; Rome Lab at Hanscom salaries and budget; Phillips Lab, Lincoln, and MITRE salaries; and commissary, Base Exchange, and TDY expenditures.

Source: D&B-Dun's Market Identifiers

## SUMMARY OF CONSTRUCTION, CONTRACTS, AND EXPENDITURES FOR MATERIALS, EQUIPMENT, AND SUPPLIES

| FISCAL YEAR 1994 | ACTUAL ANNUAL EXPENDITURE |
|---|---|
| **CONSTRUCTION** | |
| Military Construction Program | $0 |
| Whole House MILCON | 5,962,518 |
| Non-appropriated Fund | 123,565 |
| Military Family Housing | 2,607,200 |
| O&M | 4,656,450 |
| Other | 3,117,000 |
| **TOTAL CONSTRUCTION** | **$16,466,733** |
| **CONTRACTS AND PROCUREMENT: SERVICES, MATERIALS, EQUIPMENT, AND SUPPLIES** | |
| Buildings and Grounds | $4,829,433 |
| Utilities and Energy | 13,949,038 |
| MFH Services | 2,337,918 |
| Environmental | 2,404,220 |
| DERA | 2,715,993 |
| Telecommunications | 3,393,000 |
| Computer Costs | 16,942,100 |
| Credit Union | 1,569,000 |
| Services Provided by Small Business and Local College/Non-Profit (Less MITRE/Lincoln Laboratory Salaries) | 338,330,857 |
| Medical Services (includes HMO expenditures) | 3,645,173 |
| Other | 1,828,637 |
| **TOTAL SERVICES** | **$391,945,369** |
| **COMMISSARY, BASE EXCHANGE, HEALTH, EDUCATION AND TDY EXPENDITURES** | |
| Commissary | $1,218,000 |
| Base Exchange | 303,304 |
| Health (CHAMPUS, Government Cost Only) | 6,082,213 |
| Health (HMO Premiums - Government and Patient) | 10,692,472 |
| Education (Impact Aid and Tuition Assistance) | 13,307,824 |
| TDY | 7,592,421 |
| **TOTAL EXPENDITURE** | **$39,196,234** |
| ***GRAND TOTAL*** | ***$447,608,336*** |

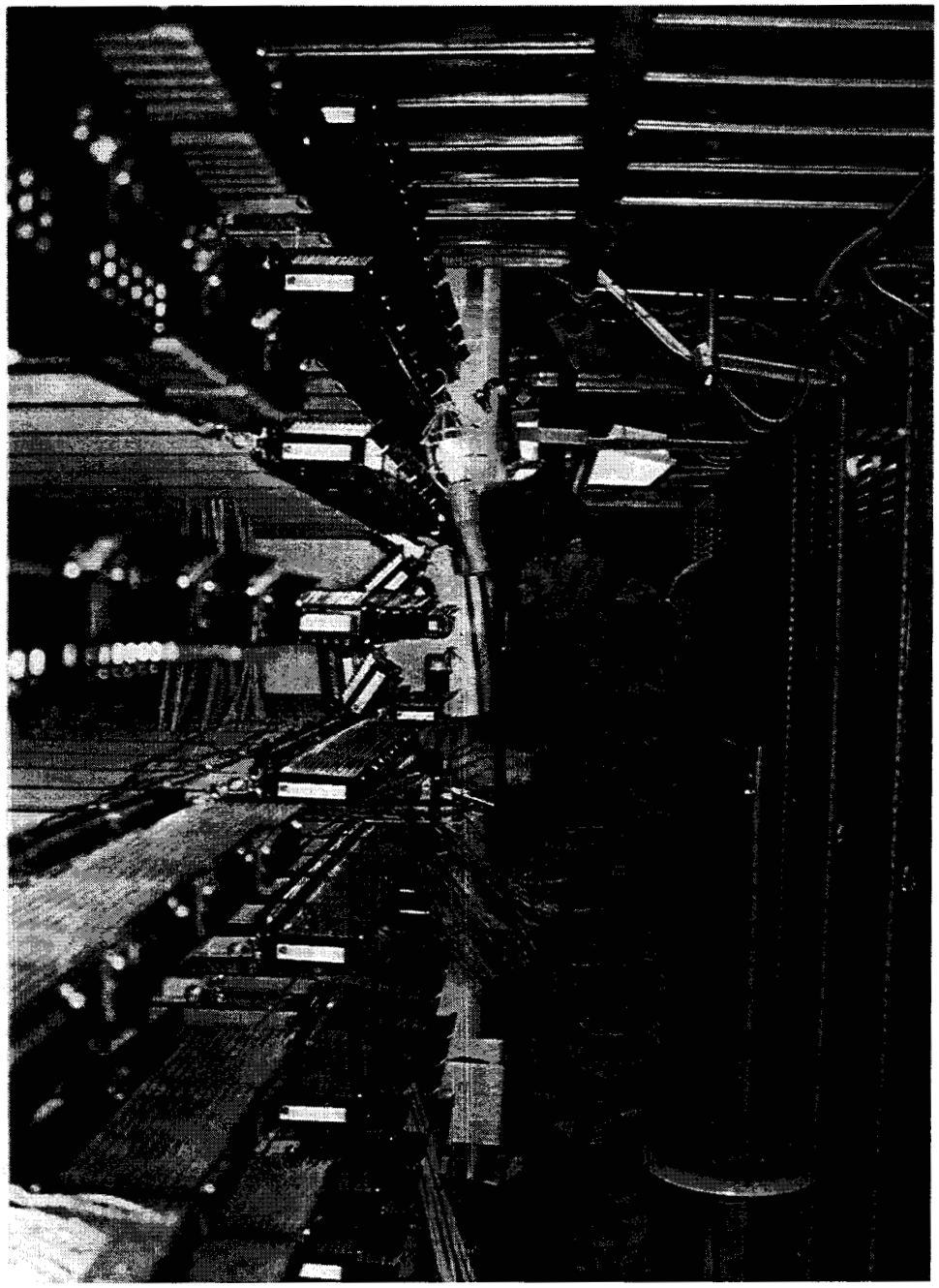
**FEDERAL IMPACT EDUCATION ENTITLEMENT FUNDS**
**TO MASSACHUSETTS SCHOOLS**
**(Within a 50 mile radius of Hanscom AFB)**

| NUMBER OF SCHOOLS | TOTAL ENTITLEMENT |
|---|---|
| 31 | $5,226,336 |

**TDY DATA**

| | APPROXIMATE EXPENDITURE |
|---|---|
| **NUMBER NON-AVAILABILITY STATEMENTS AND CONTRACT QUARTERS**<br>**17,343**<br>(Average 2 days at $133.00 per day) | $4,613,238 |
| **NUMBER BILLETED ON-BASE**<br>**32,595**<br>(Average 2 days at approximately $45.70 per day) | $2,979,183 |
| ***TOTAL*** | ***$7,592,421*** |

# 38TH ENGINEERING INSTALLATION WING



## 38TH ENGINEERING INSTALLATION WING (EIW)
## TINKER AIR FORCE BASE
## OKLAHOMA

Effective November 8, 1994, Communications Systems Center (CSC) was deactivated and reactivated as the 38th Engineering Installation Wing (38th EIW). The wing designation highlights the engineering and installation wartime mission.

The 38th EIW, at Tinker Air Force Base, Oklahoma, is part of Air Force Materiel Command (AFMC), Wright-Patterson AFB, Ohio and reports to Electronics Systems Center (ESC), an AFMC organization at Hanscom AFB, MA. The 38th EIW provides integrated communications-computer systems and services during war, preparations for war, and during peacetime for the Air Force and specified Department of Defense agencies worldwide. The 38th EIW also provides communications systems for allied nations through the Security Assistance Program.

38th EIW personnel provide customers a variety of services, including engineering, installation, acquisition and contracting, material management, software development, limited depot repair and maintenance, and program management. With over 8,000 active duty, civilian, and Air National Guard personnel worldwide, the 38th EIW supports customers in 40 countries and nearly every state in the Union.

The 38th EIW is headquarters to eight active duty units located across the globe. Additionally, the 38th EIW provides training and advisory services to 19 Air National Guard units in 16 states. Headquarters personnel and unit members often perform required tasks under difficult circumstances: compressed schedules, technical glitches, and bad weather and inhospitable terrain are just a few of the challenges that confront them daily. But, no challenge is too great not to be met head-on and overcome. From designing computer software to installing a radar on top of an isolated mountain, from correcting a malfunctioning air traffic control system to shipping material to isolated spots around the world, the men and women in the 38th EIW do their jobs and do them well.

Whether it's communications, computer, or air traffic control and weather systems, whether it's a small job or a Herculean one, whether it's for the United States Air Force or one of its allies, the 38th EIW remains committed to one unwritten rule--keep the customer satisfied. By keeping the customer satisfied, the men and women in the 38th EIW play a vital role in the Air Force mission. They develop and maintain modern integrated communications systems that customers rely on to fulfill the Air Force mission.

## 38th EIW ORGANIZATIONAL SYMBOLS

| | |
|---|---|
| Commander, 38th Engineering Installation Wing | 38th EIW/CC |
| Vice Commander | 38th EIW/CV |
| Technical Director | 38th EIW/CA |
| Senior Enlisted Advisor | 38th EIW/CCC |
| Executive Officer | 38th EIW/CCE |
| Commander, Engineering Installation Group | 1845 EIG/CC |
| Systems Telecommunications Engineering Management | 38th EIW/ES |
| Financial Management | 38th EIW/FM |
| Judge Advocate | 38th EIW/JA |
| Materiel Management | 38th EIW/MM |
| Mission Support | 38th EIW/MS |
| Operations Support | 38th EIW/OS |
| Programs | 38th EIW/PG |
| Contracting | 38th EIW/PK |
| Reserve Forces | 38th EIW/RF |
| Automated Communications Systems | 38th EIW/SD |
| Plans and Requirements | 38th EIW/XP |

## 38th EIW ASSIGNED STRENGTH

| ASSIGNED CIVILIAN | | ASSIGNED MILITARY | |
|---|---|---|---|
| SENIOR EXEC SERVICE | 0 | OFFICERS | 195 |
| GENERAL SCHEDULE | 1,056 | ENLISTED | 2,525 |
| WAGE SUPERVISOR | 60 | | |
| WAGE LEADER | 0 | **TOTAL** | **2,720** |
| WAGE GRADE | 52 | | |
| OTHER EMPLOYEES | 5 | | |
| **TOTAL** | **1,173** | ***TOTAL ASSIGNED*** | ***3,893*** |

## 38th EIW GRADE STRUCTURE

**GENERAL SCHEDULE**

| *GS* | *NO.* |
|---|---|
| 1 | 0 |
| 2 | 1 |
| 3 | 1 |
| 4 | 25 |
| 5 | 92 |
| 6 | 22 |
| 7 | 47 |
| 8 | 21 |
| 9 | 53 |
| 10 | 4 |
| 11 | 155 |
| 12 | 372 |
| 13 | 220 |
| 14 | 35 |
| 15 | 8 |
| ***TOTAL GS*** | ***1,056*** |

**MILITARY BY GRADE**

| *GRADE* | *NO.* |
|---|---|
| LT GEN | 0 |
| MAJ GEN | 0 |
| BRIG GEN | 0 |
| COL | 6 |
| LT COL | 12 |
| MAJ | 26 |
| CAPT | 63 |
| 1ST LT | 42 |
| 2D LT | 46 |
| CMSGT | 31 |
| SMSGT | 62 |
| MSGT | 322 |
| TSGT | 358 |
| SSGT | 537 |
| SGT/SRA | 652 |
| A1C | 364 |
| AMN | 159 |
| AB | 40 |
| ***TOTAL MILITARY*** | ***2,720*** |

## 38th EIW CIVILIAN WORKFORCE
## LENGTH OF SERVICE vs AGE DISTRIBUTION

The purpose of this data is to show the 38th EIW workforce in relation to RIF status and voluntary retirements.

| | YEARS OF SERVICE | | | | | |
|---|---|---|---|---|---|---|
| **AGE** | **0-4** | **5-19** | **20-24** | **25-29** | **30+** | **TOTAL** |
| 34 AND BELOW | 59 | 240 | 0 | 0 | 0 | 299 |
| 35-39 | 7 | 136 | 3 | 0 | 0 | 146 |
| 40-44 | 7 | 103 | 29 | 1 | 0 | 140 |
| 45-49 | 4 | 102 | 49 | 35 | 5 | 195 |
| 50-54 | 2 | 87 | 17 | 48 | 35 | 189 |
| 55-59 | 1 | 61 | 10 | 18 | *38 | 128 |
| 60-61 | 0 | 16 | *6 | *2 | *9 | 33 |
| 62 AND ABOVE | 0 | *17 | *6 | *5 | *15 | 43 |
| ***TOTAL*** | ***80*** | ***762*** | ***120*** | ***109*** | ***102*** | ***1,173*** |

* Eligible for Voluntary Retirement total is 98 or 8.3% of the workforce.

## 38th EIW PAYROLL
## ($ IN MILLIONS)

| | FY90 | FY91 | FY92 | FY93 | FY94 | Projected FY95 |
|---|---|---|---|---|---|---|
| **Military** | 57.6 | 67.1 | 70.7 | 60.4 | 73.1 | 71.0 |
| **Civilian** | 57.9 | 59.2 | 62.4 | 66.2 | 65.7 | 54.0 |
| ***TOTAL*** | ***$115.5*** | ***$126.3*** | ***$133.1*** | ***$126.6*** | ***$138.8*** | ***$125.0*** |

**38th EIW FY94 OBLIGATIONS**
**ORGANIZATIONAL SUMMARY**
**($ IN MILLIONS)**

| ORGANIZATION | *38th EIW | **OTHER CUSTOMERS | TOTAL |
|---|---|---|---|
| ENGINEERING & INSTALLATION | $23.4 | 6.8 | 30.2 |
| ACQUISITION PROGRAMS | 15.5 | 0.0 | 15.5 |
| SOFTWARE DEVELOPMENT | 17.2 | 0.0 | 17.2 |
| **SUBTOTAL** | **$56.1** | **$6.8** | **$62.9** |
| ***MISSION SUPPORT | 71.0 | 0.0 | 71.0 |
| MILITARY PAY | 73.1 | 0.0 | 73.1 |
| ***TOTAL*** | ***$200.2*** | ***$6.8*** | ***$207.0*** |

* Includes $65.7M civilian pay
** Direct allocated funds except civilian pay
*** Includes reimbursements; does not include customer direct cite funds

**38th EIW PROGRAM FUNDS**
**($ IN MILLIONS)**

| FUND TYPE | FY90 | FY91 | FY92 | FY93 | FY94 | Projected FY95 |
|---|---|---|---|---|---|---|
| OTHER AFMC | 49.1 | 47.7 | 57.5 | 46.7 | 56.1 | 47.0 |
| *OTHER CUSTOMERS | 0.2 | 0.5 | 7.9 | 10.3 | 36.0 | 25.0 |
| **MISSION SUPPORT | 60.4 | 61.1 | 68.3 | 74.8 | 71.0 | 71.0 |
| MILITARY PAY | 57.6 | 67.1 | 70.7 | 69.4 | 73.1 | 73.1 |
| ***TOTAL*** | ***$167.3*** | ***$176.4*** | ***$204.4*** | ***$201.2*** | ***$236.2*** | ***$216.1*** |

* Reimbursement from other Air Force and non-Air Force customers
** Includes civilian pay

**38th EIW CONTRACT SUMMARY**
**($ IN MILLIONS)**
**FY94**

| | ***NUMBER OF ACTIONS*** | | | ***DOLLARS OBLIGATED*** | | |
|---|---|---|---|---|---|---|
| | **Oklahoma** | **Other** | ***Total*** | **Oklahoma** | **Other** | ***Total*** |
| LARGE BUSINESS | 39 | 9,235 | 9,274 | $0.485 | $60.173 | $60.658 |
| SMALL BUSINESS | 410 | 1,555 | 1,965 | .151 | 11.901 | 12.052 |
| NOT FOR PROFIT | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| ***TOTAL*** | ***449*** | ***10,790*** | ***11,239*** | ***$0.636*** | ***$72.074*** | ***$72.710*** |

**38th EIW CONTRACTORS**
**LARGE BUSINESS**
**($ IN MILLIONS)**

Identified below are the 15 **Large Business** firms which received the greatest obligated dollars from the 38th EIW in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | AT & T | $11.254 |
| 2 | UNISYS CORPORATION | 3.517 |
| 3 | SIECOR CORPORATION | 3.314 |
| 4 | PACIFIC BELL | 2.702 |
| 5 | SOUTHWESTERN BELL TELEPHONE | 2.631 |
| 6 | GTE GOVERNMENT SYSTEMS CORPORATION | 2.198 |
| 7 | NETWORK CONSTRUCTION SERVICES, INC | 1.993 |
| 8 | UNITED AIRLINES | 1.978 |
| 9 | US WEST COMMUNICATIONS | 1.739 |
| 10 | C3, INC | 1.380 |
| 11 | ROLM COMPANY | 1.247 |
| 12 | BAKER SUPPORT SERVICES, INC | 1.204 |
| 13 | TRW INFORMATION NETWORK PROGRAMS | 0.671 |
| 14 | XEROX | 0.616 |
| 15 | WILTEL COMMUNICATIONS SYSTEMS | 0.600 |

**38th EIW CONTRACTORS**
**SMALL BUSINESS**
**($ IN MILLIONS)**

Identified below are the 15 **Small Business** firms which received the greatest obligated dollars from the 38th EIW in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | SHIELD RITE, INC | $1.798 |
| 2 | KGP TELECOMMUNICATIONS, INC | 1.014 |
| 3 | RADIANT COMMUNICATIONS CORPORATION | 0.612 |
| 4 | WALKER ASSOCIATES, INC | 0.585 |
| 5 | JO-JO'S | 0.553 |
| 6 | TEACO, INC | 0.468 |
| 7 | GRANT THORNTON | 0.460 |
| 8 | AUSTIN TELECOMMUNICATIONS & ELECTRICAL | 0.421 |
| 9 | TELCO SYSTEMS, INC | 0.352 |
| 10 | SOUTHWESTERN ENGINEERING & EQUIPMENT | 0.312 |
| 11 | TM SYSTEMS, INC | 0.290 |
| 12 | FIBERLINK SUPPLY, INC | 0.279 |
| 13 | POWER & TELEPHONE SUPPLY COMPANY, INC | 0.272 |
| 14 | FKW, INC | 0.248 |
| 15 | GTSI | 0.233 |

## 38th EIW
## REAL ESTATE AND FACILITIES

| | | * Acquisition Cost | Acres | ** Facilities SQ (FT) |
|---|---|---|---|---|
| HQ 38th EIW | Tinker AFB, OK | $22,494,276 | 88 | 178,526 |
| **OPERATING LOCATIONS** | | | | |
| OL-E | Bolling AFB, DC | 0 | N/A | Shares w/ Host |
| DET-1 OL-A | Andrews AFB, MD | 0 | N/A | Shares w/ Host |
| DET-1 OL-B | Ft Monmouth, NJ | 0 | N/A | Shares w/ Host |
| CSPO | Scott AFB, IL | 2,851,254 | N/A | 22,629 |
| CSPO OL-K | Peterson AFB, CO | 0 | N/A | Shares w/ Host |
| 485 EIG | Griffis AFB, NY | 31,176,306 | N/A | 247,431 |
| 1927 EIG | Kelly AFB, TX | 8,481,312 | N/A | 67,312 |
| 1839 EIG | Keesler AFB, MS | 25,402,104 | N/A | 201,604 |
| 1845 EIG | Tinker AFB, OK | 7,556,094 | N/A | 59,969 |
| 1849 EIS | McClellan AFB, CA | 20,287,260 | N/A | 161,010 |
| 1818 RAS | 19 Various Locations | 0 | N/A | Shares w/ Host |
| | ***TOTAL*** | ***$118,248,606*** | ***88*** | ***938,481*** |

* Estimated Total Acquisition Cost.

** Total square footage requirements does not include an estimate for facilities at various locations shared with host.

# MATERIEL SYSTEMS GROUP

## MATERIEL SYSTEMS GROUP (MSG)
## WRIGHT-PATTERSON AIR FORCE BASE
## OHIO

The Materiel Systems Group (MSG) is part of the Air Force Materiel Command (AFMC), Wright-Patterson AFB, Ohio and reports to Electronic Systems Center (ESC) at Hanscom AFB, Massachusetts. The MSG is primarily located at Wright-Patterson AFB, Dayton, Ohio, with support offices at four Air Logistics Centers -- Oklahoma City, Oklahoma; Ogden, Utah; San Antonio, Texas; and Sacramento, California.

The MSG has 770 military and civilian personnel, and more than 1100 contractors assigned to carry out its mission to provide the critical logistics information systems support necessary to keep Air Force units and weapon systems in a state of readiness, and to sustain their operations in peace and war. The organization manages the development and sustainment of over 230 AFMC wholesale logistics information systems.

This responsibility ranges from requirements to acquisition to sustainment. The MSG workforce is certified to provide a broad range of services from requirements analysis, requirements definition, planning, programming and budgeting assistance to program management for the development, implementation, fielding, maintenance, and re-engineering of information systems. MSG's state-of-the-art capability supports a broad base of Air Force-wide and other DoD multi-service customers. Several MSG-managed systems have been selected for deployment in support of the Corporate Information Management (CIM) logistics standard systems migration effort.

The MSG has adopted the Integrated Weapon System Management (IWSM) structure and single manager concept to manage AFMC's wholesale logistics information systems. The MSG is comprised of 14 directorates with eight business areas managed by Development Support Managers (DSMs), while six System Support Managers (SSMs) provide program control, contracting, and programming support to the DSMs.

The MSG embraces seamless, cradle-to-grave information systems management which affords the opportunity to meet the MSG's core challenge -- to directly support the Air Force command, control, communications, computers, and intelligence (C4I) concept and support the Air Force warrior.

## MSG ORGANIZATIONAL SYMBOLS

| | |
|---|---|
| Commander, Materiel Systems Group | MSG/CC |
| Deputy Director | MSG/CA |
| Contracting | MSG/PK |
| San Antonio Software Development Activity | MSG/SA |
| Contracting Systems | MSG/SB |
| Financial Management Systems | MSG/SF |
| Asset Management | MSG/SH |
| Business Process Improvement | MSG/SI |
| McClellan Software Development Activity | MSG/SJ |
| Requirements Systems | MSG/SM |
| Ogden Software Development Activity | MSG/SO |
| Reliability and Maintenance | MSG/SQ |
| CAMS/REMIS | MSG/SR |
| Oklahoma City Software Development Activity | MSG/SU |
| Plans and Programs C2 Systems | MSG/SX |
| Program Control | MSG/SZ |

## MSG ASSIGNED STRENGTH

| ASSIGNED CIVILIAN | | ASSIGNED MILITARY | |
|---|---|---|---|
| SENIOR EXEC SERVICE | 0 | OFFICERS | 21 |
| GENERAL SCHEDULE | 715 | ENLISTED | 33 |
| WAGE SUPERVISOR | 0 | | |
| WAGE LEADER | 0 | **TOTAL** | **54** |
| WAGE GRADE | 0 | | |
| STUDENT AIDE | 1 | | |
| **TOTAL** | **716** | ***TOTAL ASSIGNED*** | ***770*** |

## MSG GRADE STRUCTURE

**GENERAL SCHEDULE**

| *GS* | *NO.* |
|---|---|
| 1 | 0 |
| 2 | 0 |
| 3 | 1 |
| 4 | 3 |
| 5 | 30 |
| 6 | 14 |
| 7 | 21 |
| 8 | 0 |
| 9 | 17 |
| 10 | 0 |
| 11 | 115 |
| 12 | 317 |
| 13 | 140 |
| 14 | 49 |
| 15 | 9 |
| TOTAL GS | 716 |
| ***CIVILIAN TOTAL*** | ***716*** |

**MILITARY BY GRADE**

| *GRADE* | *NO.* |
|---|---|
| LT GEN | 0 |
| MAJ GEN | 0 |
| BRIG GEN | 0 |
| COL | 1 |
| LT COL | 7 |
| MAJ | 5 |
| CAPT | 6 |
| 1ST LT | 1 |
| 2D LT | 1 |
| CMSGT | 0 |
| SMSGT | 0 |
| MSGT | 13 |
| TSGT | 5 |
| SSGT | 10 |
| SGT | 3 |
| SRA | 0 |
| A1C | 0 |
| AMN | 2 |
| AB | 0 |
| ***TOTAL MILITARY*** | ***54*** |

## MSG CIVILIAN WORKFORCE
## LENGTH OF SERVICE vs AGE DISTRIBUTION

The purpose of this data is to show the MSG workforce in relation to RIF status and voluntary retirements.

**YEARS OF SERVICE**

| AGE | 0-4 | 5-19 | 20-24 | 25-29 | 30+ | TOTAL |
|---|---|---|---|---|---|---|
| 34 AND BELOW | 6 | 119 | 0 | 0 | 0 | 125 |
| 35-39 | 3 | 102 | 2 | 0 | 0 | 107 |
| 40-44 | 0 | 76 | 25 | 3 | 0 | 104 |
| 45-49 | 1 | 66 | 44 | 47 | 2 | 160 |
| 50-54 | 0 | 45 | 21 | 54 | 11 | 131 |
| 55-59 | 0 | 26 | 3 | 14 | *21 | 64 |
| 60 -61 | 0 | 4 | *2 | *1 | *10 | 17 |
| 62 AND ABOVE | 0 | *6 | *2 | *2 | *9 | 19 |
| ***TOTAL*** | ***10*** | ***444*** | ***99*** | ***121*** | ***53*** | ***727*** |

* Eligible for Voluntary Retirement total is 53 or 7.3% of workforce.

## MSG PAYROLL
## ($ IN MILLIONS)

| | FY90 | FY91 | FY92 | FY93 | FY94 | Projected FY95 |
|---|---|---|---|---|---|---|
| **Military** | * | * | 32.3 | 34.5 | 39.3 | 36.6 |
| **Civilian** | ** | ** | ** | ** | 1.2 | 1.1 |
| ***TOTAL*** | ***$0*** | ***$0*** | ***$32.3*** | ***$34.5*** | ***$40.5*** | ***$37.7*** |

* Breakout not available. MSG civilian pay included in overall HQ AFMC civilian pay funding.

** Breakout not available. MSG military pay included in overall HQ AFMC military pay funding.

**MSG FY94 PROGRAM**
**FUNDS**
**($ IN THOUSANDS)**

| | FY90 | FY91 | FY92 | FY93 | FY94 | Projected FY95 |
|---|---|---|---|---|---|---|
| O&M | 120 | 127 | 52 | 44 | 41,576 | 15,326 |
| INVESTMENT EQUIPMENT | 14,502 | 41 | 24,104 | 0 | 0 | 1,114 |
| DBOF* | 0 | 0 | 74,413 | 81,658 | 49,081 | 67,500 |
| OTHER CUSTOMERS | 0 | 0 | 20,616 | 66,652 | 122,113 | 130,000 |
| ***TOTAL*** | ***$14,622*** | ***$168*** | ***$119,185*** | ***$148,354*** | ***$212,770*** | ***$213,940*** |

* The MSG was not part of the Defense Business Operations Fund (DBOF) prior to FY92 and received no outside customer funding via Military Interdepartmental Purchase Requests (MIPRs).

**MSG FY94 OBLIGATIONS**
**ORGANIZATION SUMMARY**
**($ IN THOUSANDS)**

| ORGANIZATION | MSG | OTHER CUSTOMERS | TOTAL |
|---|---|---|---|
| CONTRACTING MANAGEMENT | $2,410.8 | $7,147.0 | $9,557.8 |
| BUSINESS PROCESS IMPROVEMENT | 14,304.3 | 7,495.1 | 21,799.4 |
| PLAN & PROGRAMS (C2 SYSTEMS) | 3,062.0 | 0 | 3,062.0 |
| SOFTWARE ENGINEERING INTEGRATION & PROGRAM INITIATION | 1,027.5 | 1,781.7 | 2,809.2 |
| FINANCIAL MANAGEMENT | 784.4 | 2,290.0 | 3,074.4 |
| ASSET MANAGEMENT | 12,649.4 | 13,555.9 | 26,205.3 |
| REQUIREMENTS | 28,662.0 | 12,067.2 | 40,729.2 |
| MAINTENANCE SYSTEMS | 4,656.6 | 37,830.2 | 42,486.8 |
| RELIABILITY/MAINTAINABILITY | 25,165.4 | 8,006.3 | 33,171.7 |
| SUPPORT OFFICES (SOs) | 696.9 | 200.0 | 896.9 |
| PROGRAM CONTROL | 2,767.7 | 26,209.3 | 28,977.0 |
| **TOTAL** | ***$96,187.0*** | ***$116,582.7*** | ***$212,769.7*** |

**MSG CONTRACTORS**
**LARGE BUSINESS**
**($ IN MILLIONS)**

Identified below are the 15 **Large Business** firms which received the greatest obligated dollars from MSG in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | GRUMMAN DATA SYSTEMS | $32.9 |
| 2 | ROBBINS-GIOIA | 32.0 |
| 3 | BDM CORPORATION | 21.0 |
| 4 | COMPUTER SCIENCE CORPORATION | 19.2 |
| 5 | DYNAMICS RESEARCH CORPORATION | 11.3 |
| 6 | COMPUTER ASSOCIATES | 10.3 |
| 7 | MARTIN MARIETTA | 9.1 |
| 8 | LITTON COMPUTER SERVICES | 7.9 |
| 9 | AT&T | 7.1 |
| 10 | XEROX | 4.9 |
| 11 | KPMG PEAT MARWICK | 4.0 |
| 12 | IBM | 3.9 |
| 13 | TRW | 3.6 |
| 14 | SYSCON | 2.3 |
| 15 | THE ANALYTIC SCIENCES CORPORATION (TASC) | 1.8 |

## MSG CONTRACTORS
## SMALL BUSINESS
## ($ IN MILLIONS)

Identified below are the 10 **Small Business** firms which received the greatest obligated dollars from MSG in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | DECISION SYSTEMS TECHNOLOGIES, INC | $6.7 |
| 2 | I-NET | 5.4 |
| 3 | CENTURY TECHNOLOGIES, INC | 4.4 |
| 4 | INNOLOG | 3.9 |
| 5 | EXCEL MANAGEMENT SYSTEMS | 3.5 |
| 6 | RJO ENTERPRISES, INC | 3.2 |
| 7 | ENTEK | 2.0 |
| 8 | NCI INFORMATION SYSTEMS | 1.9 |
| 9 | RCF INFORMATION SYSTEMS | 1.7 |
| 10 | INNOVATIVE TECHNOLOGY CORPORATION | 1.3 |

## MSG CONTRACT SUMMARY
## ($ IN MILLIONS)
## FY94

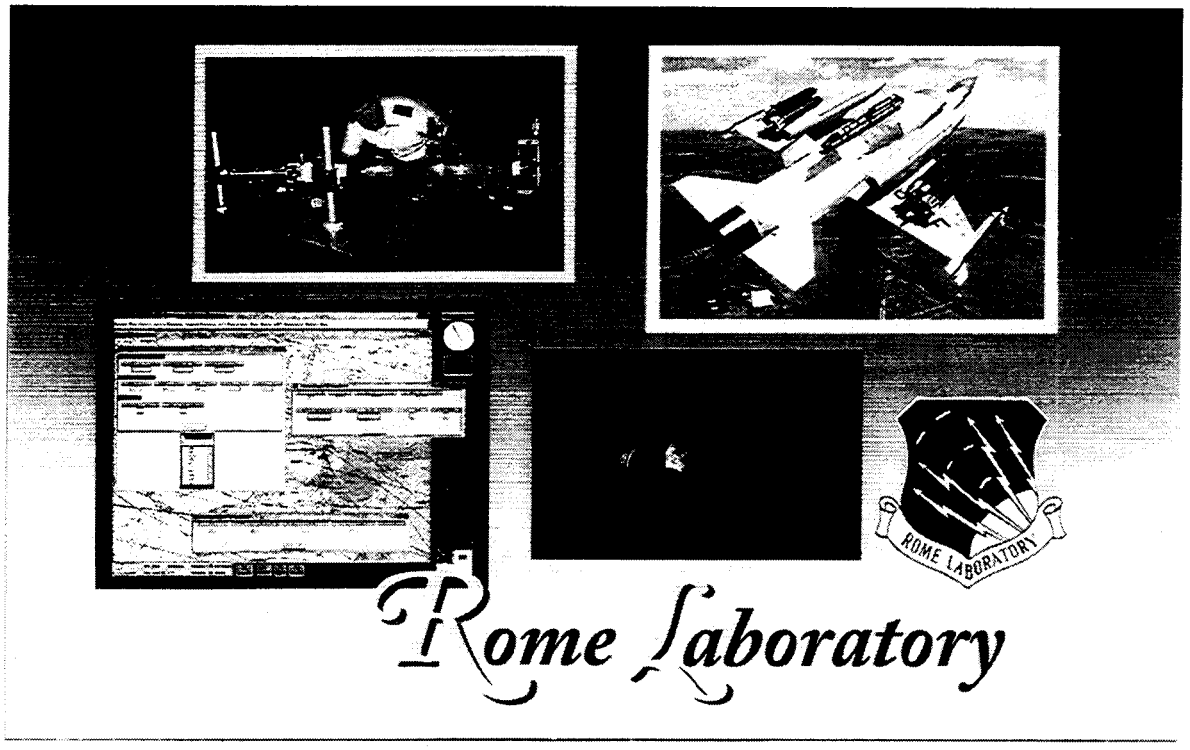
| | *NUMBER ACTIONS* | *DOLLARS OBLIGATED* |
|---|---|---|
| LARGE BUSINESS | 786 | $183.1 |
| SMALL BUSINESS | 423 | 43.2 |
| NOT-FOR- PROFIT | 0 | 0 |
| **TOTAL** | **1,209** | **$226.3** |

**MSG**
**REAL ESTATE AND FACILITIES**
**($ IN MILLIONS)**

| | FACILITY NUMBER | *ACQUISITION COST | FACILITIES (SQ FT) |
|---|---|---|---|
| MSG WRIGHT-PATTERSON AFB, OHIO (TENANT) | N/A | $8.3 | 75,000 |
| MSG DAYTON, OHIO | N/A | 7.9 | 71,201 |
| **MSG SUPPORT OFFICES** (TENANT) | | | |
| OGDEN SOFTWARE DEVELOPMENT ACTIVITY | N/A | .8 | 8,238 |
| OKLAHOMA CITY SOFTWARE DEVELOPMENT ACTIVITY | N/A | 1.3 | 14,300 |
| MCCLELLAN SOFTWARE DEVELOPMENT ACTIVITY | N/A | .5 | 3,850 |
| SAN ANTONIO SOFTWARE DEVELOPMENT ACTIVITY | N/A | .4 | 4,622 |
| ***TOTAL*** | | ***$19.2*** | ***177,211*** |

* Represents facility replacement costs. SOURCE: Air Force Pricing Guide

# ROME LABORATORY



## ROME LABORATORY (RL)
## GRIFFISS AIR FORCE BASE
## NEW YORK

Rome Laboratory at Griffiss Air Force Base, NY, is the Air Force Materiel Command (AFMC) center of excellence for Command, Control, Communications, Computers and Intelligence (C4I) research and development.

C4I is the military process of managing U.S. forces on a worldwide basis. The effective planning, directing, coordinating, and controlling of forces requires surveillance, communications and information processing. To provide the U.S. Air Force a more effective C4I capability, Rome Lab develops techniques and equipment for the surveillance of ground and aerospace objects, and for inter-theater and intra-theater survivable communications. Rome Lab is also the Air Force center of expertise for the development of technologies for battle management information systems and the handling of intelligence data.

Engineers and scientists at the laboratory are also involved in the following technologies: software engineering, artificial intelligence/expert systems, solid state sciences and materials, electromagnetics, photonics, signal processing, computer architectures, reliability, maintainability and compatibility of electronic systems.

Rome Lab operates three technical directorates at Griffiss Air Force Base, NY, and one at Hanscom Air Force Base, MA. Occupying more than 18 acres of floor space, Rome Lab houses some of the finest research and development facilities in the country. These include areas for research in signal processing, microelectronics, antennas, and solid state devices and materials. The laboratory also operates off-base research sites at various locations in New York and Massachusetts, where research and engineering is conducted in functions such as surveillance, communications, antennas, and scattering.

In all technical areas, Rome Lab is directly responsible to the Electronic Systems Center (ESC) at Hanscom Air Force Base, MA. Rome Lab maintains a military and civilian workforce of about 1,000. The majority of these employees are scientists and engineers specializing in such areas as electronics, physics, computer science and mathematics. The laboratory carries out research and development using its own resources and those of contractors throughout the country. Rome Lab's annual budget is more than $400 million, with ongoing contracts valued in excess of $2.2 billion.

In recognition of its numerous scientific achievements, Rome Lab has earned the Air Force Outstanding Unit Award--the service's highest organizational honor--on six different occasions. In addition, the laboratory has been honored three times since 1990 with the Air Force Organizational Excellence Award. Laboratory scientists and engineers have been honored five times with the Harold Brown Award, the Air Force's highest recognition for significant individual achievement in the realm of reaserch and development.

## RL ORGANIZATIONAL SYMBOLS

| | |
|---|---|
| Commander, Rome Laboratory | RL/CC |
| Chief Scientist | RL/CA |
| Deputy Director | RL/CD |
| Executive Director | RL/CCE |
| Protocol | RL/CCP |
| Hq Sq Section | RL/CCQ |
| Acquisition Logistics | RL/AL |
| Small Business | RL/BC |
| Technical Facilities | RL/CE |
| Command, Control, and Communications | RL/C3 |
| Operations and Support | RL/DO |
| Electromagnetics and Reliability | RL/ER |
| Comptroller | RL/FM |
| History Office | RL/HO |
| Information Management | RL/IM |
| Intelligence and Reconnaissance | RL/IR |
| Staff Judge Advocate | RL/JA |
| Logistics | RL/LG |
| Surveillance and Photonic | RL/OC |
| Public Affairs | RL/PA |
| Contracting | RL/PK |
| Communications and Computers | RL/SC |
| Safety Office | RL/SE |
| Technical Resources | RL/SU |
| Staff Meteorologist | RL/WE |
| Plans and Programs | RL/XP |

## RL ASSIGNED STRENGTH

| ASSIGNED CIVILIAN | | ASSIGNED MILITARY | |
|---|---|---|---|
| SENIOR EXEC SERVICE | 5 | OFFICERS | 86 |
| GENERAL SCHEDULE | 845 | ENLISTED | 28 |
| WAGE SUPERVISOR | 2 | | |
| WAGE LEADER | 0 | **TOTAL** | **114** |
| WAGE GRADE | 8 | | |
| OTHER EMPLOYEES | 0 | | |
| **TOTAL** | **860** | ***TOTAL ASSIGNED*** | ***974*** |

## RL GRADE STRUCTURE

**GENERAL SCHEDULE**

| *GS* | *NO.* |
|---|---|
| 1 | 0 |
| 2 | 0 |
| 3 | 0 |
| 4 | 32 |
| 5 | 64 |
| 6 | 14 |
| 7 | 29 |
| 8 | 2 |
| 9 | 33 |
| 10 | 4 |
| 11 | 74 |
| 12 | 225 |
| 13 | 235 |
| 14 | 93 |
| 15 | 40 |
| ***TOTAL GS*** | ***845*** |

**MILITARY BY GRADE**

| *GRADE* | *NO.* |
|---|---|
| LT GEN | 0 |
| MAJ GEN | 0 |
| BRIG GEN | 0 |
| COL | 5 |
| LT COL | 3 |
| MAJ | 8 |
| CAPT | 45 |
| 1ST LT | 9 |
| 2D LT | 16 |
| CMSGT | 0 |
| SMSGT | 2 |
| MSGT | 2 |
| TSGT | 7 |
| SSGT | 6 |
| SGT | 6 |
| SRA | 0 |
| A1C | 4 |
| AMN | 1 |
| AB | 0 |
| ***TOTAL MILITARY*** | ***114*** |

## RL CIVILIAN WORKFORCE
## LENGTH OF SERVICE vs AGE DISTRIBUTION

The purpose of this data is to show the RL workforce in relation to RIF status and voluntary retirements.

| | YEARS OF SERVICE | | | | | |
|---|---|---|---|---|---|---|
| **AGE** | **0-4** | **5-19** | **20-24** | **25-29** | **30+** | **TOTAL** |
| 34 AND BELOW | 28 | 175 | 0 | 0 | 0 | 203 |
| 35-39 | 8 | 100 | 3 | 0 | 0 | 111 |
| 40-44 | 2 | 72 | 22 | 0 | 0 | 96 |
| 45-49 | 3 | 46 | 33 | 33 | 4 | 119 |
| 50-54 | 1 | 30 | 24 | 35 | 62 | 152 |
| 55-59 | 0 | 22 | 7 | 14 | *75 | 118 |
| 60-61 | 1 | 7 | *2 | *0 | *9 | 19 |
| 62 AND ABOVE | | *7 | *4 | *5 | *26 | 42 |
| ***TOTAL*** | ***43*** | ***459*** | ***95*** | ***87*** | ***176*** | ***860*** |

* Eligible for Voluntary Retirement total is 128 or 14.9% of workforce.

## RL PAYROLL--GRIFFISS AND HANSCOM
## ($ IN MILLIONS)

| | FY90 | FY91 | FY92 | FY93 | FY94 | Projected FY95 |
|---|---|---|---|---|---|---|
| **Military** | $9.5 | $8.9 | $8.5 | $7.3 | $7.3 | $7.4 |
| **Civilian** | 47.4 | 48.8 | 49.6 | 51.8 | 50.1 | 50.1 |
| ***TOTAL*** | ***$56.9*** | ***$57.7*** | ***$58.1*** | ***$59.1*** | ***$57.4*** | ***$57.5*** |

**RL FY94 OBLIGATIONS**
**ORGANIZATIONAL SUMMARY**
**($ IN MILLIONS)**

| ORGANIZATION | EXPLORATORY DEVELOPMENT | ARPA | OTHER AFMC* | OTHER CUSTOMERS | TOTAL |
|---|---|---|---|---|---|
| PLANS & PROGRAMS | $1 | $0 | $10 | $7 | $18 |
| COMMAND, CONTROL COMMUNICATIONS | 19 | 24 | 34 | 19 | 96 |
| INTELLIGENCE & RECONNAISSANCE | 9 | 2 | 19 | 76 | 106 |
| ELECTROMAGNETICS & RELIABILITY | 20 | 3 | 3 | 11 | 37 |
| SURVEILLANCE & PHOTONICS | 18 | 18 | 5 | 7 | 48 |
| **SUBTOTAL** | **** $67** | **$47** | **$71** | **$120** | **$305** |
| MISSION SUPPORT (06RA/3400) | | | | | 23 |
| MILITARY PAY | | | | | 7 |
| ***TOTAL*** | ***** $67*** | ***$47*** | ***$71*** | ***$120*** | ***$335*** |

* Other AFMC column reflects only those funds (other than Exploratory Development) received directly from HQ AFMC. Funds received from ESC, ASC, WL, and other activities are included in the other customers column.

** Includes 62702F Proj Pay

## RL PROGRAM FUNDS
## ($ IN MILLIONS)

| FUND TYPE | FY90 | FY91 | FY92 | FY93 | FY94 | Projected FY95 |
|---|---|---|---|---|---|---|
| SDI | $60 | $31 | $26 | $20 | $5 | $7 |
| EXPLORATORY DEV | 41 | 38 | 35 | 36 | **68 | **75 |
| ARPA* | 26 | 34 | 44 | 41 | 50 | 55 |
| OTHER AFMC | 56 | 60 | 60 | 76 | 91 | 79 |
| OTHER CUSTOMERS | 142 | 114 | 102 | 110 | 123 | 133 |
| MISSION SUPPORT (06RA/3400) | 38 | 41 | 41 | 43 | 23 | 21 |
| MILITARY PAY | 10 | 9 | 9 | 7 | 7 | 7 |
| ***TOTAL**** | ***$373*** | ***$327*** | ***$317*** | ***$333*** | ***$367*** | ***$377*** |

* ARPA--Advanced Research Project Agency
** Includes 62702F Proj Pay
*** Includes ESC funds:

| | |
|---|---|
| FY90 | $27.1 M |
| FY91 | 13.5 M |
| FY92 | 7.4 M |
| FY93 | 8.4 M |
| FY94 | 9.1 M |
| FY95 | 3.5 M (Estimated) |

**RL CONTRACT SUMMARY**
**($ IN MILLIONS)**
**FY94**

| | *NUMBER OF ACTIONS* | | | | *DOLLARS OBLIGATED* | | | |
|---|---|---|---|---|---|---|---|---|
| | **MA** | **NY** | **Other** | ***Total*** | **MA** | **NY** | **Other** | ***Total*** |
| LARGE BUSINESS | 45 | 119 | 289 | 453 | $12.2 | $33.3 | $120.3 | $165.8 |
| SMALL BUSINESS | 38 | 82 | 175 | 295 | 5.8 | 11.4 | 28.5 | $45.7 |
| NOT-FOR-PROFIT | 26 | 81 | 137 | 244 | 4.8 | 8.4 | 11.6 | $24.8 |
| ***TOTAL*** | ***109*** | ***282*** | ***601*** | ***992*** | ***$22.8*** | ***$53.1*** | ***$160.4*** | ***$236.3*** |

**RL CONTRACTORS**
**LARGE BUSINESS**
**($ IN MILLIONS)**

Identified below are the 15 **Large Business** firms which received the greatest obligated dollars from RL in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | GTE CONTEL FEDERAL SYSTEMS | $32.9 |
| 2 | PLANNING RESEARCH CORPORATION | 19.2 |
| 3 | STERLING SOFTWARE U.S., INC | 15.5 |
| 4 | HAZELTINE CORPORATION | 9.4 |
| 5 | GENERAL ELECTRIC/MARTIN MARIETTA | 6.7 |
| 6 | PAR TECHNOLOGY/ROME RESEARCH | 6.1 |
| 7 | SCIENCE APPLICATIONS INT'L CORPORATION | 5.7 |
| 8 | HUGHES AIRCRAFT COMPANY | 4.2 |
| 9 | BBN SYSTEMS & TECHNOLOGIES | 4.1 |
| 10 | GRUMMAN AEROSPACE CORPORATION | 4.0 |
| 11 | KAMAN SCIENCES CORPORATION | 4.0 |
| 12 | WESTINGHOUSE ELECTRIC CORPORATION | 4.0 |
| 13 | THE ANALYTIC SCIENCES CORPORATION | 3.8 |
| 14 | GENERAL RESEARCH CORPORATION | 3.3 |
| 15 | TRW | 3.2 |

**RL CONTRACTORS**
**SMALL BUSINESS**
**($ IN MILLIONS)**

Identified below are the 15 **Small Business** firms which received the greatest obligated dollars from RL in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | SYNECTICS CORPORATION | $7.8 |
| 2 | MEI ASSOCIATES, INC | 2.3 |
| 3 | DECISION SCIENCE APPLICATION, INC | 2.2 |
| 4 | VIASAT, INC | 1.9 |
| 5 | GEMINI INDUSTRIES, INC | 1.7 |
| 6 | INFOSYSTEMS TECHNOLOGY, INC | 1.7 |
| 7 | TRUSTED INFORMATION SYSTEMS, INC | 1.7 |
| 8 | SOFTWARE PRODUCTIVITY SOLUTIONS, INC | 1.5 |
| 9 | ODYSSEY RESEARCH ASSOCIATES, INC | 1.2 |
| 10 | FUENETZ SYSTEMS CONCEPTS, INC | .853 |
| 11 | METEOR COMMUNICATIONS CORPORATION | .850 |
| 12 | STANFORD TELECOMMUNICATIONS, INC | .790 |
| 13 | QUESLICH, INC | .780 |
| 14 | SOHAR INCORPORATED | .689 |
| 15 | ELECTRIC COMPUTING CONCEPTS, INC | .640 |

**RL CONTRACTORS**
**UNIVERSITIES AND NOT-FOR-PROFIT**
**($ IN MILLIONS)**

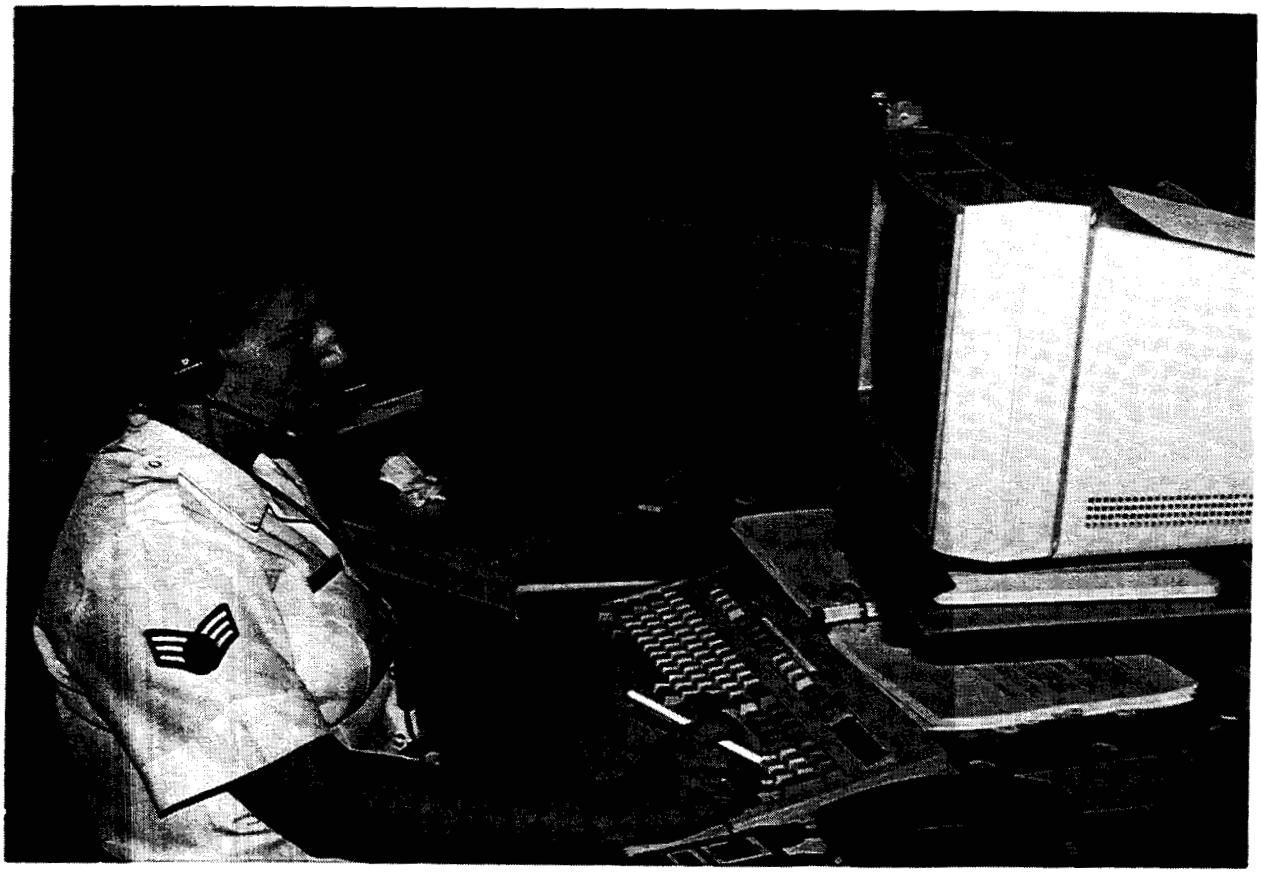
Identified below are the 15 **Universities and Not-for-Profit** firms which received the greatest obligated dollars from RL in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | SRI INTERNATIONAL | $5.7 |
| 2 | UNIVERSITY OF SOUTHERN CALIFORNIA | 3.5 |
| 3 | IITRI | 2.8 |
| 4 | MASSACHUSETTS INSTITUTE OF TECHNOLOGY | 2.1 |
| 5 | UNIVERSITY OF MASSACHUSETTS | 1.7 |
| 6 | SYRACUSE RESEARCH CORPORATION | 1.5 |
| 7 | SYRACUSE UNIVERSITY | 1.2 |
| 8 | CORNELL UNIVERSITY | 1.1 |
| 9 | OPEN SOFTWARE FOUNDATION, INC | .822 |
| 10 | UNIVERSITY OF CALIFORNIA, IRVINE | .785 |
| 11 | GEORGIA TECH RESEARCH CORPORATION | .686 |
| 12 | NORTHWEST UNIVERSITY | .680 |
| 13 | INDIANA UNIVERSITY SYSTEM | .646 |
| 14 | KESTREL INSTITUTE | .638 |
| 15 | UNIVERSITY OF COLORADO | .621 |

## RL
## REAL ESTATE AND FACILITIES
## ($ IN THOUSANDS)

| | ACQUISITION COST | ACRES | FACILITIES SQ (FT) |
|---|---|---|---|
| HQ RL | | | |
| GRIFFISS AFB, NY (TENANT) | $25,1117 | N/A | 685,775 |
| **OPERATING LOCATIONS** | | | |
| RL/ER-H--HANSCOM AFB, MA (TENANT) | 9,679 | N/A | 140,787 |
| AVA, NY | 617 | 297 | 12,359 |
| FORESTPORT, NY | 885 | 184 | 16,264 |
| IPSWICH, MA | 1,200 | 65 | 11,285 |
| NEWPORT 1, (TANNER HILL),NY | 839 | 37 | 10,989 |
| NEWPORT 2, (IRISH HILL), NY | 2,041 | 41 | 13,647 |
| PROSPECT, MA | 200 | 6 | 4,824 |
| QUAKER HILL, NY | 7 | 7 | 0 |
| STOCKBRIDGE, NY | 671 | 295 | 14,510 |
| TUMMONDS HILL (ONTARIO CTR), NY | 134 | 2 | 1,557 |
| VERONA, NY | 4,922 | 493 | 69,341 |
| VIENNA, NY | 7 | 3 | 0 |
| YOUNGSTOWN, NY | 572 | 99 | 7,686 |
| **SUBTOTAL** | **$12,095** | **1,529** | **162,462** |
| ***TOTAL*** | ***$46,891*** | ***1,529*** | ***898,024*** |

# STANDARD SYSTEMS GROUP



## STANDARD SYSTEMS GROUP (SSG)
## MAXWELL AIR FORCE BASE--GUNTER ANNEX
## ALABAMA

The mission of the Standard Systems Group (SSG) is to provide specified standard communications-computer systems as directed by Air Force through the Electronic Systems Center (ESC) or Air Force Materiel Command (AFMC). The SSG designs, develops, procures, integrates, produces, and manages all worldwide computer systems for their life-cycle as directed by higher headquarters.

Ensuring the most beneficial, efficient, and effective use of resources, SSG provides seamless management of standard computer systems from inception through worldwide employment and replacement. It manages software development programs based on headquarters direction, to include use of latest design and reuse tools and software engineering processes. SSG provides for the study, development, modification and improvement of automated systems management concepts, objectives, functions and practices on fixed and deployable communications systems equipment, software facilities, manpower, support, standards, training, and funding.

SSG performs Air Force-wide configuration management for all SSG-managed standard systems applications, both hardware and software. It also provides a technical assistance and problem reporting focal point for worldwide call-in and resolution of problems, and controls these activities to ensure prompt response to user queries and problems. SSG manages the small computer requirements contract efforts for the Air Force, which includes providing Air Force a source of expertise on small computer hardware, software, and maintenance.

Through continuous analysis of systems requirements and database content of standard and related unique systems, SSG determines systems integration and optimization opportunities, and ensures an evolutionary approach to systems change. Technical experts at SSG also participate in technical assistance and consultant services on system design and the use of management productivity techniques, and selection evaluations of equipment, software and systems as directed by headquarters.

Automated data systems managed by SSG span all functions of base-level Air Force activities, including operations (e.g. Air Force Wing Command and Control System), maintenance (e.g. Core Automated Maintenance System), research and development (e.g. On-Line Vehicle Interactive Management System), comptroller (e.g. Base Budget Automated System), and many others.

## SSG ORGANIZATIONAL SYMBOLS

| | |
|---|---|
| Commander, Standard Systems Group | SSG/CC |
| Executive Director | SSG/ED |
| Executive Officer | SSG/EDE |
| Vice Director | SSG/EV |
| Executive Officer to Vice Director | SSG/EVE |
| Technical Director | SSG/EA |
| Command Administration | SSG/EVA |
| Protocol | SSG/EVP |
| Senior Enlisted Advisor | SSG/CCC |
| Hq Sq Section | SSG/CCQ |
| Engineering | SSG/EN |
| Financial Management | SSG/FM |
| Historian | SSG/HO |
| Judge Advocate | SSG/JA |
| Logistics Support Systems | SSG/LG |
| Public Affairs | SSG/PA |
| Contracting | SSG/PK |
| Acquisition and Program Management Support | SSG/PM |
| Reserve Forces Advisory | SSG/RF |
| Quality Culture | SSG/TQ |
| Base Support Systems | SSG/SB |
| Systems Support | SSG/SS |
| Operations Support | SSG/XO |

## SSG ASSIGNED STRENGTH

| ASSIGNED CIVILIAN | | ASSIGNED MILITARY | |
|---|---|---|---|
| SENIOR EXEC SERVICE | 0 | OFFICERS | 197 |
| GENERAL SCHEDULE | 530 | ENLISTED | 972 |
| WAGE SUPERVISOR | 0 | | |
| WAGE LEADER | 0 | **TOTAL** | **1,169** |
| WAGE GRADE | 0 | | |
| TERM EMPLOYEES * | 109 | | |
| **TOTAL** | **639** | ***TOTAL ASSIGNED*** | ***1,808*** |

* Term employees: temporary employees

## SSG GRADE STRUCTURE

**GENERAL SCHEDULE**

| *GS* | *NO.* |
|---|---|
| 1 | 0 |
| 2 | 0 |
| 3 | 0 |
| 4 | 18 |
| 5 | 35 |
| 6 | 31 |
| 7 | 21 |
| 8 | 1 |
| 9 | 9 |
| 10 | 0 |
| 11 | 59 |
| 12 | 345 |
| 13 | 83 |
| 14 | 27 |
| 15 | 10 |
| TOTAL GS | 639 |
| ***CIVILIAN TOTAL*** | ***639*** |

**MILITARY BY GRADE**

| *GRADE* | *NO.* |
|---|---|
| LT GEN | 0 |
| MAJ GEN | 0 |
| BRIG GEN | 0 |
| COL | 9 |
| LT COL | 20 |
| MAJ | 32 |
| CAPT | 80 |
| 1ST LT | 27 |
| 2D LT | 29 |
| CMSGT | 16 |
| SMSGT | 38 |
| MSGT | 170 |
| TSGT | 188 |
| SSGT | 226 |
| SGT | 40 |
| SRA | 232 |
| A1C | 37 |
| AMN | 12 |
| AB | 13 |
| ***TOTAL MILITARY*** | ***1,169*** |

## SSG CIVILIAN WORKFORCE
## LENGTH OF SERVICE vs AGE DISTRIBUTION

The purpose of this data is to show the SSG workforce in relation to RIF status and voluntary retirements.

| | YEARS OF SERVICE | | | | | |
|---|---|---|---|---|---|---|
| **AGE** | **0-4** | **5-19** | **20-24** | **25-29** | **30+** | **TOTAL** |
| 34 AND BELOW | 34 | 60 | 0 | 0 | 0 | 94 |
| 35-39 | 3 | 58 | 3 | 0 | 0 | 64 |
| 40-44 | 12 | 60 | 36 | 2 | 0 | 110 |
| 45-49 | 15 | 46 | 22 | 22 | 2 | 107 |
| 50-54 | 6 | 49 | 11 | 25 | 25 | 116 |
| 55-59 | 1 | 51 | 9 | 17 | *21 | 99 |
| 60-61 | 1 | 12 | *10 | *7 | *3 | 33 |
| 62 AND ABOVE | 0 | *2 | *6 | *3 | *5 | 16 |
| ***TOTAL*** | ***72*** | ***338*** | ***97*** | ***76*** | ***56*** | ***639*** |

* Eligible for Voluntary Retirement total is 57 or 8.9% of workforce.

## SSG PAYROLL
## ($ IN MILLIONS)

| | FY90 | FY91 | FY92 | FY93 | FY94 | Projected FY95 |
|---|---|---|---|---|---|---|
| **Military** | 47.0 | 48.0 | 45.0 | *36.0 | 42.8 | 43.7 |
| **Civilian** | 33.1 | 35.6 | 31.8 | 34.3 | 35.3 | 36.0 |
| ***TOTAL*** | ***$80.1*** | ***$83.6*** | ***$76.8*** | ***$70.3*** | ***$78.1*** | ***$79.7*** |

*Note: This is an estimate based on actual data provided by host accounting and finance office through June 1993. There was no military personnel interface after June 1993.

**SSG FY94 OBLIGATIONS**
**ORGANIZATIONAL SUMMARY**
**($ IN MILLIONS)**

| | | FY90 | FY91 | FY92 | FY93 | FY94 | Projected FY95 |
|---|---|---|---|---|---|---|---|
| (1) | O&M | 118.7 | 125.1 | 125.5 | 115.5 | 124.6 | 105.6 |
| (2) | O&M REIMBURSABLE | 9.4 | 11.9 | 24.0 | 15.9 | 20.3 | 15.0 |
| (3) | INVESTMENT EQUIP | | | | | | |
| | Direct | 38.6 | 25.2 | 62.4 | 125.9 | 129.0 | * |
| | Reimbursable | | | 14.7 | | 7.8 | |
| (4) | OTHER CUSTOMERS | | | 9.7 | 6.2 | 21.8 | 0.0 |
| (5) | MILITARY PAY | 47.0 | 48.0 | 45.0 | 36.0 | 42.8 | 43.7 |
| | ***TOTAL*** | ***$213.7*** | ***$210.2*** | ***$281.3*** | ***$299.5*** | ***$346.3*** | ***$164.3*** |

* Not Available
(1) Includes civilian pay, subOBANs for Command and Control Systems Center, and AF Computer Acquisition Center thru FY92.
(2) Includes Computer Sevices Center, San Antonio, Texas, thru FY92.
(3) Total dollars programmed as of 30 Sep 94.
(4) Funding received outsided AFMC are both direct and reimbursement. Funds were not tracked prior to Jan 92.
(5) FY95 figures are estimates.

Funding received supports the operation and development of over 40 DoD and Air Force mission programs. Major Defense system acquisition development programs such as Combat Ammunition System (CAS), Cargo Movement Operations System (CMOS), Fuels Automated Management System (FAMS), Base Level System Modernization (BLMS), Data Defense Network (DDN), Defense Message System-Air Force (DMS-AF), and Air Force Command and Control Networking (AFC2N), comprise over 50 percent of the SSC annual approved program dollars. Funded multi-year acquisitions FY96-01 total upwards of $1 billion.

## SSG CONTRACT SUMMARY
## ($ IN MILLIONS)
## FY94

| | *NUMBER ACTIONS* | *DOLLARS OBLIGATED* |
|---|---|---|
| LARGE BUSINESS | 2,268 | $187.0 |
| SMALL BUSINESS | 216 | 24.0 |
| NOT-FOR- PROFIT | 0 | 0 |
| TOTAL | 2,484 | $211.0 |

## SSG CONTRACTORS
## ALABAMA BUSINESSES
## ($ IN MILLIONS)

Identified below are the 12 contractors doing business with SSG that maintain facilities in Alabama ranked by total value of active contracts.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | AT&T | $1,138.0 |
| 2 | ZDS | 792.0 |
| 3 | LOGICON | 670.0 |
| 4 | GTSI | 655.0 |
| 5 | UNISYS GOVERNMENT SYSTEMS | 612.0 |
| 6 | HFSI | 600.0 |
| 7 | GTE GOVERNMENT SYSTEMS CORP | 259.0 |
| 8 | EDS | 115.0 |
| 9 | HARRIS DATA SERVICES CORP | 100.0 |
| 10 | I-NET, INC | 64.0 |
| 11 | PSE | 40.0 |
| 12 | OGS | 23.0 |

**SSG CONTRACTORS**
**LARGE BUSINESS**
**($ IN MILLIONS)**

Identified below are the 8 **Large Business** firms which received the greatest obligated dollars from SSG in FY94.

| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | UNISYS GOVERNMENT SYSTEMS | $115.0 |
| 2 | LOGICON | 37.0 |
| 3 | ELECTRONIC DATA SYSTEMS CORPORATION | 9.0 |
| 4 | PRC, INC | 8.6 |
| 5 | HARRIS DATA SERVICES CORPORATION | 8.1 |
| 6 | AT&T | 5.0 |
| 7 | OGDEN GOVERNMENT SERVICES | 4.2 |
| 8 | GTE GOVERNMENT SYSTEMS CORPORATION | 4.0 |

**SSG CONTRACTORS**
**SMALL BUSINESS**
**($ IN MILLIONS)**

Identified below are the 8 **Small Business** firms which received the greatest obligated dollars from SSG in FY94.

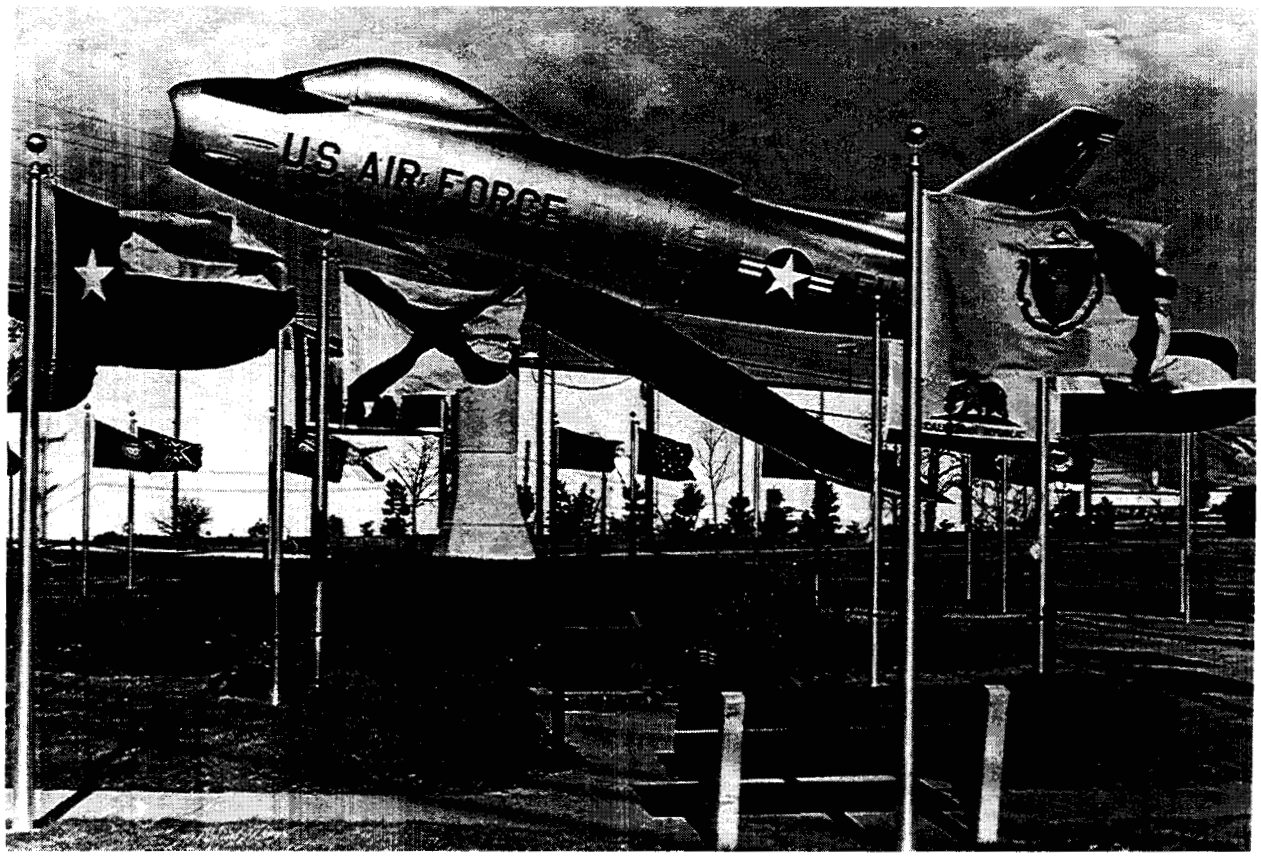
| RANK | CONTRACTOR | $ DOLLARS OBLIGATED |
|---|---|---|
| 1 | MANUFACTURING TECHNOLOGY | $9.2 |
| 2 | I-NET, INC | 7.1 |
| 3 | POTOMAC SYSTEM ENGINEERING INC | 3.4 |
| 4 | MCR SERVICES, INC | 1.4 |
| 5 | TECH-MASTERS INC | 1.0 |
| 6 | NCI INFORMATION SYSTEMS, INC | .9 |
| 7 | SUMMARIA SYSTEMS, INC | .4 |
| 8 | GOVERNMENT TECHNOLOGY SERVICES, INC | .3 |

## SSG
## REAL ESTATE AND FACILITIES
## ($ IN THOUSANDS)

| | FACILITY NUMBER | ACQUISITION COST | FACILITIES SQ (FT) |
|---|---|---|---|
| HQ AETC* | | | |
| MAXWELL AFB, AL | 206 | 97.5 | 6,377 |
| | 220 | 126.8 | 7,558 |
| | **216 | | 2,500 |
| | 221 | 146.8 | 6,534 |
| | 222 | 107.1 | 6,352 |
| | 223 | 146.3 | 4,589 |
| | 310 | 108.4 | 6,002 |
| | 324 | 106.8 | 6,287 |
| | 325 | 124.9 | 6,366 |
| | 403 | 243.1 | 15,145 |
| | 426 | 171.8 | 6,899 |
| | 501 | 197.9 | 12,120 |
| | **820 | | 2,700 |
| | **834 | | 2,075 |
| | 852 | 90.8 | 5,000 |
| | 856 | 23,997.4 | 193,399 |
| | 857 | 5,593.5 | 115,985 |
| | 868 | 300.3 | 15,334 |
| | 881 | 187.0 | 5,000 |
| | 888 | 2,259.6 | 77,092 |
| | **1510 | | 2,200 |
| | **1512 | | 8,300 |
| ***TOTAL*** | | ***$34,006.0*** | ***513,814*** |

* No acreage except as pertains to office buildings
** Shared with other base activities

# HANSCOM AFB ECONOMIC IMPACT ON NEW ENGLAND



# INTRODUCTION

## SUMMARY

The Hanscom AFB economic impact computation is produced annually to estimate the total economic impact of Hanscom expenditures on the communities surrounding the base. The impact of base spending is both direct and indirect. The community directly benefits from the payroll monies spent by military and civilian employees and profits by fulfilling many of the base's procurement needs. Indirectly, base expenditures produce a ripple effect in the economy that supports the creation of secondary jobs within the economic impact area.

The expenditures of Hanscom AFB are divided into two categories: "base level" and "prime contract" expenditures. This study only explores the impact Hanscom AFB has on the New England economy due to "base level" expenditures because "prime contract" expenditures are not directly related to where a base is located.

"Base level" expenditures represent the cost of maintaining the base and supporting the Electronic Systems Center's (ESC) mission. These expenditures include such items as payroll, construction, services provided, health care, and utilities.

During fiscal year 1994, Hanscom spent approximately $1.1 Billion in New England on "base level" expenditures. This spending induces secondary spending which continues to increase as the dollars "ripple" through the economy.

Based on these computations, Hanscom's economic impact is estimated as follows:

- **Total Economic Impact** of Hanscom AFB on the New England economy is estimated at **$2.9 billion**.

- **Number of Secondary Jobs Created** by Hanscom AFB expenditures in New England is computed at **12,110 jobs.**

- **Total Employment Supported** by annual Hanscom AFB expenditures is computed at **24,886 jobs.**

Economic impact is a useful reference statistic for Air Force management and a valuable source of information for community leaders, legislators, and installation visitors.

## METHODOLOGY

The economic impact and secondary jobs computations using input-output tables published by the US Department of Commerce, Bureau of Economic Analysis (BEA) in 1992. These tables are based on 1982 detail level national information which was updated in 1987 at the summary level. Additionally, the BEA used the Regional Input-Output Modeling System (RIMS II) to create Massachusetts unique tables using the national tables as a benchmark.

This study made the primary assumption that the BEA's Massachusetts input-output tables would be applicable to all of Hanscom's expenditures in New England.

# ECONOMIC IMPACT CALCULATION

PART I: DATA SUMMARY AND ADJUSTMENT

| FROM PAGE | TITLE | ANNUAL AMOUNT | ECONOMIC IMPACT FACTORS | ECONOMIC IMPACT CREATED |
|---|---|---|---|---|
| **I. PAYROLL** | | | | |
| Page 5-1 | Military | $80,803,500 | x 2.52 | **$203,624,820** |
| Page 5-1 | Civilian | $89,508,008 | x 2.52 | **$225,560,180** |
| Page 5-1 | Civilian NAF and Others | $463,447,334 | x 2.52 | **$1,167,887,282** |
| **II. CONSTRUCTION** | | | | |
| Page 5-13 | Whole House MILCON | $5,962,518 | x 2.82 | **$16,814,301** |
| Page 5-13 | Non-appropriated Fund | $123,565 | x 2.97 | **$366,988** |
| Page 5-13 | Military Family Housing | $2,607,200 | x 2.79 | **$7,274,088** |
| Page 5-13 | Buildings and Grounds | $2,350,000 | x 3.37 | **$7,919,500** |
| Page 5-13 | O&M and Other | $7,773,450 | x 2.68 | **$20,832,846** |
| **III. CONTRACTS AND PROCUREMENTS** | | | | |
| Page 5-13 | Buildings and Grounds | $2,479,433 | x 2.44 | **$6,049,817** |
| Page 5-13 | Utilities and Energy | $13,949,038 | x 1.71 | **$23,852,855** |
| Page 5-13 | MFH Services | $2,337,918 | x 2.96 | **$6,920,237** |
| Page 5-13 | Environmental & DERA | $5,120,213 | x 2.82 | **$14,439,001** |
| Page 5-13 | Telecommunications | $3,393,000 | x 2.19 | **$7,430,670** |
| Page 5-13 | Computer Costs | $16,942,100 | x 3.49 | **$59,127,929** |
| Page 5-13 | Credit Union | $1,569,000 | x 2.83 | **$4,440,270** |
| Page 5-13 | Technical Support Svs | $338,330,857 | x 2.88 | **$974,392,868** |
| Page 5-13 | Medical Services | $3,645,173 | x 2.65 | **$9,659,708** |
| Page 5-13 | Other | $1,828,637 | x 2.88 | **$5,266,475** |
| **IV. COMMISSARY, BX, HEALTH, EDUCATION, AND TDY EXPENDITURES** | | | | |
| Page 5-13 | Commissary | $1,218,000 | x 1.75 | **$2,131,500** |
| Page 5-13 | Base Exchange | $303,304 | x 2.90 | **$879,582** |
| Page 5-13 | Health (CHAMPUS) | $6,082,213 | x 3.09 | **$18,794,038** |
| Page 5-13 | Health (HMO) | $10,692,472 | x 3.09 | **$33,039,738** |
| Page 5-13 | Education (Impact Aid) | $5,226,336 | x 3.17 | **$16,567,485** |
| Page 5-13 | Education (Tuition Asst) | $8,081,488 | x 3.11 | **$25,133,428** |
| Page 5-13 | TDY | $7,592,421 | x 2.63 | **$19,968,067** |
| **TOTAL EXPENDITURES** | | **$1,081,367,178** | | |
| ***TOTAL ECONOMIC IMPACT*** | | | | ***$2,878,373,673*** |

## SECONDARY JOBS CREATED CALCULATION

PART II: SECONDARY JOBS

| FROM PAGE | TITLE | ANNUAL AMOUNT | JOBS MULTIPLIER | JOBS CREATED |
|---|---|---|---|---|
| **I. CONSTRUCTION** | | | | |
| Page 5-13 | Whole House MILCON | $5,962,518 | x 27.82 | **166** |
| Page 5-13 | Non-appropriated Fund | $123,565 | x 28.51 | **4** |
| Page 5-13 | Military Family Housing | $2,607,200 | x 25.45 | **67** |
| Page 5-13 | Buildings and Grounds | $2,350,000 | x 17.19 | **41** |
| Page 5-13 | O&M and Other | $7,773,450 | x 23.52 | **183** |
| **II. CONTRACTS AND PROCUREMENTS** | | | | |
| Page 5-13 | Buildings and Grounds | $2,479,433 | x 18.06 | **45** |
| Page 5-13 | Utilities and Energy | $13,949,038 | x 7.26 | **102** |
| Page 5-13 | MFH Services | $2,337,918 | x 28.99 | **68** |
| Page 5-13 | Environmental & DERA | $5,120,213 | x 28.29 | **145** |
| Page 5-13 | Telecommunications | $3,393,000 | x 16.63 | **57** |
| Page 5-13 | Computer Costs | $16,942,100 | x 32.03 | **543** |
| Page 5-13 | Credit Union | $1,569,000 | x 28.24 | **45** |
| Page 5-13 | Technical Support Svs | $338,330,857 | x 26.85 | **9,085** |
| Page 5-13 | Medical Services | $3,645,173 | x 22.84 | **84** |
| Page 5-13 | Other | $1,828,637 | x 26.85 | **50** |
| **III. COMMISSARY, BX, HEALTH, EDUCATION, AND TDY EXPENDITURES** | | | | |
| Page 5-13 | Commissary | $1,218,000 | x 10.41 | **13** |
| Page 5-13 | Base Exchange | $303,304 | x 43.23 | **14** |
| Page 5-13 | Health | $6,082,213 | x 36.75 | **224** |
| Page 5-13 | Health (HMO Premiums) | $10,692,472 | x 36.75 | **393** |
| Page 5-13 | Education (Impact Aid) | $5,226,336 | x 37.79 | **198** |
| Page 5-13 | Education (Tuition Asst) | $8,081,488 | x 41.70 | **337** |
| Page 5-13 | TDY | $7,592,421 | x 32.39 | **246** |

***TOTAL SECONDARY JOBS CREATED*** ***12,110***

***DIRECT HANSCOM AFB EMPLOYMENT (See Page 2-3)*** ***12,776***

***TOTAL EMPLOYMENT SUPPORTED BY HANSCOM AFB EXPENDITURES*** ***24,886***

## GLOSSARY

| | |
|---|---|
| **AAFES** | Army/Air Force Exchange Service |
| **AFMC** | Air Force Materiel Command |
| **ARPA** | Advanced Research Project Agency |
| **ASC** | Aeronautical Systems Center |
| **BOQ** | Bachelor Officer Quarters |
| **BX** | Base Exchange |
| **C3** | Command, Control, and Communications |
| **C3CM** | C3 Countermeasures |
| **C4I** | Command, Control, Communications, Computers, and Intelligence |
| **CIV** | Civilians |
| **CSG** | Communications Systems Group |
| **DARPA** | Defense Advanced Research Project Agency |
| **EXPL** | Exploratory |
| **FCRC** | Federal Contract Research Center |
| **FMS** | Foreign Military Sales |
| **GS** | General Schedule |
| **LL** | Lincoln Laboratory |
| **MIL** | Military |
| **MILCON** | Military Construction |
| **MSG** | Materiel Systems Group |
| **NAF** | Non-appropriated Fund |
| **NAFBX** | NAF and BX Employees |
| **OP SPT** | Operating Support |
| **OSD** | Office of the Secretary of Defense |
| **R & D** | Research and Development |
| **RDT & E** | Research, Development, Test, and Evaluation |
| **RIF** | Reduction In Force |
| **RL** | Rome Laboratory |

## GLOSSARY

| | |
|---|---|
| **SDI** | Strategic Defense Initiative |
| **SJC** | Secondary Jobs Created |
| **SPTG** | Support Group |
| **SSG** | Standard Systems Group |
| **VOQ** | Visiting Officer Quarters |
| **WL** | Wright Laboratory |

# Document Separator

Presented Apr. 7, 1995
Community meeting

# 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.

**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

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:**
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 work-load 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.

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**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**

**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.

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**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.

# FALLACIES ON UTILIZATION

| TEST | ELAPSED TIME | SIMULATOR PREP | SIMULATOR TEST | TEST REPORT & ANALYSIS |
|---|---|---|---|---|
| REDCAP/EMTE/AFEWES LINKAGE | 120 | 60 | 14 | 42 |
| REDCAP EF111 TEST | 167 | 96 | 25 | 34 |
| PMTC NOISE QUALITY | 50 | 28 | 5 | 14 |
| ESD TEST PROGRAM | 183 | 48 | 10 | 75 |
| WARLOCK TEST PROGRAM | 138 | 80 | 28 | 28 |
| B-2 M&S TESTING | 300 | 104 | 60 | 104 |
| TACTICAL A/C DECOY TEST | 75 | 28 | 7 | 26 |
| MLAT I | 210 | 120 | 21 | 7 |
| AVERAGE | 155 | 71 | 21 | 41 |

SIMULATOR USAGE

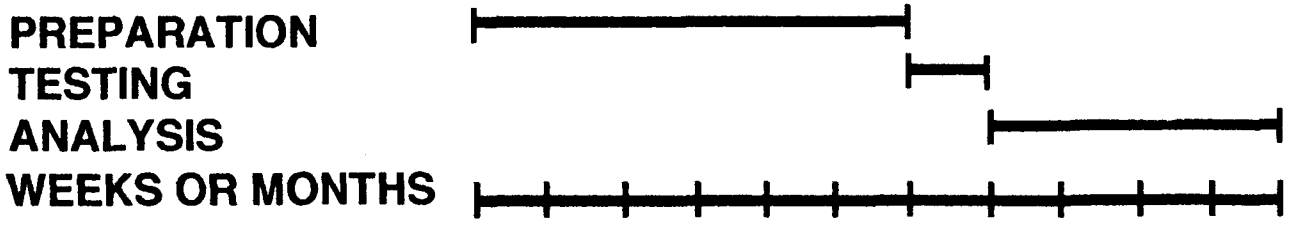
ALL UNITS ARE IN DAYS

**TEST TIME IS 15% OF SIMULATOR USAGE TIME**

# THE MILITARY VALUE OF REDCAP IS NOT JUST FROM TESTING

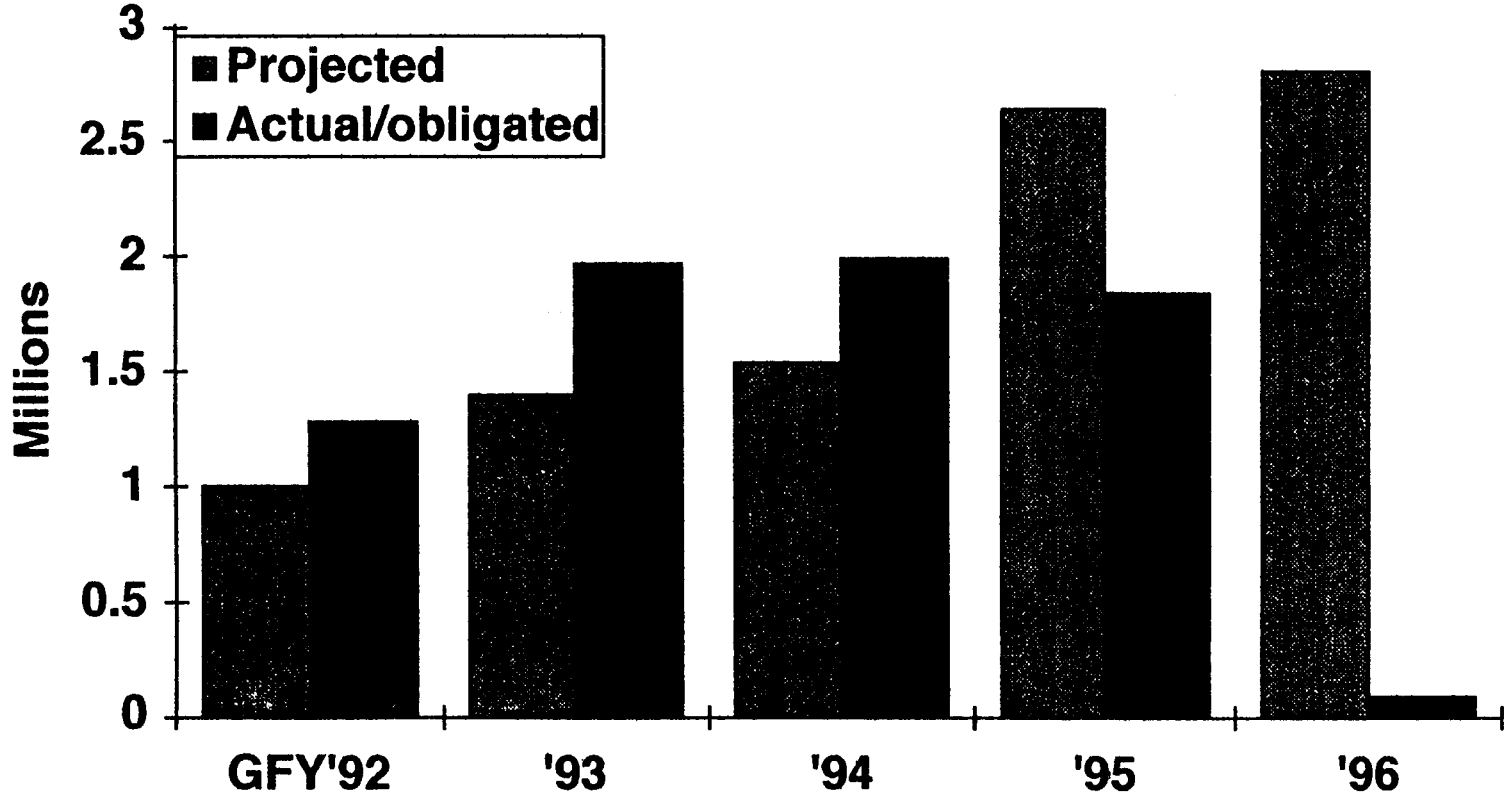
# THE PREPARATION TIME AND ANALYSIS TIME IS OF EQUAL OR GREATER VALUE

## TYPICAL TEST PROGRAM TIMELINES



# REDCAP WORKLOAD

## ACTUAL WORKLOAD ALWAYS EXCEEDS PROJECTED




as of 5 April 95

# 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**

**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:**
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**Return on Investment:**
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**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

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**

**Recommendation:**
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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 |

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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**

**Recommendation:**
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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<br>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.

**REDCAP Realignment - The SECDEF's BRACC Recommendations**

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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 |

**REDCAP Realignment - The SECDEF's BRACC Recommendations**

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## REDCAP Realignment - The TESTER's Perspective

### ASSERTION

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.

**REDCAP Realignment - The SECDEF's BRACC Recommendations**

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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.

**REDCAP Realignment - The SECDEF's 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.

**REDCAP Realignment -**
**The SECDEF's BRACC Recommendations**

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# Document Separator

# CALSPAN CORPORATION

## 50 YEARS

### OF SERVICE TO THE

## UNITED STATES GOVERNMENT

### WITH INDEPENDENT

## RESEARCH

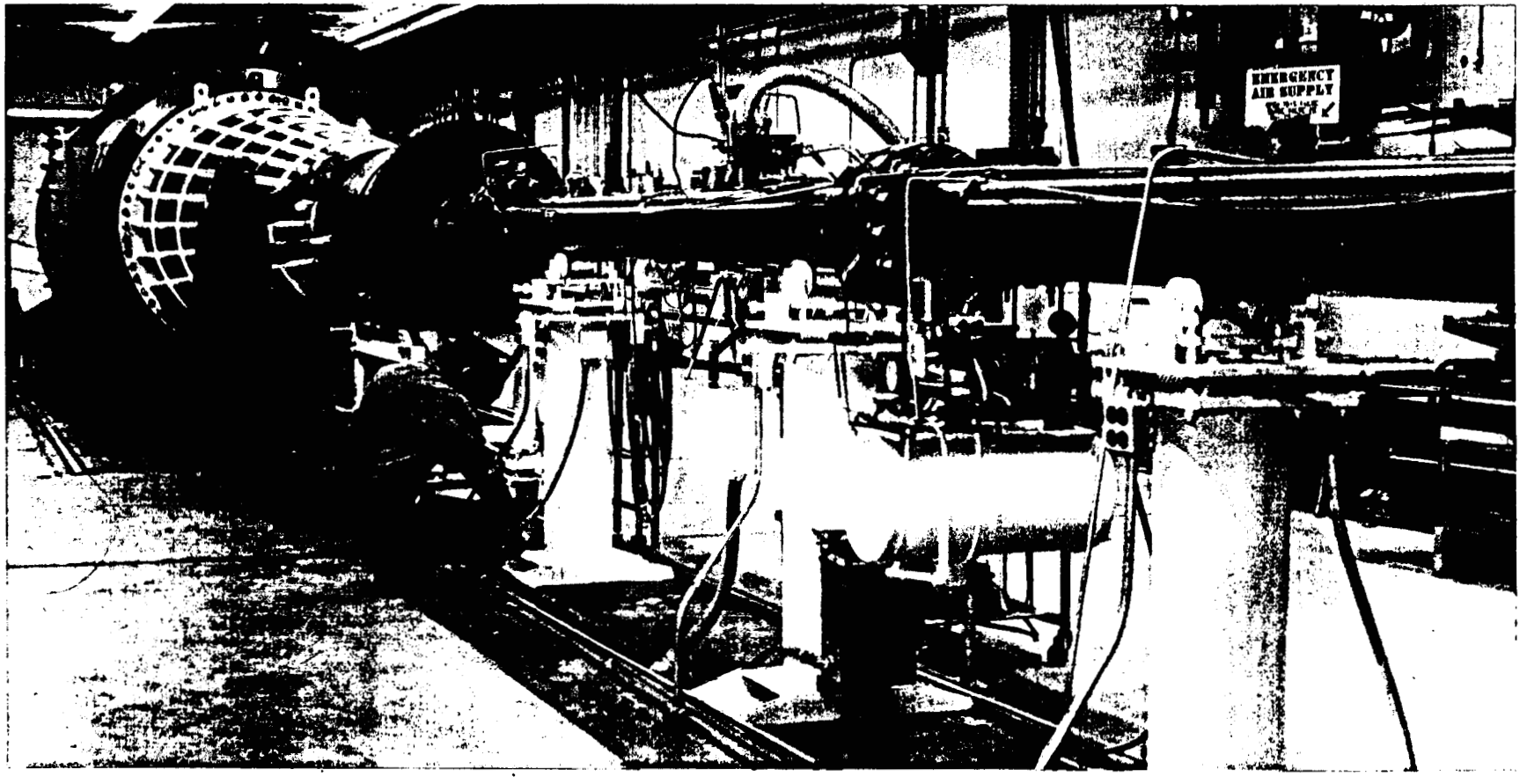
## DEVELOPMENT

## TESTING

SPACE INDUSTRIES INTERNATIONAL

CALSPAN ADVANCED TECHNOLOGY CENTER

# Hypersonics and Propulsion




The 96″ Hypersonic Shock Tunnel, operational since 1963, was upgraded in 1993 with a new driver and a larger–diameter driven tube to provide increased test times under high–enthalpy conditions.

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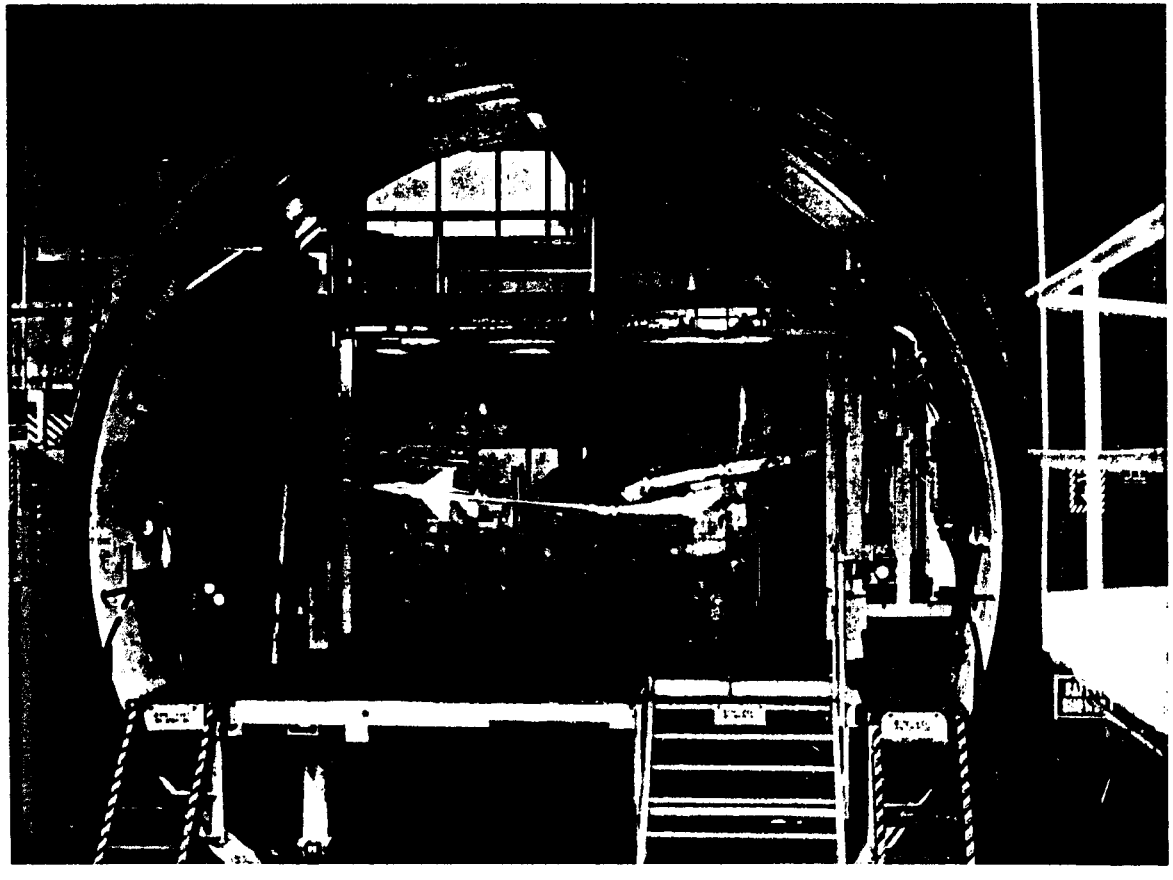
# Calspan Transonic Wind Tunnel



- Versatile Testing Capabilities
- Low Cost Per Data Point
- High Quality Data
- Experienced Technical Staff

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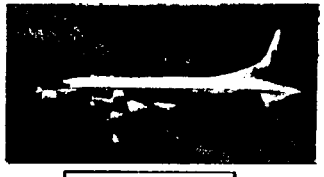
# Flight Research Accomplishments

USAF NT-33A

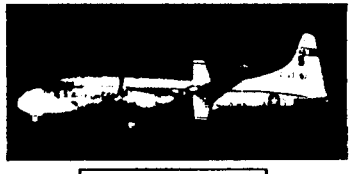


USAF NC-131H TIFS

IN-FLIGHT SIMULATORS

USN X-22A

USAF F-16 / VISTA



USAF NC-131H ASTTA

CALSPAN LEARJET "24"

CALSPAN LEARJET "25"

- World leader in development and operation of in–flight simulator aircraft
  - VISTA NF–16D is latest of 14 developed
- In–flight simulators used to develop US fighter aircraft, B–1 and B–2, and newest foreign aircraft
- International reputation in aircraft flying qualities and flight controls research
  - Our Cooper–Harper Pilot Rating Scale is universally used for aircraft handling qualities evaluations
- Provide academic and flight training to virtually every US military test pilot; now expanded to European flight test community

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CALSPAN ADVANCED TECHNOLOGY CENTER

# Transportation Sciences

- Advanced Highway Systems
- Automotive Safety Testing
- Accident Research, Analysis, and Training
- Tire Test Facility
- Safety Test Equipment Design/Fabrication

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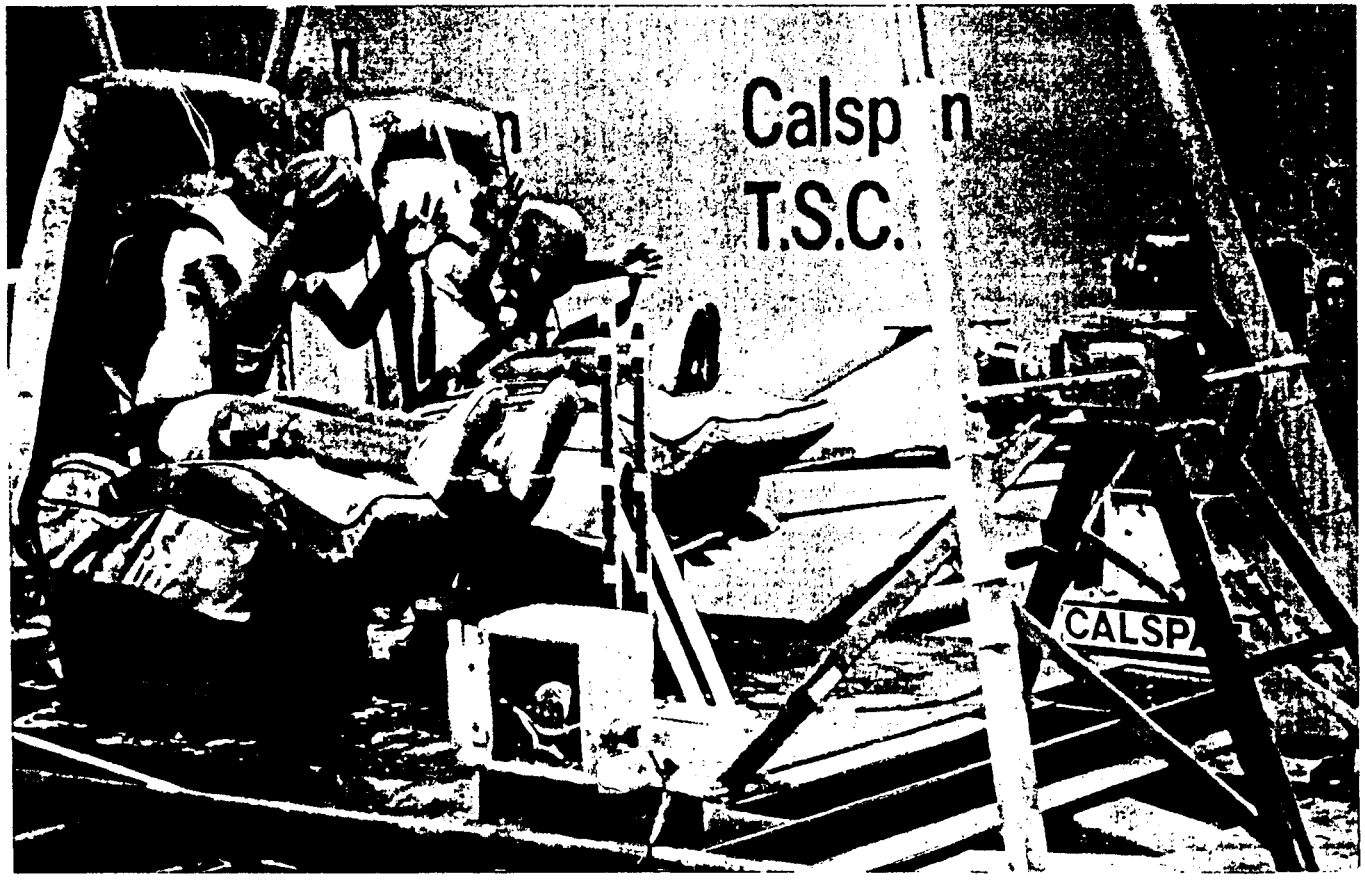
## CALSPAN ADVANCED TECHNOLOGY CENTER

# Transportation Sciences




Calspan has performed all of the US Government dynamic compliance tests of child restraints since 1982.

ATC/38
3/95

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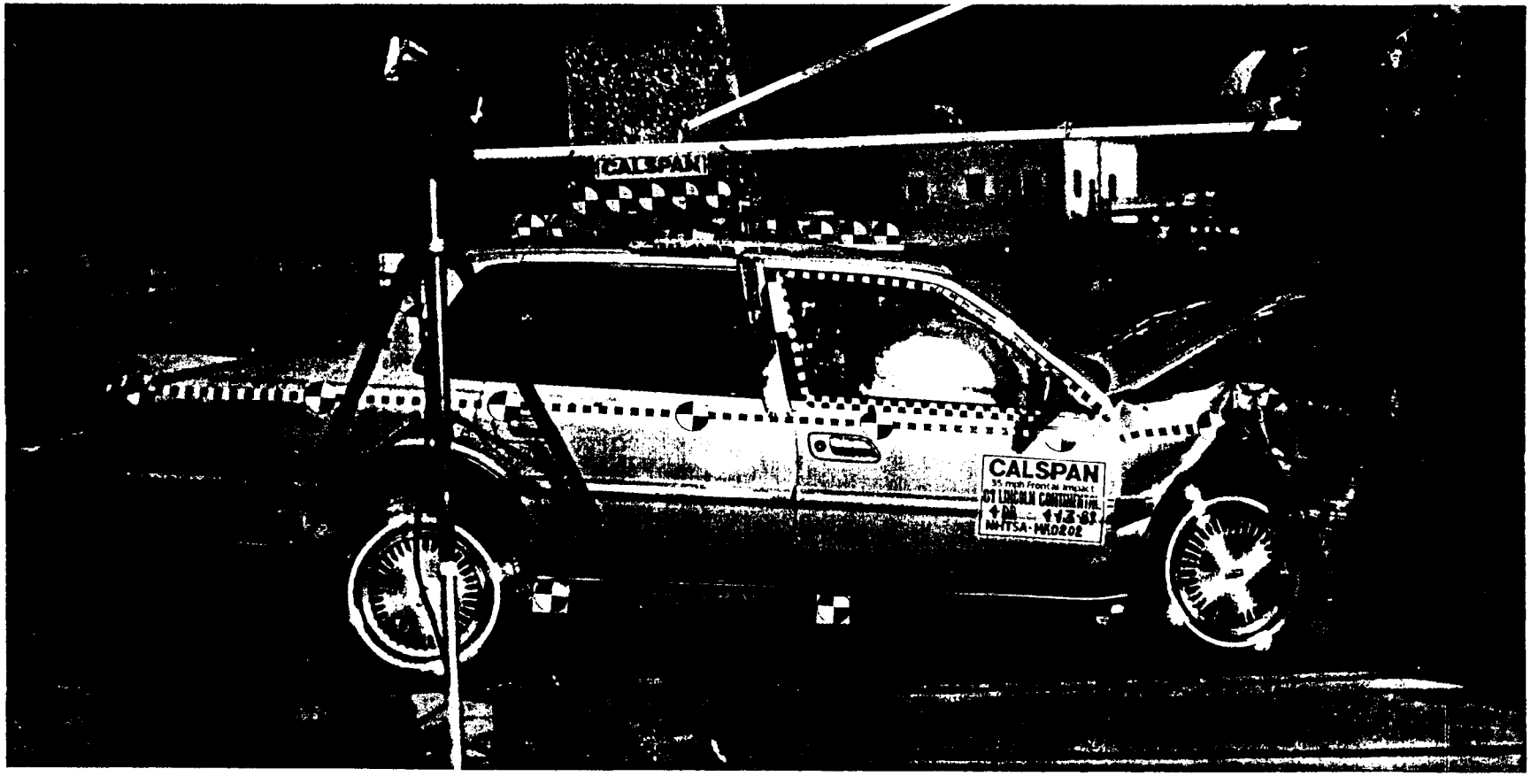
# CALSPAN ADVANCED TECHNOLOGY CENTER

## Transportation Sciences




Calspan has performed most of the consumer information crash tests for the US Government. These data are used in publications such as Consumers Reports on the crashworthiness of new cars and trucks.

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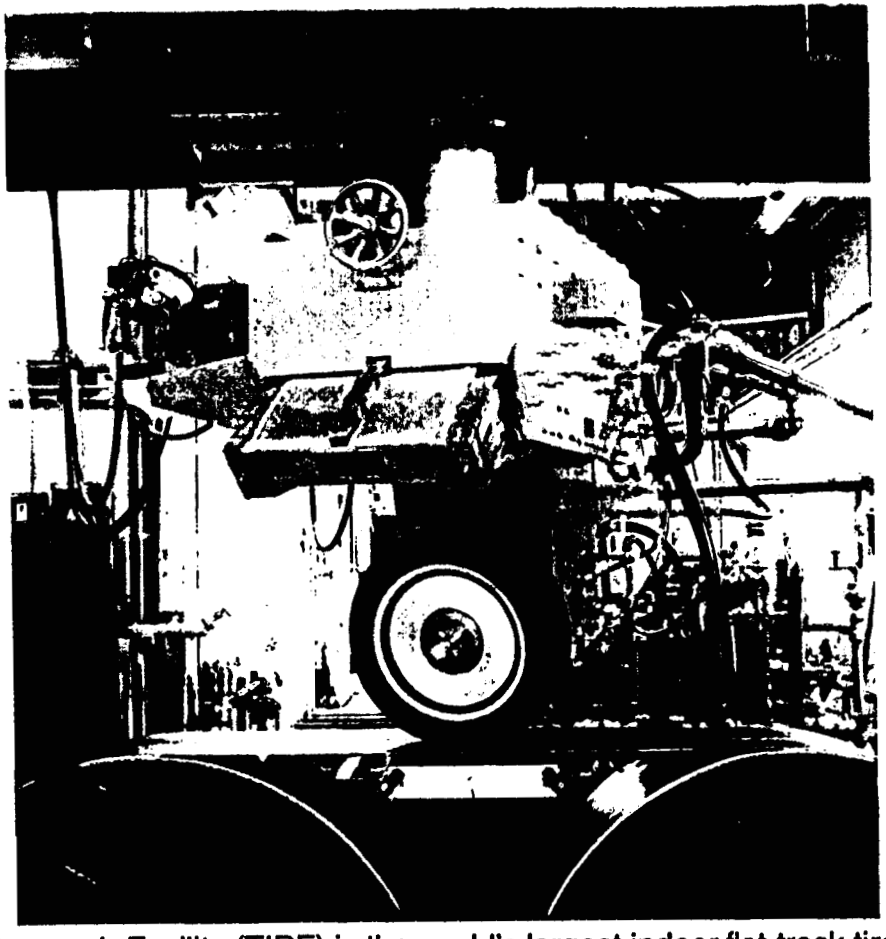
# CALSPAN ADVANCED TECHNOLOGY CENTER

## Transportation Sciences



Calspan's Tire Research Facility (TIRF) is the world's largest indoor flat track tire test machine.

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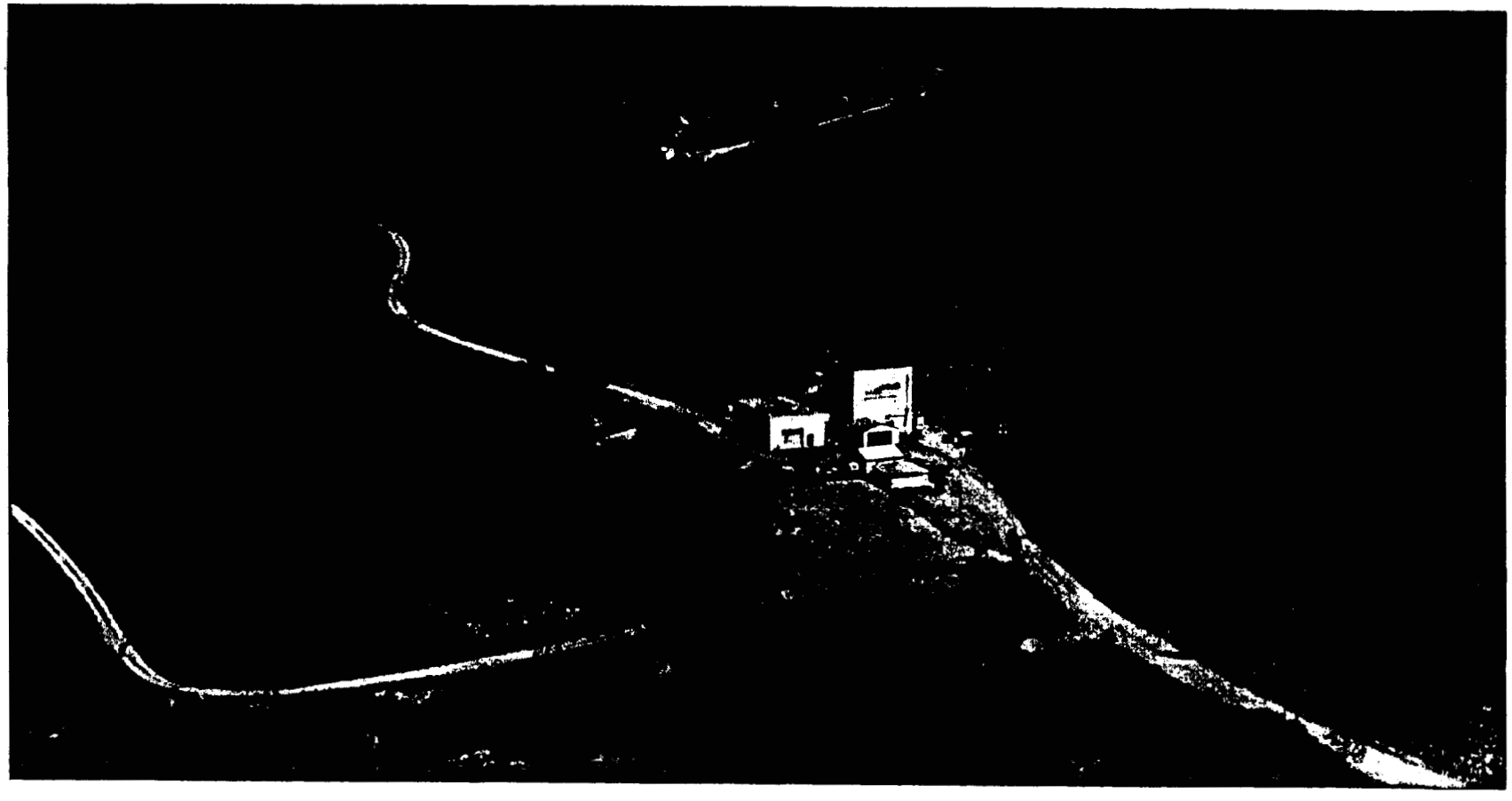
CALSPAN ADVANCED TECHNOLOGY CENTER

# Chemical Surety Testing

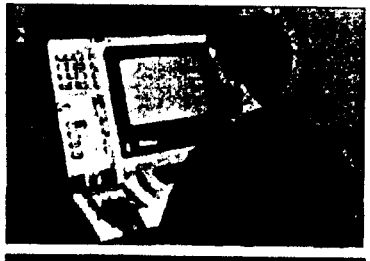


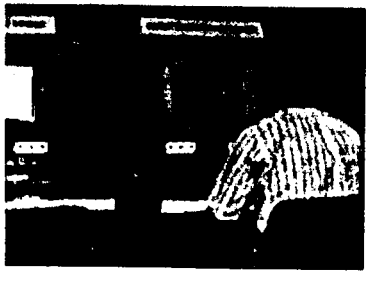
Calspan performs full–scale tests of chemical defense systems at its 700–acre remote site

401 9/27/94

105100- 6

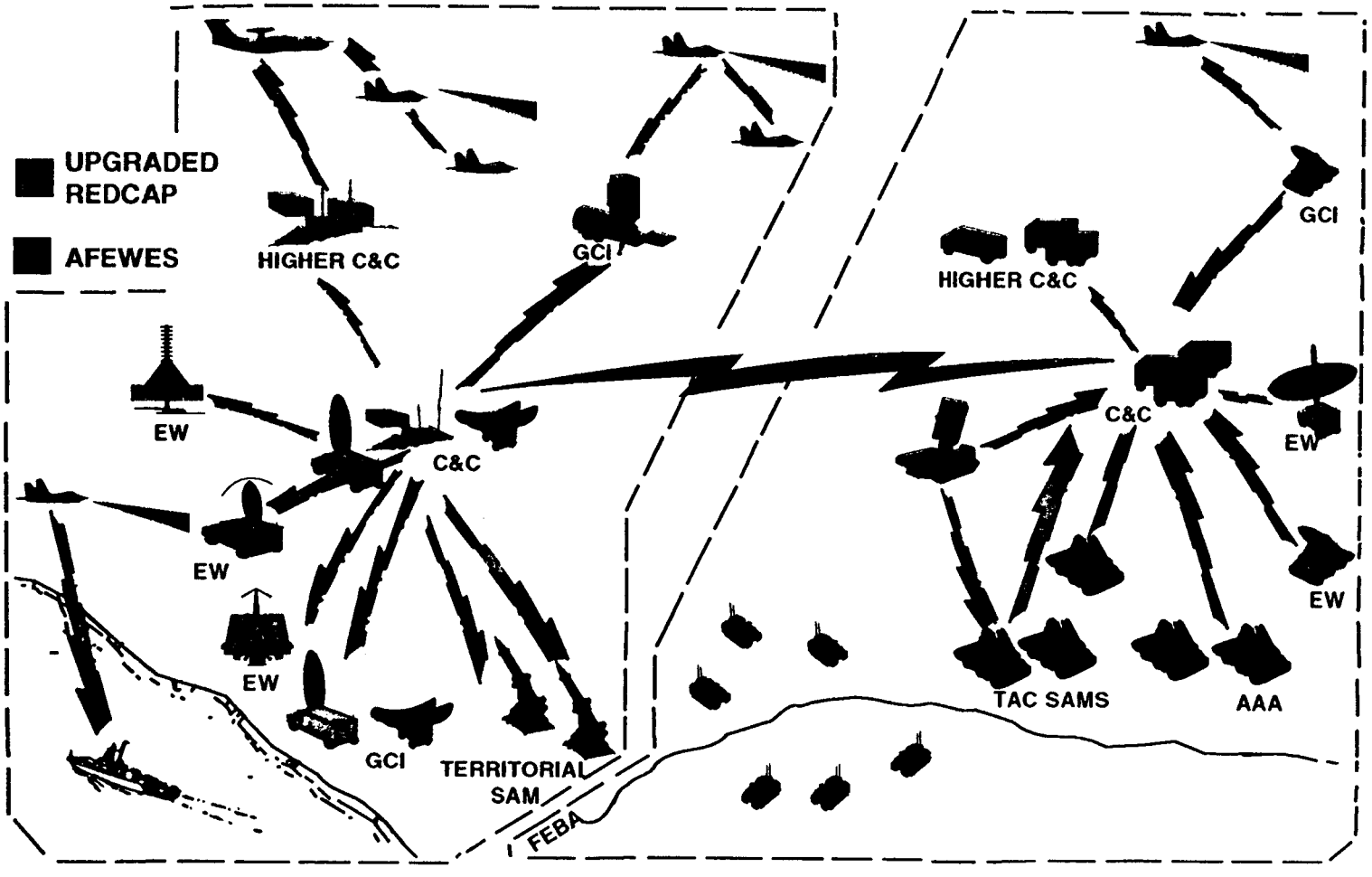
# SIMULATING THE IADS WITH REDCAP





- 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

# GENERIC IADS ROLES & MISSIONS

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105100-8

# EVOLVING REDCAP CAPABILITIES

| | 1988 | | | 1993 | | | 1994 | | | FUTURE NOW UNFUNDED | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sensors | Air Sur / C3 | Weap Control | Sensors | Air Sur / C3 | Weap Control | Sensors | Air Sur / C3 | Weap Control | Sensors | Air Sur / C3 | Weap Control |
| FSU | Y | Y | | Y | Y | | Y | | | | | |
| FSU NAVAL | Y | | | Y | Y | Y | Y | | | | | |
| FSU TACSAM | Y | Y | | Y | Y | Y | Y | | | | | |
| IRAN | Y | | | Y | | | Y | | | | | |
| N. KOREA | | | | | Y | Y | | | | | | |
| IRAQ | Y | | | Y | | | Y | | | | | |
| LIBYA | Y | Y | | Y | Y | Y | Y | | | | | |
| CUBA | | | | | | | Y | | | | | |
| SYRIA | Y | | | Y | | | Y | | | | | |
| CHINA | Y | | | Y | | | Y | | | | | |
| PERU | Y | | | Y | | | Y | | | Y | | |
| INDIA | Y | Y | | Y | Y | | Y | | | Y | | |
| PAKISTAN | Y | Y | Y | Y | Y | Y | Y | | | Y | | |
| YEMEN | Y | | | Y | | | Y | | | Y | | |
| SERBIA | | | | | | | Y | | | | | |
| ALGERIA | Y | | | Y | | | Y | | | Y | | |
| VIETNAM | | | | | | | | | | | | |
| EX-NSWP | Y | Y | Y | Y | Y | Y | Y | | | | | |

NO CAPABILITY

Y LIMITED CAPABILITY

FUNCTIONAL REPLICATION

ALGORITHM REPLICATION

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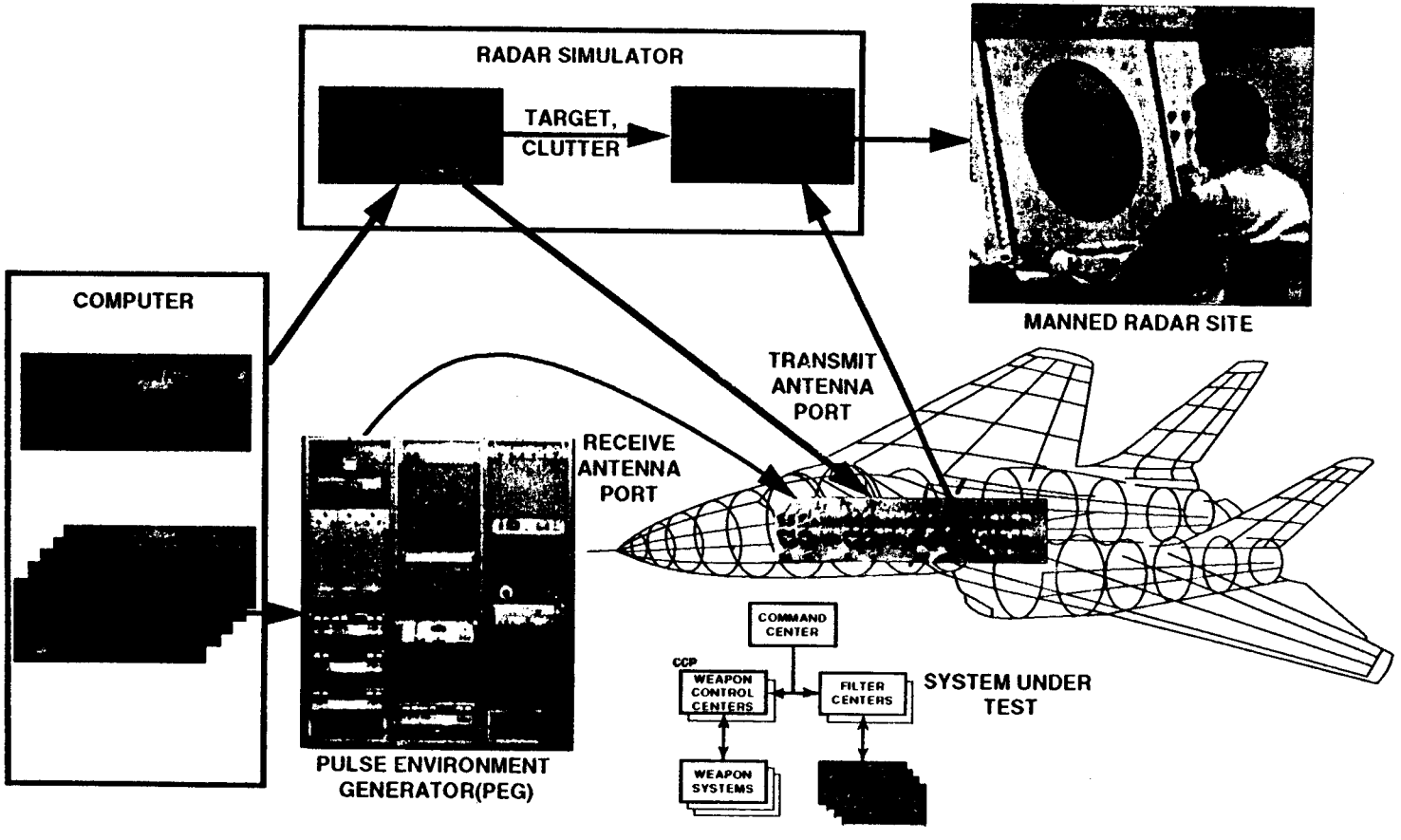
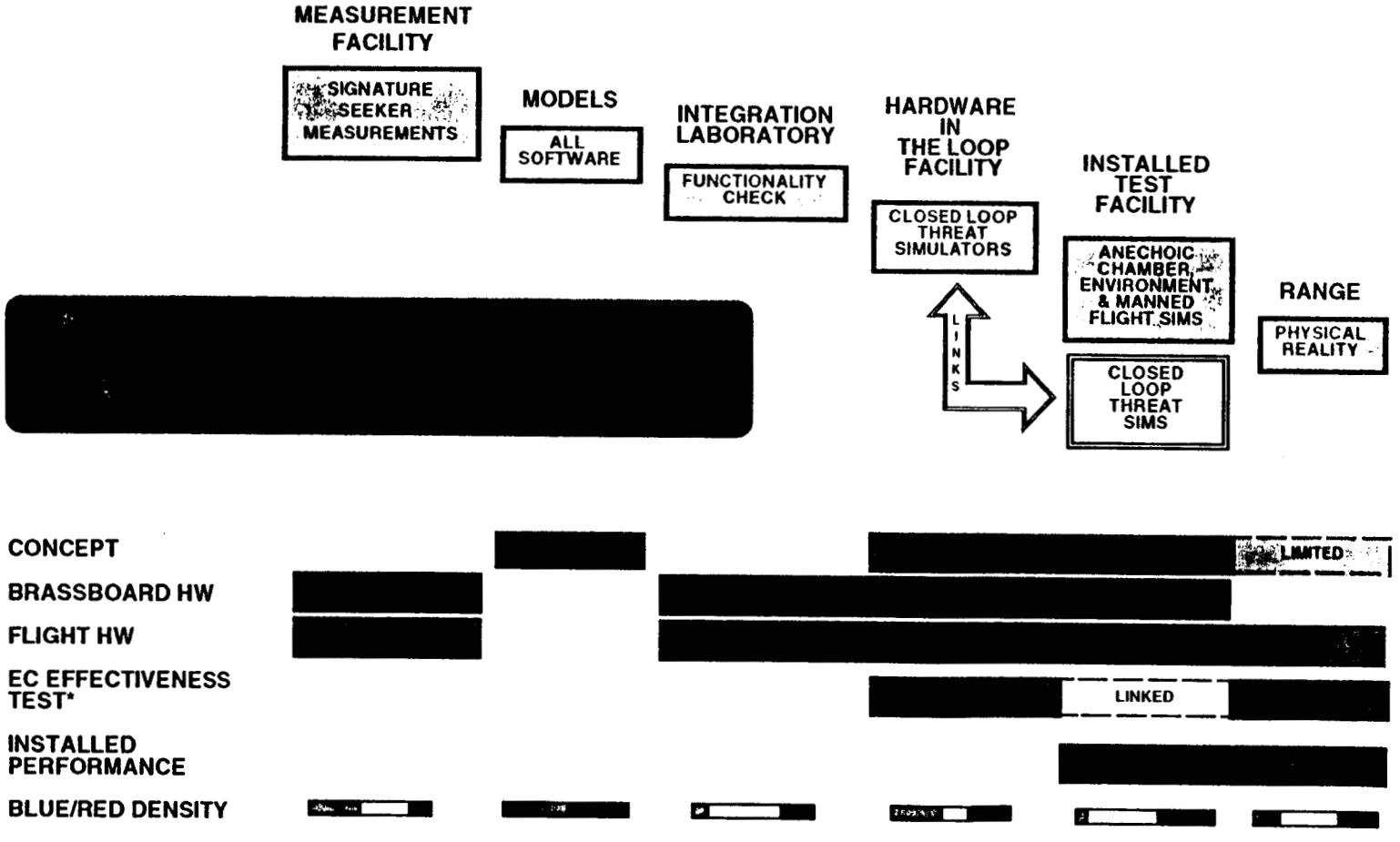
105100-16

# CLOSING THE RADAR LOOP WITH REAL RF



# ASSESSING THE ROLE OF HITL IN THE EC TEST PROCESS



# HITL TEST CAPABILITIES

| STRENGTHS | REDCAP HWIL | MODEL BASED IADS SIMULATION | IADS RANGES |
|---|---|---|---|
| Real Radar RF and Processing | ● | ▲ | ● |
| Real C3 RF and Processing | ● | ▲ | □ |
| Realistic Displays with Man in the Loop | ● | ▲ | ● |
| Major Threats which are Unfeasible for Ranges | ● | ● | ▲ |
| Concept Development | ● | ● | □ |
| Hardware TEST Capability: Breadboards | ● | ▲ | ▲ |
| Hardware TEST Capability: Brassboards | ● | ▲ | □ |
| Hardware TEST Capability: Distributed Platforms | ● | ▲ | □ |
| Hardware TEST Capability: Classified Techniques | ● | ▲ | ▲ |
| Hardware TEST Capability: Dense Environments | ● | ▲ | ▲ |
| Threat Update Flexibility | ● | ● | □ |
| Established SIMVAL Process | ● | ▲ | ● |

● - YES
□ - LIMITED
▲ - NO

# IADS RANGES PROVIDE UNIQUE TEST CAPABILITIES

| UNIQUE CAPABILITIES | OPEN-AIR RANGES | REDCAP HITL | MODEL-BASED SIMULATIONS |
|---|---|---|---|
| Fully Integrated SUT | ● | ▲ | ▲ |
| Real Aircraft Hardware | ● | ▲ | ▲ |
| Real Ground Hardware | ● | □ | ▲ |
| Free Space Environment | ● | ▲ | ▲ |
| Visual Effects | ● | ▲ | ▲ |
| Real World Effects | ● | ▲ | ▲ |
| Realistic Display with Man-In-Loop | ● | ● | ▲ |
| Real Radar RF & Processing | ● | ● | ▲ |
| Flight Hardware | ● | □ | ▲ |
| Established SIMVAL Process | ● | ● | ▲ |

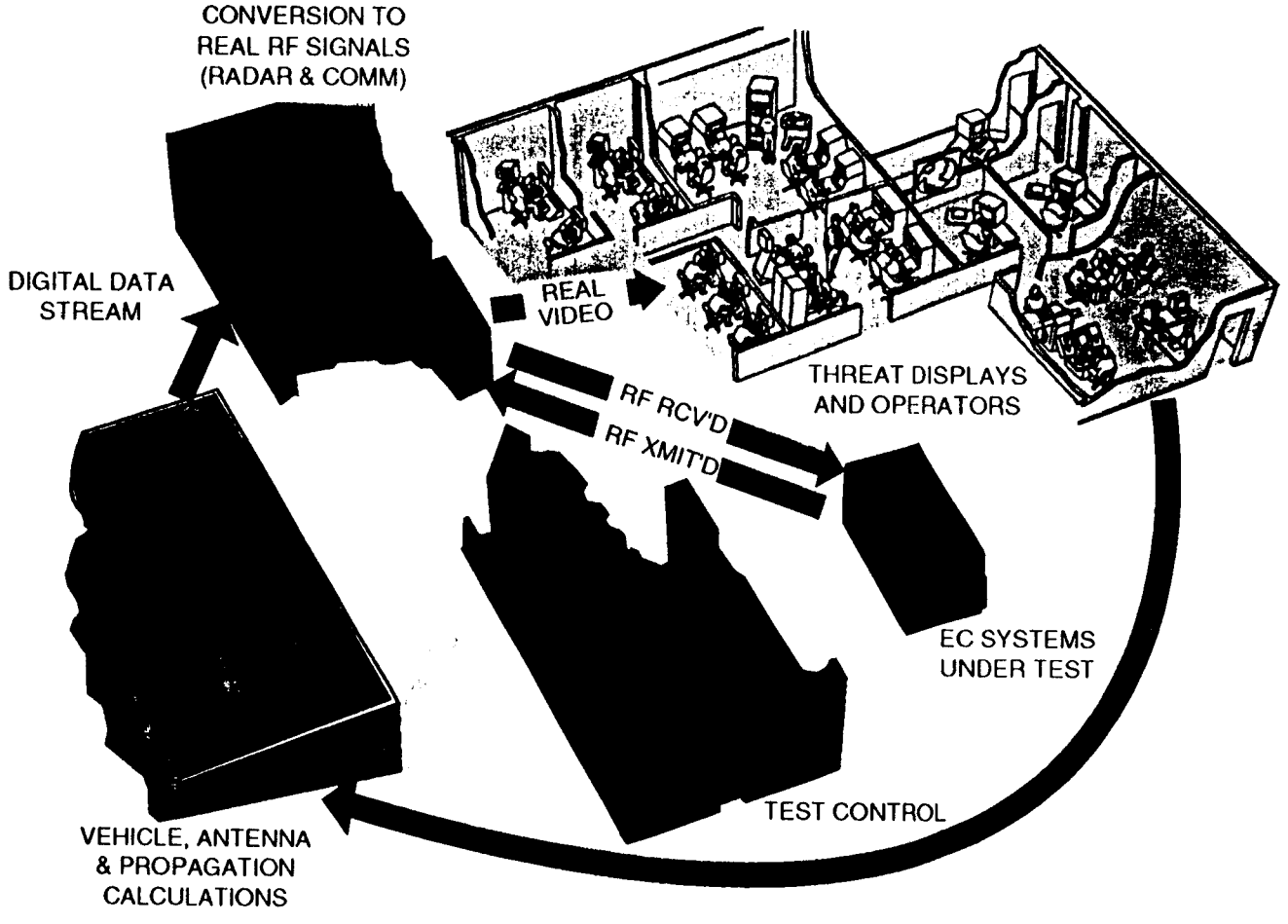
● - YES
□ - LIMITED
▲ - NO

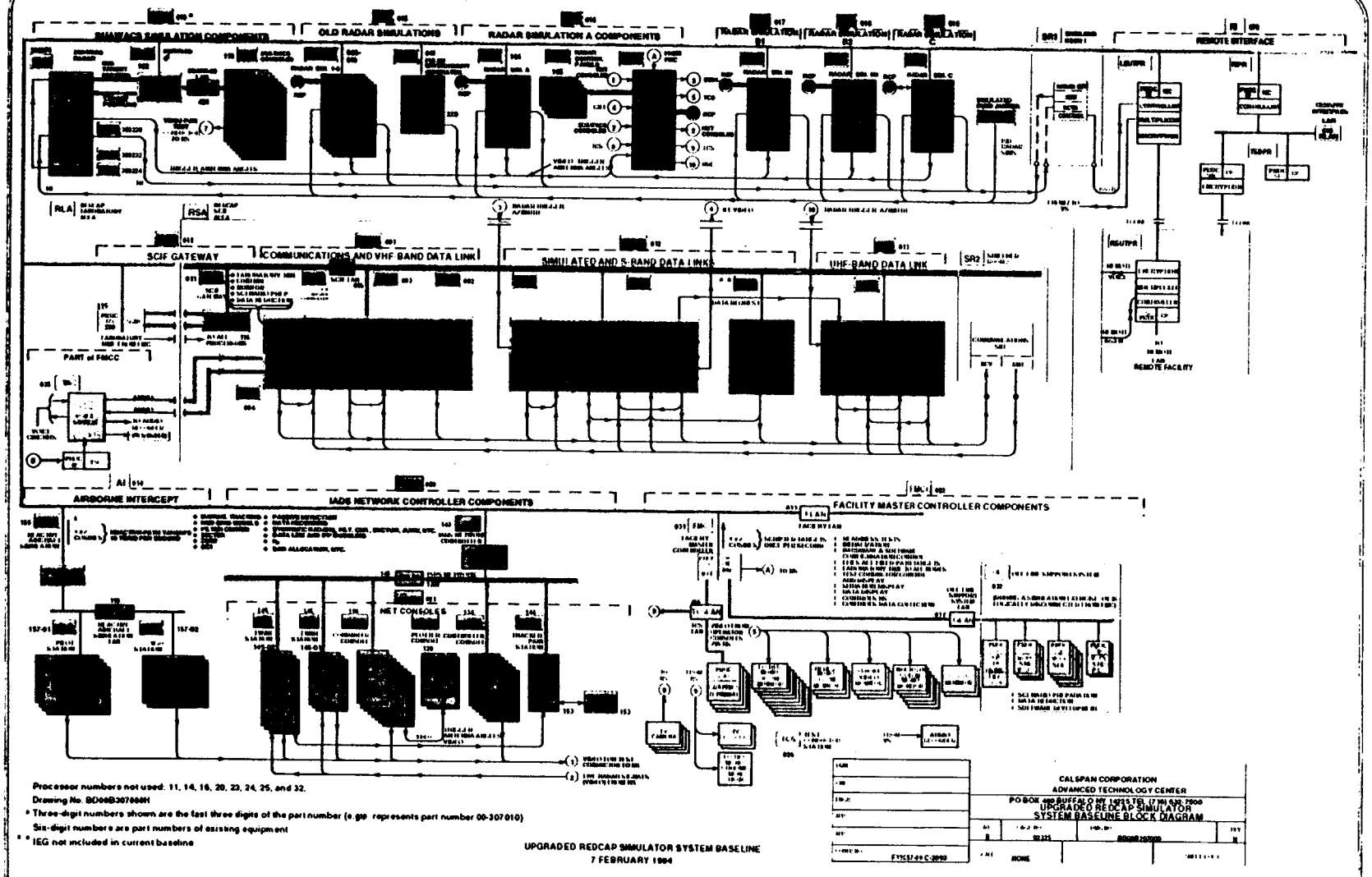
# MODEL BASED IADS SIMULATIONS PROVIDE UNIQUE CAPABILITIES

| UNIQUE CAPABILITIES | MODEL-BASED SIMULATIONS | REDCAP HITL | OPEN AIR RANGES |
|---|---|---|---|
| Level III and IV Modeling | ● | ▲ | ▲ |
| Concept Development | ● | ● | □ |
| Major Threats Unfeasible for Range | ● | ● | ▲ |
| Responsiveness | ● | □ | ▲ |
| Blue/Red Flexibility | ● | □ | ▲ |
| Repeatability | ● | ● | □ |
| Availability | ● | ● | □ |
| Low Relative Cost | ● | □ | ▲ |

● - YES
□ - LIMITED
▲ - NO

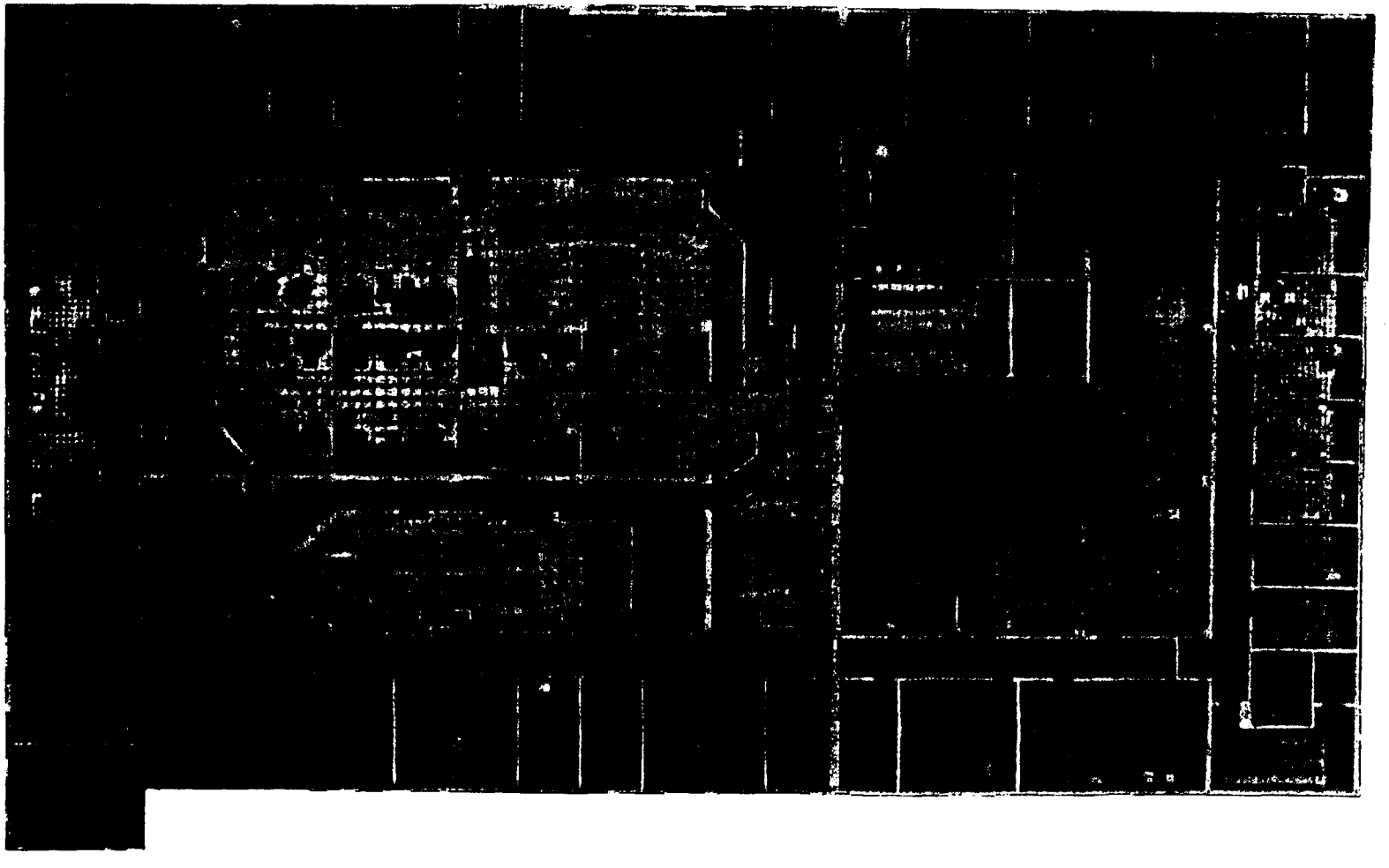
# REAL TIME INTERACTIONS AT REDCAP



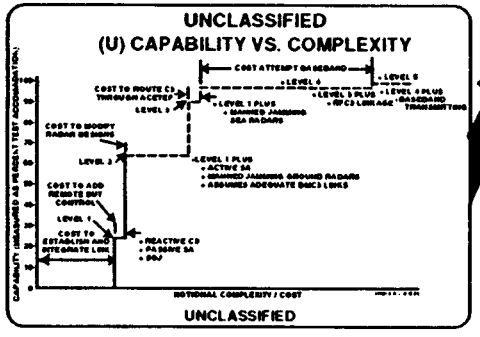



# UPGRADED REDCAP SIMULATOR SYSTEM BASELINE

# THE UPGRADED REDCAP FACILITY

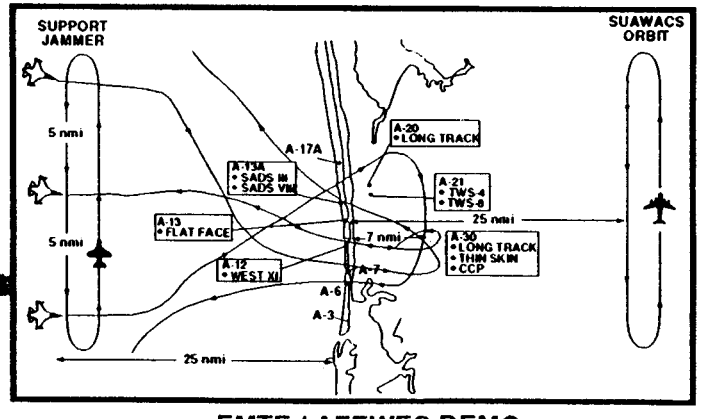


# PROVIDING REAL-TIME C2 TO MULTISERVICE TEST FACILITIES

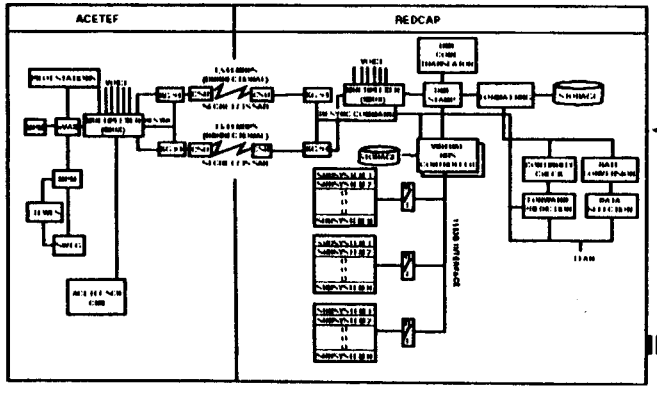



ACETEF / ECITF LINK STUDY
STARTED AUGUST 1989

OSD DIRECTED DEMO SEPT 1990

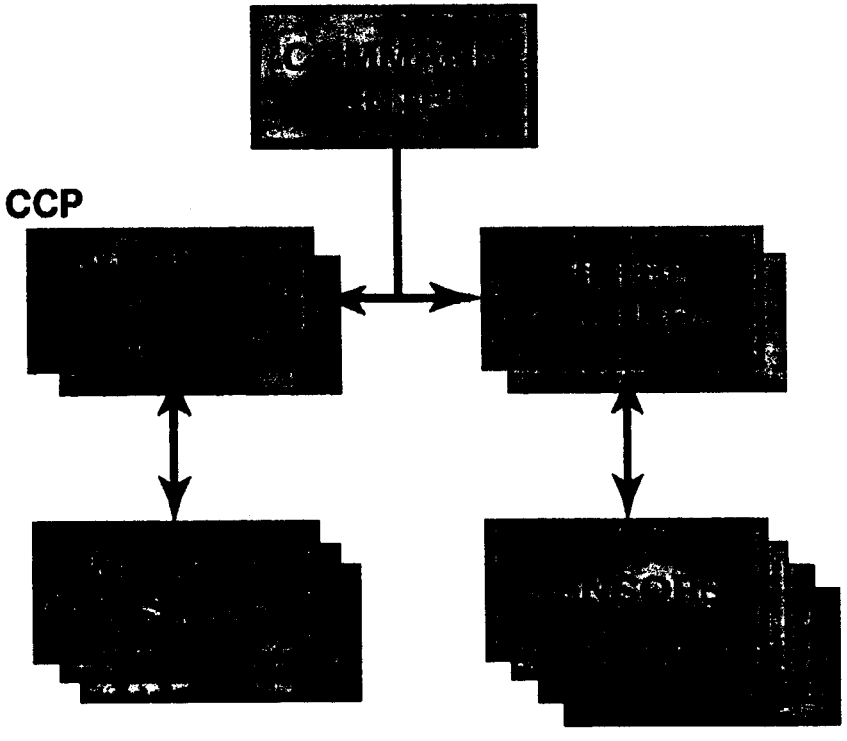



EMTE / AFEWES DEMO
JUNE 1991

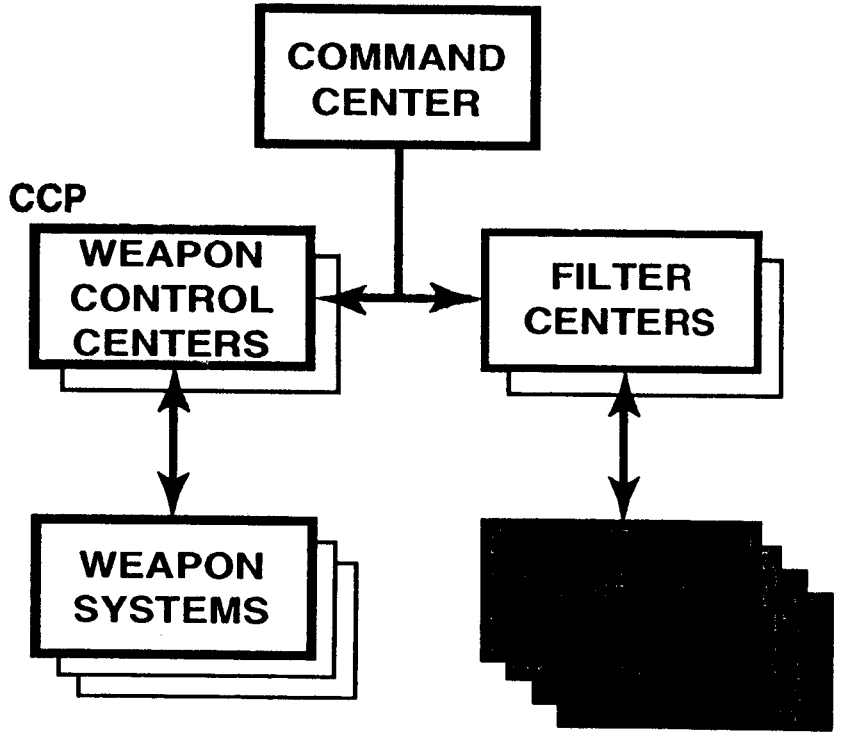



IMPLEMENTATION
(1994)

# INTEGRATING THE THREAT ASSETS THROUGH COMMAND AND CONTROL



# INTEGRATING THE THREAT ASSETS THROUGH COMMAND AND CONTROL

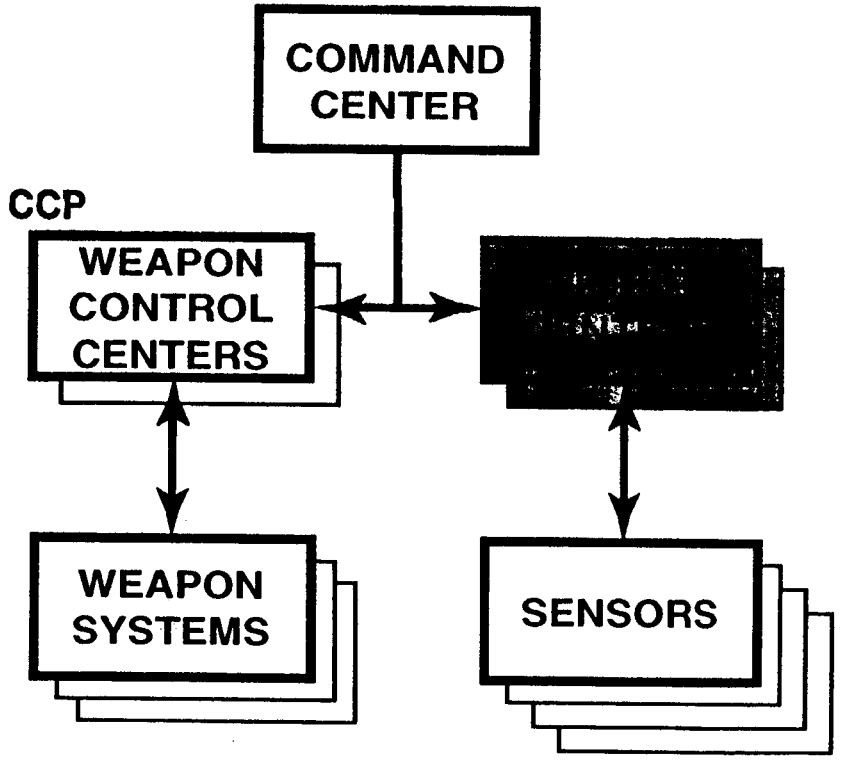


UNCLASSIFIED

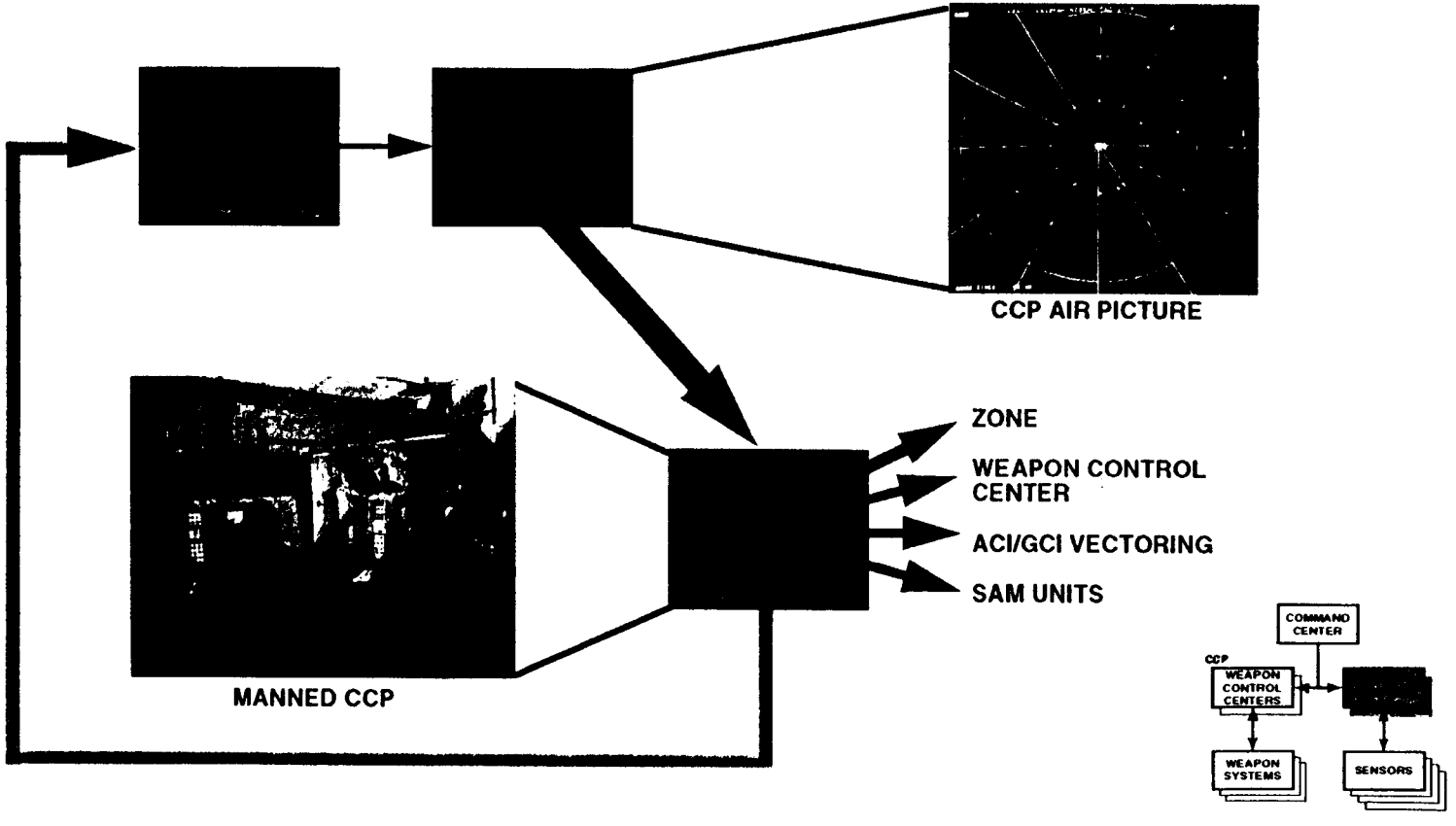


UNCLASSIFIED

# INTEGRATING THE THREAT ASSETS THROUGH COMMAND AND CONTROL



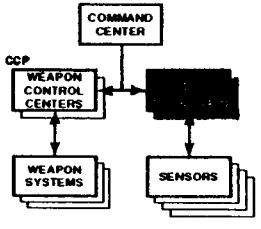
# AIR SURVEILLANCE FUNCTIONS



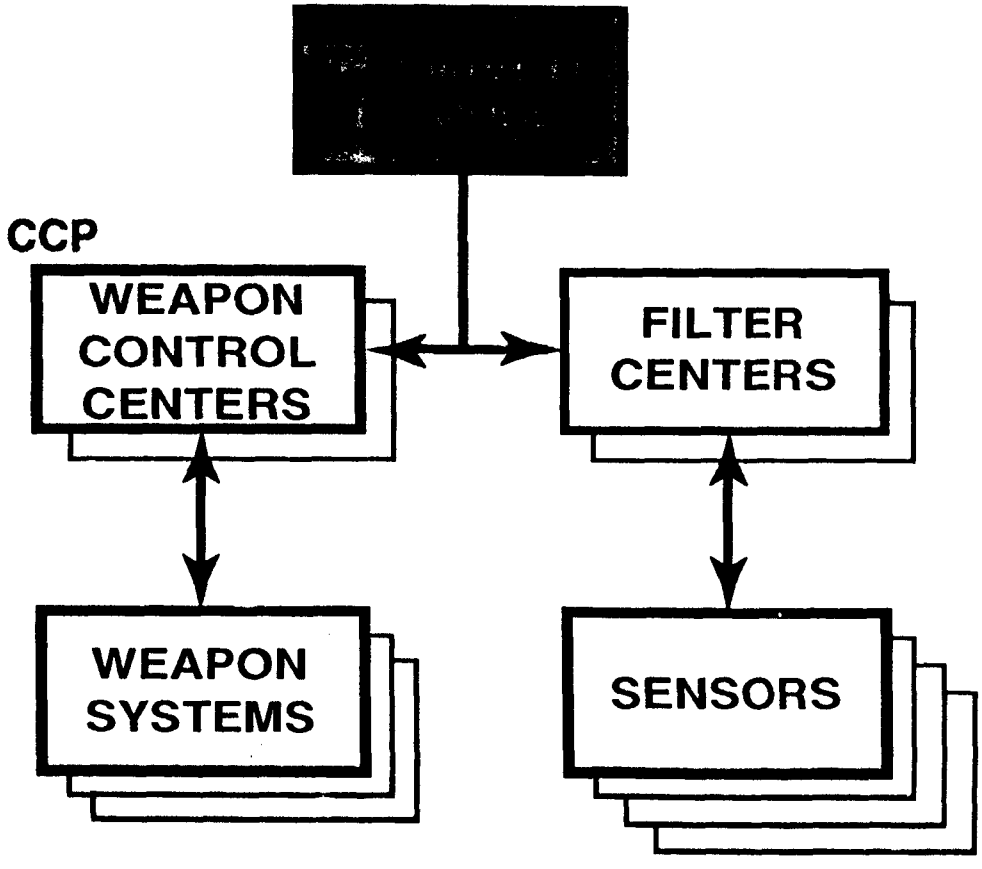
# UNIQUE TESTING CAPABILITY

[redacted] → REAL ALGORITHMS → REDCAP UPGRADES [ADA OBJECTS] ARCHITECTURE

= [redacted]

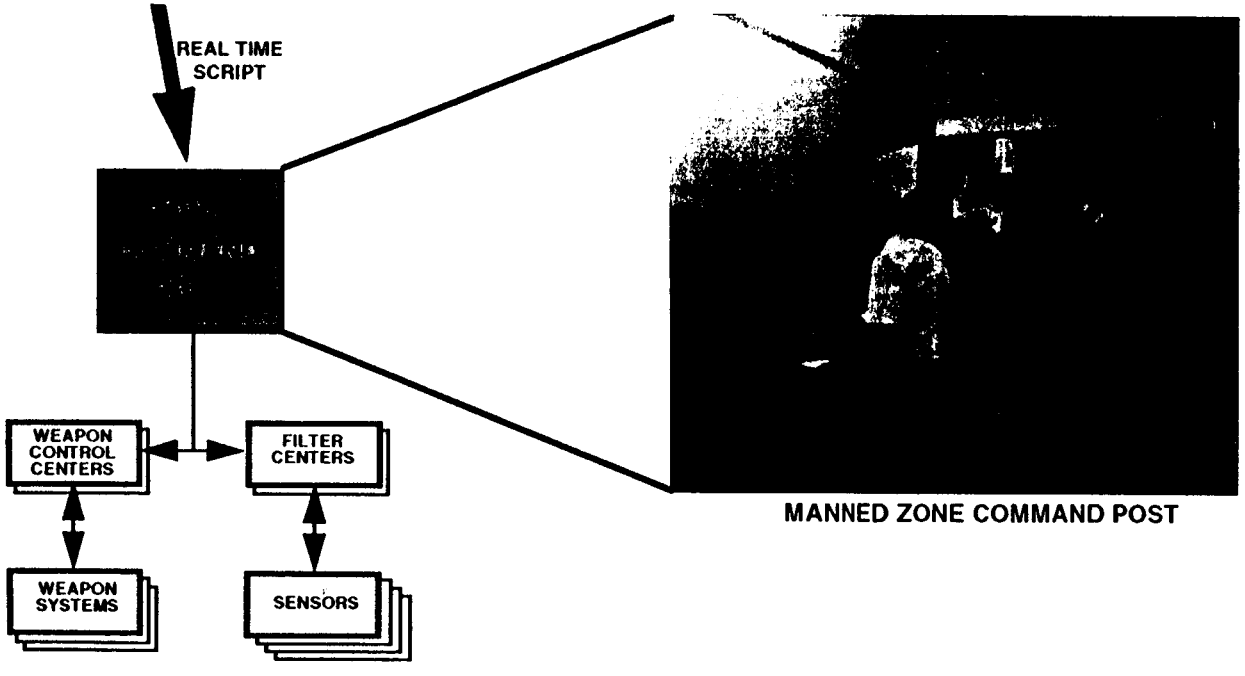


# INTEGRATED AIR DEFENSE SYSTEM MAJOR COMPONENTS



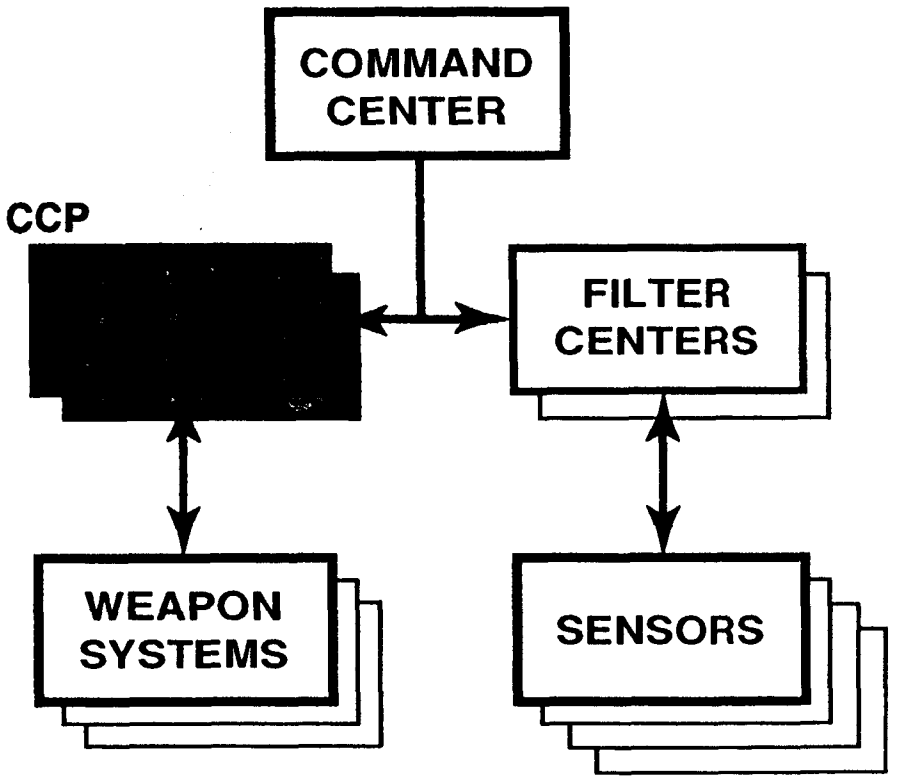
# SIMULATING HIGH LEVEL COMMAND & CONTROL

- INTELLIGENCE INDICATIONS & WARNING
- NATIONAL ASSET ELINT
- NATIONAL ASSET COMINT




MANNED ZONE COMMAND POST

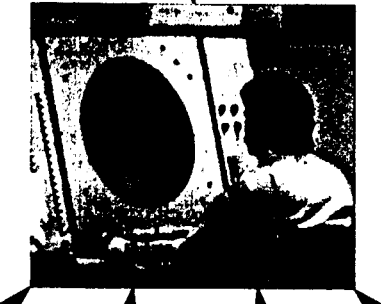
# INTEGRATING THE THREAT ASSETS THROUGH COMMAND AND CONTROL



# CONTROLLING SAM ENGAGEMENT

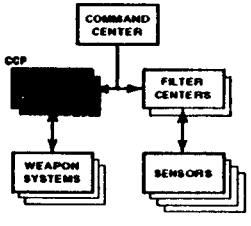
- IFF EVALUATION
- SAM/AI DECONFLICTION
- POSITION ACCURACY
- WEAPONS RELEASE DELAYS

SECTOR COMMAND POST

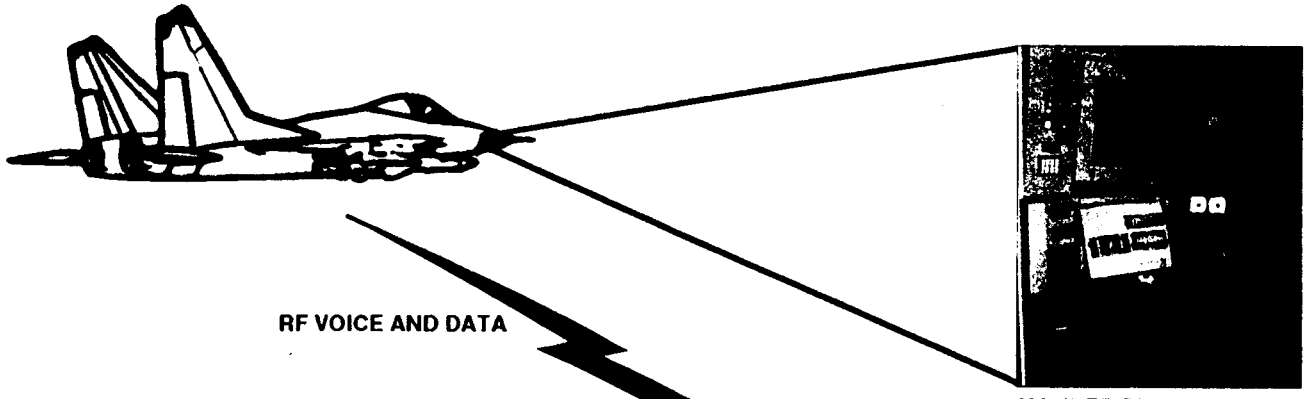


BATTERY COMMAND POST

GRID INPUT DATA
- AFEWES
- RANGE
- ( MODELS )

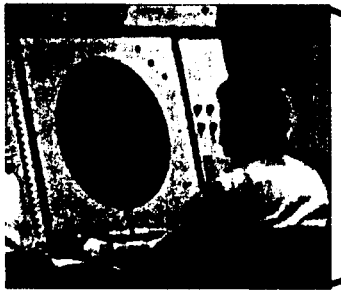


# CONTROLLING AIR INTERCEPTS

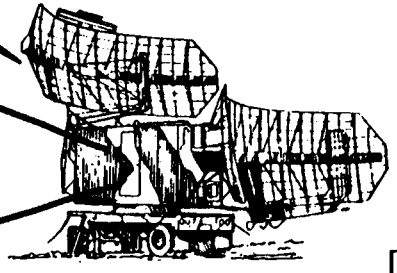


MANNED PILOT STATION

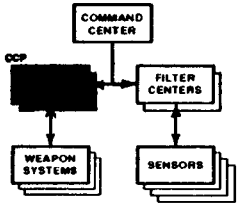
RF VOICE AND DATA

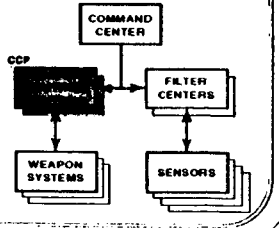


GCI OPERATORS



GCI SITE



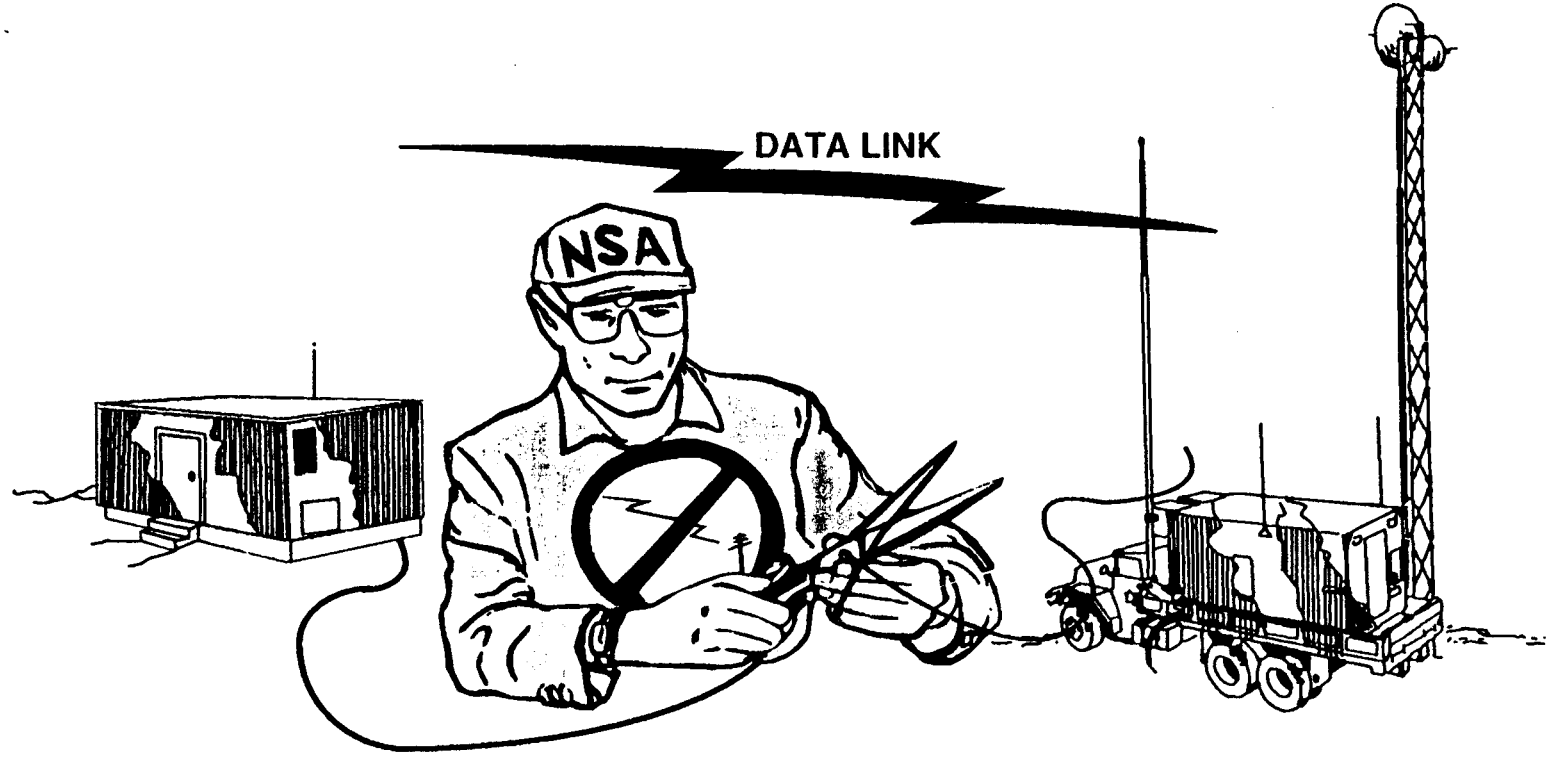





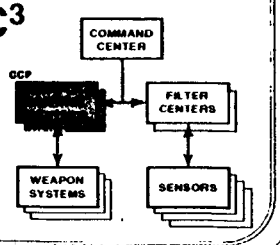



105100-80

# HITL FACILITY IS ESSENTIAL FOR TESTING

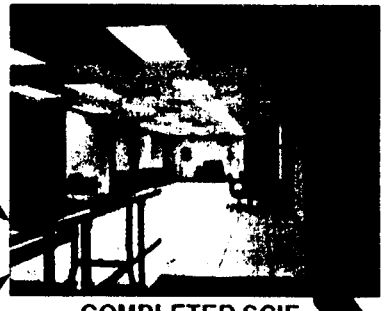



- Modern Hardware Must be Tested Against Real BMC$^3$ Signals
- Real Signals Can Not be Radiated in Open Air



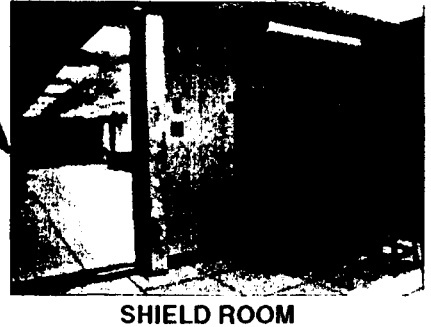
# PROVIDING A SECURE SCI LEVEL HITL TESTING CAPABILITY

SCIF IN PROGRESS

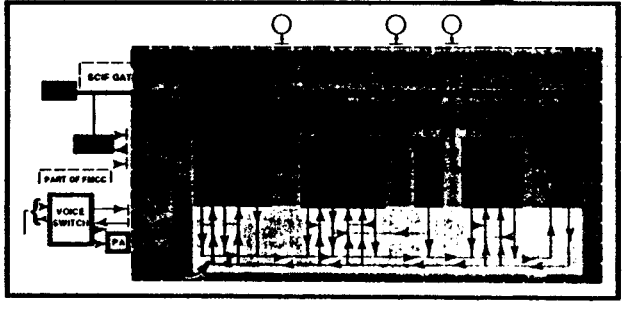


COMPLETED SCIF

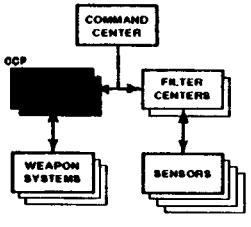
SUT EQUIPMENT



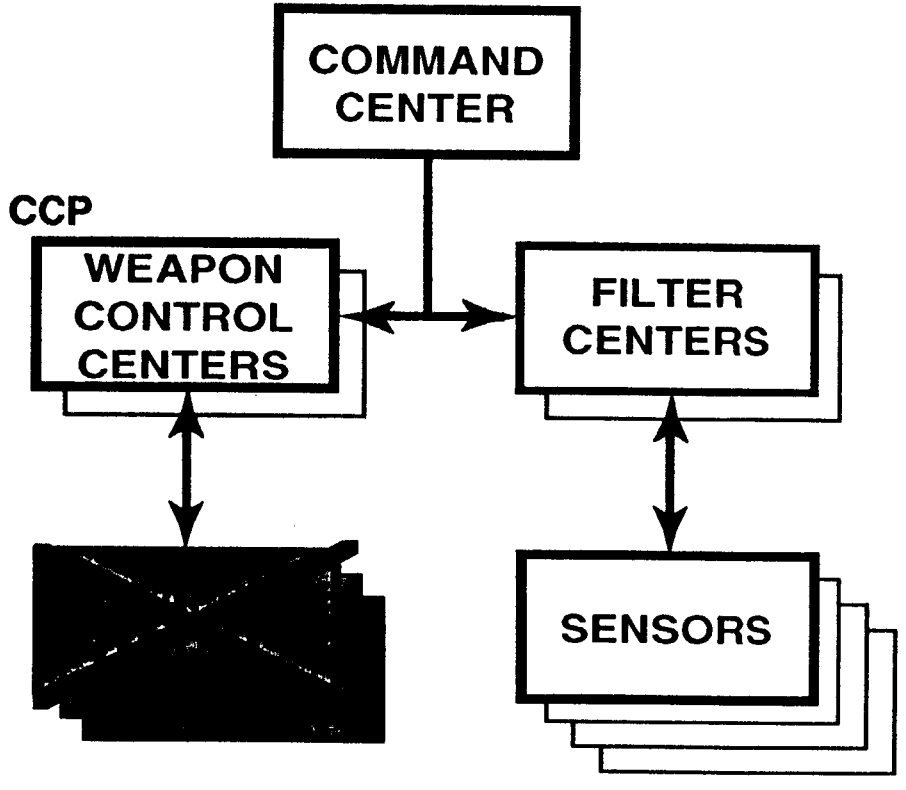
SHIELD ROOM




BMC³ LINK HARDWARE

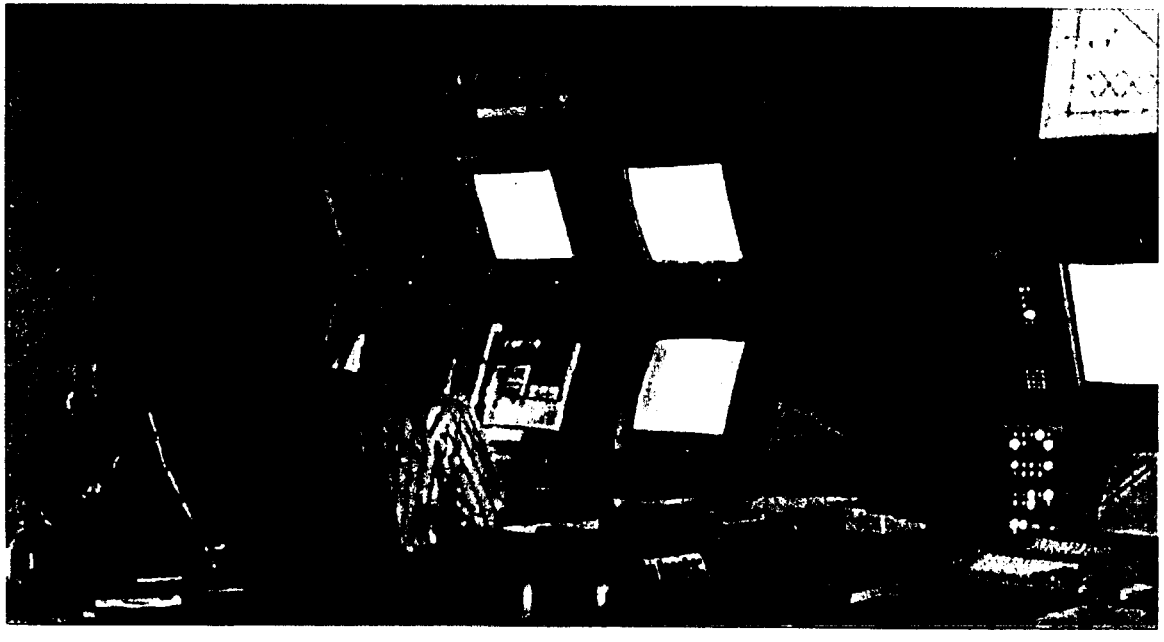


# INTEGRATING THE THREAT ASSETS THROUGH COMMAND AND CONTROL




*WEAPON SYSTEMS $P_K$ NOT A REDCAP FUNCTION

# REAL TIME MONITORING AND CONTROL

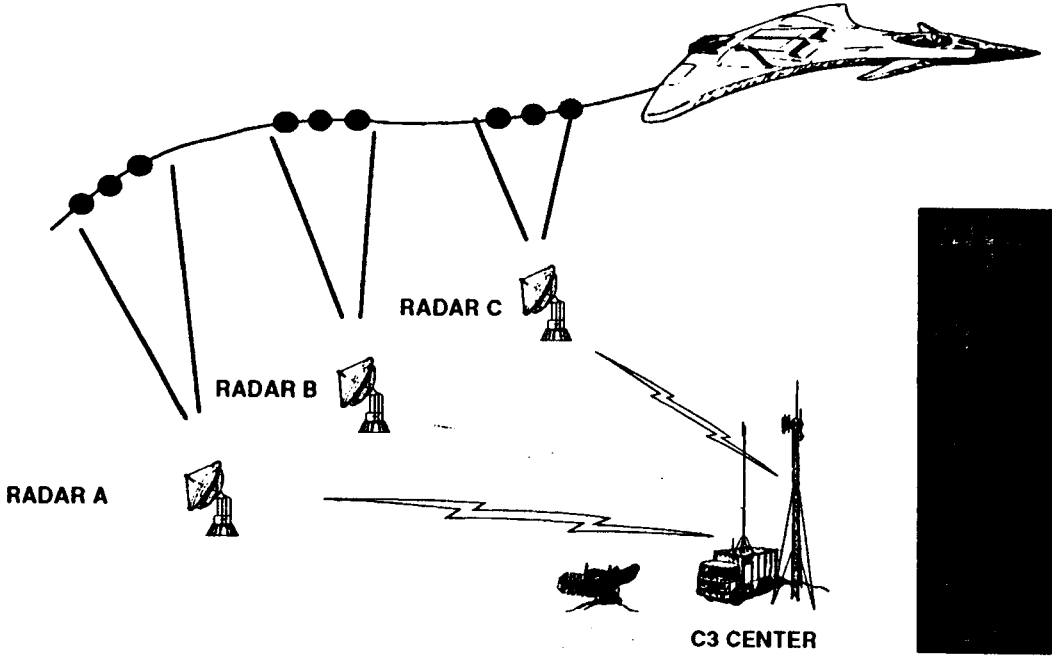


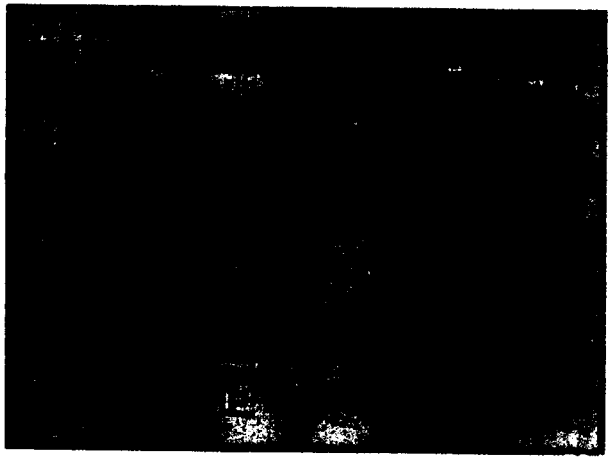
- CENTRAL CONTROL
- COMPLETE MONITORING
- EXTENSIVE DATA COLLECTION

# YOU SHOULD CARE

## Command and Control can Kill!

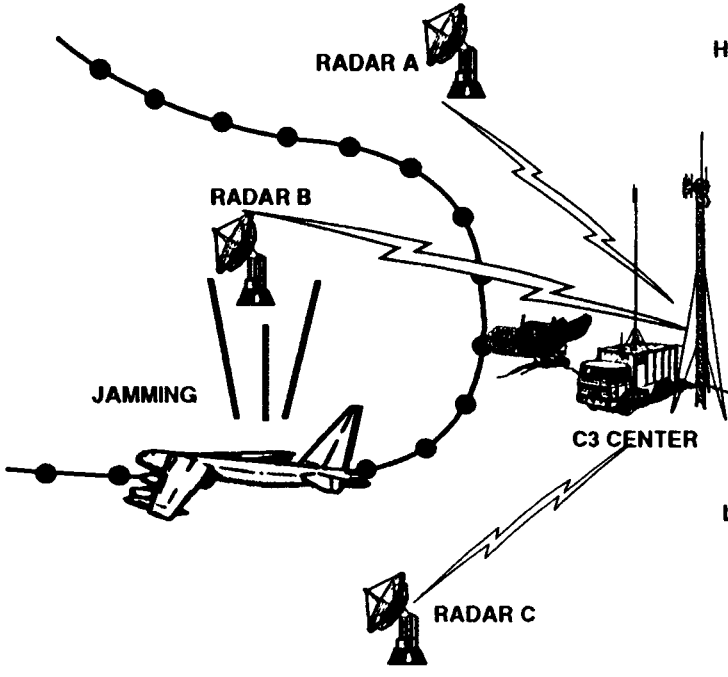
# REDUCING THE STEALTH ADVANTAGE

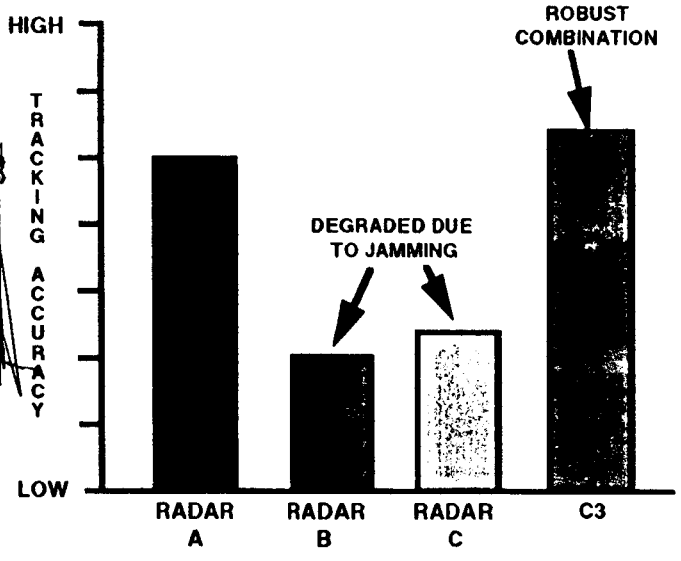


- $C^3$ CENTER FUSES TRACK UPDATES INTO COMPOSITE TRACK
- OVERALL CONTINUITY OF FUSED DATA CAN BE GREATER THAN COMPOSITE PARTS

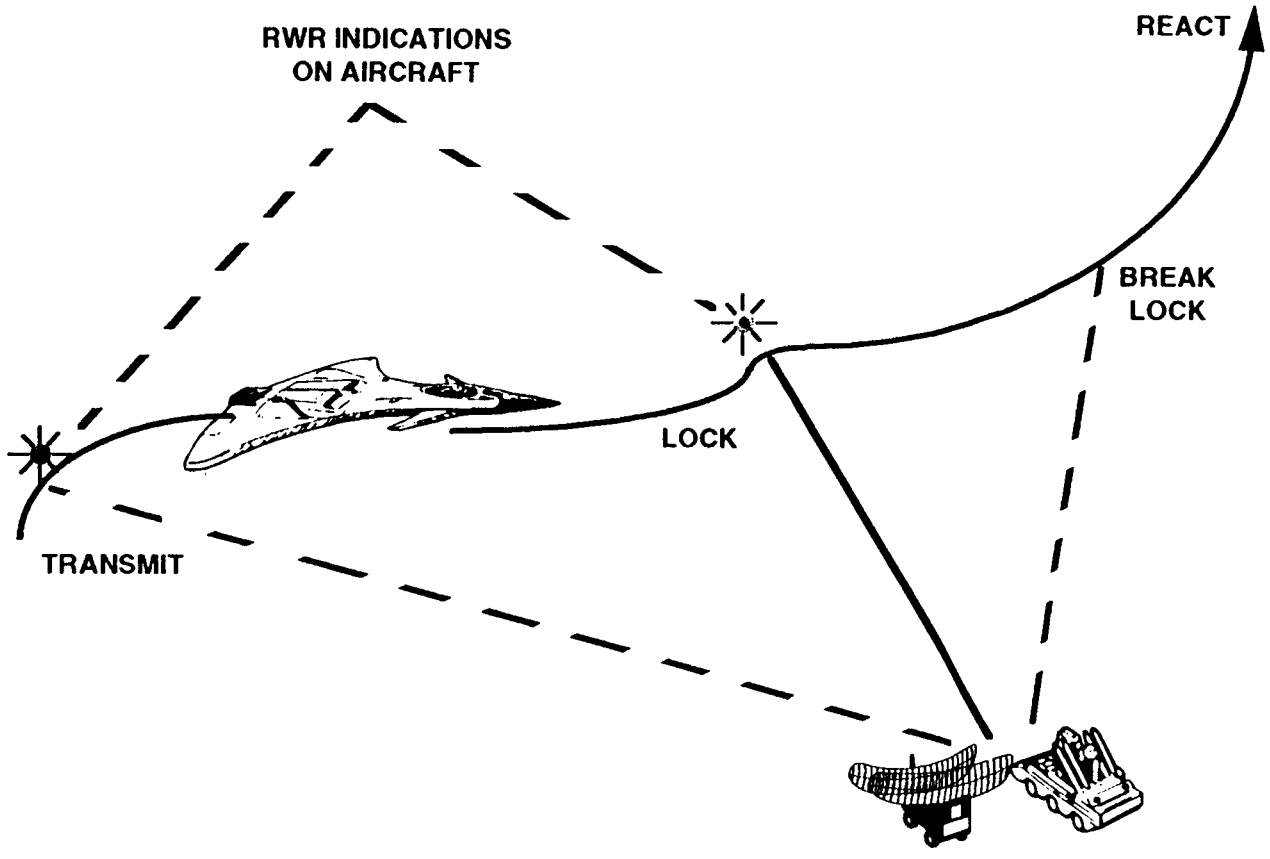
# REDUCING ECM EFFECTIVENESS



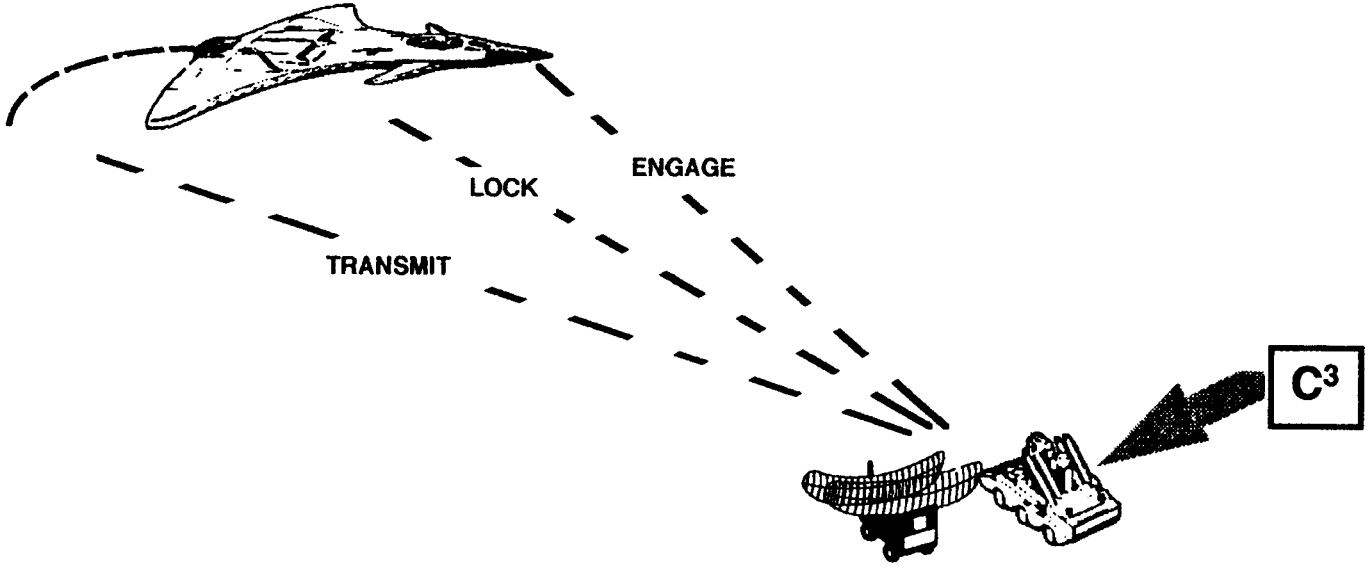




- $C^3$ CENTER SELECTIVELY MERGES DATA
- ONE ON ONE EFFECTS NOT DIRECTLY TRANSFERRABLE

# SITUATIONAL AWARENESS

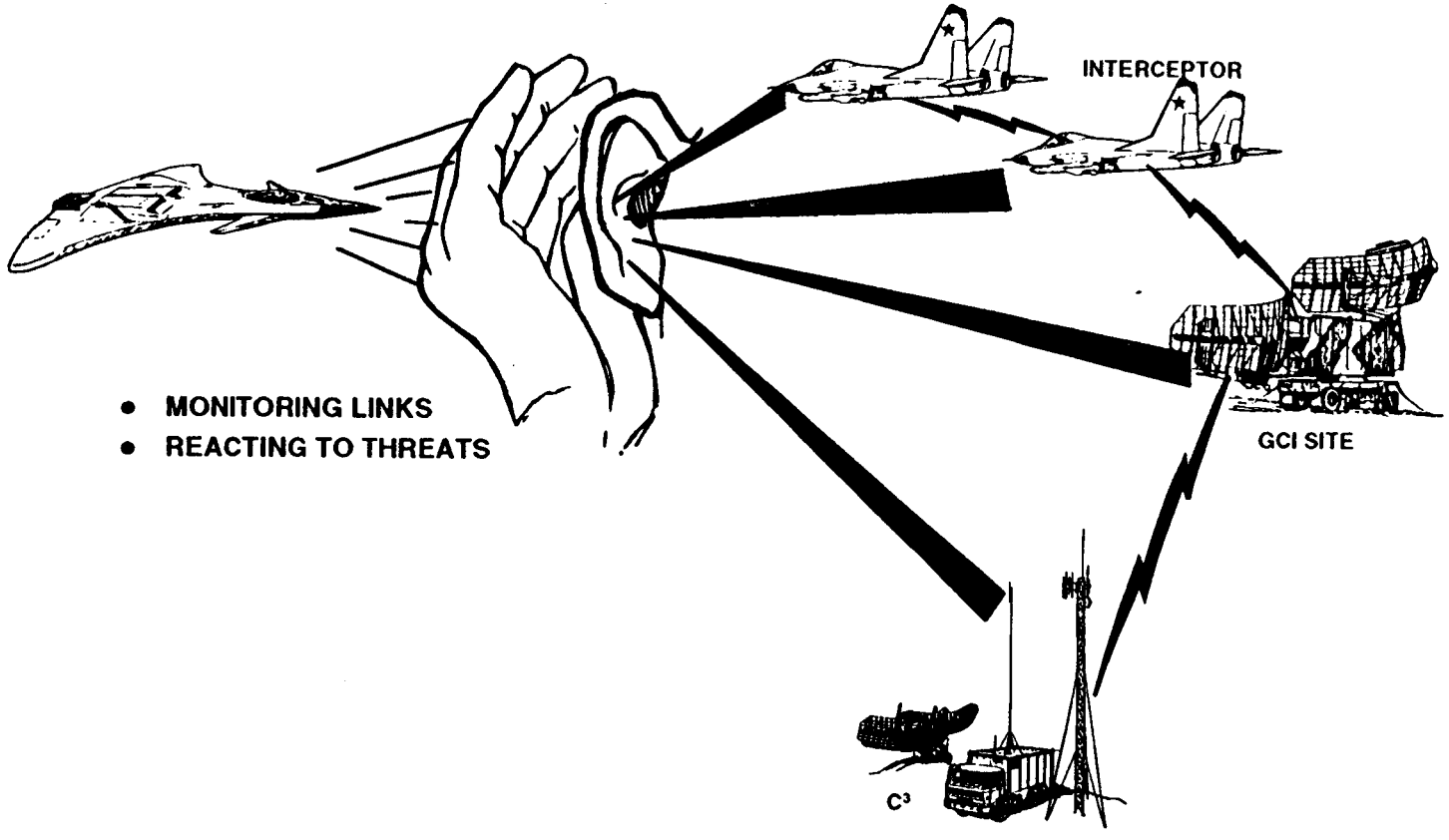


# REDUCING SITUATIONAL AWARENESS ADVANTAGE




- MINIMUM SAM RADIATE TIME
- MINIMUM SAM ACQUISITION TIME
- AUTOMATIC SAM ANTENNA POSITIONING
- OPTIMUM SAM FIRING OPPORTUNITIES

# RESTORING THE SITUATIONAL AWARENESS ADVANTAGE




- MONITORING LINKS
- REACTING TO THREATS





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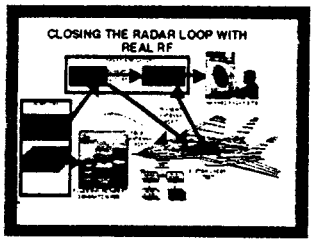
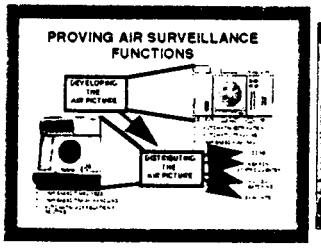
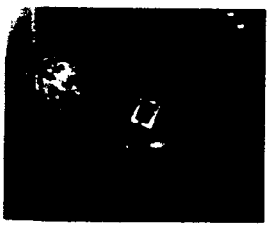
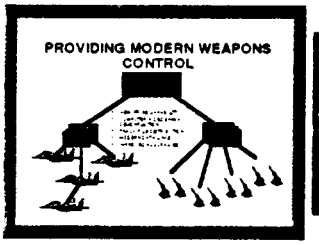
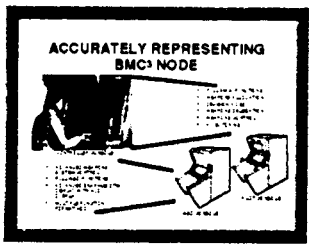
# SIMULATING THE IADS WITH REDCAP

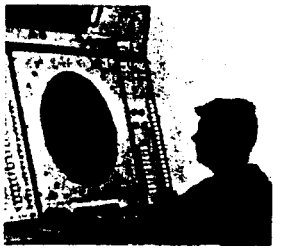


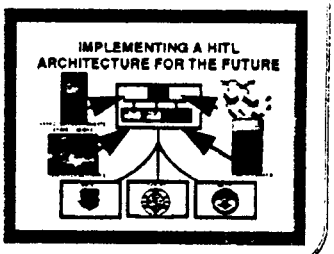






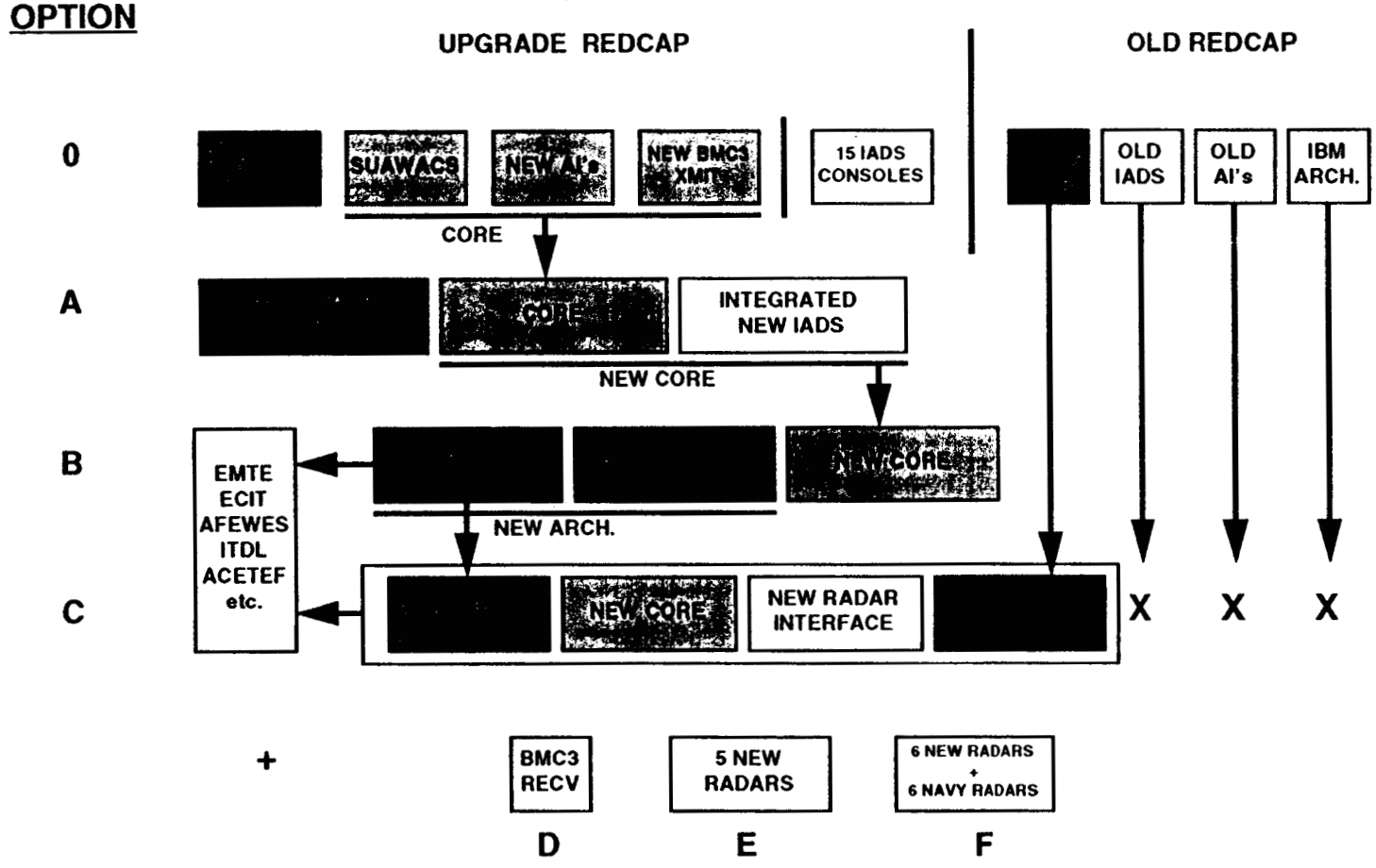






# UPGRADE PROGRAM OPTIONS

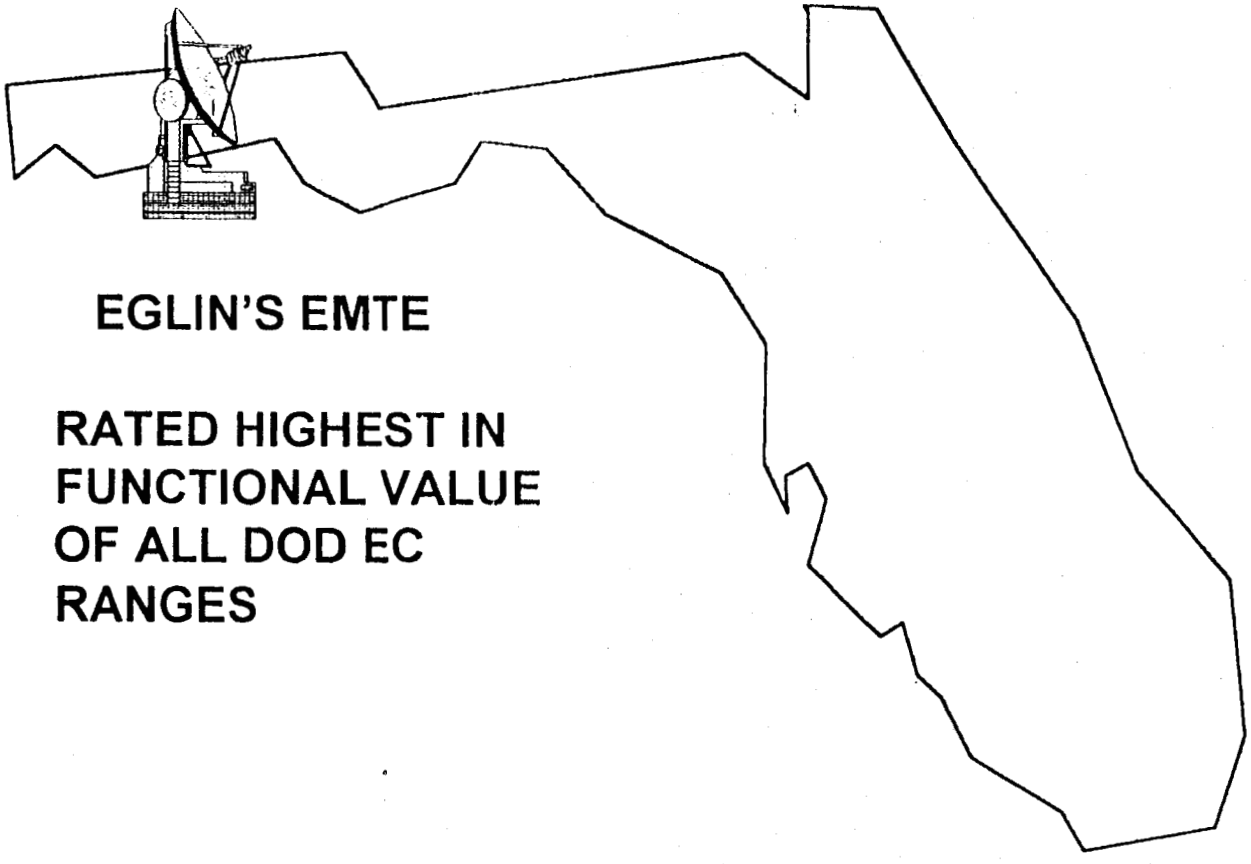
(AS ESTABLISHED IN 1991)



# Document Separator

# OKALOOSA COUNTY ECONOMIC DEVELOPMENT COUNCIL

# DEFENSE SUPPORT INITIATIVE



**EGLIN'S EMTE**

**RATED HIGHEST IN FUNCTIONAL VALUE OF ALL DOD EC RANGES**

# EDC/DSI

- RECOMMEND BRAC ANALYZE AIR FORCE EC DECISION FOR:
  - TOTAL AIR FORCE COST IMPACT vs AFMC COST REDUCTION
  - OVERALL T&E, OT&E AND EC TRAINING IMPACT FOR THE AIR FORCE
  - SOUNDNESS OF THE DECISION TO DISMANTLE THE DOD EC RANGE RATED HIGHEST IN FUNCTIONAL VALUE AND RECREATE IT IN THE WESTERN US IN AN ERA OF DECLINING MILITARY BUDGETS

# EDC/DSI

- T&E JOINT CROSS-SERVICE GROUP GIVES EGLIN'S EMTE A FUNCTIONAL VALUE OF <u>65</u>
  - PT MUGU - 58
  - PAX RIVER - 53
  - EDWARDS - 52
  - CHINA LAKE - 47
  - USA EPG - 47
  - HOLLOMAN - 29
  - AFEWES - 17
  - CRANE - 17
  - REDCAP - 15

# EDC/DSI

- AIR FORCE STATES THESE ACTIONS WILL :
  - SAVE $48M OVER 20 YEARS
  - HAVE NO ADVERSE IMPACT ON AFSOC, ACC OR OTHER EMTE USERS

# EDC/DSI

- REALITY IS THAT THESE ACTIONS WILL:
  - INCREASE THE COST OF EC TESTING TO THE CUSTOMER
    - » COST OF DOING BUSINESS - CIVILIAN PAY, CONTRACTOR COSTS, DATA REDUCTION, etc, ARE HIGHER IN WESTERN U.S.
    - » TDY COSTS WILL INCREASE FOR AFSOC, WRALC & ACC
    - » TANKER SUPPORT WILL BE REQUIRED DUE TO DISTANCES BETWEEN STAGING BASES AND RANGES

# EDC/DSI

- REALITY (CONT)
  - CREATE ADDITIONAL MCP REQUIREMENTS
    - » AWC MAY HAVE TO MOVE WEST TO ACCOMPLISH ITS EC OT&E MISSION
  - IMPACT AFSOC'S EC READINESS
    - » QUICK REACTION EC FIXES, REQUIRED IN ALL CONTINGENCIES, WILL BE DELAYED

# EDC/DSI

- HOWEVER AIR FORCE DECIDES TO DISMANTLE EMTE AND DISCONTINUE EGLIN'S EC LEADERSHIP ROLE
  - ESTABLISH EDWARDS AS EC SINGLE FACE TO THE CUSTOMER
  - MOVE 8 SIMULATORS & 2 POD SYSTEMS TO NELLIS RANGE COMPLEX
    - » LEAVE REMAINING EMTE ASSETS FOR AFSOC TRAINING AND SUPPORT OF WEAPONS TESTING BUT WITHOUT UPGRADE FUNDING
  - CLOSE REDCAP & AFEWES & MOVE THEIR ASSETS TO EDWARDS
  - UPGRADE EDWARD'S BENEFIELD ANECHOIC CHAMBER TO ACCOMPLISH EC MISSION AT A COST OF $140M

# Document Separator

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT
STATE HOUSE • BOSTON 02133
(617) 727-3600

WILLIAM F. WELD
GOVERNOR

ARGEO PAUL CELLUCCI
LIEUTENANT-GOVERNOR

April 6, 1995

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

Dear Chairman Dixon:

As you know, on March 1, Secretary Perry recommended that Hanscom Air Force Base be expanded. In addition, documents released as part of the base closure process indicate that the Defense Department considered a number of cross-service options to expand Hanscom; regrettably, however, most of these scenarios were rejected due to prohibitive military construction costs.

The citizens of the Commonwealth of Massachusetts are committed to the preservation and enhancement of Hanscom; thus, on February 9, I signed into law state bonding authority for $100 million in capital improvements to accommodate an enhancement or expansion of Hanscom as a result of the 1995 BRAC process. This offer presents a win-win situation for the federal government and Massachusetts. For the Defense Department, state offsets of military construction costs will increase the cost savings associated with base closures. Moreover, strengthening Hanscom will contribute significantly to development in the high-technology sectors that are driving the Commonwealth's economic growth.

Attached are cost estimates for space and infrastructure improvements at Hanscom that could be funded by the state, enabling the BRAC to expand Hanscom markedly at a very low cost. Under Massachusetts law, I have the authority to fund these improvements, and I am prepared to do so without delay.

Thank you for your consideration. If you have any questions, please do not hesitate to contact me, or have a staff member contact Bill Smith at (617) 727-3206.

Sincerely,

Bill Weld

William F. Weld

Attachments

Chapter 300

THE COMMONWEALTH OF MASSACHUSETTS

*In the Year One Thousand Nine Hundred and Ninety-two*

*AN ACT* RELATIVE TO STIMULATING EMPLOYMENT AND ENCOURAGING THE SITING OF CERTAIN FEDERAL FACILITIES IN THE COMMONWEALTH.

*Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:*

SECTION 1. The general court hereby finds that:

(1) It is an important function of government to increase opportunities for gainful employment and improve living conditions, assist in stimulating and promoting a balanced and productive economy and otherwise to improve the prosperity, health and general welfare of the inhabitants of the commonwealth.

(2) The lack of gainful employment in the commonwealth puts additional pressure on the state's welfare programs, increases the cost of unemployment compensation to the existing enterprises of the commonwealth and leaves many of the citizens of the commonwealth without health insurance.

(3) Therefore, it is in the best public interest of the commonwealth to promote the prosperity and general welfare of all citizens by taking all necessary and reasonable measures to make attractive and advantageous locations and facilities for major federal agencies and operations available to the federal government under the terms and conditions which are required by such federal agencies and are competitive with those offered by other states, including office space and facilities without cost to said agencies.

(4) The advantages of this program to the general public would include a significant increase in the gainful employment of the citizens; a decrease in welfare and unemployment compensation costs; and increase in the number of citizens covered by employment-related health insurance; a significant increase in economic activity; and an increase in the tax base of the commonwealth.

(5) It is therefore expressly declared that the provision of this act constitute a needed program in the public interest and serve a necessary and valid public purpose for which public money may be expended or invested.

SECTION 1A. To provide for certain activities and projects, the sums set forth in section two are hereby appropriated from the General Fund unless specifically designated otherwise in the items for the several purposes and subject to the conditions therein, subject to the provisions of law regulating the disbursement of public funds and the conditions pertaining to appropriations specified herein for the fiscal year nineteen hundred and ninety-three.

SECTION 2.

1599-8000 For capital projects for the establishment of a United States Department of Defense Financing and Accounting Service Facility in the town of Southbridge and the commonwealth's expenses in carrying out the provisions of this act including without limitation the acquisition of the selected site and all necessary facilities required to meet the Department of Defense Finance and Accounting Services requirements, planning and studies, the preparation of plans and specifications, any construction, reconstruction, improvement, renovation, enlargement, expansion, remodeling, alteration, repair and furnishings and equipment or build-out undertaken pursuant to the provisions of this act, and any administrative costs associated therewith either at the time of acquisition of the site or subsequent thereto; provided, that no funds shall be expended from this item prior to the recommendation of the Defense Base Closure and Realignment Commission to establish said facility in Southbridge and approval of said recommendation by the United States Congress; provided further, that funds from this item in an amount not to exceed one hundred thousand dollars shall be expended pursuant to section five of this act; and provided further, that the executive office of administration and finance in coordination with the executive office of economic affairs shall submit a

report detailing all expenditures made pursuant to this item to the house and senate ways and means committees on or before July thirty-first, nineteen hundred and ninety-three and quarterly thereafter ..... $100,000,000

SECTION 3. As used in this act the following terms shall, unless otherwise required, have the following meanings:

"Commissioner", the commissioner of the division of capital planning and operations;

"Selected Site", the site selected by the United States Department of Defense for its Defense Finance and Accounting Services in the town of Southbridge, as the same may be subsequently changed, expanded, reduced or otherwise altered or any replacement or alternative site chosen.

SECTION 4. (a) Upon notification by the United States Department of Defense to the town of Southbridge, that Southbridge has been selected by the United States Department of Defense as a site for its Defense Finance and Accounting Services facilities and such site has been so identified as part of the United States Secretary of Defense's recommendation to the United States Defense Base Closure and Realignment Commission and approval of said recommendation by the United States Congress, the commissioner is authorized, consistent with the provisions of this act, to take any and all necessary actions to acquire, procure, operate and maintain real property and facilities, including without limitation any associated appurtenances or improvements constructed thereon, necessary to satisfy the Defense Finance and Accounting Services requirements.

(b) The commissioner is further authorized to acquire the selected site together with its associated appurtenances and improvements through purchase, lease for a period not to exceed thirty years, lease for a period not to exceed thirty years with an option to purchase, the exercise of the power of eminent domain in accordance with the provisions of chapter seventy-nine or eighty A of the General Laws or any other procedure now or hereinafter provided by law, or otherwise.

(c) The commissioner is further authorized to employ alternative methods of procurement relative to the design, demolition, construction, reconstruction, improvement, renovation, enlargement, expansion, remodeling, repair or build-out of any and all facilities, as may be useful or necessary from time

to time on the selected site to satisfy the requirements of the Defense Finance and Accounting Services, including without limitation, turnkey, design-build, lease, lease purchase or utilization of modular buildings.

(d) At least thirty days prior to utilizing a method of procurement pursuant to subsection (c) not otherwise authorized by chapter seven, or section seven E of chapter twenty-nine of the General Laws, the commissioner shall submit to the general court a report, in writing, which specifies the reasons for determining that such recommended alternative is useful or necessary.

(e) In the event the commissioner determines to procure the selected site through a purchase, the purchase price shall not be greater than the fair market value as determined and agreed upon by an appraiser selected by the division of capital planning and operations and an appraiser selected by the owner of the selected site. In the event the appraisers so selected are unable to agree upon the fair market value, they may jointly select a third appraiser, whose appraisal costs shall be equally borne by the owner and said division, who shall determine the fair market value for purposes of this section and so advise the commissioner. Each appraiser selected pursuant to this section shall be a state-licensed real estate appraiser as defined in section one hundred and seventy-three of chapter one hundred and twelve of the General Laws. Nothing contained herein shall affect or limit in any way the right of the commissioner to exercise the right of eminent domain in accordance with chapter seventy-nine or eighty A of the General Laws and this act.

(f) The commissioner is hereby further authorized to take any and all steps necessary to operate, manage or maintain or contract with third parties for the management, maintenance and operation of the selected site and facilities. Any contract for such services shall not be for a term greater than ten years.

(g) Any contract entered into pursuant to subsection (f) shall be subject to annual appropriations by the general court; provided, however, that nothing contained herein shall prohibit, subject to appropriation, the use of any funds in excess of the capital reserve requirements, as provided in the Federal Facilities Reserve Fund established by section two X of chapter twenty-nine of the General Laws, as inserted by section eight of this act, for purposes of subsection (f).

SECTION 5. Notwithstanding the provisions of subsection (a) of section 4, nothing contained herein shall prohibit the division of capital planning and

operations from expending funds for planning and other administrative costs related to the purposes of this act prior to the notification of the United States Department of Defense to the town of Southbridge that it has been selected by the United States Department of Defense as a site for its Defense Financing and Accounting Services facilities. Amounts expended pursuant to said section shall be reimbursed from funds available pursuant to section two of this act and pursuant to schedules submitted to the house and senate ways and means committees.

SECTION 6. The commissioner is further authorized, subject to the written approval of the secretary of administration and finance, to lease to the Department of Defense, the General Services Administration or other agency of the United States Government, the selected site and any facilities, including without limitation, any associated improvements or appurtenances constructed thereon existing or subsequently acquired or procured pursuant to this act, for a term not to exceed thirty years and on such terms and conditions and for such consideration, if any, which he deems appropriate. Upon the expiration of any lease entered into hereunder, the commissioner shall have the authority to dispose of the selected site and any facilities, subject only to the procedures required by sections forty E to forty J, inclusive of chapter seven of the General Laws.

SECTION 7. The acquisition, procurement, construction, reconstruction, improvement, renovation, enlargement, expansion, remodeling, alteration, repair, build-out, development, financing, management, maintenance, operation or leasing of all or any portion of the selected site and its associated appurtenances and improvements for occupancy or use by the Department of Defense Finance and Accounting Services and any contract for construction and design or other consulting services for or relating to the construction, reconstruction, improvement, renovation, development, financing, management, maintenance, operation or leasing of all or any portion of the selected site and its associated appurtenances and improvements for the site and its facilities shall be exempt from the provisions of section thirty-eight A½ to thirty-eight O, inclusive of chapter seven of the General Laws, section forty-four A to forty-four J, inclusive of chapter one hundred and forty-nine of the General Laws and section thirty-nine M of chapter thirty of the General Laws or any other special or general law or rule or regulation providing for the advertising or bidding of construction, development, financing, management, leasing or im-

provements to or the acquisition of or disposition of interest in real or personal property.

SECTION 8. Chapter 29 of the General Laws is hereby amended by inserting after section 2W, inserted by section 4 of chapter 203 of the acts of 1992, the following section:-

Section 2X. There is hereby established upon the books of the commonwealth a separate fund to be known as the Federal Facilities Reserve Fund. There shall be credited to such fund all revenues resulting from the development leasing, operation, granting of concessions or other use of the selected site and its facilities or agreements related thereto including, without limitation, grants, fees, compensation, payments or revenues of any kind from any agency of the federal government or any other governmental entity.

Amounts credited to such fund shall be available, subject to appropriation, for planning and studies, acquisition of land and buildings and interest therein, the preparation of plans and specifications, the development, construction, reconstruction, improvement, renovation, enlargement, expansion, remodeling, build-out, repair, furnishings and equipment, or management, operation or maintenance of the selected site and its facilities and any administration costs associated therewith; provided, however, that said funds shall not be used for management, operation or maintenance unless the commissioner determines that adequate reserves necessary to meet the foreseeable capital needs of the selected site and its facilities will be available in the fund despite such use.

SECTION 9. If final approval by the United States Congress of the Defense Base Closure and Realignment Commission's recommendation to locate said Finance and Accounting Services Facility in the town of Southbridge has not been received as of June thirtieth, nineteen hundred and ninety-four this act shall expire.

SECTION 10. This act shall take effect upon its passage.

House of Representatives, December 23, 1992.

Passed to be enacted, , Speaker.

In Senate, December 23, 1992.

Passed to be enacted, , President.

H 6333

29 December, 1992.

Approved,

at four o'clock and — minutes, P. M.

W. Urham F. Weld

Governor.

Chapter

THE COMMONWEALTH OF MASSACHUSETTS

*In the Year One Thousand Nine Hundred and Ninety-five*

*AN ACT* RELATIVE TO STIMULATING EMPLOYMENT AND ENCOURAGING THE SITING OF CERTAIN FEDERAL FACILITIES IN THE COMMONWEALTH.

*Whereas*, The deferred operation of this act would tend to defeat its purpose, which is to immediately encourage the siting of certain federal facilities in the commonwealth, therefore it is hereby declared to be an emergency law, necessary for the immediate preservation of the public convenience.

*Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:*

SECTION 1. Clause (4) of section 1 of chapter 300 of the acts of 1992 is hereby amended by inserting after the word "activity", in line 5, the following words:- ; the preservation and enhancement of the commonwealth's high-tech economic base.

SECTION 2. Said chapter 300 is hereby further amended by striking out section 1A, as appearing in section 1 of chapter 386 of the acts of 1992, and inserting in place thereof the following section:-

*Section 1A*. To provide for the projects and expenditures provided for in this act, the secretary of administration and finance is hereby authorized to spend the sum set forth in section two for the several purposes of this act, subject to the conditions specified herein and subject to the provisions of law regulating the disbursement of public funds and the approval thereof.

SECTION 3. Item 1599-8000 of section 2 of said chapter 300 is hereby amended by inserting after the word "Southbridge", in line 3, the following words:- or for capital projects to enhance or expand other United States Department of Defense facilities in the commonwealth.

SECTION 4. Said item 1599-8000 of said section 2 of said chapter 300 is hereby further amended by inserting after the word "requirements", in line 7, the following words:- , or other Department of Defense requirements.

SECTION 5. Said item 1599-8000 of said section 2 of said chapter 300 is hereby further amended by inserting after the word "Southbridge", in line 16,

the following words:- or enhance or expand other Department of Defense facilities in the commonwealth.

SECTION 6. Section 3 of said chapter 300 is hereby amended by inserting after the word "Southbridge", in line 6, the following words:- , or any United States Department of Defense facilities in the commonwealth selected for enhancement or expansion as the result of the nineteen hundred and ninety-five base closure and realignment process.

SECTION 7. Said section 3 of said chapter 300 is hereby further amended by inserting after the word "chosen", in line 8, the following words:- including any land or buildings, or interest therein, necessary to carry out the purposes of this act.

SECTION 8. Section 4 of said chapter 300 is hereby amended by inserting after the word "facilities", in line 4, the following words:- or upon notification by the United States Department of Defense to the base commander or facility administrator of a Department of Defense facility that the facility has been selected for enhancement or expansion as the result of the nineteen hundred and ninety-five base closure and realignment process.

SECTION 9. Said section 4 of said chapter 300 is hereby further amended by inserting after the word "requirements", in line 11, the following words:- or other United States Department of Defense requirements.

SECTION 10. Said section 4 of said chapter 300 is hereby further amended by inserting after the word "Services", in line 23, the following words:- or other United States Department of Defense requirements.

SECTION 11. Section 5 of said chapter 300 is hereby amended by inserting after the word "facilities", in line 7, the following words:- or prior to the notification by the United States Department of Defense that facilities in the commonwealth have been selected for enhancement or expansion.

SECTION 12. Section 6 of said chapter 300 is hereby amended by inserting after the word "Government", in line 4, the following words:- , or to any United States Department of Defense contractor performing work for a Department of Defense facility.

SECTION 13. Section 7 of said chapter 300 is hereby amended by inserting after the word "Services", in line 6, the following words:- , the Department of Defense facilities that have been selected for enhancement or expansion, or a Department of Defense contractor performing work for a Department of Defense facility that has been selected for enhancement or expansion.

SECTION 14. Said chapter 300 is hereby further amended by striking out sections 8A and 8B, inserted by section 2 of chapter 386 of the acts of 1992, and inserting in place thereof the following two sections:-

*Section 8A.* To meet the expenditures necessary in carrying out the provisions of this act, the state treasurer shall, upon the request of the governor, issue and sell bonds of the commonwealth, in an amount to be specified by the governor from time to time, but not exceeding, in the aggregate, the sum of one hundred million dollars. Said bonds shall only be issued and sold after final approval by the United States Congress of the recommendation of the Department of Defense to locate said Finance and Accounting Services Facility in the town of Southbridge or after final approval by the United States Congress of a recommendation from the United States Defense Base Closure and Realignment Commission to enhance or expand other United States Department of Defense facilities in the commonwealth. All bonds issued by the commonwealth, as aforesaid, shall be designated on their face, Federal Facilities Enhancement Act of 1995, and shall be issued for such maximum term of years, not exceeding thirty years, as the governor may recommend to the general court pursuant to Section 3 of Article LXII of the Amendments to the Constitution of the Commonwealth; provided, however, that all such bonds shall be payable not later than December thirty-first, two thousand and thirty. Notwithstanding any other provision of this act, bonds, and the interest thereon, issued under the authority of this section shall be general obligations of the commonwealth.

*Section 8B.* The state treasurer may borrow from time to time on the credit of the commonwealth such sums of money as may be necessary for the purposes of meeting payments as authorized by this act and may issue and renew from time to time notes of the commonwealth therefor, bearing interest payable at such time and at such rates as shall be fixed by the state treasurer. Such notes shall be issued and may be renewed one or more times for such term, not exceeding one year, as the governor may recommend to the general court in accordance with Section 3 of Article LXII of the Amendments to the Constitution of the Commonwealth, but the final maturities of such notes, whether original or renewal, shall not be later than June thirtieth, two thousand and seven. Notwithstanding any other provision of this act, notes and interest thereon issued under the authority of this act shall be general obligations of the commonwealth.

SECTION 15. Section 9 of said chapter 300 is hereby amended by inserting after the word "Southbridge", in line 3, the following words:- or to enhance or expand other United States Department of Defense facilities in the commonwealth.

SECTION 16. Said section 9 of said chapter 300 is hereby further amended by striking out, in line 4, the word "ninety-four" and inserting in place thereof the following word:- ninety-six.

SECTION 17. Nothing in this act shall be construed to preclude the town of Southbridge from accessing funds from the proceeds of any bonds issued pursuant to this act.

House of Representatives, February 9, 1995.

Preamble adopted, [signature], Speaker.

In Senate, February 9, 1995.

Preamble adopted, [signature], President.

House of Representatives, February 9, 1995.

Bill passed to be enacted, [signature], Speaker.

In Senate, February 9, 1995.

Bill passed to be enacted, Louis P. Bertonazzi, President.

9 February, 1995.

Approved,

at five o'clock and 35 minutes, P. M.

W. Mitt Weld

Governor.