DCN 912

BRAC-95 Scenario Development Data Call Tasking

Scenario Number:	3-20-0223-044
Scenario Title:	NISE San Diego

Due Date:	1300 EST, 20 November 1994

Description of Closure/Realignment Scenario

Close NISE West San Diego. Consolidate with NCCOSC RDT&E Division San Diego and leave any necessary remaining functions in place.

Preparation of a Scenario Development Data Call response for the closure/realignment scenario described above is mandatory. The lead major claimant may submit a separate, additional Scenario Development Data Call response, which while not changing the base(s) identified as being closed/realigned, does identify alternative receiving sites. If an additional response is submitted, identify this response as Scenario Number 3-20-0223-044A.

BSAT Points of Contact

Any questions concerning this specific closure/realignment scenario should be addressed to the BSAT Technical Centers Team at (703) 681-0491. General questions regarding COBRA or other costing issues should be addressed to Mr. David Wennergren at (703) 681-0466.

Table 3-B: MILCON Requirements

Gaining Base Name:			
Category (Unit)	New Construction Requirement	Rehabilitation Requirement	Comment
Horizontal (SY)			
Berthing (FB)			
Air Maintenance (SF)			
Other Operations (SF)			
Administrative (SF)			
Training (SF)			
Maintenance (SF)			
Bachelor Quarters (SF)			
Supply/Storage (SF)			
Dining Facilities (SF)			
Personnel Support (SF)			
Communications (SF)			
Ship Maintenance (SF)			
RDT&E (SF)			
POL Storage (BL)			
Ammo Storage (SF)			
Medical Facilities (SF)			
Environmental	$	$	
Other: - - -	 $ $ $	 $ $ $	

BRAC-95 SCENARIO DEV PMENT DATA CALL
ATTACHMENT 1: BAsE LOADING DATA

PART 5: TOTAL FACILITY SQUARE FEET. This is the total Class 2 facility square feet, excluding family housing, MWR and utilities, as reported in the Naval Facilities Assets Data Base (NFADB). This figure is used in determining the number of square feet which will be "shut down" as a result of the closure action.

Total Facility Square Feet (in thousands): 0

PART 6: BASE OPERATING SUPPORT (BOS) COST DATA. This is the total BOS costs reported for the host and tenant activities in Data Call 66. Please review this data and ensure that it is consistent with FY 1996 OSD Submit budget data. If BOS cost data needs to be revised, specific revisions should be noted on a revised copy of the appropriate Data Call 66 table(s), which should then be returned with this data call response.

			***** O&M, etc. *****				***** DBOF *****				***** TOTAL *****			
UIC	NAME	MAJOR CLAIMANT	RPMA NONPAY	RPMA PAY	OBOS NONPAY	OBOS PAY	RPMA NONPAY	RPMA PAY	OBOS NONPAY	OBOS PAY	RPMA NONPAY	RPMA PAY	OBOS NONPAY	OBOS PAY
68944	NISE WEST TAYLOR STREET	COMSPANAVWARC	0	0	0	0	1714	0	21507	9457	1714	0	21507	9457
		TOTALS:	0	0	0	0	1714	0	21507	9457	1714	0	21507	9457

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BRAC-95 SCENARIO DEV! ?MENT DATA CALL
ATTACHMENT 1: BA$E LOADING DATA

PART 3: MANPOWER DATA - SPECIAL USE AREAS. This is a list of "special use areas" assigned to the activity being considered for closure or realignment. Please review this list and determine which, if any, of these special use areas will also be closed as a result of this action. If so, note this fact in the "Closed?" column, and then identify the fiscal year in which the area will be closed. For any special use areas which will be closed, corresponding numbers of billets/positions must be incorporated both into the "End FY 2001 Activity Population" and also the "Eliminated and Relocated Billets/Positions" data in your data call response. Manpower estimates shown below reflect Data Call 1 estimates. Please ensure that accurate "End of FY 2001" data is used in your response; as well as ensuring that you do not double count any numbers already shown on Part 1 of this

UIC	NAME	MAJOR CLAIMANT	CITY	STATE	OFF	ENL	CIV	Non-DOD	CLOSED?	FY
N 68944	NCCOSC ISE West	COMSPANAVWAR	IMPERIAL BEACH	CA	0	0	9	0		
N 68944	NISE WEST TAYLOR STREET	COMSPANAVWAR	SAN DIEGO	CA	0	0	0	0		
				TOTALS:	0	0	9	0		

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BRAC-95 SCENARIO DEV' PMENT DATA CALL
ATTACHMENT 1: BA LOADING DATA

PART 2: MANPOWER DATA - DETACHMENTS. This is a list of detachments belonging to the activity being considered for closure or realignment. Please review this list and determine which, if any, of these detachments will also be closed as a result of this action. If so, note this fact in the "Closed?" column, and then identify the fiscal year in which the detachment will be closed. For any detachments which will be closed, corresponding numbers of billets/positions must be incorporated both into the "End FY 2001 Activity Population" and also the "Eliminated and Relocated Billets/Positions" data in your data call response. Manpower numbers shown below reflect Data Call 1 estimates. Please ensure that accurate "End of FY 2001" data is used in your response; as well as ensuring that you do not double count any numbers already shown on Part 1 of this attachment.

UIC	NAME	MAJOR CLAIMANT	CITY	STATE	OFF	ENL	CIV	Non-DOD	CLOSED?	FY
N 62676	NISE WEST ACTIVITY PEARL	COMSPANAVWAR	PEARL HARBOR	HI	0	0	0	0		
N 62676	NISE WEST ACTIVITY PEARL	COMSPANAVWAR	ADAK	AK	0	0	0	0		
N 68944	NISE WEST CRYPTO REPAIR	COMSPANAVWAR	SAN DIEGO	CA	0	0	0	0		
N 68944	NISE WEST DETACHMENT	COMSPANAVWAR	VALLEJO	CA	0	0	0	0		
N 66121	NISE WEST FACILITY GUAM	COMSPANAVWAR	FINEGAYAN	GU	0	0	0	0		
N 66120	NISE WEST FACILITY JAPAN	COMSPANAVWAR	YOKOSUKA	JAP	0	0	0	0		
N 68944	NISE WEST FIELD OFFICE KEY	COMSPANAVWAR	KEY WEST	FL	0	0	0	0		
N 68944	NISE WEST GPS FACILITY	COMSPANAVWAR	IMPERIAL BEACH	CA	0	0	0	0		
				TOTALS:	0	0	0	0		

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BRAC-95 SCENARIO DEV PMENT DATA CALL
ATTACHMENT 1: BA LOADING DATA

Activity: 68944 NISE WEST SAN DIEGO CA

PART 1: MANPOWER DATA - HOST AND TENANTS. This data is provided to assist you in identifying military billets and civilian positions which will either be relocated or eliminated as a result of closure or realignment. Officer (OFF), Enlisted (ENL) and Civilian (CIV) numbers reflect end strength, not on-board counts. The "Planned Force Structure Reduction" column represents the difference between projected "Beginning of FY 1996" and projected "End of FY 2001" end strength. The source of this data is the BUPERS/NAVCOMPT/CMC data bases in support of the FY 1996/1997 OSD Submit. Review this list and make any necessary annotations, including the addition or deletion of lines of data to accurately reflect the host and tenant population. Note that Military Students (STU) must be shown as an Average On-Board (AOB) count. If a significant student population is located at the activity, then all students need to be identified in this table. Student data need only be provided for the "End of FY 2001" column of the table. If any numbers are changed, please provide a revised set of totals at the end of the listing.

UIC	NAME	MAJOR CLAIMANT	BEGIN FY 1996 OFF	ENL	CIV	STU	PLANNED FORCE STRUCTURE CHANGES OFF	ENL	CIV	STU	END FY 2001 OFF	ENL	CIV	STU
N 68944	NISE WEST SAN DIEGO CA	COMSPANAVWAR	1	6	909	0	0	0	-118	0	1	6	791	0
N 68944	CCSC West Coast ISE NAVSTA SD	COMSPANAVWAR	0	0	0	0	0	0	0	0	0	0	0	0
N 68944	NESEC Det MCB Pen	COMSPANAVWAR	0	0	0	0	0	0	0	0	0	0	0	0
		TOTALS:	1	6	909	0	0	0	-118	0	1	6	791	0

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BRAC-95 SCENARIO DEVI 'MENT DATA CALL
ATTACHMENT 1: BASE LOADING DATA

PART 7: CONTRACT WORKYEAR DATA. This is the total contract workyear data reported by the host and tenant activities in Data Call 66. Please review this data, especially the columns regarding contract workyears which will either be eliminated or transferred as a result of the closure/realignment action. Sum of workyears transferred + eliminated + remaining at activity must equal Total Contract Workyears. Annotate corrections as necessary.

UIC	NAME	MAJOR CLAIMANT	TOTAL CONTRACT WORKYEARS	NO. OF WORK-YEARS TO BE TRANSFERRED	NO. OF WORK-YEARS TO BE ELIMINATED	NO. OF WORK-YEARS REMAINING AT ACTIVITY
68944	NISE WEST TAYLOR STREET FACILITY	COMSPANAVWAR	364	364	0	0
		TOTALS:	364	364	0	0

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square feet.

Other Operations - General Purpose Operations Facilities (Aircraft, Ordnance, Amphibious, Headquarters, etc.), shown in square feet.

Administrative - Administrative space (General Purpose and ADP), shown in square feet.

Training - Training Facilities (Academic, Reserve, Applied Instruction, Recruit Processing, Operational Trainers, etc.), shown in square feet.

Maintenance - Non-Weapons facilities (Vehicles, Electronics, Public Works, etc.), shown in square feet.

Bachelor Quarters - Barracks, Dormitories or Unmarked Officer Quarters, shown in square feet.

Supply/Storage - Operational Storage, Cold Storage, General Warehouse, etc., shown in square feet.

Dining Facilities - Enlisted Mess Hall, shown in square feet.

Personnel Support - Fire, Police, Family Service Centers, MWR, Child Care, etc., shown in square feet.

Communications - Other Communications Facilities, (Communications Centers, Telephone Exchanges, Terminal Equipment, Radar Air Traffic Control Center, etc.), shown in square feet.

Ship Maintenance - Shore Intermediate Maintenance, Waterfront Services, Amphibian Vehicle Maintenance, etc., shown in square feet.

RDT&E - Other Research, Development, Test and Evaluation (RDT&E) facilities (Aircraft, Ship, Underwater, Electronics, etc.) (does not include Ammo/Propulsion Labs), shown in square feet.

POL Storage - Jet Engine Fuel Storage, shown in barrels.

Ammo Storage - General Purpose, High Explosive, Small Arms and Missile Magazines, shown in square feet.

Medical Facilities - Hospitals, Medical/Dental Clinics, etc., shown in square feet.

Table 3-B - Military Construction Requirements. Identify the amount of new construction or rehabilitation (using the designated unit of measure) which will be required at the receiving site. Include a brief description of the requirement in the Comment column.

- Do not include Family Housing construction requirements on this table, they will be identified on a separate data call format.

- The COBRA MILCON algorithm will estimate the cost of MILCON requirements for the standard categories of construction listed on the next page. However, if an engineered estimate(s) is already available, then a dollar value for the requirement(s) should be identified in the "Comment" column of the table.

- Any identified Environmental Mitigation MILCON projects must include a total cost and brief description of the requirement in the "Comment" column of the table.

- The "Other" row is provided to identify MILCON requirements which do not fit the standard construction categories, e.g., dry docks, SCIF conversions, aircraft wash racks, etc. Enter a total cost and brief description for each identified requirement. For these "unique" categories of construction, a square footage estimate should also be indicated, if possible.

For Rehabilitation Requirements: if entered as a "unit of measure" (e.g., SF, etc.), then corresponding costs will be calculated at 75% of the cost of new construction (worst-case cost estimate for rehabilitation costs). If the rehabilitation will involve renovation at an anticipated rate of less than 75%, then in addition to identifying the requirement (SF, etc.), enter in the Comment block either a rehabilitation cost or an appropriate percentage which should be used in lieu of the 75% rate.

Show any cost entries in ($000).

Description of "Units of Measure" used in Table 3-B:

SY - Square Yards
FB - Feet of Berthing
SF - Square Feet
BL - Barrels

Description of standard "Categories of Construction" used in Table 3-B (including examples of types of construction included in these categories)**:**

Horizontal - Aprons/Paving (Aircraft Parking Aprons, Combat Aircraft Ordnance Loading Areas, etc.), shown in square yards.

Berthing - General Purpose Berthing Piers, shown in feet of berthing.

Air Maintenance - Maintenance Hangers (General Purpose, High Bay, etc.), shown in

Summarize data shown in response to supporting data questions a. through f. above in the following table:

Table 3-A: Dynamic Base Information

Gaining Base Name:								
		1996	1997	1998	1999	2000	2001	Total
a.	One-Time Unique Costs *							
b.	One-Time Unique Savings							
c.	Environ. Mitigation							
d.	Misc. Recurring Costs							
e.	Misc. Recurring Savings							
f.	Land Purchases							

* Includes both Community Infrastructure Impact and Other One-Time Unique Costs, as applicable.

e. Miscellaneous Recurring Savings. Identify any other recurring savings associated th the closure/realignment action which will not be calculated automatically by the model, g., elimination of leases of facilities or equipment, etc. For the savings, identify the year ı which each will begin and describe the nature of the savings. Only savings directly ttributable to the closure/realignment action should be identified. (Do not include changes n non-payroll BOS, Family Housing Operations, housing allowances, CHAMPUS costs or salary savings for eliminated positions/billets, all of which are calculated by other COBRA algorithms.). Do not double count any savings identified on Losing Base tables (Enclosure (2)).

Gaining Base: _____

	Annual Savings	FY	Description
1.			

f. Land Purchases. Identify any land purchases required at gaining bases to accommodate relocating activities/functions. Identify the cost, number of acres, year in which purchase will occur and a brief description identifying why the land needs to be purchased.

Gaining Base: _____

	Cost	No. of Acres	FY	Description
1.				

c. Environmental Mitigation. Environmental cleanup costs at closing bases are not considered in COBRA, since these costs will be incurred regardless of whether the activity is closed or remains opened. If, however, additional environmental costs are incurred at gaining bases as the result of a transfer of functions or personnel, these costs should be identified, e.g., wetland mitigation, environmental impact statements at gaining bases, new permits, etc. Identify below any non-Military Construction environmental mitigation costs which will be incurred as a result of this closure/realignment action. (Note: Military Construction Costs for environmental mitigation are identified in Table 3-B). For each cost, identify the amount, year in which the cost will be incurred and a brief description of the cost.

Gaining Base: _____

	Cost	FY	Description
1.			

d. Miscellaneous Recurring Costs. Identify any other recurring costs associated with the closure/realignment action at the gaining base which will not be calculated automatically by the COBRA algorithms (as noted in the Introduction section), e.g., new leases of facilities or equipment, etc. For each cost, identify the year in which the cost will begin and describe the nature of the cost. Only costs directly attributable to the closure/realignment action should be identified. (Do not include changes in non-payroll BOS, Family Housing Operations, housing allowances or CHAMPUS costs, all of which are calculated by other COBRA algorithms.). Do not double count any costs identified on Losing Base tables (Enclosure (2)).

Gaining Base: _____

	Annual Cost	FY	Description
1.			

a. (2) Other Unique One-Time Costs. Identify any other one-time unique costs at the gaining base which will not be calculated automatically by the COBRA algorithms (as noted in the Introduction section). Examples include use of temporary office space, etc. Only costs directly attributable to the closure/realignment action should be identified. This area should not be used to identify routine moving or personnel costs, which are calculated automatically by the COBRA algorithms, nor should it be used to identify one-time unique moving costs which will be addressed in the Losing Base tables (enclosure (2)). For each unique one-time cost, identify the amount, year in which the cost will be incurred and describe the nature of the cost. Do not double count any costs identified on Losing Base tables (Enclosure (2)). **Remember to aggregate with 2.a.(1) costs on the previous page, if any, when transferring data to Summary Table.**

Gaining Base: _____

	Cost	FY	Description
1.			

b. Other One-Time Unique Savings. Identify any other one-time unique savings at the gaining base which will not be calculated automatically by the COBRA algorithms (as noted in the Introduction section). This area should not be used to identify routine moving or personnel savings, which are calculated automatically by the COBRA algorithms. Do not include MILCON Cost Avoidances (which were identified in a separate data call), or Procurement Cost Avoidances (which are covered in the losing base enclosure). For each savings, identify the amount, year in which it will occur and describe the nature of the savings. Only savings directly attributable to the closure/realignment action should be identified. Do not double count any savings identified on Losing Base tables (Enclosure (2)).

Gaining Base: _____

	Cost	FY	Description
1.			

BRAC-95 SCENARIO DEVELOPMENT DATA CALL
ENCLOSURE (3) - GAINING BASE QUESTIONS

Complete a separate Enclosure (3) - Gaining Base Questions, as appropriate, for each "gaining" base involved in the closure/realignment scenario. Make additional copies of this enclosure as necessary. Tables included in this enclosure are 3-A and 3-B. Enter the name of the Gaining Base in the block below.

Gaining Base:	

Table 3-A - Dynamic Base Information. Complete the following "Supporting Data" section. Then, summarize this data in the Summary Data Table (3-A) that immediately follows this "Supporting Data" section. Show all entries in ($000).

Table 3-A: Supporting Data

a. Other One-Time Unique Costs. This item has been divided into two sections. First, separately identify any Community Infrastructure Impact costs. Second, separately identify any other One-Time Unique costs. **Finally, when transferring these figures to the Summary Data Table (3-A), combine both sets of numbers into one "Other One-Time Unique Costs" answer (by year).**

a. (1) Community Infrastructure Impacts. Identify any cost impacts on community infrastructure at gaining bases which would result from the transfer of functions/personnel, e.g., requirement to build new sewage treatment facility, etc. For each cost, identify the amount, year in which it would be incurred, location (city, etc.), and a brief description of the requirement. Answers must be consistent with certified data contained in the gaining base's Data Call 65, "Economic and Community Infrastructure Data", response. Ensure that adequate coordination takes place, especially in those cases where the gaining and losing base are in different claimancies. **Remember to aggregate this answer with 2.a.(2) costs on the next page, if any, when transferring data to Summary Table.**

Gaining Base: _____

	Cost	FY	Location	Description
1.				

BRAC-95 SCENARIO DEVELOPMENT DATA CALL
Enclosure (2) - LOSING BASE QUESTIONS

Summarize data shown in response to supporting data questions a. through j. above in the following table. Note that all entries must be shown in ($000).

Table 2-F: Dynamic Base Information Summary

Losing Base:								
		1996	1997	1998	1999	2000	2001	Total
a.	One-Time Unique Costs							
b.	One-Time Unique Svgs							
c.	One-Time Move Costs							
d.	Net Mission Costs							
e.	Net Mission Savings							
f.	Misc Recur Costs							
g.	Misc Recur Savings							
h.	Land Sales							
i.	Procurement Cost Avoid							

j. Fac. Shutdown (KSF)	

No additional cost or savings have been identified.

j. Facility Shutdown. If an activity is being realigned but not completely closed, then identify the number of square feet of Class 2 real property (buildings), excluding family housing, MWR and utilities facilities, which will be shut down at the losing base as a result of this action. If an activity is being completely closed, then just enter "All". The Base Loading Data Attachment includes an identification of total square feet for the activity and should be referred to in answering this question. Note that this entry should be shown in "thousands of square feet" (KSF).

Losing Base: _____

Facility KSF Shutdown: _____

There will be no facilities shutdown.

h. Land Sales. Identify any proceeds, if identifiable and realistically expected to be received, which would be realized through the sale of excessed property at the losing base(s). In most cases, proceeds will not be realized from the sale of land at closed activities. However, if unusual circumstances warrant, identify estimated amount of proceeds, number of acres to be sold and rationale for assuming that proceeds will be obtained.

Losing Base: _____

	Revenues	No. of Acres	Rationale
1.			

None

i. Procurement Cost Avoidances. Identify any procurement cost avoidances which would be realized as a result of the closure/realignment scenario. Items identified here must not include any funds, regardless of appropriation, identified as BOS costs in Data Call 66. An example of a cost to include here would be a planned "Other Procurement account" purchase of a computer system, which will no longer be required as a result of the closure/realignment action. For each cost avoidance, identify the amount, year in which the cost would have been incurred, whether the cost avoidance is one-time or recurring in nature, and the nature of the cost avoidance.

Losing Base: _____

	Cost	FY	One-Time/Recurring	Explanation
1.				

None identified

f. Miscellaneous Recurring Costs. Identify any other recurring costs at the losing base which will not be calculated automatically by the COBRA algorithms (as noted in the Introduction section), e.g., new leases of facilities or equipment, etc. For each cost, identify the amount, year in which the cost will begin and describe the nature of the cost. Only costs directly attributable to the closure/realignment action should be identified. (Do not include changes in non-payroll BOS, Family Housing Operations, housing allowances or CHAMPUS costs, all of which are calculated by other COBRA algorithms.) Do not double count changes in Mission costs shown above. Do not double count any costs identified on Gaining Base tables (Enclosure (3)).

Losing Base: _____

	Annual Cost	FY	Description
1.			

None identified

g. Miscellaneous Recurring Savings. Identify any other recurring savings at the losing base which will not be calculated automatically by the COBRA algorithms (as noted in the Introduction section), e.g., elimination of leases of facilities or equipment, etc. For the savings, identify the amount, year in which each will begin and describe the nature of the savings. Only savings directly attributable to the closure/realignment action should be identified. (Do not include changes in non-payroll BOS, Family Housing Operations, housing allowances, CHAMPUS costs or salary savings for eliminated positions/billets, all of which are calculated by other COBRA algorithms.) Do not double count changes in Mission Costs shown above. Do not double count any savings identified on Gaining Base tables (Enclosure (3)).

Losing Base: _____

	Annual Savings	FY	Description
1.			

None identified.

e. **Net Mission Savings.** Complete the following worksheet to identify any net recurring decreases in mission costs associated with the closure/realignment of the losing base and/or transfer of workload to gaining bases. For each net cost decreases, identify the name of the gaining base where the workload will be transferred (if applicable), cost decreases by year and describe the nature of the cost decrease. If this worksheet is filled in, provide supporting data to show calculations and methodology used to estimate these cost decreases.

Net Mission Savings (Cost Decreases) Worksheet						
Losing Base:						
Gaining Base	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001 and Beyond
1.						
Description:						
2.						
Description:						
3.						
Description:						
4.						
Description:						
5.						
Description:						

None identified other than the personnel savings achieved through the co-location of like functions previously identified.

consistent with previously submitted certified data.

d. Net Mission Costs. Complete the following worksheet to identify any net recurring increases in mission costs associated with the closure/realignment of the losing base and/or transfer of workload to gaining bases. For each net cost increase, identify the name of the gaining base where the workload will be transferred (if applicable), cost increases by year and describe the nature of the cost increase. If this worksheet is filled in, provide supporting data to show calculations and methodology used to estimate these cost increases.

Net Mission Costs (Cost Increases) Worksheet						
Losing Base:						
Gaining Base	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001 and Beyond
1.						
Description:						
2.						
Description:						
3.						
Description:						
4.						
Description:						
5.						
Description:						

No cost increases identified.

Document Separator

NAVAL HEALTH RESEARCH CENTER
SAN DIEGO, CA

The recent report submitted by the Department of the Defense (DOD) to the Commission on DOD Base Closure and Realignment (BRAC) has recommended the relocation of the necessary functions, personnel and equipment of the Naval Health Research Center (NHRC) to the Bureau of Naval Personnel at Memphis, Tennessee. NHRC is a Naval Bureau of Medicine and Surgery research facility located on Pt. Loma. NHRC is one of eight Navy medical research commands, all of which are currently undergoing a separate DOD action to combine all the military medical research into an Armed Forces Medical Research and Development Agency. NHRC employees approximately 60 civil service, 55 contract and 25 military personnel, who are involved in a variety of medical research projects dealing with applied human physiology, epidemiology and medical information systems in support of sailors and marines. The recommendation to relocate NHRC's functions, personnel and equipment to Memphis is one of several recommendations dealing with DOD technology centers/laboratories that the BRAC Commission will consider. After approximately four months of review, hearings, etc., the BRAC Commission will make final recommendations which will then be considered by the President and then the Congress. Final approval to the BRAC Commission recommendations is not expected until later this fiscal year. At this time there is insufficient information to speculate on the impact of any impending BRAC actions on either facilities or personnel.

Larry M. Dean
Captain, Medical Service Corps
United States Navy
Commanding Officer

POINT PAPER

Subj: NAVAL HEALTH RESEARCH CENTER, SAN DIEGO CA

Issue

- Additional information is needed to clarify issues contained in the justification section of Attachment X-17 of DON BRAC-95 Analysis and Recommendations, March, 1995.

Background:

- BRAC-95 recommended disestablish the Naval Health Research Center (NHRC), San Diego, CA, and relocate necessary functions, personnel and equipment to the Bureau of Naval Personnel (BuPers) at Memphis, TN.
- Justification for relocation was to consolidate NHRC with BuPers, reduce excess capacity, align NHRC with DON's principal organization responsible for military personnel and the primary user of its products, enhance synergy, and achieve economies.
- The RDA-21 medical research and development consolidation process was not considered in the BRAC-95 Analysis and Recommendations.

Discussion:

- NHRC is a fourth echelon **BuMed** activity specializing in applied biomedical R&D for the fleet and the Marine Corps.
- NHRC is a tennant activity of the Naval Command, Control and Ocean Surveillance Center RDT&E Division (NRaD) which provides facilities and administrative support. The facilities which are currently occupied by NHRC will not be affected by collateral BRAC-95 decisions.
- In the current, on-going consolidation of defense medical research and medical materiel development (RDA-21), NHRC capabilities are proposed to become part of the Armed Forces Medical Research and Development Agency in San Diego (Armed Forces Medical Research Unit No. 3, San Diego, CA).
- Tri-service military medical R&D infrastructure reduction, elimination of redundancies and excess capacity, and associated economies are being accomplished in the RDA-21 process which is directed by the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee.
- The mission of NHRC is to "support fleet operational readiness through research, development, test, and evaluation of biomedical and psychological aspects of Navy and Marine Corps personnel health and performance." NHRC is neither equipped nor staffed to conduct personnel research. BuPers funding accounts for less that three percent of NHRC's current budget.
- Direct access to operational units is critical to the performance of the NHRC mission. Synergy with fleet and FMF customers, as well as biomedical partners at the University of California, San Diego State University, Naval Medical Center, SD, Environmental Preventive Medicine Unit-5, NRaD, and other high-biotech, San Diego-based organizations would be severely diminished by a relocation to TN.

Recommendation:

- Retain medical RDT&E assets and capabilities of NHRC in San Diego within the Armed Forces Medical Research and Development Agency.

RATIONALE FOR PROXIMITY WITH FLEET AND MARINE CORPS

The Naval Health Research Center (NHRC) is a strategically positioned forward Bureau of Medicine and Surgery laboratory to support fleet operational readiness through research, development, test, and evaluation on the biomedical and psychological aspects of the Navy and Marine Corps. Most of the work conducted at this facility is in the advanced development stage of the research or evaluation process and requires close and continuous interaction with operational units of the Navy, Marine Corps, and Special Operations.

San Diego is the home of the Pacific fleet. The ships, submarines, aircraft, shore-based commands, and command and control facilities located in this area are critical to the execution of field research. Much of our field research focuses on shipboard health care delivery and requires close coordination with senior medical department representatives afloat and force medical officers ashore. These studies include medical evacuation at sea; the training, use, and certification of shipboard independent duty hospital corpsmen; health care requirements for women at sea; behavioral interventions to reduce sexually transmitted diseases during deployment to the Western Pacific, and telemedicine. Given the isolation and inaccessibility of deployed ships, and the necessary constraints on medical personnel and supplies, shipboard medicine represents a unique and critical aspect of Navy operational readiness. Due in large part to its close proximity to operational units, the Naval Health Research Center is preeminent in this critical area of research. Other areas of field research in operational units include heat stress aboard ship or during fire fighting exercises and the evaluation of protective interventions, physical readiness standards for specific communities (e.g., Explosive Ordinance Disposal) or tasks (e.g., damage control), evaluation of shipboard health promotion training and programs, and cockpit electromyographic analysis of neck and back strain during air combat maneuvering, to name a few.

Our proximity to the Naval Medical Center, San Diego and with the Naval Environmental Preventive Medicine Unit 5 allows close linkage of Navy medical R&D with both the clinical and the preventive and environmental medicine communities. These linkages are critical to our programs in epidemiology, occupational health, and HIV surveillance, and are often facilitated by the co-assignment of medical staff.

The mountainous coastal region 40 minutes north of San Diego is the location of Camp Pendleton, a major Marine Corps base. Our close access to the marines at this base, as well as the recruits at the Marine Corps Recruiting Depot in San Diego, has been instrumental to our field studies in the areas of combat casualty documentation, etiologic agents, risk factors, and prophylaxis of respiratory disease epidemics, and the epidemiology of soft tissue injuries, to name a few. Cold weather field studies are performed at our remote laboratory at the Mountain Warfare Training Center for the Marine Corps in the mountains of Bridgeport, CA., and heat stress field studies are conducted at 29 Palms.

The San Diego location of SEAL Teams 1,3, and 5, the Naval Special Warfare Center, Special Boat Group 1, COMNAVSPECWARCOM, and the only high fidelity Seal Delivery Vehicle simulator, provide access to SEALs for field studies of hypothermia, biomedical enhancement, and biomedical protective equipment.

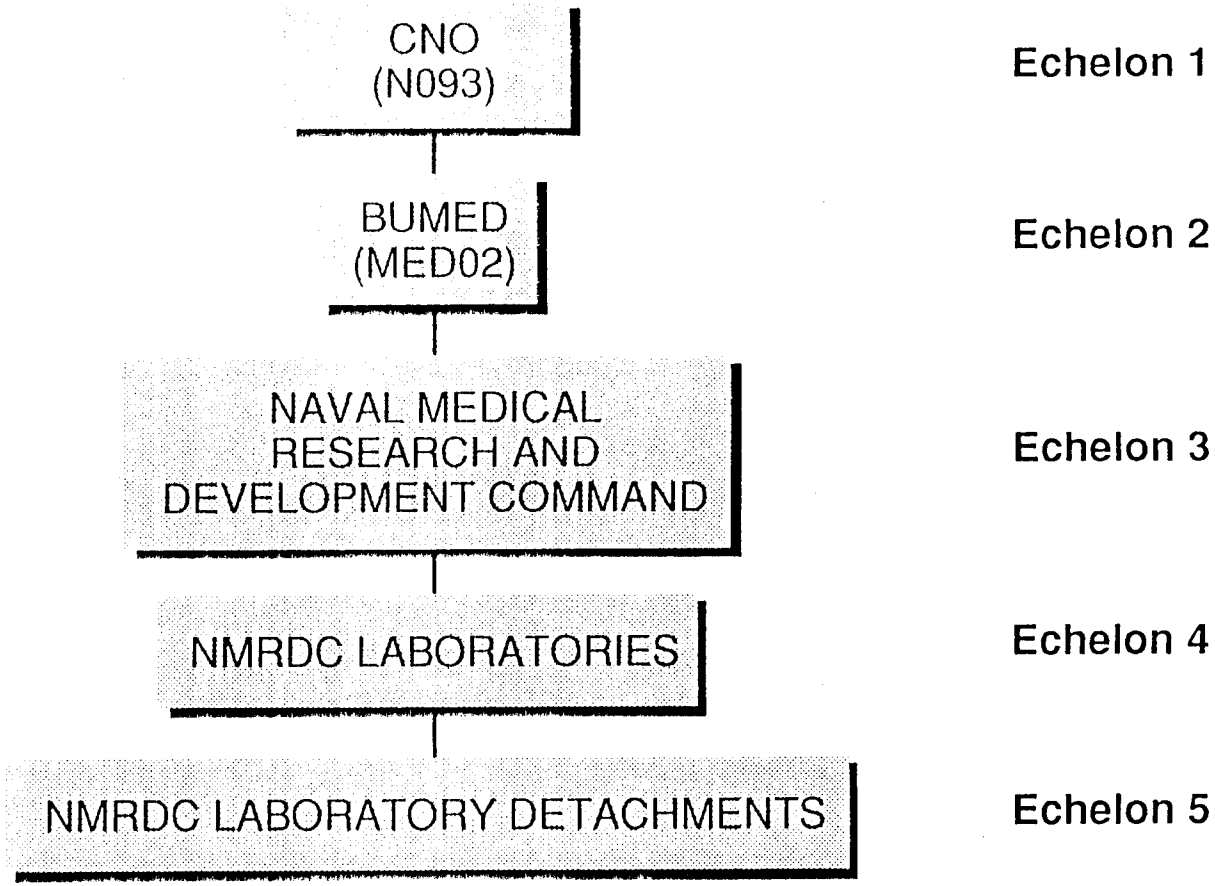
In summary, the surface, subsurface, air, special operations and Marine Corps platforms are key to recruitment of research subjects and on-site biomedical data collection. Interaction with fleet customers is essential to the execution of an effective biomedical R&D program. This interaction is necessary to tailor and transition fleet biomedical products, to gain trust, and to fully recognize and respond to the biomedical research requirements.

Naval Health Research Center

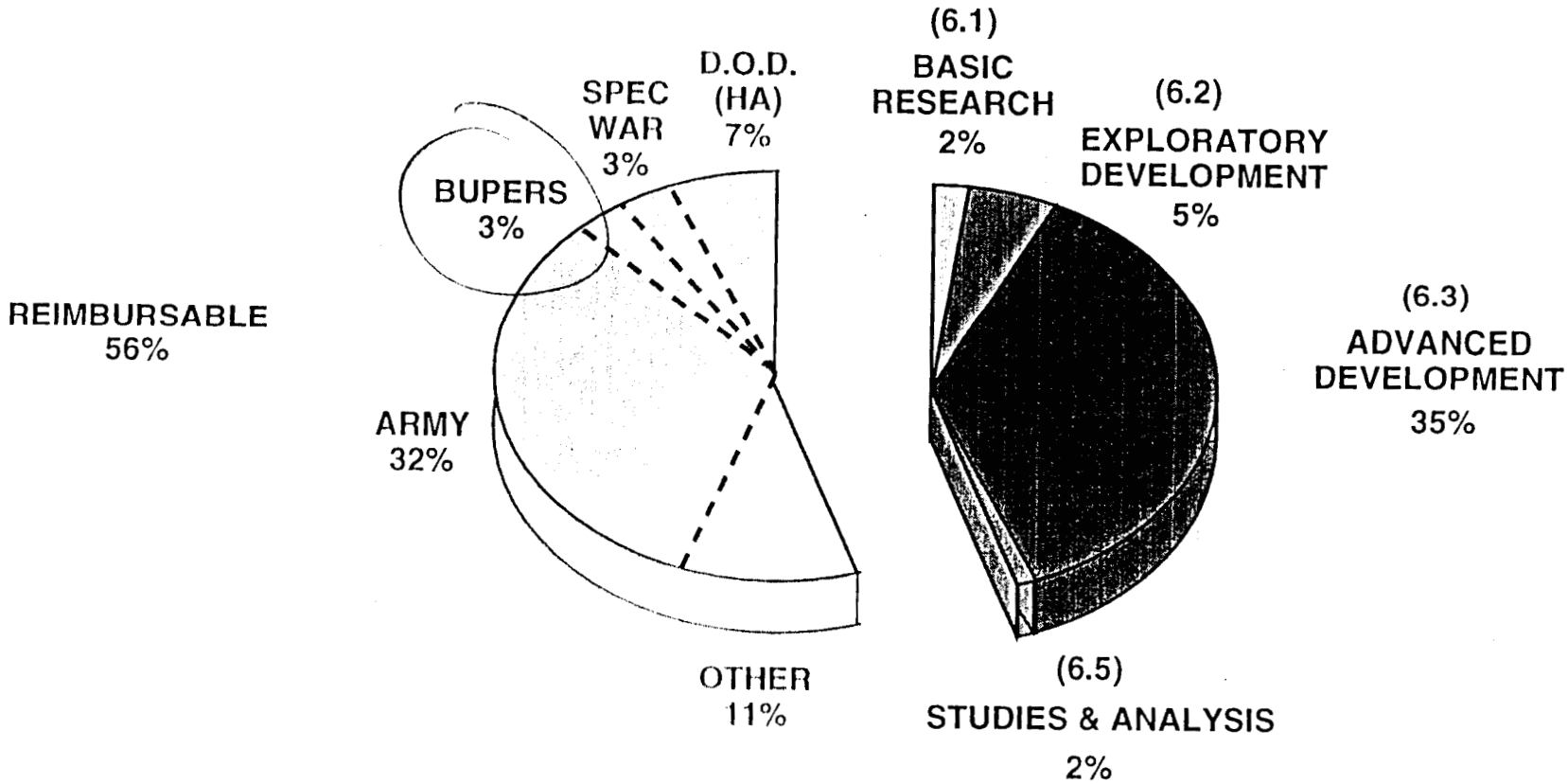
San Diego, California

To Support Fleet Readiness Through Research, Development, Testing, And Evaluation On The Biomedical And Psychological Aspects Of Navy And Marine Corps Personnel Health And Performance.

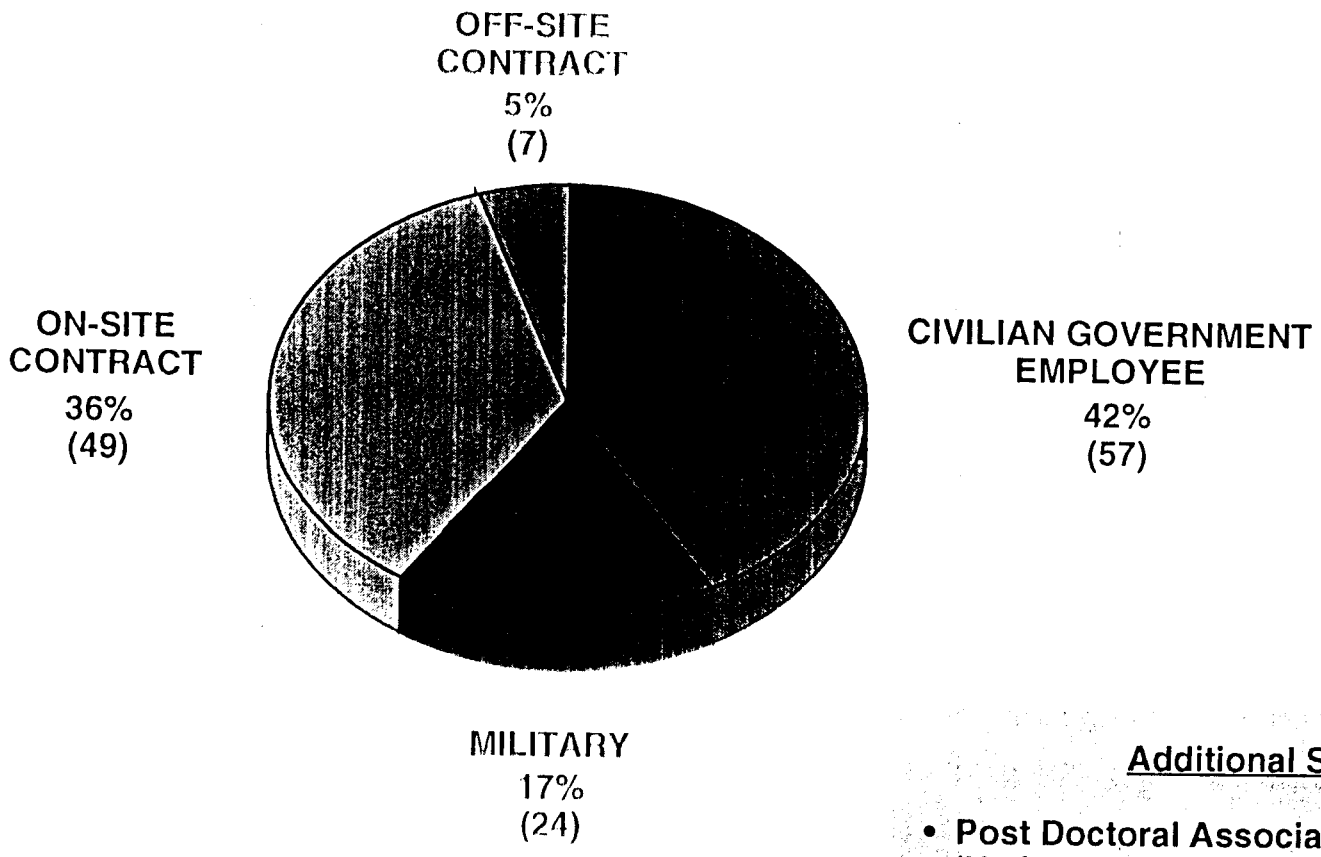
CHAIN OF COMMAND



NHRC
Total Obligated Authority



NHRC STAFFING

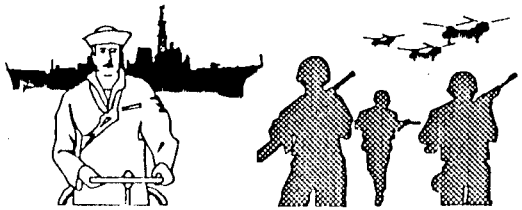


Additional Staff

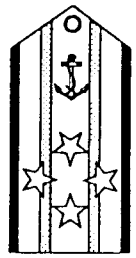
- Post Doctoral Associates (National Research Council)
- Graduate Student Assistants
- Summer Faculty
- Interagency Personnel Agreements

NHRC CUSTOMERS

OPERATIONAL FORCES

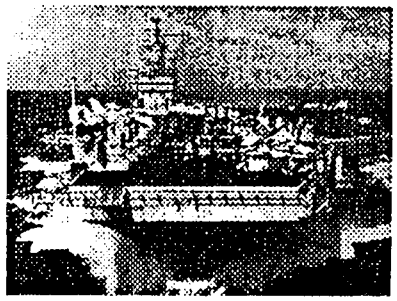


HEADQUARTERS



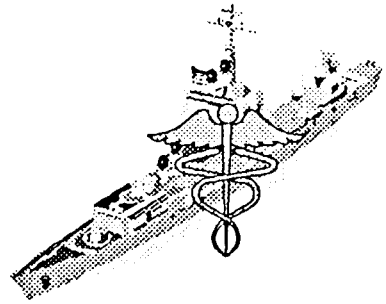
UNITED STATES NAVY
NAVAL HEALTH RESEARCH CENTER

OPERATIONAL & TRAINING COMMANDS

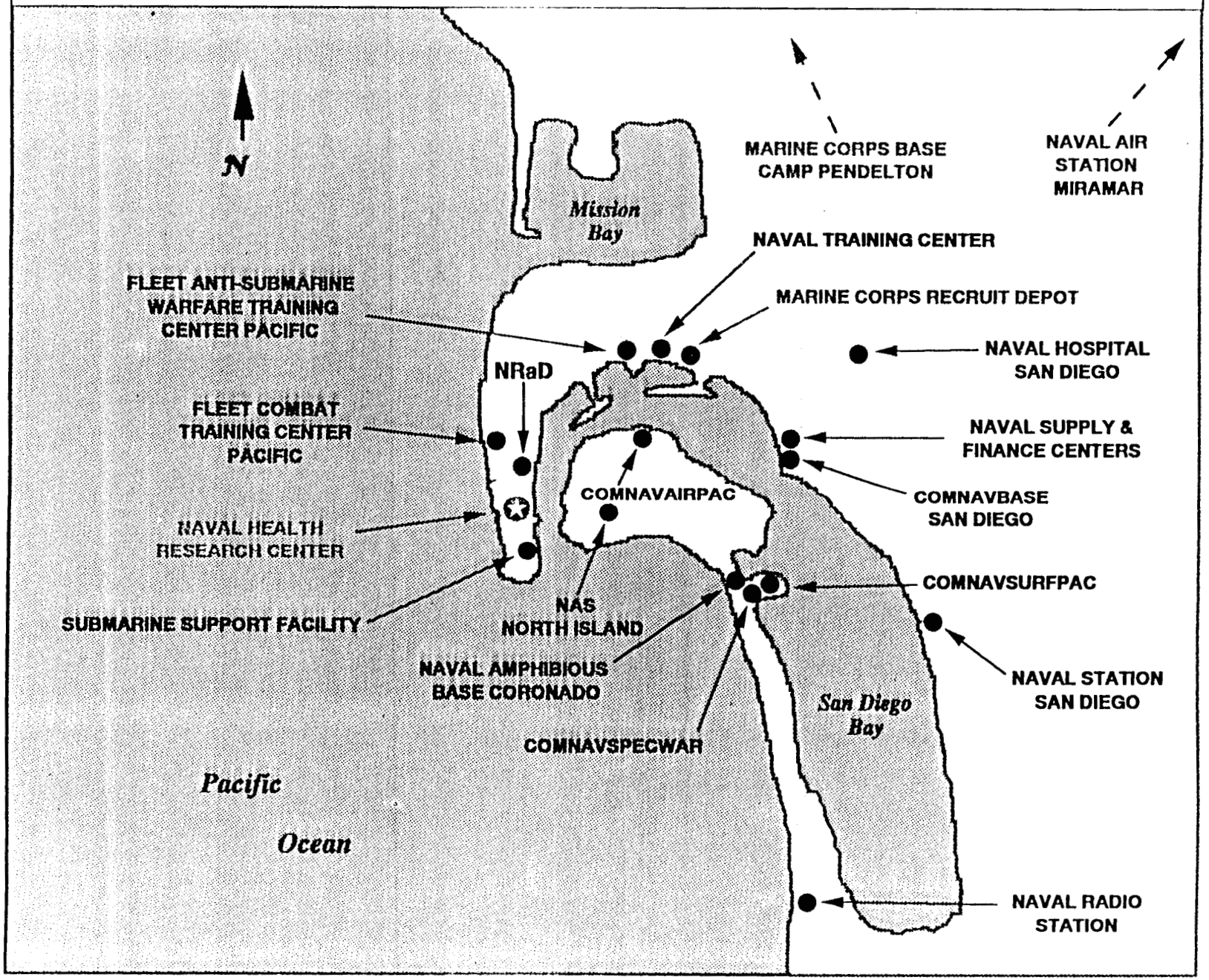


MEDICAL TREATMENT FACILITIES

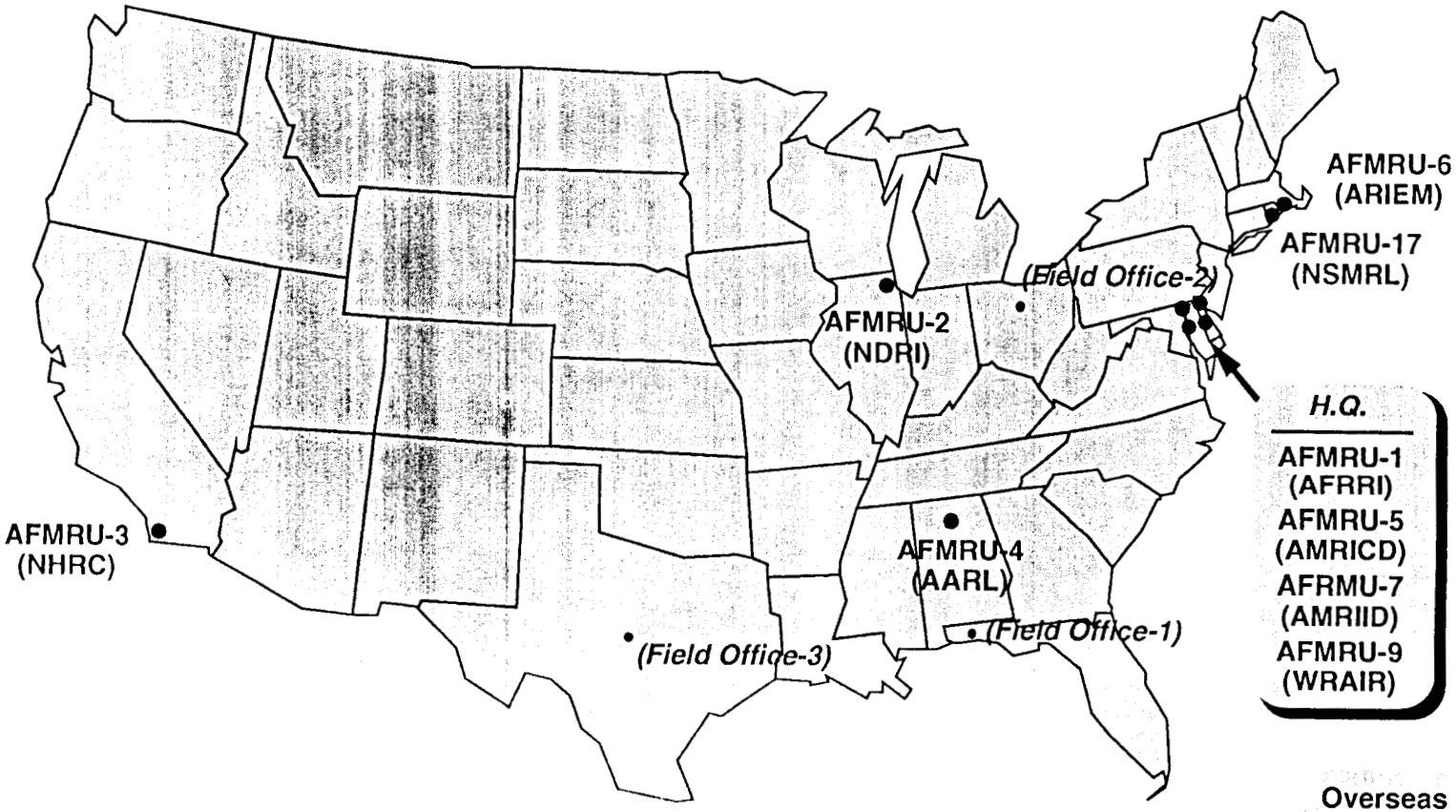
FLEET SURGEONS & FORCE MEDICAL OFFICERS



Major Naval Facilities in the San Diego Area



ARMED FORCES MEDICAL RESEARCH AND DEVELOPMENT AGENCY



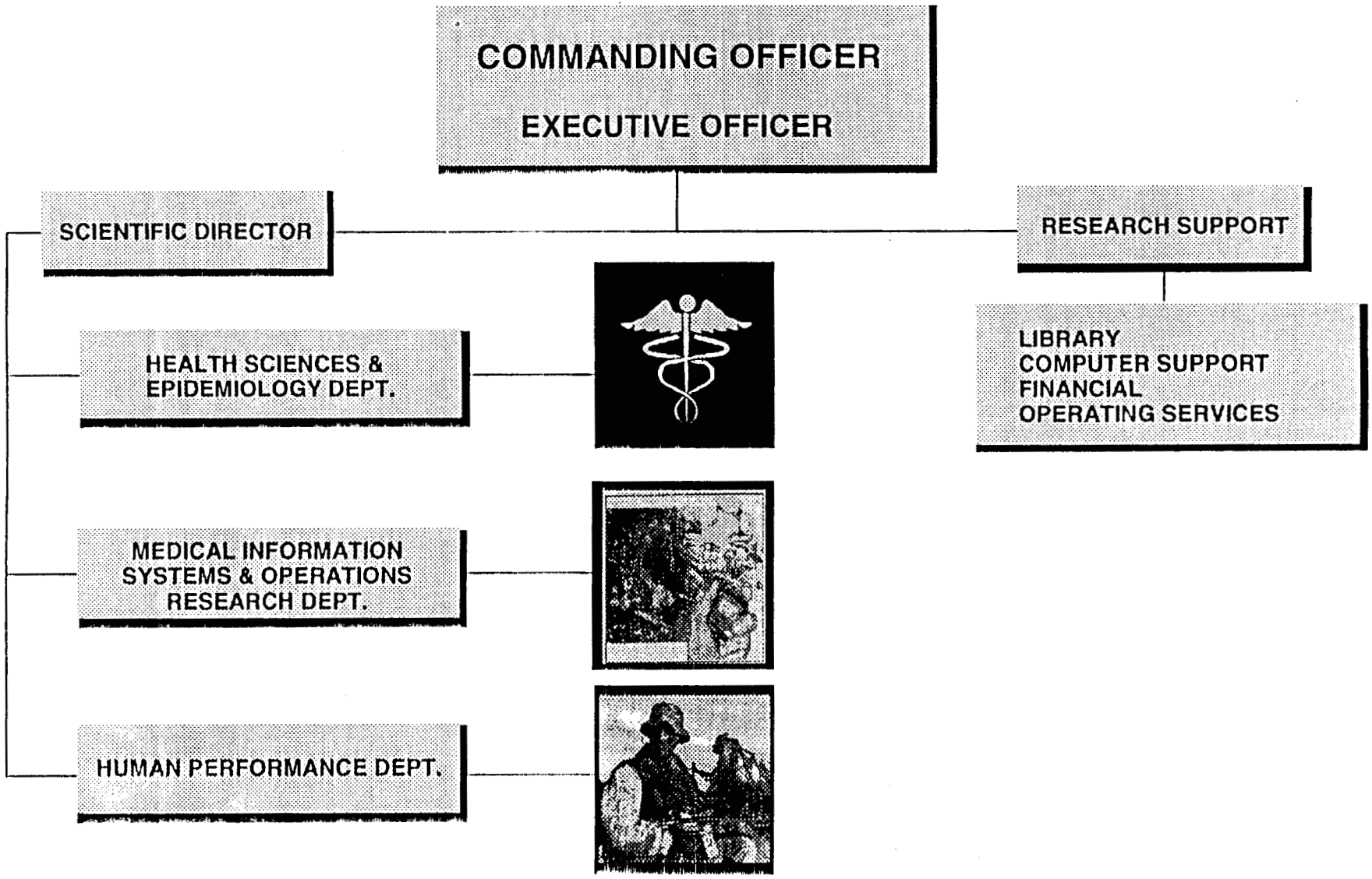
H.Q.

AFMRU-1 (AFRRI)
AFMRU-5 (AMRICD)
AFRMU-7 (AMRIID)
AFMRU-9 (WRAIR)

Overseas Labs

AFMRU-10	Jakarta
AFMRU-11	Cairo
AFMRU-12	Bangkok
AFMRU-13	Kenya
AFMRU-14	Brazil
AFMRU-15	Germany
AFMRU-16	Peru

NAVAL HEALTH RESEARCH CENTER



Health Sciences & Epidemiology

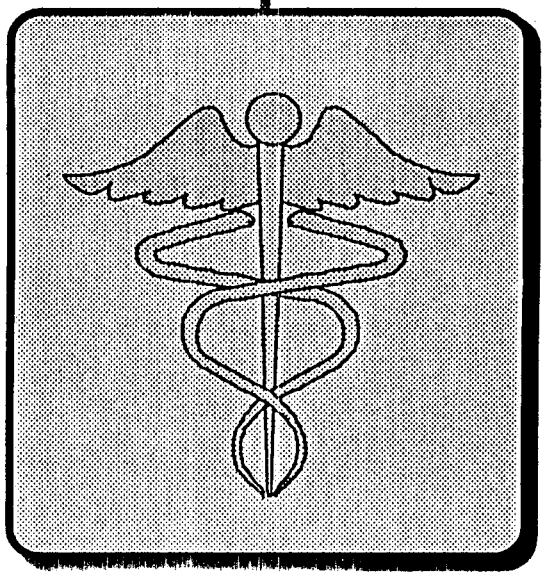
Programs

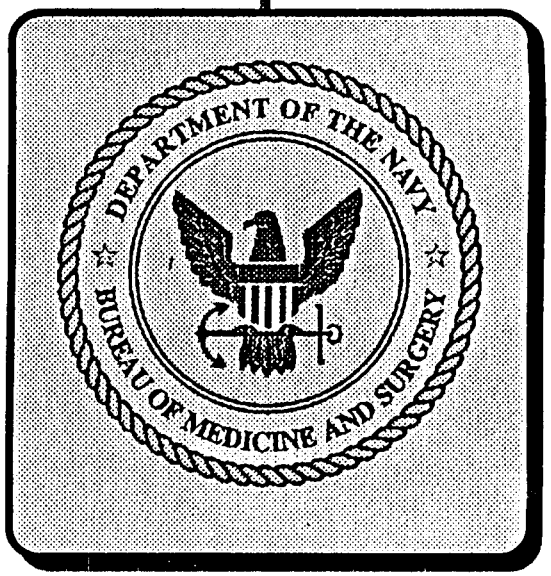
Health Promotion Evaluation

Applied Epidemiology

Medical Policy/ Decision Support

Projects





Health Sciences & Epidemiology

Programs

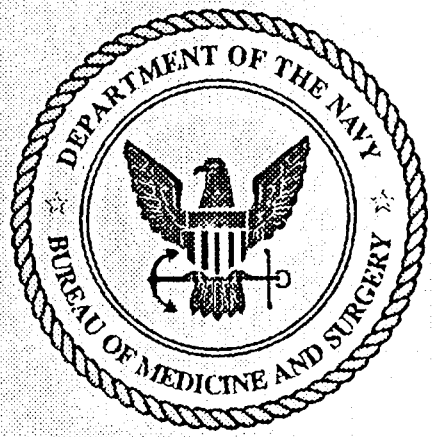
Health Promotion Evaluation

Applied Epidemiology

Medical Policy/ Decision Support

Projects

- Health Promotion/Fitness Evaluation
- Military Based Intervention for the Prevention of STD's/HIV



Health Promotion/Fitness Evaluation

PROBLEM

- Diseases of life style reduce fleet effectiveness and increase health-care costs.

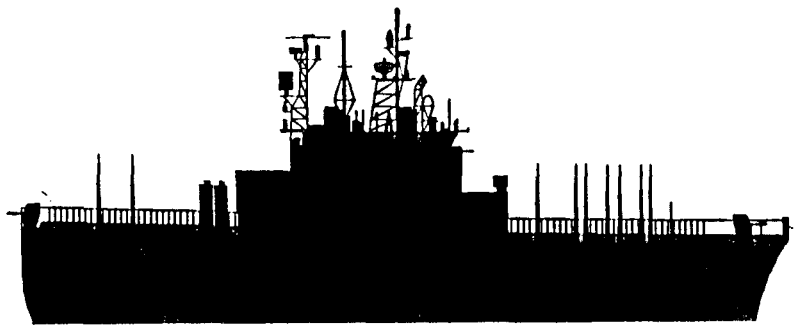
OBJECTIVE

- Develop Navy standards of physical fitness and instruments for measuring fitness and health risks.
- Determine prevalence of dysfunctional lifestyle behaviors and health risks.
  (e.g., smoking, obesity, alcohol abuse, hypertension)
- Assess relationships between life-style behaviors, fleet readiness, and health outcomes.
- Evaluate effectiveness of Navy health promotion and treatment programs.

PAYOFF

- Navywide and command-level monitoring of trends in health risks.
- Navy-specific models for predicting life-style-related health outcomes and associated costs.
- More cost-effective health promotion and treatment programs.
- Health-care cost containment.
- A healthier, fitter fighting force.

Military Based Intervention for the Prevention of STD's/HIV



PROBLEM

- Acquisition of STD's during deployment characterized by:
  - inexact incidence rates
  - poor documentation
  - STD's often asymptomatic

OBJECTIVE

- Design and test behavioral intervention for reduction of STD incidence
- Evaluate newly developed non-invasive diagnostic methods for STD's
- Provide guidelines for standardization of interventions and methods

PAYOFF

- Reduction in incidence of STD's
- Preventive measures and non-invasive diagnostics for STD's in active duty personnel on WestPac deployment
- Successful products applicable to deployed and shore-based personnel

Health Sciences & Epidemiology

Programs

Health Promotion Evaluation

Applied Epidemiology

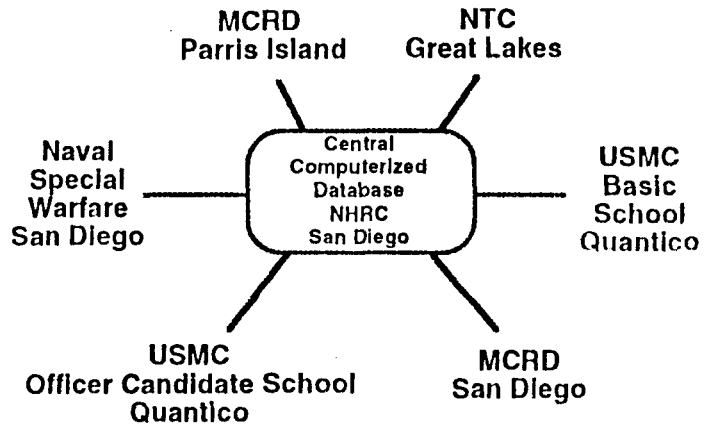
Medical Policy/ Decision Support

Projects

- Soft Tissue Injury
- HIV Central Registry and Surveillance
- Occupational Health Surveillance
- Gulf War Illness

DEPARTMENT OF THE NAVY
BUREAU OF MEDICINE AND SURGERY

Soft Tissue Injury



PROBLEM

- High rates of musculoskeletal injury resulting in:
  - substantial morbidity among military personnel
  - high fiscal cost of lost training

OBJECTIVES

- Describe ICD-9 specific rates of overuse injury
- Determine risk factors for injury and identify high risk participants
- Improve medical diagnostic, treatment, and rehabilitative procedures
- Test preventive interventions
- Reduce injuries

FINDINGS

- High Rates of Musculoskeletal (MS) Injuries:
  - 40% of male recruits at MCRD, SD
  - 60% of female Marine Officer Candidates
  - 50% of BUD/S trainees
- Impact at MCRD,SD:
  - $16 million lost to stress fractures annually
  - 53,000 lost training days to MS injury annually
- Primary Contributors to MS injury MCRD, SD:
  - poor pre-training fitness
  - rigorous training
  - footwear
- Interventions in Progress at MCRD, SD:
  - modification of basic training
  - footwear/equipment evaluation
  - maximize pre-conditioning platoon

PAYOFFS

- Baseline, research-quality database
- Injury classification
- Preventive/therapeutic interventions
- Reduction of training costs
- Reports: medical and operational

HIV Surveillance

Foreign Ports

PROBLEM

- HIV infection and AIDS are major infectious diseases that can impact on readiness and health care delivery.

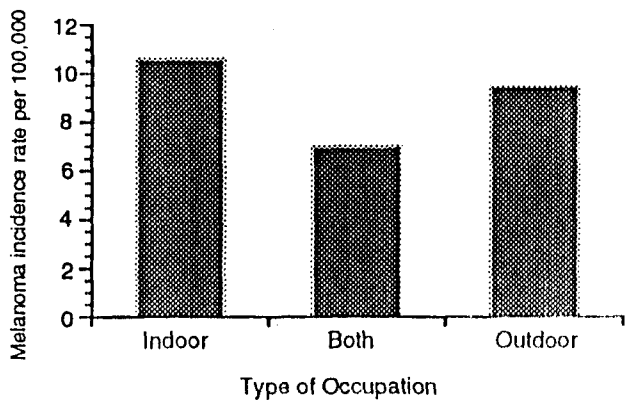
OBJECTIVE

- To develop a registry of all HIV tests.
- To monitor the HIV epidemic.
- To determine Navy-specific risk factors.

PAYOFF

- Information that can be used for assessment of the impact of HIV on Navy readiness.
- Information for developing effective prevention programs and assignment policies.
- Reduced spread of HIV infection.

Occupational Health Surveillance



PROBLEM

- Occupationally related disease and injury reduce Navy readiness and consume fiscal resources.

OBJECTIVE

- To monitor occupationally associated disease and injury in Navy and Marine Corps personnel.
- To determine risk factors for disease and injury.

PAYOFF

- Information regarding incidence and risk factors for medical decision support .
- Information for developing effective prevention programs.
- Reduced illness and injury.

Gulf War Illness

PROBLEM

Military service in the Persian Gulf War is alleged to be associated with increased unexplained morbidity.

OBJECTIVE

Comprehensive epidemiological studies in collaboration with the Department of the VA, EPA, U.S. Army and Univ. of CA at San Diego

- 7 major studies involving military populations from 2,000 to 1.2 million
- Data regarding symptoms, hospitalizations, psychological profiles, birth defects collected and analyzed

PAYOFF

Preliminary results:

- No difference in major birth defects among babies born to Gulf War veterans and era controls (1991-1992)
- No excess in hospitalizations for Cancer, Infectious Disease, Respiratory Disease or Disease of the Skin and Subcutaneous Tissue
- Greater number of self-reported symptoms among Gulf War veterans

Health Sciences & Epidemiology

Programs

Health Promotion Evaluation

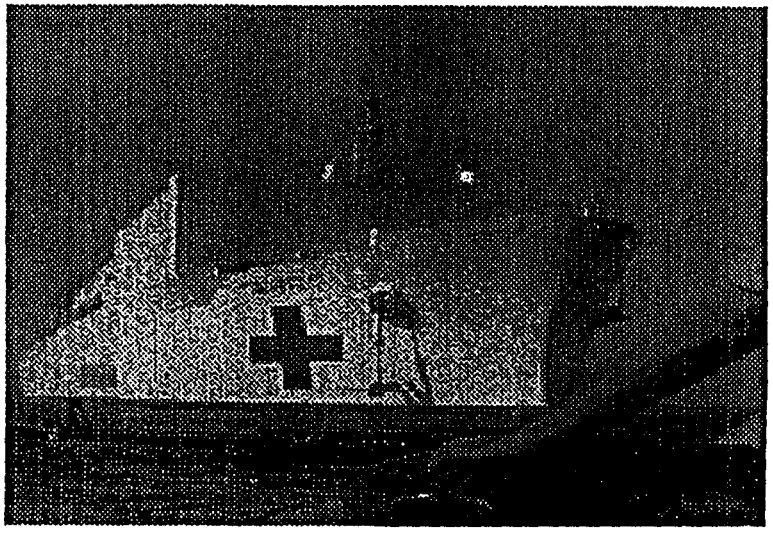
Applied Epidemiology

Medical Policy/ Decision Support

Projects

- Desert Storm Medical Policy Evaluation
- Adverse Reproductive Outcomes

Desert Storm Medical Policy Evaluation



PROBLEM

- Navy Medicine requires information to evaluate the Total Force Policy in the Gulf War.
- Large-scale recall may dramatically impact reservist retention.

OBJECTIVE

- Assess major issues associated with Operations Desert Shield/Storm by Navy medical personnel.
- Assess major issues associated with the recall process by Navy medical reservists.

PAYOFF

- Empirical support for improvement in:
  - leadership
  - logistics
  - administration
  - active-duty relations
- Developed reliable retention estimates which allayed concerns of accelerated attrition from the reserves.

Adverse Reproductive Outcomes

PROBLEM

Navy women may be at higher risk for adverse reproductive outcomes

OBJECTIVE

Determine the occurrence of adverse reproductive outcomes in enlisted Navy women 1982-1992

- maternal death
- late fetal death
- spontaneous abortion
- ectopic pregnancy

PAYOFF

- 33,413 pregnancy-related hospitalizations
- No maternal deaths
- Pregnancies distributed as follows:
  - 86% live births
  - .8% late fetal deaths (≥ 22 weeks)
  - 9.9% spontaneous abortions
  - 2.7% ectopic pregnancy
  - .6% other early fetal loss
- Lower paygrades had disproportionally higher rates of ectopic and spontaneous abortions
- Occupational ratings and types of duty (ship/shore) at time of conception had no impact on pregnancy outcome
- Expand database to include Marine Corps /Navy officers 1993
- Survey is under way to assess risk factors

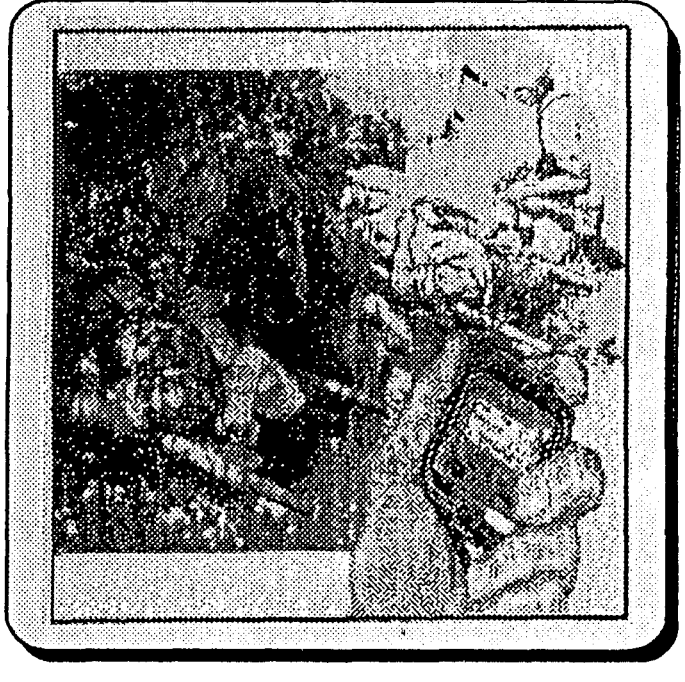
Medical Information Systems & Operations Research

Programs

Operations Research

Projects

Medical Informatics



Medical Information Systems & Operations Research

Programs

Operations Research

Projects

- Disease Non-Battle Injury/ Battle Injury Projections
- Mishap Cost Reduction and NAVOSH Quality Assessment Model
- An Interactive Epidemiological System

Medical Informatics

Disease and Non-Battle Injury / Battle Injury Projections

PROBLEM

- Accurate estimates of DNBI and Battle Injury rates are needed for the total patient load projections used in medical planning modules.

OBJECTIVE

- Develop databases of DNBI and BI information.
- Compute DNBI and BI rates of incidence.
- Develop automated query system to project rates for various operational scenarios.

PAYOFF

- A model to predict DNBI and Battle Injury rates for populations identified by branch of service, geographic region, and level of combat.
- Developed the DNBI and casualty rates used for Navy medical resource and manpower planning.

Mishap Cost Reduction and NAVOSH Quality Assessment Model

PROBLEM

- A method is needed to contain the costs resulting from occupational illnesses and injuries.

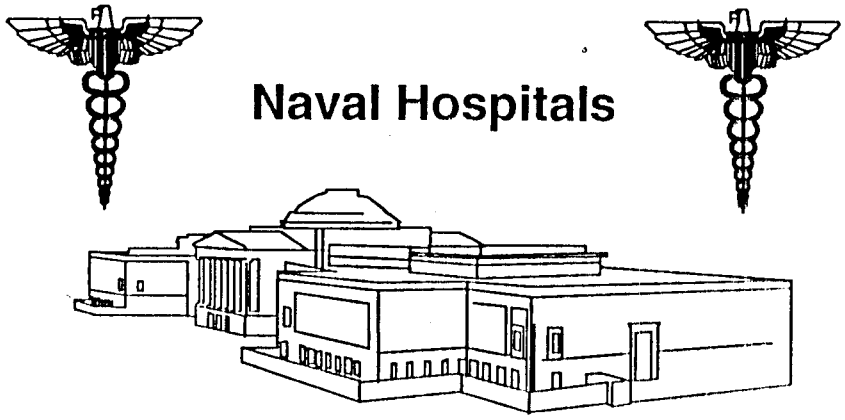
OBJECTIVE

- Develop a model for Occupational Safety and Health that will facilitate continuous process improvement leading to a reduction in work-related injuries and illnesses.
- Identify for facility managers, safety officers, and health personnel, intervention strategies designed to optimize work, health, and safety.

PAYOFF

- A model that allows the effect of interventions on health and safety outcomes at Navy industrial facilities to be predicted.

An Interactive Epidemiological System (EPISYS)



PROBLEM

- Methods are needed to allow the incidence of illnesses and injuries to be rapidly determined for Navy populations.

OBJECTIVE

- Detect medical events and evaluate trends.
- Project morbidity rates in Navy populations.
- Determine sampling requirements for epidemiological analyses.

PAYOFF

- EPISYS - An interactive system for detecting new trends for illness and injury in the Navy, determining the specific subpopulations affected, and assessing the magnitude of the difference between groups.

Medical Information Systems & Operations Research

Programs

Operations Research

Projects

Medical Informatics

- Improved Methods for Wartime Health Care Documentation
- Computer Assisted Medical Diagnosis
- Hazardous Material Life-Cycle Cost Model

Improved Methods of Documentation at Forward Medical Treatment Facilities

PROBLEM

- Manual documentation of medical data is time consuming and frequently lacks critical information

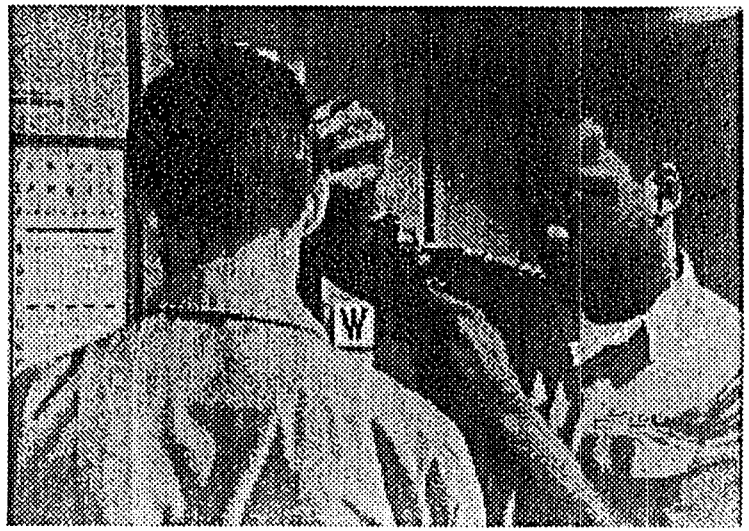
OBJECTIVE

- Develop automated documentation methods to ensure continuity of care at forward medical treatment facilities

PAYOFF

- Developed hand-held device (MEDTAG) to document echelon 1 data
  - structured prompting sequence with two-button data entry
  - intuitive data entry interface
  - automatic time/date stamp
  - backlit display
  - MARC card read/write capability
  - exceeds FMC data documentation requirements
  - more data gathered more accurately in less time
  - Patent Serial # 08/277,802 Navy Case 75,092
- Developed portable electronic tablet (MEDTAB) to document echelon 2 data
  - touchscreen data entry
  - context specific data entry forms
  - automatic patient tracking
  - automatically updated status boards
  - generates medical regulating reports
  - fewer patient tracking errors
  - reduced personnel requirements
  - interfaces with MEDTAG via MARC card

Computer Assisted Medical Diagnosis



PROBLEM

- Inaccurate diagnoses may lead to the evacuation of patients that are not seriously ill or to the failure to evacuate patients that need more definitive care.

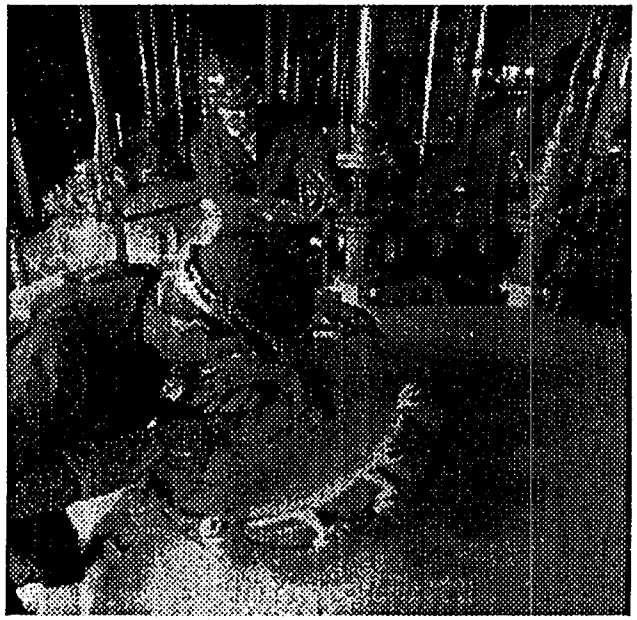
OBJECTIVE

- Develop a software shell to implement diverse medical treatment algorithms.
- Compare the performance of different types of diagnostic algorithms.

PAYOFF

- Developed diagnostic module that interfaces with the Shipboard Medical System (SAMS).

Hazardous Material Life-Cycle Cost Model



PROBLEM

- A method is needed to combine all the costs resulting from the need to protect workers' health and safety with procurement costs to determine the total cost of using a hazardous material in the workplace.

OBJECTIVE

- Identify and measure the factors contributing to the cost of using a hazardous material.
- Design and develop a system that will accumulate costs throughout the life-cycle of a hazardous material to yield a total cost.

PAYOFF

- A computer program that computes the life-cycle costs for a hazardous material.

Human Performance

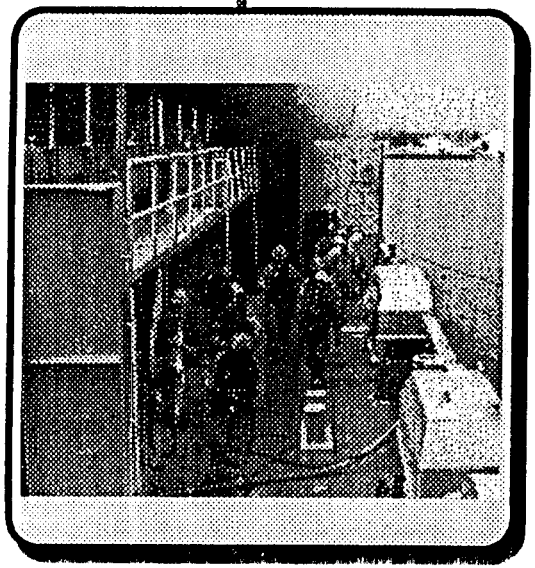
Programs

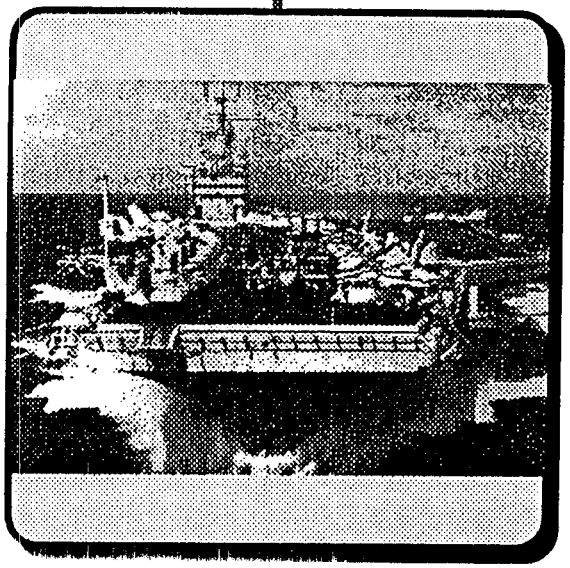
Applied Physiology

Continuous Operations

Special Operations

Projects





Human Performance

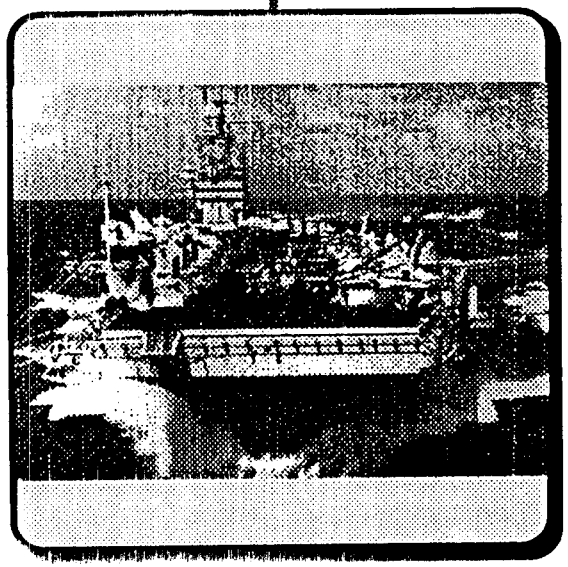
Programs

Applied Physiology

Projects

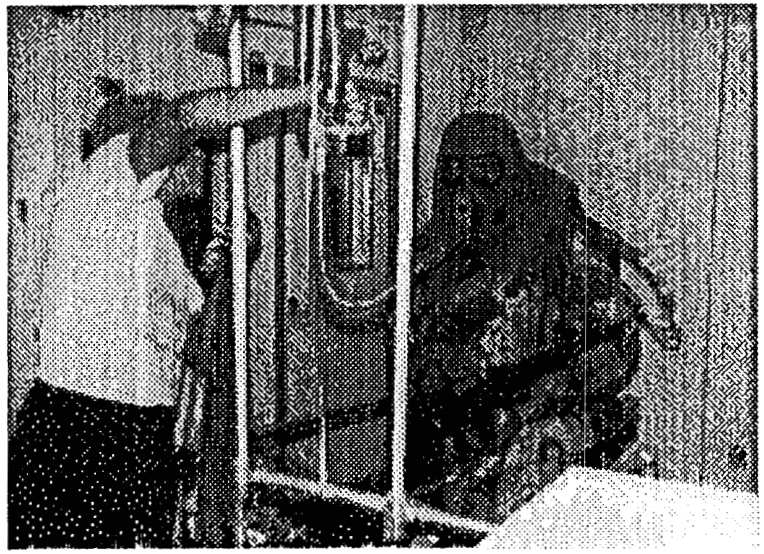
- Microclimate Cooling
- Head and Neck Strain in Combat Aviators
- Cold-related Combat Performance Decrements
- Occupational Physical Fitness Standards
- Damage Control Operations in Protective Overgarments

Continuous Operations



Special Operations

Microclimate Cooling



PROBLEM

- High heat thermal environments and use of protective overgarments (e.g., CBR-D) pose threat of heat illness.

OBJECTIVE

- Develop gender specific PHEL curves.
- Evaluate different CBR-D garments and heat strain countermeasures.
- Develop work/rest guidelines for CBR-D.

PAYOFF

- Increase stay time in machinery spaces.
- Prevent human performance degradation.
- Reduce incidence of heat illness and lost man-days.

Head and Neck Strain in Combat Aviators

PROBLEM

- Combat aviators are subjected to *G*-forces that can result in neck and back injury.
- Helmets and night vision equipment can increase the onset of muscle fatigue.

OBJECTIVE

- Quantify neck and back muscle fatigue/injury during *G*-maneuvers in combat aviators (males and females).
- Evaluate influence of various helmets for predisposing neck injury.
- Develop an effective strength training program to minimize neck and back fatigue.

PAYOFF

- Specific exercise countermeasures to reduce muscle injury.
- Reduce incidence of neck and back fatigue/injury.

Cold-related Combat Performance Decrements

PROBLEM

- Cold induced injuries and hypothermia degrade combat effectiveness.

OBJECTIVE

- Develop empirical models to predict human performance degradation in cold weather operations.

PAYOFF

- Exposure guidelines for flight deck personnel in cold weather.
- Better field rewarming devices.
- Fluid hydration guidelines for Marines in cold/high altitude environments.

Occupational Physical Fitness Standards

PROBLEM

- Current physical readiness standards are not related to performance of Navy jobs.
- Individuals who are not adequately physically fit may fail to perform critical tasks in times of combat.

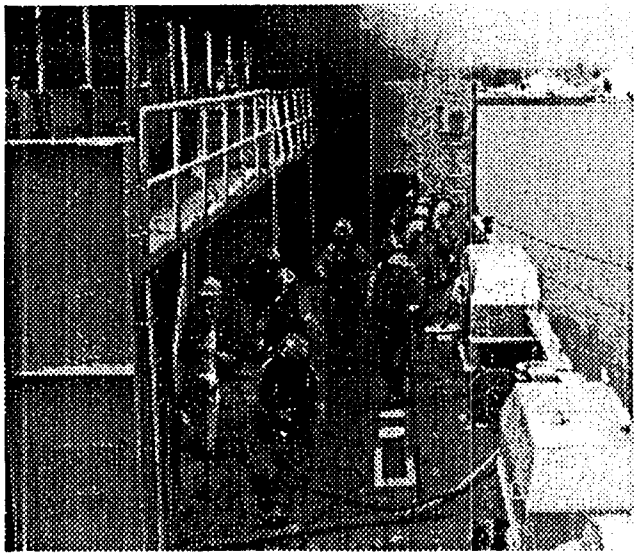
OBJECTIVE

- Determine physical fitness requirements for Explosive Ordinance Disposal divers.
- Determine physical fitness requirements for emergency shipboard tasks.

PAYOFF

- Physical fitness standards for critical jobs.
- Enhanced shipboard survivability.

Damage Control Operations in Protective Overgarments



PROBLEM

- High incidence of heat strain and illness during simulated fire training aboard naval ships.

OBJECTIVE

- Determine cooling requirements for fire fighters.
- Evaluate different heat strain countermeasures.
- Develop work/rest guidelines for cbr-d and fire fighting ensembles.

PAYOFF

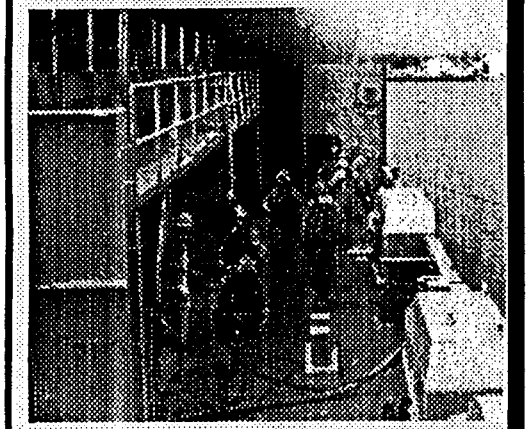
- Reduce incidence of heat illness during training and in live fire fighting.
- Increase stay time in fire compartment to put out fires.
- Increase cooling rate and reduce recovery time during fire hose team transition

Human Performance

Programs

Applied Physiology

Projects

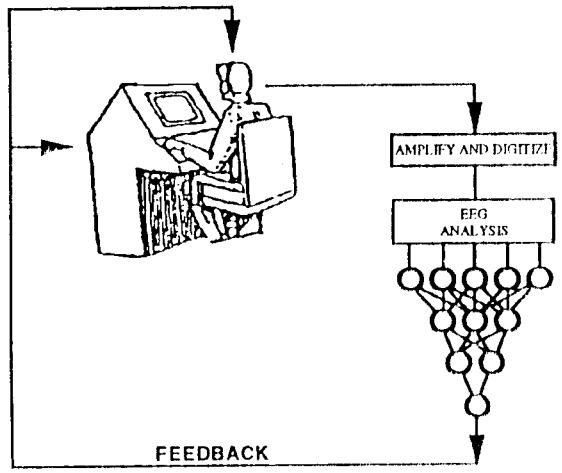


Continuous Operations

- Alertness Monitoring/ Management
- Circadian Rhythm Effects In Continuous Operations

Special Operations

Alertness Monitoring/Management



PROBLEM

- Man-machine system errors associated with operator:
  - Loss of alertness
  - Inattentiveness

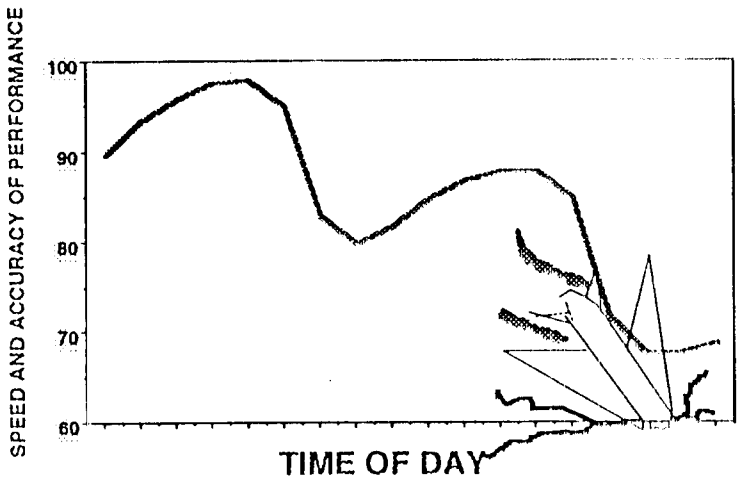
OBJECTIVE

- Refine methods of using EEG to monitor operators.
- Design feedback systems to reduce error rates.

PAYOFF

- Psychophysiological technologies for:
  - using feedback to reduce error rates
  - improving operator training
  - improving man-machine system designs

Circadian Rhythm Effects in Continuous Operations



PROBLEM

- Maintain operational effectiveness during nighttime/continuous military operations.

OBJECTIVE

- Intervention to minimize circadian rhythm/sleep loss effects on performance.

PAYOFF

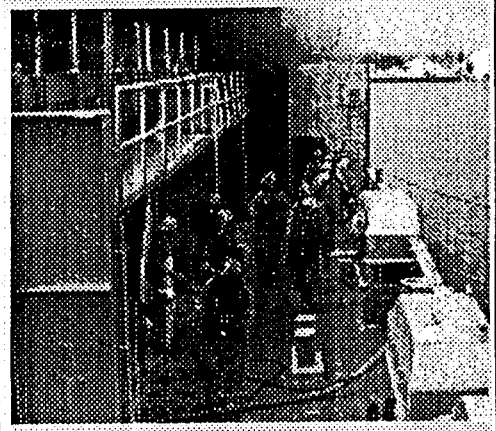
- Minimize performance degradation.
- Safe and effective pharmacological agents.
- Performance forecasting models.

Human Performance

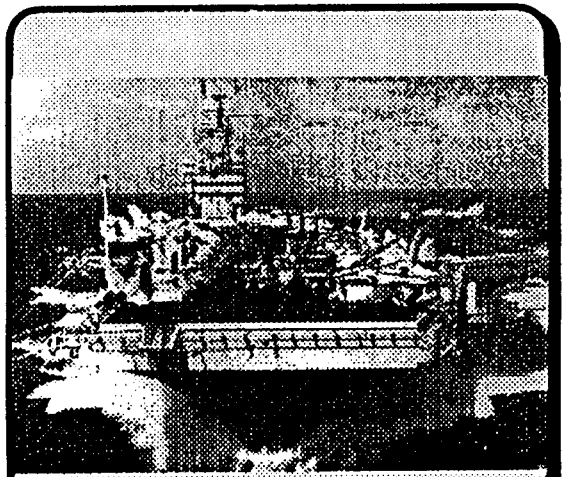
Programs

Applied Physiology

Projects



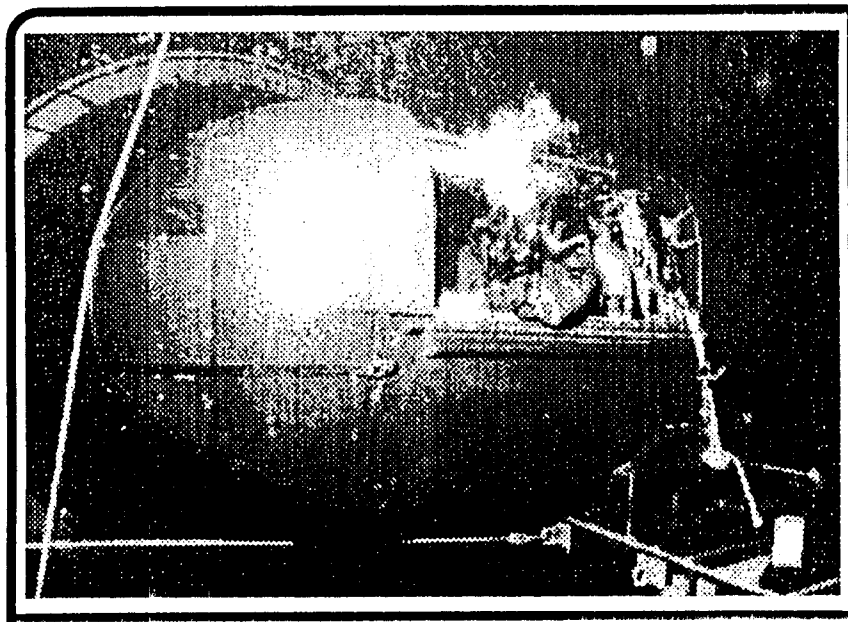
Continuous Operations



Special Operations

- SDV Operator Performance
- Enhancement Methodologies for Special Operations Personnel
- Enhanced Visual Acuity/PRK

SDV Operator Performance



PROBLEM

- Performance degradation during cold water missions is not quantified
- No formal operator proficiency and readiness standards

OBJECTIVE

- Identify problems areas and quantify performance decrements of SDV operators
- Develop performance enhancement strategies and guidelines

PAYOFF

- Enhanced mission planning for targets in cold waters
- Improved training and operator readiness
- Enhanced long-range strategic plans

Enhancement Methodologies for Special Operations Personnel

PROBLEM

- Performance decrements
- Need for effective biomedical countermeasures

OBJECTIVE

- Apply biomedical and exercise science techniques to Special Operations personnel

PAYOFF

- Biomedical and Psychological Screening of Trainees
  - reduced voluntary attrition
  - refined biomarkers to predict overuse injuries
- Modified Training Programs
  - decreased muscle damage and soreness (eccentric training)
  - decreased injuries
- Carbohydrate (CHO) Loading
  - increased endurance time by 10%
  - peak muscle glycogen persisted for > 3 days
- Glucose Polymer Beverages
  - increased CHO intake by 100%
  - increased muscle glycogen
- Compendium of Ergogenic Aids

Enhanced Visual Acuity /Photorefractive Keratectomy (PRK)

PROBLEM

- Decreased performance and safety of myopic personnel in operational environments
- Disqualification of highly trained specialists
- Indefinite patient care requirements and costs

OBJECTIVE

- Determine efficacy of PRK to improve vision and rifle firing accuracy of military personnel
- Document benefits and potential adverse side effects of PRK
- Reduced patient care requirements and costs

PAYOFF

- Uncorrected visual acuity of myopic personnel (20/200) becomes (20/20)
- Elimination of handicaps associated with corrective lenses in operational environments
- Retention of highly qualified personnel
- Reduced long term medical care and costs

HOW TO CONTACT NHRC

Address:	P.O. Box 85122 San Diego, CA 92186-5122
Telephone:	Com: (619) 553-8400 DSN: 553-8400
Fax:	(619) 553-9389
E-Mail:	DDN%"*name*@VAX309.NHRC.NAVY.MIL"
Msg PLAD:	NAVHLTHRSCHCEN SAN DIEGO CA

Document Separator

ISE East

Naval Command, Control and Ocean Surveillance Center
NCCOSC
EAST
In-Service Engineering

Division

COMMAND BRIEF

February 1995

Commanding Officer: Capt. Terry Lengerich

Executive Director: Mr. Don Bailey

NCCOSC In-Service Engineering East Coast Division

We are an engineering division of the

Naval Command, Control and Ocean Surveillance Center (NCCOSC)

reporting to the

Space and Naval Warfare Systems Command (SPAWAR)

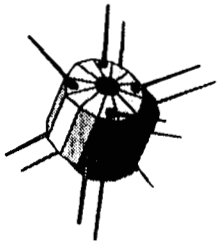
Excellence Through Teamwork

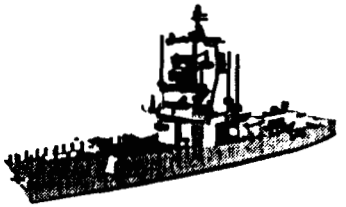
OUR MISSION

NCCOSC **is the Navy's full spectrum research, development, test and evaluation, engineering and fleet support center for command control and communications and ocean surveillance and the integration of those systems which overarch multiplatforms.**

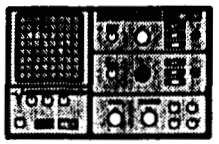
OUR PRODUCTS

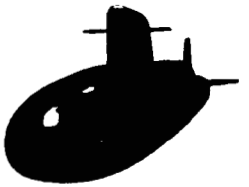
"Smart Buyers"; Technical Advice and Oversight

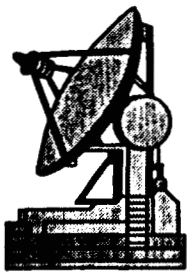




- Engineering studies & analysis
- Procurements & procurement specifications
- Install, upgrade, modify, & restore hardware & software
- Engineering support for acquisition testing
- Logistics requirements, plans & interim support
- Program-project support, execution & budgeting
- Training requirements, plans, materials & courses
- On-site engineering support & operations







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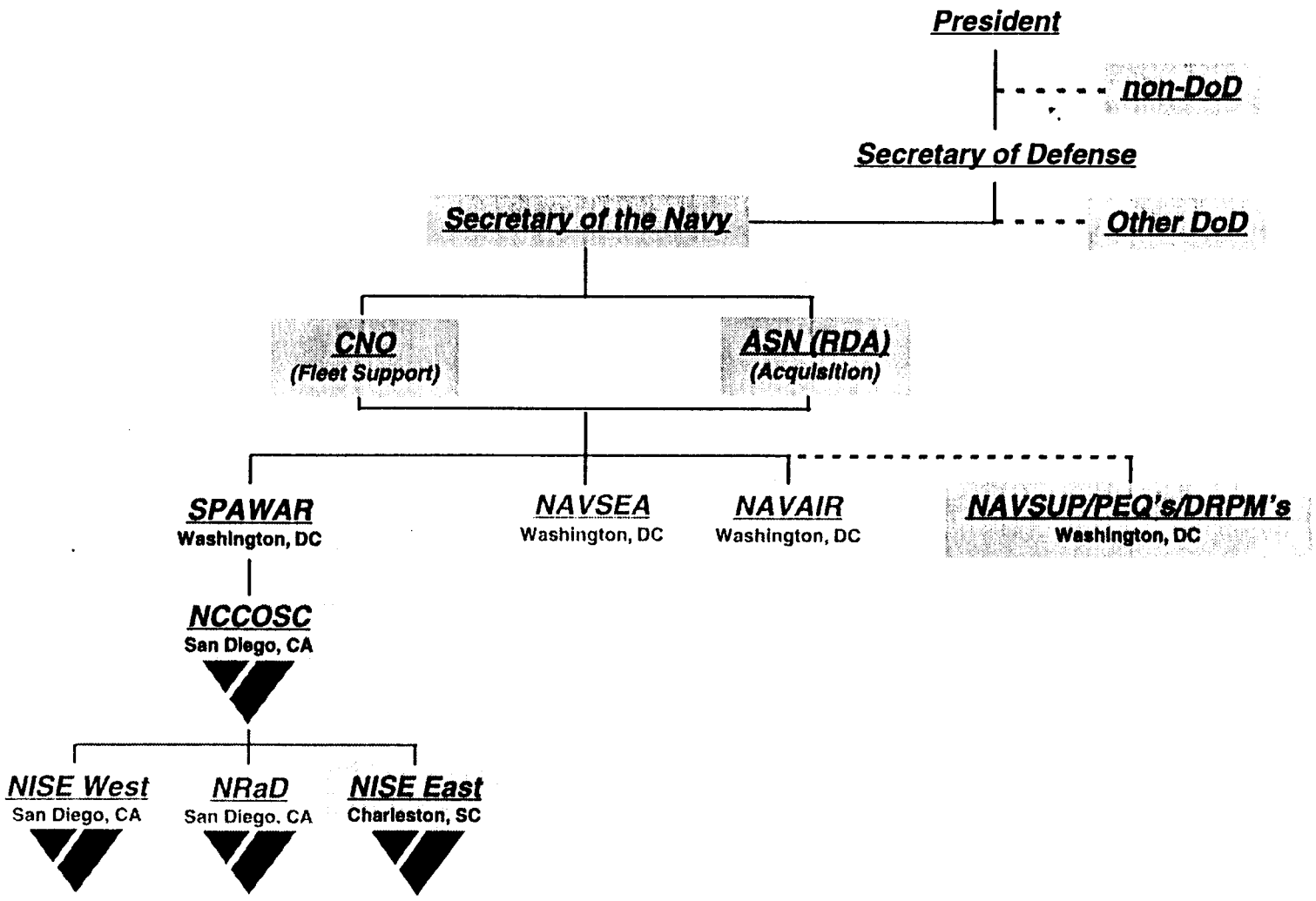
CHAIN of COMMAND



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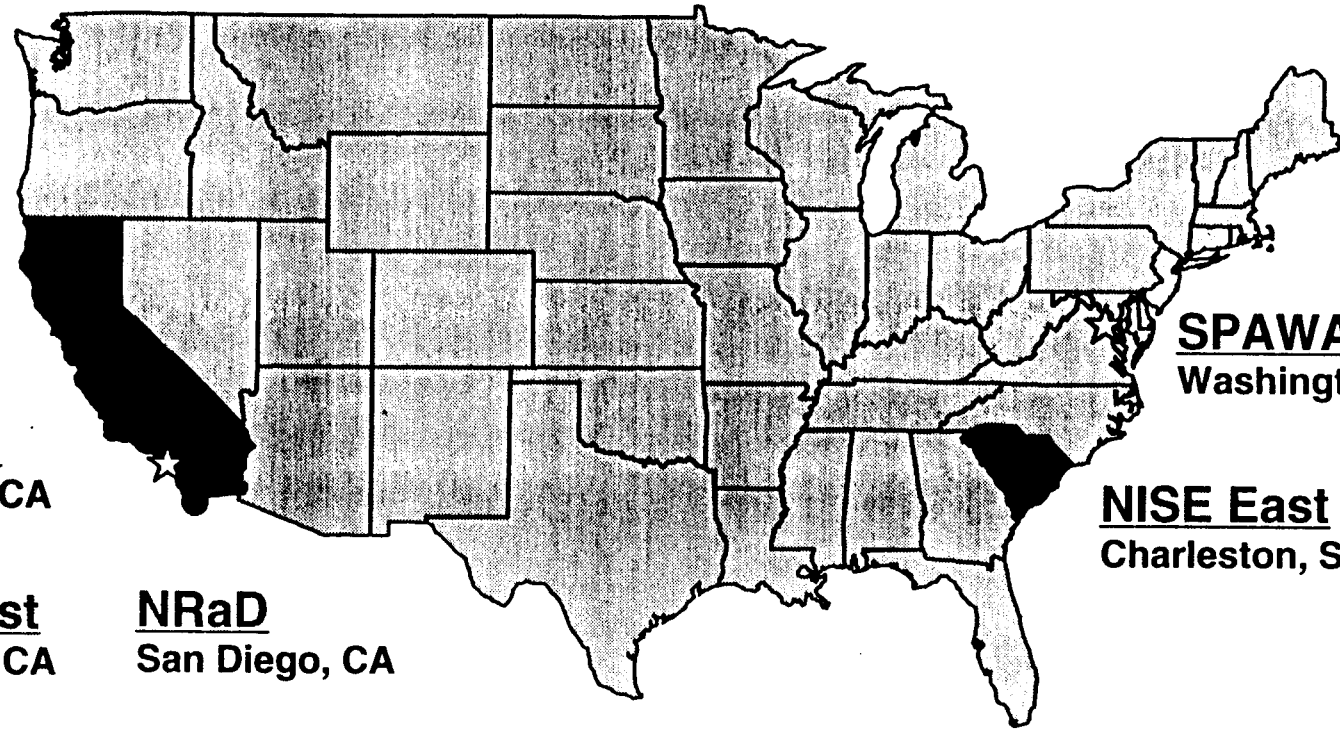
SPAWAR Command Locations



SPAWAR
Washington, DC

NISE East
Charleston, SC

NCCOSC
San Diego, CA

NISE West
San Diego, CA

NRaD
San Diego, CA

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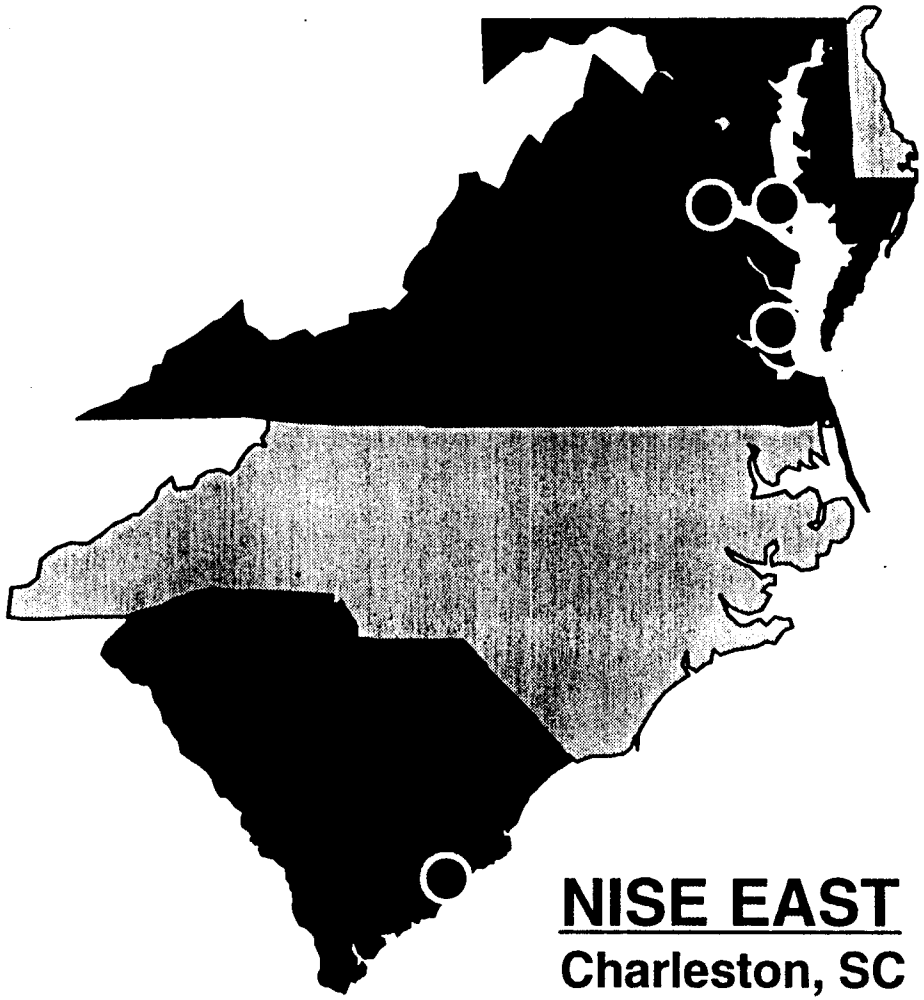
NCCOSC In-Service Engineering East Coast Division



DETACHMENTS

Washington, DC
St. Inigoes, MD
Norfolk, VA

NISE EAST
Charleston, SC

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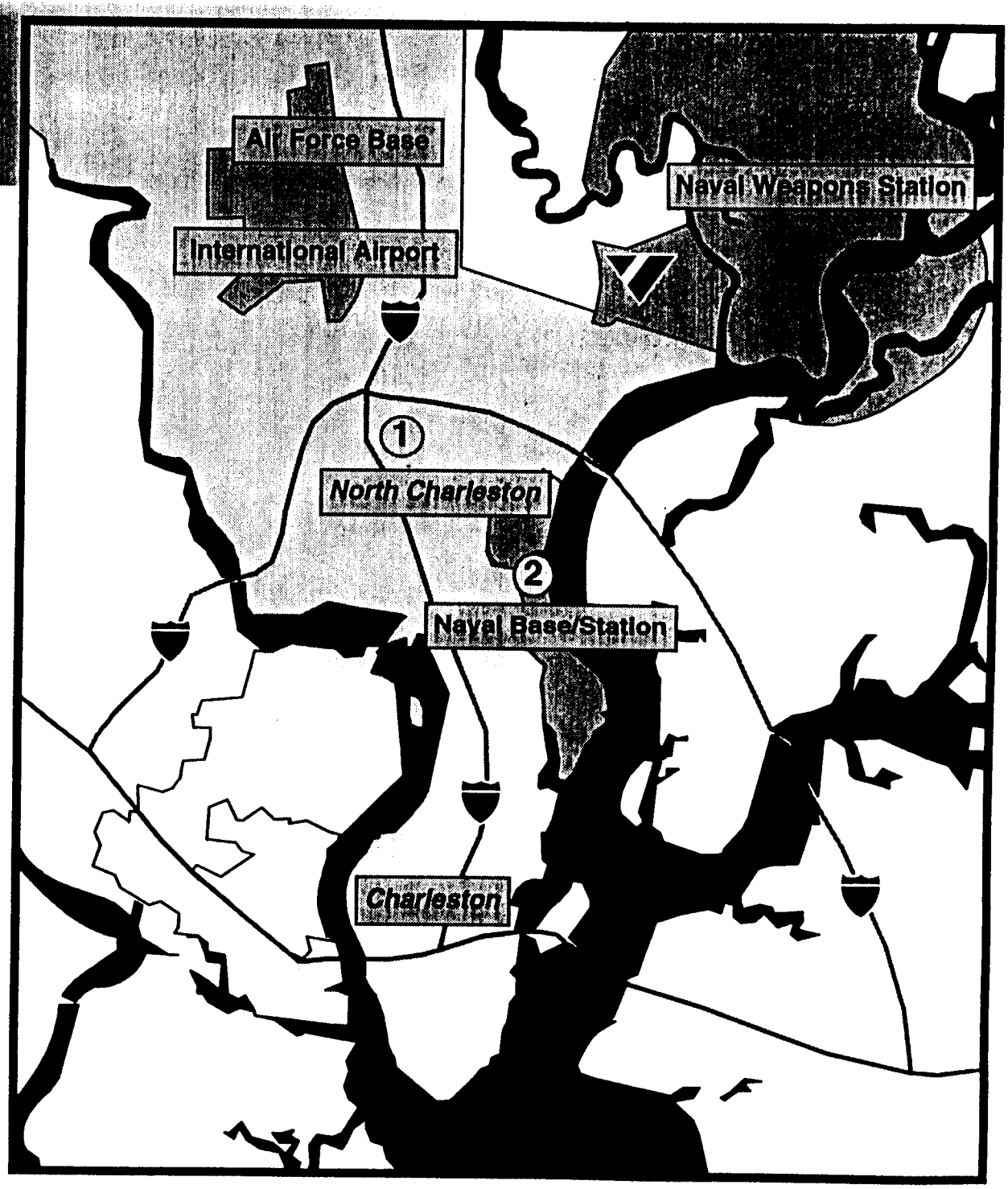
NISE EAST

Charleston Location

Headquarters

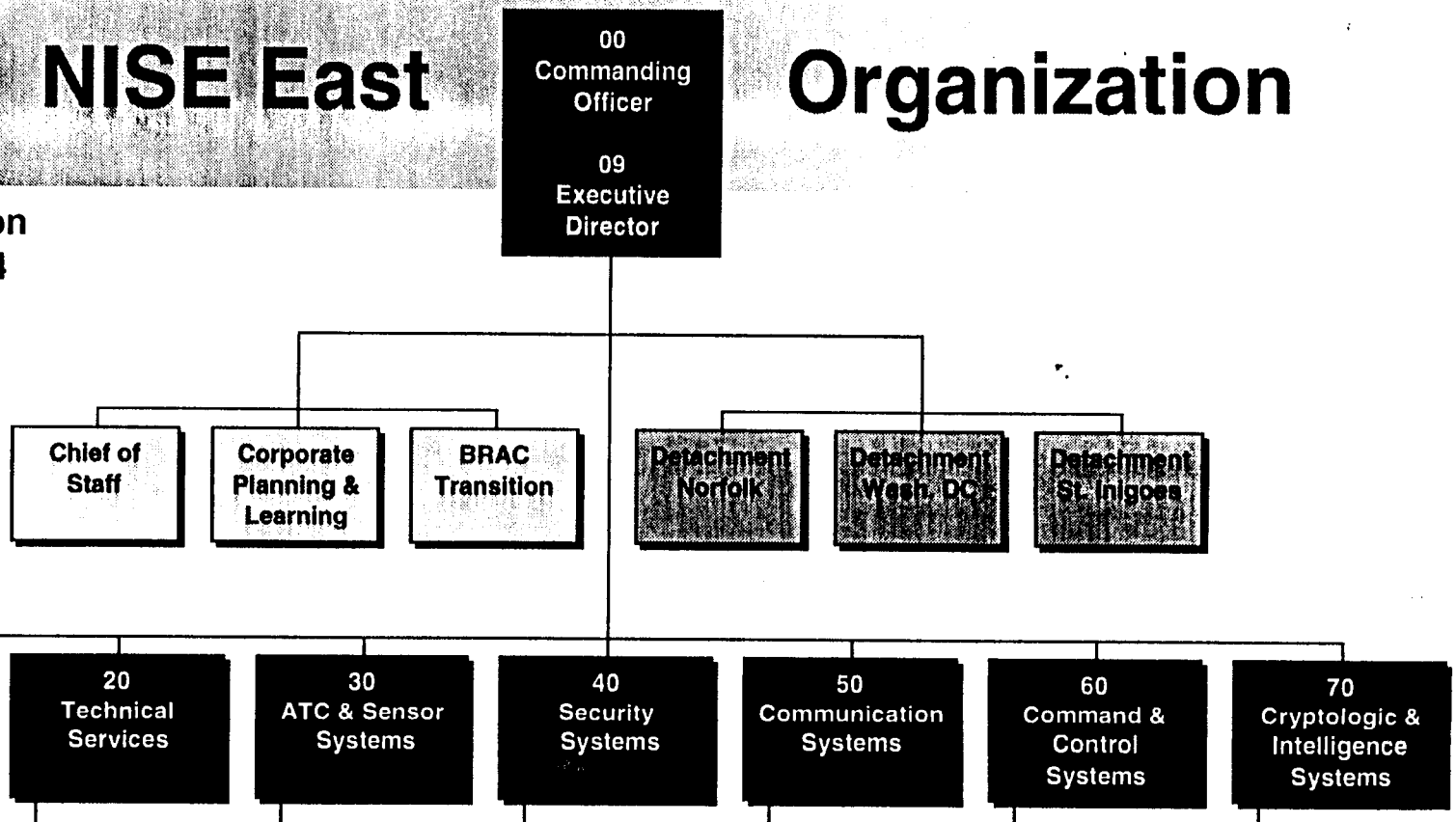
① Marriott & Summit Buildings

② Modular Maintenance Facility



NISE East Organization

Personnel by location
DCPDS: 23 DEC 94
TOTAL: 1205



	10 Business Services	20 Technical Services	30 ATC & Sensor Systems	40 Security Systems	50 Communication Systems	60 Command & Control Systems	70 Cryptologic & Intelligence Systems
C	76	252	89	81	117	1	71
N	49	37	12	2	138	79	27
S	2	10	20	0	0	44	0
W	4	5	0	66	1	0	22
	131	304	121	149	256	124	120
	(NUWC)		(33)		(22)	(11)	

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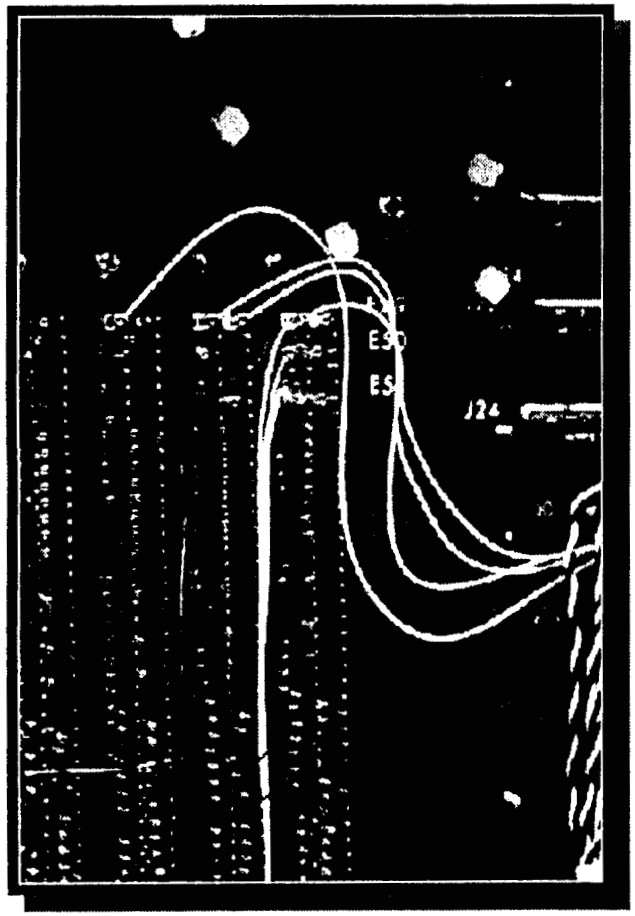
BUSINESS SERVICES

- Contracting
- Finance
- Material Management
- Personnel
- Administrative Services

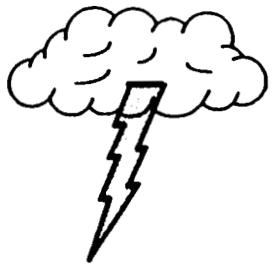
TECHNICAL SERVICES



- Corporate information management system
- Technical documentation services
- Electromagnetic effects analysis
- Environmental effects testing
- Mechanical fabrication, modular maintenance and calibration
- Corporate Video Teleconferencing

AIR TRAFFIC CONTROL (ATC) and SENSOR SYSTEMS

- Radar, radio communications, and data display systems
- Radiation detection, indication and computation (RADIAC) program
- Video assessment and surveillance systems
- Navigational systems
- Meteorologic sensor and display systems



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SECURITY SYSTEMS

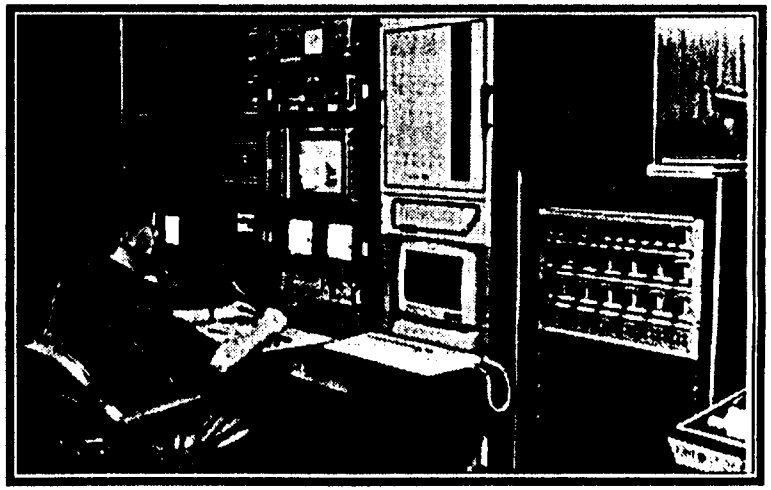
- Physical intrusion prevention and detection systems
- Information, networks, computers, and communications security systems
- Signal emanation protection

COMMUNICATIONS SYSTEMS

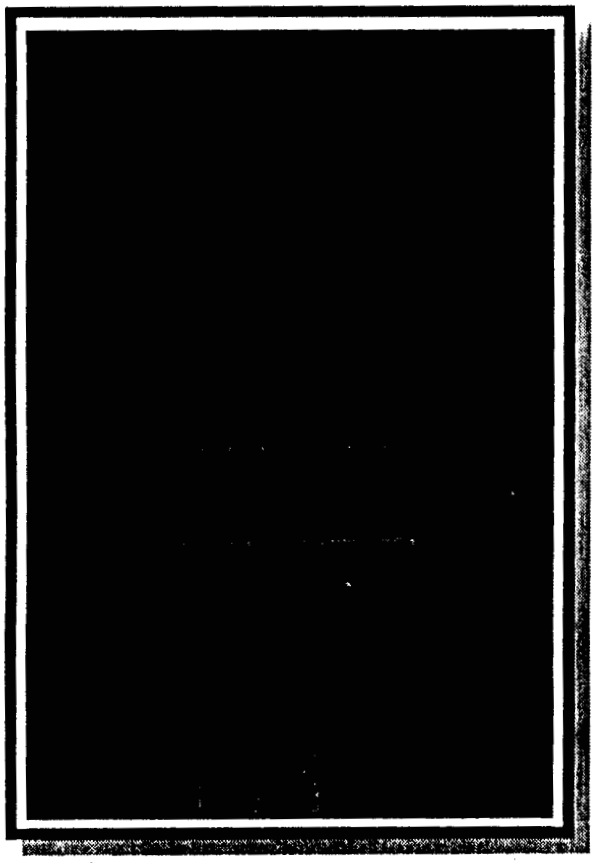
- Line of sight and over the horizon (LF - EHF)
- Hand held, portable, mobile, and satellite
- Data , video, voice, FAX
- Subs, ships, shore stations, vehicles and aircraft
- Analog and digital; electrical and optical
- Point to point, networks and switches

COMMAND and CONTROL SYSTEMS

- Display systems
- Data processors and storage
- Decision aid program
- Decision support systems
- Tactical and non-tactical



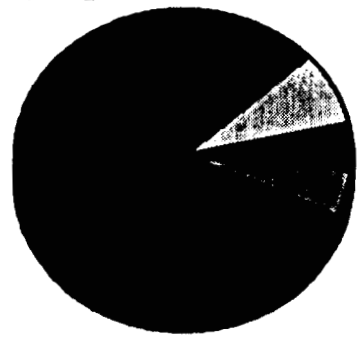
CRYPTOLOGIC and INTELLIGENCE SYSTEMS



- Direction finding & signal acquisition
- Analysis & exploitation
- Intercept & analysis
- Space surveillance
- Signal security
- Secondary imagery dissemination
- Fixed, portable and mobile systems

Employees - 23 DEC 94

DP	Professional	542
DT	Technical	360
DG	General	147
DA	Administrative	108
DS	Specialist	68
	TOTAL:	1225



Officers	13
Enlisted	57

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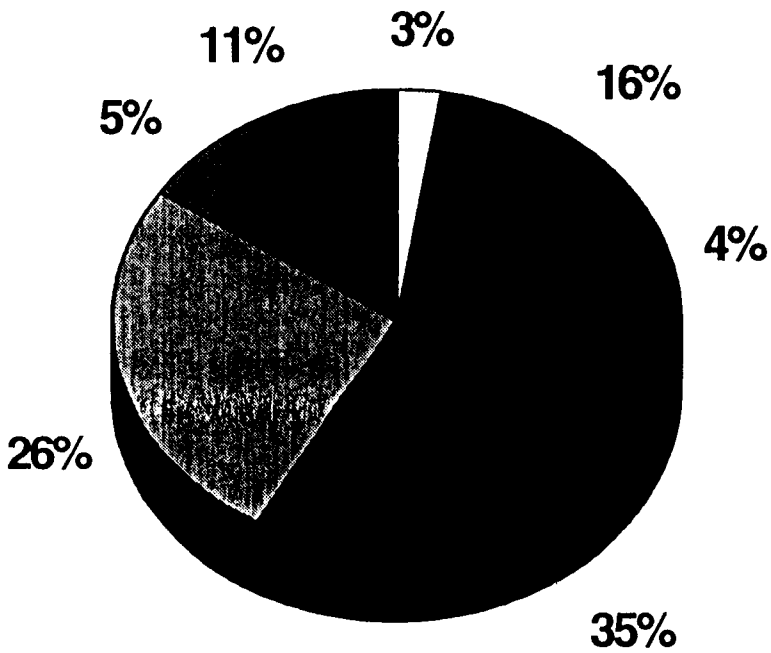
OUR SKILLS - 17 JAN 95



200 series & below	personnel, security
300 series	clerical, secretarial, analysts, assistants
500 series	budget, accounting
855 series	electronic engineers
856 series	electronic technicians
other 800 series	engineers, technicians
900 series & above	legal, supply, material, procurement, contracts

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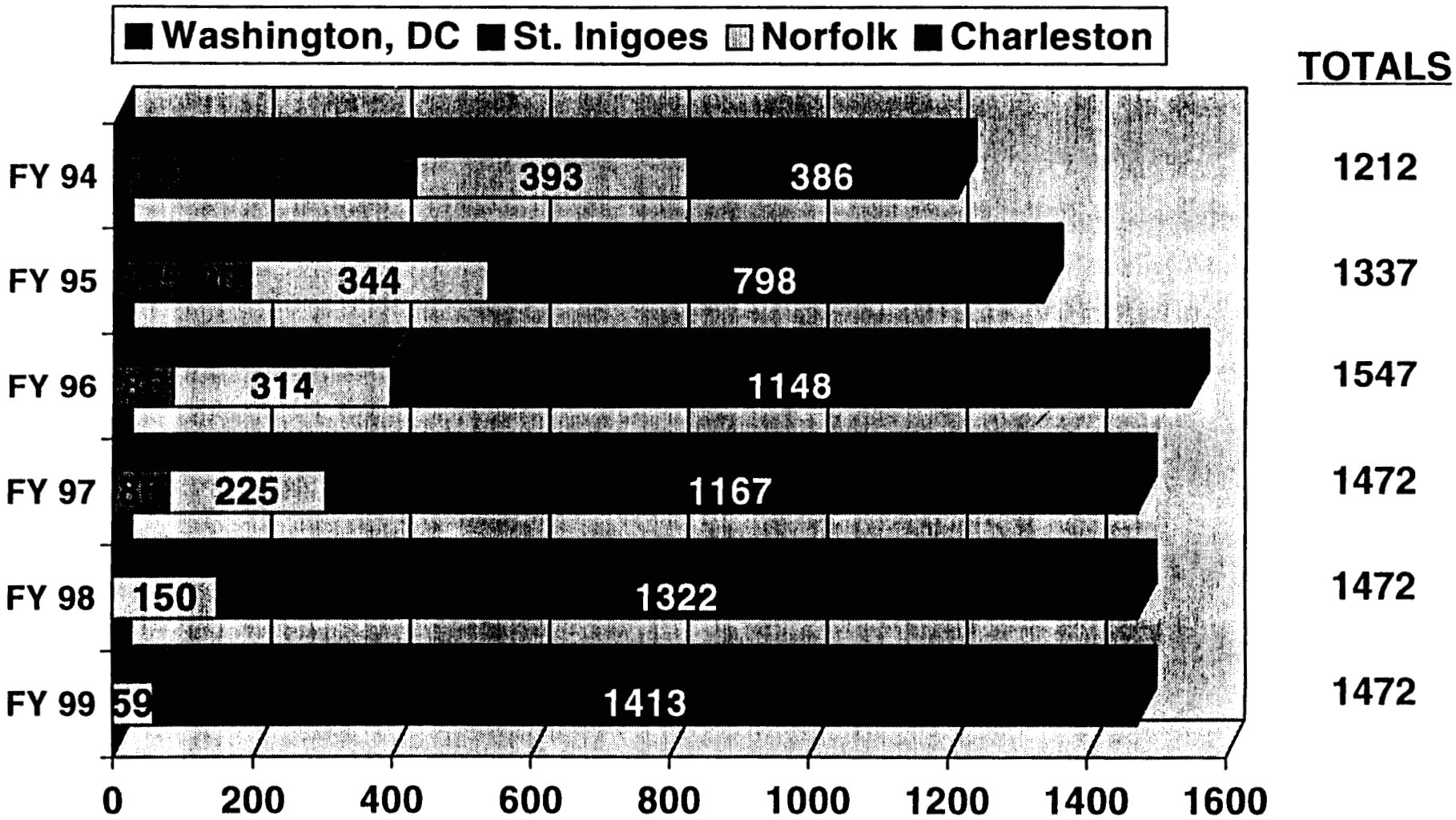
Geographical Locations - 13 FEB 95

AREA	TOTAL	AREA	TOTAL
Arlington, VA	2	Portsmouth, VA	352
Charleston, SC	622	Puerto Rico	1
Chesapeake, VA	3	Rota Spain	4
Cutler, MA	1	San Diego, CA	5
Edzell, UK	2	Saudi Arabia	1
Jacksonville, FL	3	Skaggs Island, CA	1
Key West, FL	1	St. Inigoes, MD	77
Kings Bay, GA	2	Sugar Grove, W. VA	1
London, ENG	3	Suitland, MD	8
Mayport, FL	4	Thurmont, MD	1
Naples, IT	3	Virginia Beach, VA	14
New London, CT	1	Washington, DC	108
Norfolk, VA	22	Winter Harbor, ME	1
Pensacola, FL	1	Yokosuka, JA	1

- NUWC Det - 66 (est.)
- FISC - 65 (est.)

Long Range Staffing Plans
(Fiscal Year End-Strengths)



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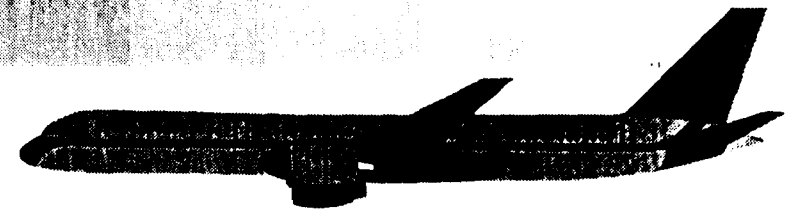
FY-94 Funding Document Profile

DOLLAR THRESHOLD	NEW FUNDING DOC's RECEIVED
0-$50K	2,416
$50K to $100K	657
$100K to $500K	1,062
$500K to $1M	177
$1M to $10M	167
Over $10M	2
TOTAL	4,481

TRAVEL ORDERS



FY94

From:	To: Europe	Asia	South America	Other	Total
Charleston	96	46	32	4,489	4,663
Norfolk	166	112	64	3,381	3,723
St. Inigoes	63	15	21	2,001	2,100
Washington	62	65	38	1,035	1,200
Total	387	238	155	10,906	11,686

FY95 - 1st QTR

From:	To: Europe	Asia	South America	Other	Total
NISE East	40	23	27	2,750	2,840

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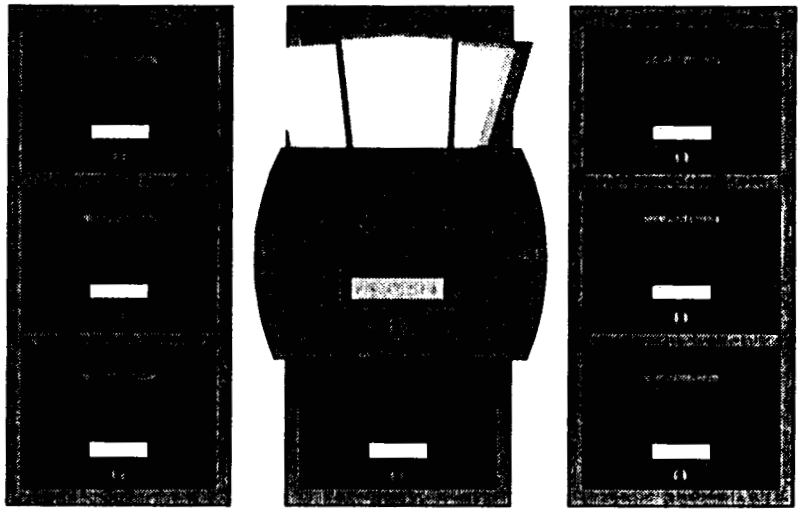
FY 94 CONTRACT ACTIONS



TYPE PURCHASE	IN-HOUSE	OUT of HOUSE
Small (< $25,000)	8025	2613
Large (≥ $25,000)	49	189
Delivery Orders	2731	175

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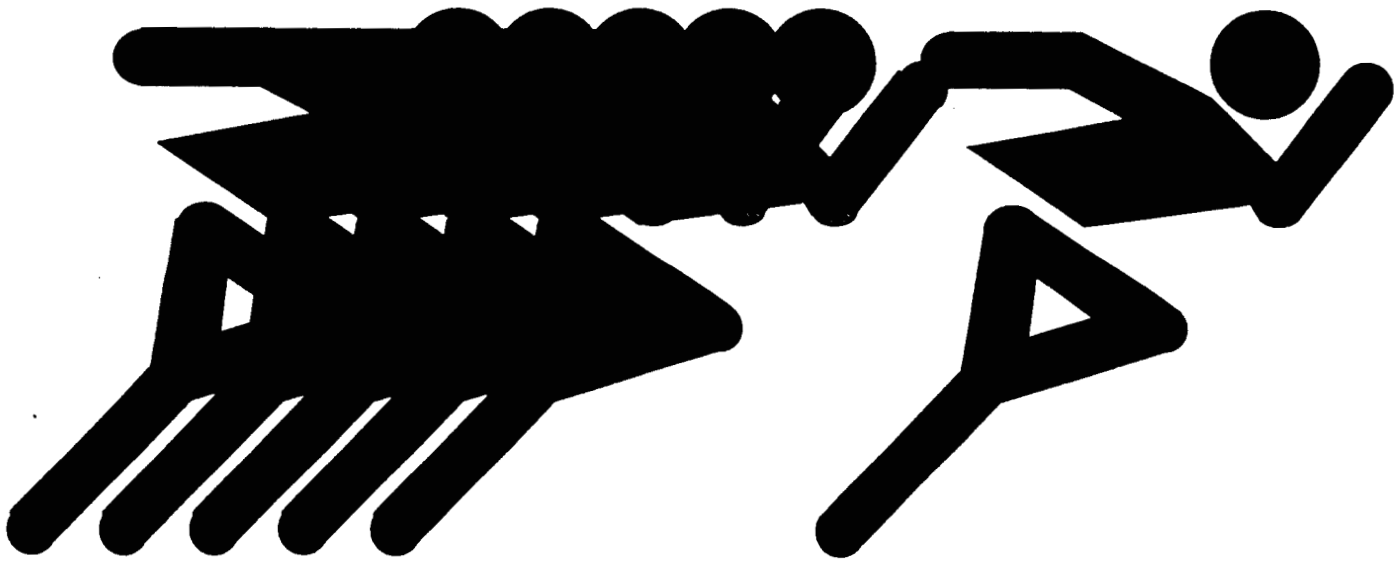
Contractors & Vendors



Five Contractors-Vendors for every NISE East Employee

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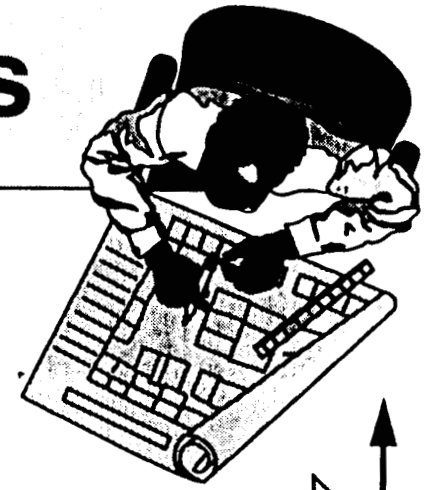
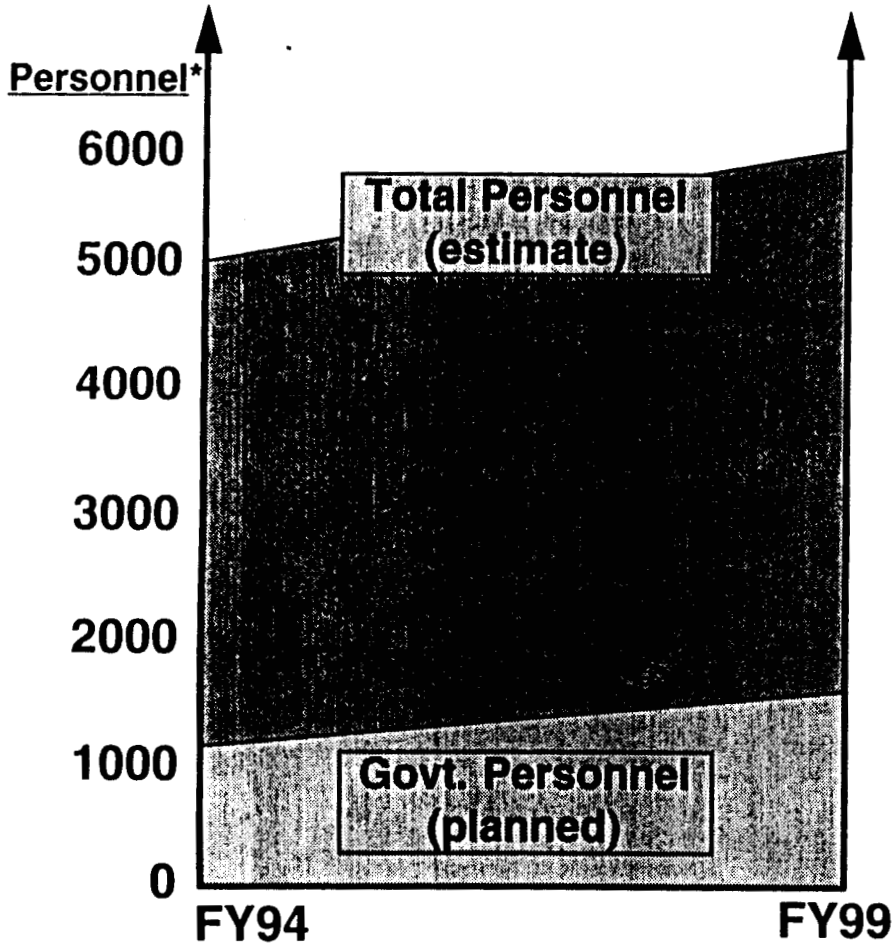
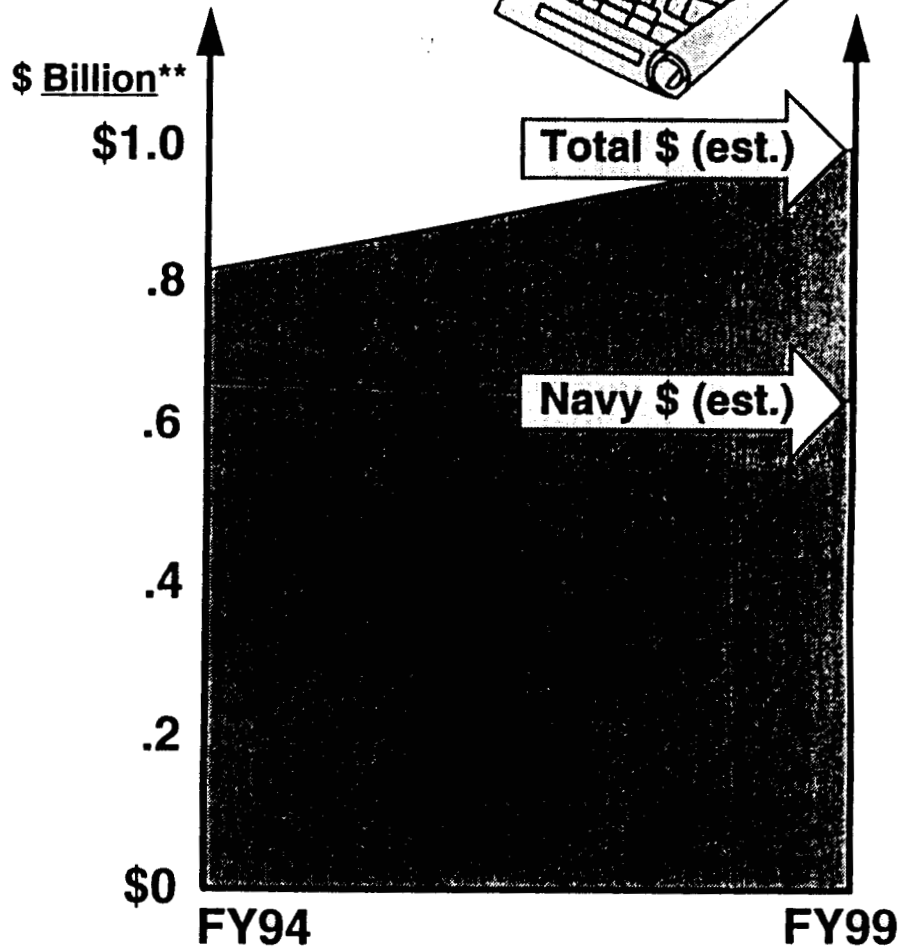
Company Prospectus



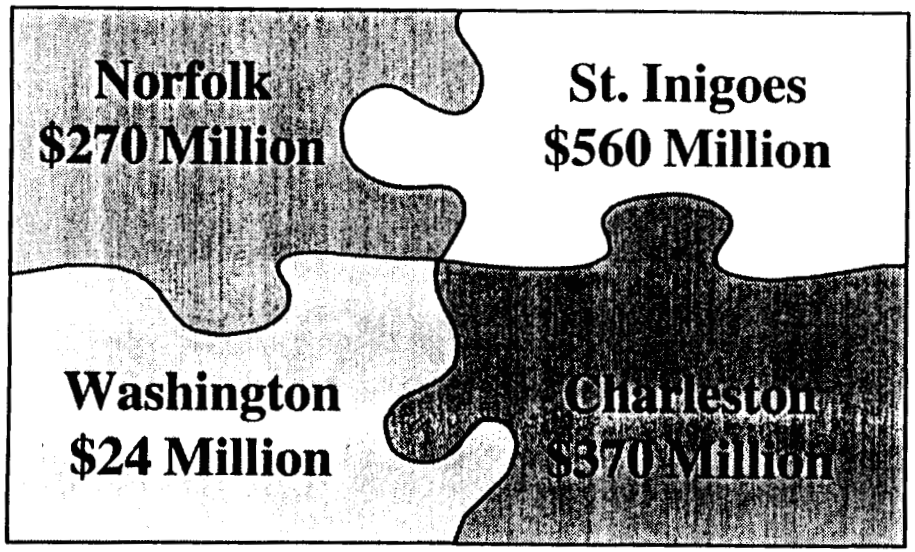




* Average Full Time Equivalent End Strength

** Value of work performed and procurements within the FY (without carry forward)

FY94 Total Obligation Authority
$1.2 Billion



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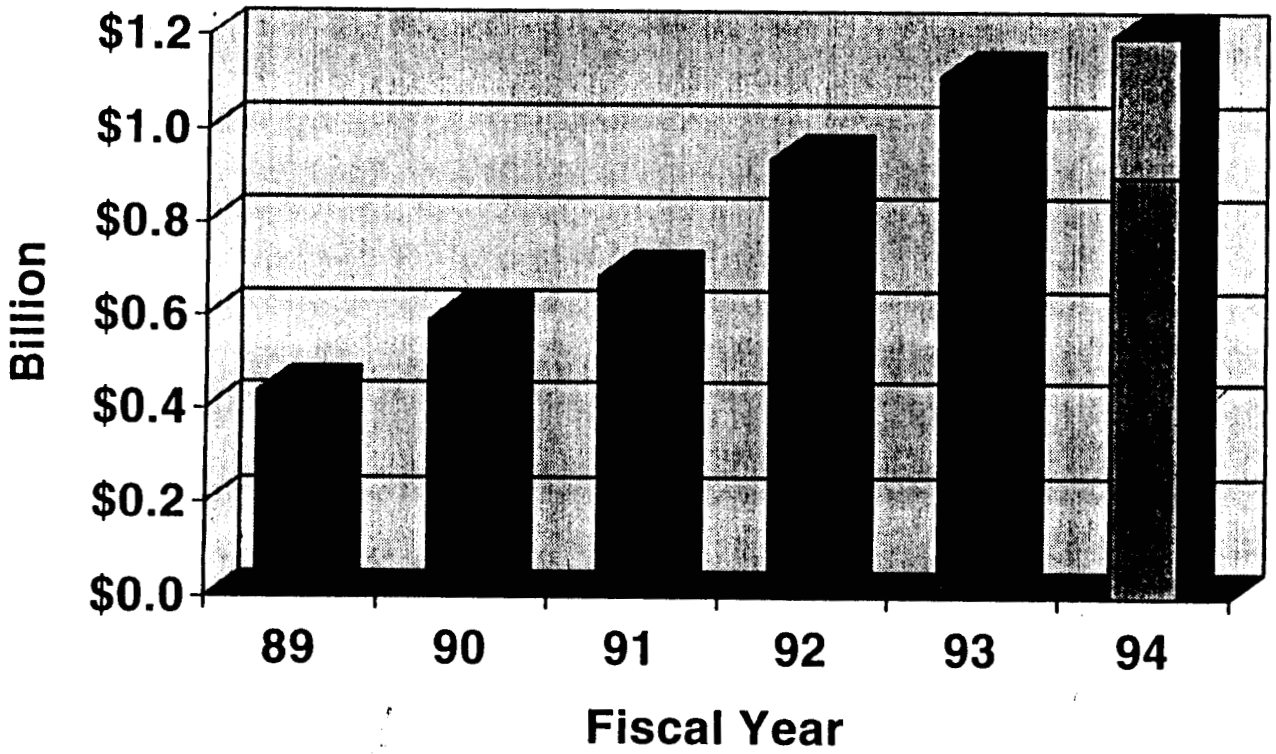
Total Obligation Authority
(Consolidated)



$300 M - Direct Cite

$900 M - Reimbursable

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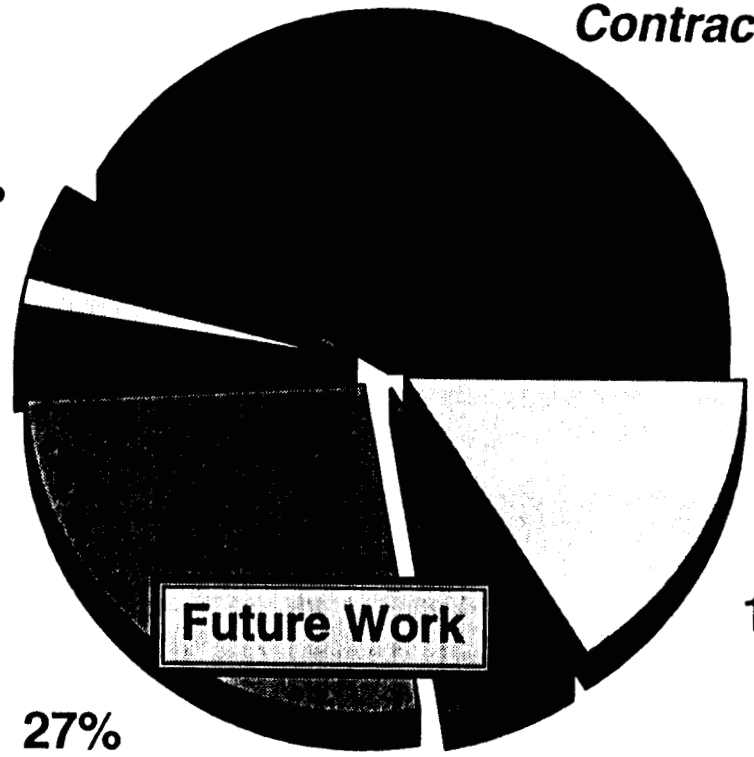
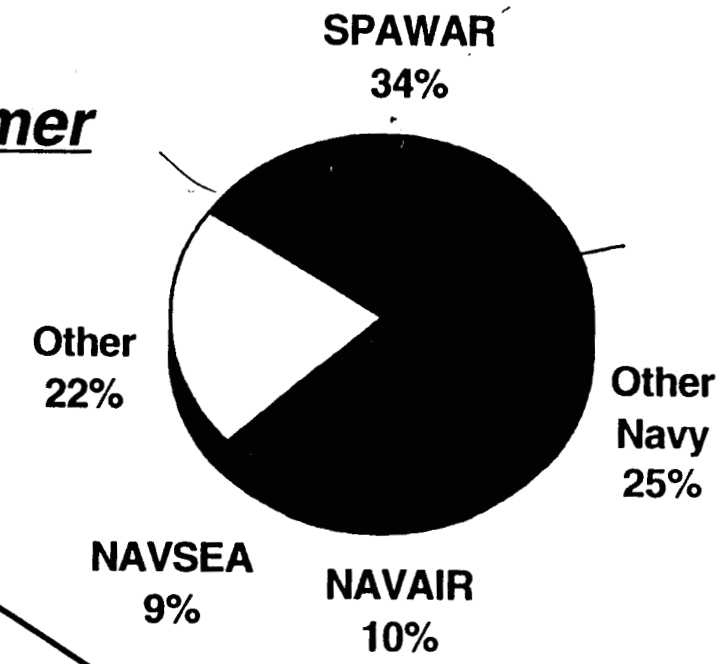
Total Obligation Authority - FY94



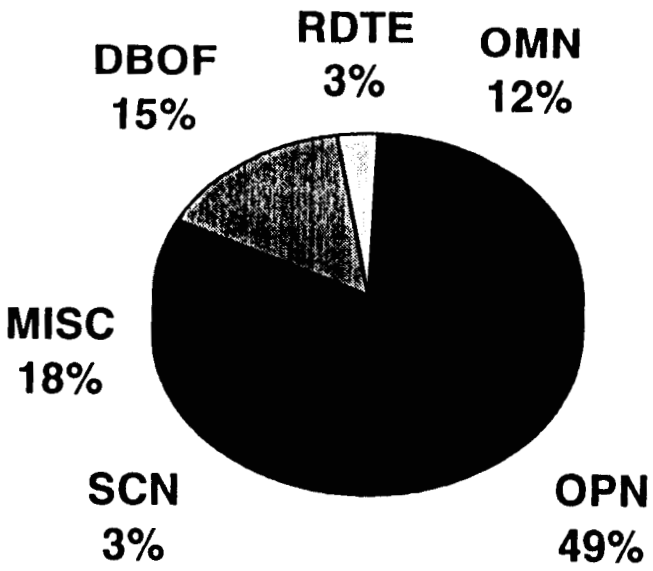
FY 94 Funding Sources - $1.2 Billion

(data source: NFAS)

by Customer



by Appropriation



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Building Structures & Land

		CLASS II (occupied) sq. ft.	LEASED sq. ft.	LAND (controlled) acres
CHARLESTON	South Annex	261,000		120
	CNSY/NAVSTA	279,200		
	Commercial		92,200	
NORFOLK	St. Juliens	300,000		200
	St. Helena	6,000		
	Little Creek	110,000		
	CINCLANTFLT	2,000		
St. INIGOES	Webster Field	125,000		
WASHINGTON	Nebraska Ave	53,500		
		1,136,700	92,200	320

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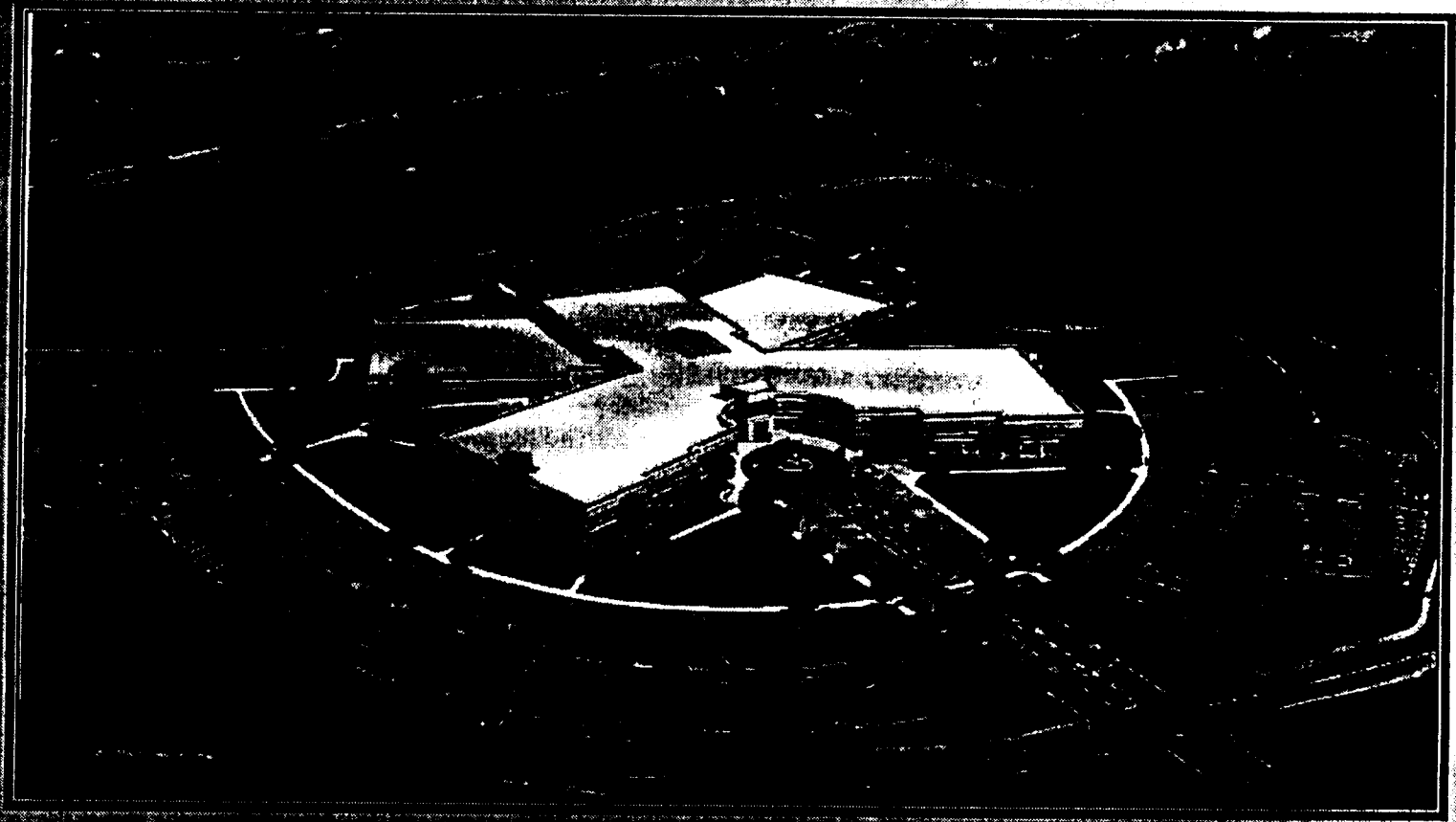
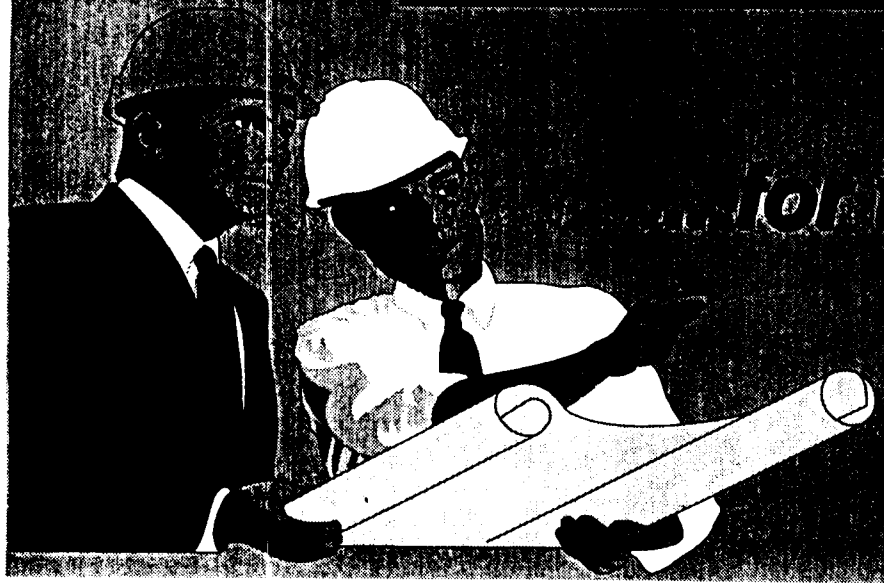
NISE EAST





Building Today ...
... for the Navy of Tomorrow!

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Facilities for the FUTURE

Phase	Planned Activity	Plan Complete	Construction Awarded	Building Occupancy
I	Building 3113 90,000 sq. ft. (Conversion & Phase II prep)	May 94	Awarded 03 Aug 94 $9.8 Million	Apr 95
II	Engineering Center 256,000 sq. ft. (New Construction)	Jul 94	Awarded 16 Sep 94 $26.5 Million	Jan 97
III	Building 3112 90,000 sq. ft. (Renovation)	Spring 95	Fall 95	Summer 96

ACCOMPLISHED IN 3 PHASES

Construction, Renovation & Conversion Costs - $43.4 Million

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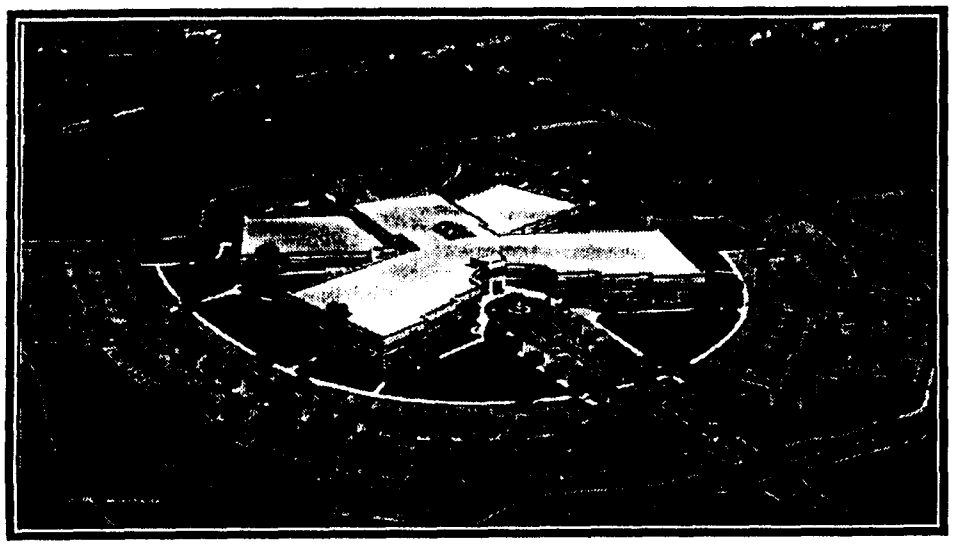
NISE East Engineering Center



- 256,000 sq. ft.
- Investment - $26.5 Million
- 900 people

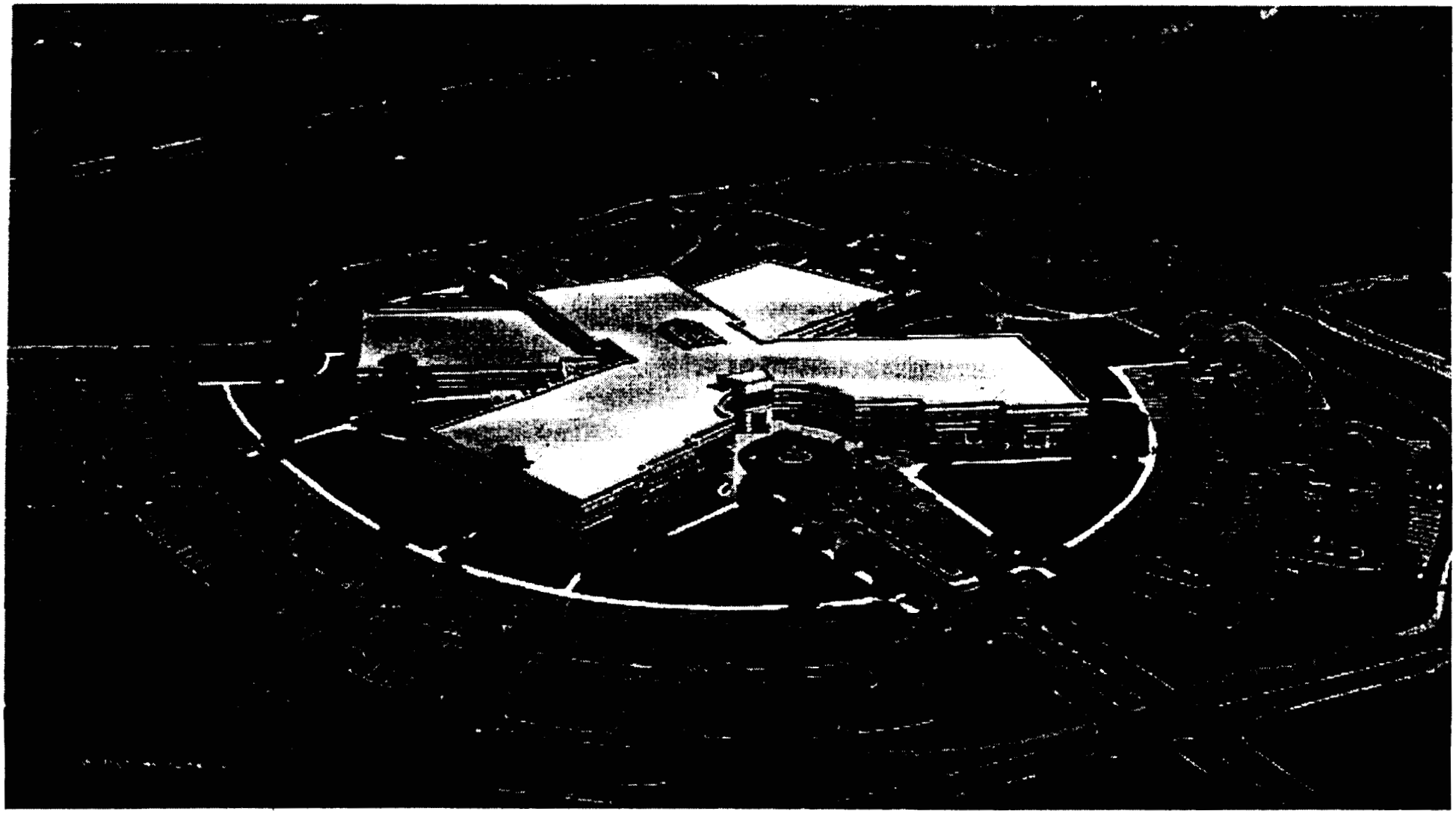
❑ Modern Facilities
- command lab
- secure environment
- computer networks (LAN/WAN)
- electromagnetic environment
- video teleconferencing
- training lab/facilities
- conference facilities
- flexible configuration
- special compartmented information facility (SCIF)

❑ Efficient Operating Costs
- energy management system
- lower ownership costs
- low maintenance costs

❑ Quality of Worklife
- cafeteria
- physical fitness room

NISE EAST

Facilities for the FUTURE



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NISE EAST

Naval Weapons Station Charleston - South Side

Headquarters under construction

① Headquarters (temp)

② ATC

③ Integration Labs

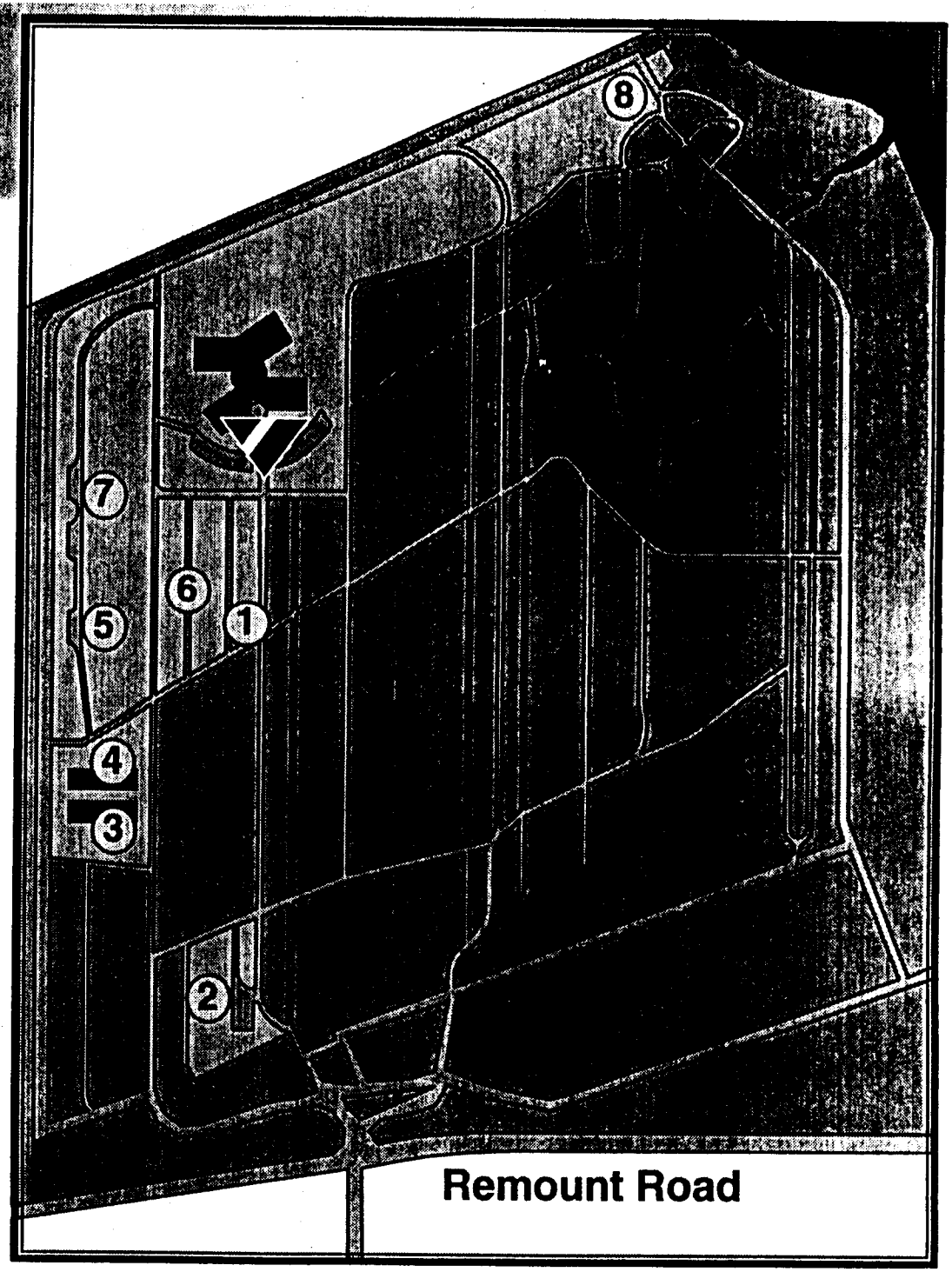
④ Infosec & Cryptologic

⑤ Cryptologic, Intellegence, VTC

⑥ Physical Security Systems

⑦ RADIAC / METOC / Navigation

⑧ SATCOM



NISE EAST

Our VISION for the future is to be . . .

of new techn

An *and business partner in the community.*

electronic engineering facilities,

Th *nurturin*

business st

Excellence Through Teamwork

Portsmouth Methodology

Subj: BRAC 9 (REVISED); RATIONALE FOR SELECTION OF SUB/SHIP TYPE WORKLOAD BY FISCAL YEAR FOR TABLE 31

1. Portsmouth Naval Shipyard provided data for maximum potential workload (Table 31 of Data Call #9) in June 1994 based on our understanding of the data call instructions and NAVSEA guidance provided. Upon receipt of CNO guidance of August 1994 (CNO ltr Ser N44/40587335), Portsmouth revised our Table 31 data to comply with this interpretation of the intent of Data Call #9.

2. The overall result of our revision was an increase in work loaded mandays for each fiscal year (FY 94 - FY 01) primarily resulting from the addition of off-site SRAs and ERPs. Specific changes by availability type are:

SSN EROs	Reduced mandays per ERO to match outyear execution projections; added ERO planning mandays in FY 01 (overall decrease in mandays for SSN EROs).
SSN DMPs	No change.
SSN RFFs	Minor workload spread adjustment for one availability (no overall change in mandays).
SSN SRAs	Increase in number of SSN SRAs per year to maximum of 12 (overall increase in mandays).
SSBN EOHs	No change.
SSBN ERPs	Added two SSBN ERPs per year in FY 01 and 02 (overall increase in mandays).
RAV/TAV Work	No change.
OPW Work	Stabilized OPW at 120K in outyears vice using as workload leveling work.
Surface Ship SRAs	Added surface ship SRAs per year to maximum of 12 to level workload; decision to select only CG, DDG and FFG SRAs was

PORTSMOUTH METHODOLOGY FOR
BRAC 95 CAPACITY ANALYSIS

Reviewed each category of submarine and surface ship listed in 4710 per final workload plan (A1) and selected potential workload from 4710 as follows:

- Load all currently assigned work.
- Load additional submarine work into PNS drydocks to maximize drydock usage and manday loading per following priorities:

  (1) SSN EROs
  (2) SSN DMPs
  (3) SSN Inactivations
  (4) Unique Submarine Availabilities

- Very little available drydock window existed after loading submarine work so no need to load in-yard surface ship work.
- Load off-site submarine work per following priorities:

  (1) Typical RA/TA emergent repair work
  (2) SSBN EOHs (1 per year)
  (3) SSN SRAs/SSBN ERPs (max 12 per year)

- Load realistic "other productive work" workload.
- Load selected surface ship off-site work (CG, DDG and FFG SRAs) to a maximum of 12 per year.

This listing is applicable for understanding data call #9 as finally submitted utilizing CNO guidance of August 1994; Our final capacity assessment was certified by the Shipyard (Code 100) and reviewed by NAVSEA prior to submittal to BSEC.

BRAC 93 METHODOLOGY

CAPACITY ANALYSIS

Reviewed each category of submarine and surface ship work listed in data call #24 against the latest. LANT Fleet data base (OP NAV Report 4710) which lists all East Coast maintenance availabilities for Navy ships by fiscal year

Layed out classes of nuclear submarines in our drydocks to determine maximum dry dock loading

Layed out classes of surface ships in our drydocks to determine maximum drydock loading.

Not 95 space

In general, nuclear submarine work is more manday intensive than non-nuclear surface ship overhauls.

Final drydock loading based on maximum mandays/month worked with nuclear submarines comprising 100% of our Depot Availabilities including:

SSN 688 Class Refueling Overhauls
SSN 688 Depot Modernization Periods
SSBN Inactivations
SSN Inactivations

Off site work was determined by the current capability of our workforce to quickly absorb the types of projects added to our work load.

Nuclear off site work added consisted entirely of additional submarine selected restricted availabilities.

Non-nuclear off site work added consisted of a mix of the following (very few per year).

DDG 51 Class Selected Restricted Availabilities
CG 47 Class Selected Restricted Availabilities
FFG 7 Class Selected Restricted Availabilities
CG 21 Class Phased Maintenance Availabilities
FFT 1078 Class Phased Maintenance Availabilities

Other production work added consisted of a mix of the types of work typically executed by the shipyard. This work was

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MIL-STD-1625C(SH)
25 August 1987
SUPERSEDING
MIL-STD-1625B(SH)
31 August 1984
(See 10.3)

MILITARY STANDARD

SAFETY CERTIFICATION PROGRAM FOR DRYDOCKING FACILITIES AND SHIPBUILDING WAYS FOR U.S. NAVY SHIPS

FEB 05 1988

FOREWORD

1. The Safety Certification Program (SCP) for drydocking facilities and shipbuilding ways, including transfer facilities, has been established to ensure the safety of U.S. Navy ships which are to be drydocked or built on these facilities. The procedure entails an evaluation and approval of data associated with the design, material condition, and operation of the facilities. This procedure is described in detail in this Military Standard (hereinafter referred to as the "standard").

2. The certification procedures, contents of certification reports, and technical requirements for certification are described in this standard. The SCP description and general certification requirements are provided in section 4. Detailed technical requirements are described in sections 5 through 9.

3. This document is applicable for certifying Navy-operated and commercially-operated drydocking, building, and launching facilities: but does not necessarily reflect all of the design requirements of dry docks, building ways or launch ways which are required by new design ship specifications.

4. The certification of a facility is based upon the evaluation of the facility data provided for certification by the operating activity. The operating activity remains solely responsible for maintaining and operating the facility in a safe manner and condition.

5. Certification of U.S. Navy dry docks leased to commercial operators should be obtained by the operator prior to docking Navy ships. The Navy is not responsible for providing or preparing certification data. Certification of the dock is not required for docking non-Navy ships.

6. In any safety program, there is the need for a strong position regarding the training of personnel. Training programs should ensure that new personnel are adequately qualified to perform their assigned functions and that every person has a sound knowledge of how their work station interacts with others. The programs should also have provisions for qualified personnel to periodically review the responsibilities and qualifications of their work stations, and for retraining or requalification whenever new procedures or operations are introduced.

7. Where terms are used herein such as "submitted", "submitted to the Navy", "provided to the Navy", or "made available for Navy review", the recipient is intended to be:

(a) The Naval Sea Systems Command (Industrial and Facility Management Directorate) when a Navy shore or fleet activity is submitting the certification report for its own drydocking facility.
(b) The Supervisor of Shipbuilding, or other designated Navy representative, when a U.S. Navy contractor is submitting the

4.2.1 Certification process. The certification process is initiated by submission of a certification report to the Navy by an operator. Based upon an evaluation of the data submitted, the Navy decides to certify or not to certify the facility and so advises the operator. Requirements for the format and contents of a certification report are described in appendix A. These include historical data, design data, maintenance procedures, manning and operating procedures, material condition survey results and proposed repairs. If the Navy's review of the certification report supports certification, a facility certification shall be issued stating the maximum docking capacity for which the facility is certified, loading limitations, duration of the certification period, and the conditions for sustaining certification.

4.2.2 Certification renewal and recertification. If a facility is significantly modified, such as a change which affects docking capacity, if the certification expires, or if it has been determined that the existing certification report is inaccurate, the operator shall reapply for certification by submitting a revised certification report. The certification of a facility may be renewed if an FRR submitted by the operator indicates that the facility remains certifiable. The FRR shall be submitted at least 4 months before the certification expiration date if the recertification is to be completed by the certification expiration date.

4.2.3 Maintenance program. The certification period of a facility may be extended by implementing a maintenance program prepared in accordance with 4.10 and demonstrating that the facility is properly maintained and operated. For Navy owned and operated docking facilities, the maintenance program is compulsory.

4.2.4 Key items in certification: capacity, limitations and duration. Capacities, limitations and duration shall be as follows:

4.2.4.1 CRC. This is the maximum allowable displacement in LT for a Navy ship on a certified facility. There is a certain comparative convenience in expressing capacity in terms of a single number displacement tonnage. However, in addition to tonnage, certain facilities may be described in more refined terms by specifying allowable line loading, such as tons per unit length; or area loading, such as tons per square foot. Use of such additional descriptors may be applicable.

4.2.4.2 Operational limitations for a particular ship docking, building or launching. In conjunction with the CRC, the Navy may impose additional operational limitations on a certified facility if considered necessary to ensure the safety of the ship.

4.2.4.3 Sustaining certification. After certification, the operator shall

in this list of equipment and their use addressed in the procedures. The patrols shall have at their disposal a means for contacting the designated personnel in the event of an emergency.

4.9.3 Systems for the prevention of unauthorized operation and flooding. These systems shall have a positive means of security to prevent unauthorized operations. The operator shall provide a description of these systems. Where flooding may occur, a system description shall also be provided showing the standby systems for the removal of water that may accumulate in the tanks, compartments, pumphouses, dock basin and other places in the facility during the lay period. Standby systems include installed systems with the same functional capability as the primary system or portable and emergency systems. The system description for standby systems shall include the number of units available, individual unit capacities, duration of operating time for fuel available (if applicable), and instructions for their operation and deployment, if applicable.

4.9.4 Disaster planning. Disaster plans shall be furnished in the certification report for the protection of the ship during the lay period. For the SCP, disasters are defined as total shore-power blackouts, floods, storms, fires, hurricanes or typhoons, and earthquakes. These disasters normally follow a natural or man-made catastrophe and necessitate the development of specific actions to prevent or minimize damage to the ship. Disaster plans shall include, but not be limited to, the following:

(a) Plans for providing adequate backup or emergency power for the operation of vital ship and dock systems in the event of a total shore-power blackout. The detailed requirements in sections 5 through 9 outline various backup or emergency power requirements for different types of facilities.
(b) Plans for securing the facility and protecting a Navy ship that cannot be undocked in the event of floods, storms, typhoons or hurricanes.
(c) Plans for combating a fire in the facility.
(d) Plans for ensuring that the ship and dock system can withstand the overturning moments defined in NAVSEA S9086-7G-STM-000/CH997, and earthquake-resisting measures which are required in docking nonnuclear-powered ships in higher seismic areas. Higher seismic areas are considered to be seismic zones 3 and 4 as specified in NAVFAC P-355. Earthquake-resisting measures shall be routinely applied to all nuclear-powered ships (except nuclear-powered aircraft carriers) regardless of facility location (seismic or nonseismic).

4.10.1 Purpose. The maintenance program provides a means for a facility to sustain certification without periodic submittals of FRRs. For Navy owned and operated docking facilities, the maintenance program is compulsory.

4.10.2 Procedure. Following a certification, an operator may elect to participate in the maintenance program. An operator who elects to participate in the maintenance program shall, within 1 year after certification, advise the Navy of his intent.

4.10.3 General requirements. An operator participating in the maintenance program shall implement a maintenance program, subject to Navy external audits at 2-year intervals with the following stipulations:

(a) A formalized maintenance system exists, is implemented, and is shown to be effective through documentation and on-site verification.
(b) Operating procedures are maintained and documented, with all changes formally controlled and implemented.
(c) Preventive maintenance is implemented and documented on all items vital to the essential performance or operation of the facility.
(d) Control inspections are performed by qualified individuals at the required frequencies, and inspection results are documented.
(e) A system for documentation, tracking, and correction of deficiencies reported from all sources, that is, maintenance personnel, control inspections, operators, and so forth, is implemented and effective.
(f) Configuration control of design and other system changes is effected through a formalized change control board made up of individuals qualified in their respective roles.
(g) Personnel qualification data records are maintained.
(h) Records of accidents or incidents reported in accordance with 4.8.3 are maintained.

The requirements for changes after certification and reports in 4.2.5 through 4.2.10 are still required when the maintenance program is selected.

4.10.4 Detailed requirements. Maintenance programs shall include the following:

4.10.4.1 Preventive maintenance. Preventive maintenance shall be implemented on all items which, if inoperative, would interfere with the essential performance or operation of the facility or would endanger property. Manufacturer's instructions shall be utilized for equipment maintenance procedures and frequencies when available.

(a) Frequency. It is not necessary that all parts be inspected simultaneously.

(1) Structures shall be inspected within a 2-year period and prior to Navy audit inspection. The inaccessible underwater body of floating dry docks shall be inspected in accordance with 5.6.5. The underwater hull of caissons shall be inspected in accordance with 6.5.4.3.

(2) Mechanical and electrical systems, equipment, and components shall be inspected and operationally tested no less than once a year. Cathodic protection systems shall be inspected where applicable.

(b) Inspection personnel. Control inspections may be made by the operator's personnel, who shall be individually qualified for their respective roles in such inspections.

(c) Forms. Records, schedules, and other associated documentation shall be maintained. Inspection checkoff lists similar to those illustrated in appendix E shall be used to record inspection results. The necessity or urgency for correcting defects found during an inspection shall be explained on the checkoff sheets. Material condition ratings as specified in 4.4.4.1 shall be utilized. Deficiencies of graving docks and marine railways for U.S. Navy activities shall be identified in accordance with the Navy shore facility planning system.

4.10.4.3 Correction of deficiencies. Deficiencies found during control inspection, preventive maintenance, or from any other source shall be reported to the authority responsible for facility maintenance. Unsatisfactory conditions or deficiencies which interfere with the essential operation of the facility or which endanger property shall be corrected immediately, the limitation identified, or operations discontinued. Marginal conditions or other deficiencies, when considered collectively to create an unsafe condition, shall also be corrected immediately. In addition, marginal conditions or deficiencies which will be unsatisfactory within the interval between inspections shall be corrected prior to the subsequent inspection. Corrective actions shall be reported to NAVSEA upon completion. Records shall be maintained of all reported deficiencies and corrective action taken. For uncorrected deficiencies, the records shall indicate when corrective action will be taken or the reason for not taking corrective action.

4.10.4.4 Configuration control procedures. The certification for a facility is granted based on a report which [illegible]

affected, to the operating procedures and other documentation. Documentation shall be maintained, describing the configuration control procedures being followed. Records, drawings, and sketches shall also be maintained of all changes submitted and the disposition of these changes.

4.10.4.5 Operating procedure changes. Changes which affect the procedures shall be formally implemented and controlled. Records shall be maintained describing the process being followed, changes requested, and disposition of all changes.

4.10.5 Biennial audits. Biennial audits shall be as follows:

4.10.5.1 Scheduling. An inspection shall be performed by a Navy team (external to the operator's activity) every 2 years. In Navy activities, external audit and the annual inspection will be conducted concurrently. Audits for commercially operated facilities will be scheduled by consultation with the operator via the cognizant SUPSHIP. The operator shall prepare all spaces of the facility to be inspected to enable the audit team to carry out its task efficiently and safely. The Navy reserves the right to conduct unscheduled audits if a particular situation warrants this action. Participants in the Navy audit team will be designated by NAVSEA. This team will make a full review and audit of the existing facility and supporting documentation. Identified deficiencies will be discussed at an exit interview and will be formalized by a written report to NAVSEA. NAVSEA will forward the results to the operator.

4.10.5.2 Scope. The scope of the audit shall be sufficient to evaluate the effectiveness of the maintenance program, and shall include:

(a) Examination of the facility and of the maintenance program documentation and operational records.
(b) Observation of a docking or undocking evolution whenever possible. In the case of a floating dry dock, this may include a submergence test.
(c) Evaluation of the control, operating and maintenance procedures.
(d) Examination of the actions to resolve deficiencies from the baseline certification or previous audit.

4.10.5.3 Maintenance program documentation. Documentation required to evaluate an activity's maintenance program is as follows:

(a) A brief written description of the activity's system for formally controlling and implementing

(1) Maintenance schedules and frequencies.
(2) Maintenance procedures for each system or equipment.
(3) Maintenance responsibilities (department or shop).
(4) Personnel qualifications required for each maintenance evolution.

(c) A brief written description of the activity's control inspection program which includes inspection responsibilities and qualification criteria for inspection personnel. Control inspection documentation shall include:

(1) Inspection results (including underwater hull survey, if applicable).
(2) Material condition check lists similar to those in appendices E through I, as applicable, with the material condition of each item inspected rated as specified in 4.4.4.1.

(d) A brief written description of the system used for reporting deficiencies; including records showing all reported deficiencies, and methods used for their prioritization, correction, or disposition. Related documentation shall include samples of the methods used for reporting deficiencies observed by:

(1) Maintenance personnel.
(2) Operating personnel.
(3) Control inspections.
(4) Other sources.

(e) A brief written description of the configuration control procedure being followed, which includes qualification criteria for configuration control board members; methods of submission, coordination, and approval or disapproval of proposed changes; and documentation showing the disposition of any proposed changes. A configuration control procedure and qualification criteria for control board members shall be developed by all participating activities, regardless of whether any changes to the facility have been proposed or effected.

4.10.5.4 Evaluation of audit findings. Based on an evaluation of the audit findings, the certification of a facility may be continued, suspended,

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REUSE OF PORTSMOUTH NAVAL SHIPYARD

FACILITIES ISSUES & DIFFICULTIES TO BE CONSIDERED

1. Central Utility Systems.

a. There are five central utility systems on the shipyard which will be required by prospective tenants in any reuse plan. The systems are described below with estimated operating costs. Costs are broken down by purchased cost and in-house costs.

1) All electric service on the shipyard comes in through the Franklin substation near gate one and is distributed throughout the shipyard via the central switchboard in building 72, the central power plant. The system works without the watchstander we always have on duty, but if there is a fault or failure on the system the corrections must be made from this switchboard. The electrical distribution is a complex multi-loop system with numerous substations and transformers, requiring experienced, high voltage trained operators.

Total operating cost:	5,441	(Cost X $1,000)
Purchased electricity:	4,398	
In-house costs:	1,043	

In-house costs include distribution system maintenance and repairs, and watchstanders.

2) All buildings on the island (except for quarters H-27) are heated with steam or hot water from the central power plant. It is very expensive to operate even one boiler, and would produce excess steam, while the majority of the buildings are vacant. We normally steam one boiler in the summer and two in the winter for the entire shipyard.

Total operating cost:	5,145
Purchased fuel oil:	3,857
In-house costs:	1,291

In-house costs are boiler plant and distribution system maintenance and boiler plant operators. NOTE: This issue was addressed in the BRAC Commission hearings on base reuse in March '95. Reference is made on page 96 to an Air Force Base with a central heating plant costing $3 million a year to operate. The reuse authority and the Air Force came to some sort of agreement for demolition of the central plant and putting heating in the

water service costs shown above purchased water includes an additional $275 for water used at the power plant in the production of steam and hot water for heating. Total cost $1,048.

4) The shipyard sanitary sewer collection system includes various pipelines and three pumping (lift) stations. All sewerage exits the shipyard through the main lift station near gate one, and is treated at the Town of Kittery treatment plant.

Total operating cost:	415
Purchased treatment:	360
In-house costs:	55

5) Telephone service for the shipyard is provided through a main switch in building 13, and a satellite switch in building 79. Services are provided through contract with AT&T for maintenance and operation of shipyard owned switches.

Total operating cost:	2,055
AT&T contract, phone bill/tech. services:	1,375
In-house:	713

In-house costs include cable plant maintenance and operator and business office personnel costs.

b. Management, operation, maintenance, and funding for all of the utility services listed above must be provided by the reuse agency. With the exception of heating, all require a centrally managed distribution system. The heating system could be central or individual by building. The total of in-house costs for all utilities is $3,177,000. Some of these costs are dependent on level of production or consumption, but this total is a good order of magnitude estimate. The reuse agency will also have to fund transmission losses and cost for common services such as street lighting.

Responsibility for the various systems could be assumed by the providing agency, such as the Kittery Water District and Central Maine Power. They could install their own meters as customers began to utilize the buildings on the shipyard. The hard part would to get each agency to assume responsibility and cost in the underutilized period between closing and full utilization. It is extremely unlikely any agency, existing or created for reuse functions, would consider assuming the high costs to operate the central heating system.

2. Community Services.

Admiralty Village, 7.
c. Trash collection and disposal, collection done in-house, 94; disposal by contract, 471.
d. Street and sidewalk maintenance, in-house and contract, 102.
e. Railroad track maintenance, in-house and contract on base, 102; by contract on Sarah Long Bridge and approach to base, 28. The shipyard is responsible for railroad track maintenance on track we do not own from the switching point in Portsmouth to the shipyard spur line because no other customer is served by this line.

3. Considerations For a Potential Tenant.

a. Buildings

1) The tenant will be required to install a heat source for the building he leases or buys. Most buildings have an installed hot water heating system requiring only the installation of a hot water furnace. Some buildings have a steam system which is not compatible with hot water and will require replacement of entire system. Most buildings have no heat zones, so the whole building must be heated or zone controls installed.

2) Most buildings still have asbestos and/or lead paint. The cost of abatement and disposal greatly increases any demolition or renovation costs; especially heating system renovations. The BRAC hearings on reuse refer to "... the ticking time bomb that sits in the asbestos buildings." (page 84, City manager Graham from CA)

3) Many of our buildings do not meet current state and local building codes. Some of these codes deal with life safety codes such as building egress requirements. The codes may have changed since construction or renovation, or the federal codes are not the same as local. Also some federal codes such as American's with Disabilities Act are recent and therefore are not met.

4) Most of our buildings are built with individual offices rather than open spaces. This is contrary to modern design which favors open concepts for flexibility.

5) Building density on the shipyard prohibits any new construction without demolition of existing structures. The only exception is recreation areas and disposal sites such as the Jamaica Island landfill with potentially hazardous wastes.

6) Demolition of unusable (unmarketable) buildings is going to be expensive and possibly a major issue for a lot of our older buildings. This issue was presented several times in the

b. Parking

Parking lots on the shipyard are not centrally located near the high occupancy office and shop buildings. The building density described above also prevents paving of new parking lots without demolition.

c. Shipyard access

1) Vehicular approach routes to the shipyard are somewhat limited by two lane secondary roads passing through business and residential areas. The shipyard itself, being on an island, is accessed via 2 two-lane bridges.

2) Railroad access is adequate, but in addition to the maintenance charges identified above in paragraph 2.e. we also pay B&M Railroad a per car use fee for each rail car brought in to the shipyard.

4. Considerations for the reuse agency.

a. Environmental issues must be addressed in spite of the reluctance of the BRAC Commission and the services to do so. Environmental cleanup is the single biggest issue and was the most frequent topic of testimony at the BRAC hearings on reuse. See testimony on pages 73, 77, & 78 for a start. City Manager Graham of California said "You heard before, you'll hear again funding of environmental cleanup of military facilities ordered to close is the **most important** and time-sensitive issue that the local reuse authorities face today." BRAC Commissioner Robles describes two "over-arching themes...and the second one was funding and funding most primarily targeted at environmental cleanup." We have the potential for major environmental cleanup costs at this shipyard. The actual cost is somewhere between the two extremes presented by our Engineering Study of cleanup costs, but the real answer is probably closest to the $1.7 Billion

b. Reduced consumption of utilities by the shipyard is going to have an economic impact on other customers. .....

SUBJECT: ANTICIPATED ENVIRONMENTAL COST ASSOCIATED WITH CLOSING THE SHIPYARD

1. A CONSULTANT RECENTLY COMPLETED A DRAFT FEASIBILITY STUDY WHICH DEVELOPED VARIOUS REMEDIAL ALTERNATIVES TO DEAL WITH ENVIRONMENTAL CONTAMINATION AT THE PORTSMOUTH NAVAL SHIPYARD. THE SHIPYARD HAS (9) SOLID WASTE MANAGEMENT UNITS (SWMUs) THAT HAVE BEEN IDENTIFIED AS PART COMPREHENSIVE FEASIBITLY STUDY .

2. A DETAILED SURVEY OF EACH SWMU AREA HAS BEEN PROVIDED AS PART OF THE FEASIBILITY STUDY WHICH QUANTIFIES CONTAMINATES AND ESTABLISHES DETAILED COST ESTIMATES FOR EACH REMEDIAL ALTERNATIVE IDENTIFIED. THE RECOMMENDED ALTERNATIVES FOR EACH SITE ARE CURRENTLY BASED ON THE SHIPYARD STAYING OPEN AND FOR THE MOST PART IDENTIFY LOWER COST ALTERNATIVES THAT FOCUS ON SOIL/ASPHALT CAPS, CUT-OFF BARRIERS, AND MONITORING. IF THE SHIPYARD WAS TO CLOSE AND THIS LAND TURNED OVER TO THE STATE OF MAINE EACH RECOMMENDED ALTERNATIVE WOULD HAVE TO BE REEVALUATED AND AGREED UPON BY THE STATE OF MAINE. BASED ON PAST DEALINGS WITH THE STATE OF MAINE DEP THEY WOULD MOST LIKELY WANT THE LAND TURNED OVER WITHOUT DEEDED RESTRICTIONS LIMITING FUTURE USE OF THE PROPERTY AND THE POSSIBILITY OF ADDITIONAL LONG RANGE ENVIRONMENTAL ACTIONS. THE STATE WOULD MOST LIKELY PUSH FOR COMPLETE CLEANUP OF ALL (9) SITES. THE FOLLOWING PROVIDES A LIST OF THE SWMU SITES, AND FOR EACH SITE INCLUDES AN ESTIMATED COST ASSOCIATED WITH IMPLEMENTING CURRENT RECOMMENDATIONS AND PROVIDING FOR TOTAL CLEANUP AS WOULD MOST LIKELY BE REQUIRED IN THE EVENT THE SHIPYARD WAS TO CLOSE;

LOCATION		CURRENT ESTIMATED COST OF REMEDIAL ACTION ($K)	CURRENT ESTIMATED COST FOR COMPLETE REMOVAL AND CLEANUP ($K)
SWMU #6 -	DEFENSE REUTLIZATION AND MARKETING OFFICE SALVAGE YARD	5,376	18,312
SWMU #8 -	JAMAICA ISLAND LANDFILL	14,380	1,664,000
SWMU #9 -	MERCURY BURIAL SITES	45	45
SWMU #10 -	BATTERY ACID TANK NO.24	43	144
SWMU #11 -	FORMER SITE OF WASTE OIL TANKS NOS. 6 & 7	1,194	COVERED UNDER SWMU #8 COSTS
SWMU #21 -	ACID/ALKALINE DRAIN TANK	0	76
SWMU #27 -	FUEL OIL SPILL AREA, BERTH #6	0	2,696

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EXCERPT

Aug 94

Portsmouth Naval Shipyard
N00102

DATA CALL 65
ECONOMIC AND COMMUNITY INFRASTRUCTURE DATA

5. **Other Socio-Economic Impacts.** For each of the following areas, describe other recent (past 5 years), on-going or projected economic impacts (both positive and negative) on the geographic region defined by your response to question 1.b. (page 3), in the aggregate:

a. Loss of Major Employers:

Pease Air Force Base closed in April 1991 resulting in the loss of an estimated 7,000 jobs and $167 million in personal income. Of the 7,000 jobs lost, 2,800 jobs were indirectly related to the closure while 4,200 were directly related.

Between 1989 and 1993, the number of employers in York County declined by 92. The declines occurred in all employment size-classes. Large layoffs occurred at a number of companies including:

Employment at the Portsmouth Naval Shipyard in Kittery has declined by over 3,600, with an additional estimated 650 person reduction in two weeks. Overall, this is a 51 percent reduction. This facility is the largest employer in York County.

Pratt & Whitney laid off 103 in January 1994.

George Newman & Co. laid off 40 in January 1994.

Duchess Shoe laid off 100 in March 1993.

Pratt & Whitney laid off 84 in January 1993.

Pratt & Whitney laid off 233 in November 1992.

Shape, Inc. laid off 150 in March 1992.

The future of the Pratt & Whitney and the Saco Defense plants remain in question, despite

DATA CALL 65
ECONOMIC AND COMMUNITY INFRASTRUCTURE DATA

b. Introduction of New Businesses/Technologies:

Several small businesses have opened in the past few years in York County, but many more have closed. In New Hampshire the only introduction of new business is at the Pease International Tradeport, where Pease Air Force Base redevelopment is underway with limited success. Cell-Tec, an English Bio-Tech Firm, has established its USA Headquarters here. Also, the State Department has located a VISA Unit and Passport Center at Pease. Delta Business Express has renovated and is using the hanger location at Pease.

c. Natural Disasters:

None.

d. Overall Economic Trends:

*** Seacoast area continues to struggle to recover from closure of Pease Air Force Base:**

- United Express Airlines, an anchor in the airport redevelopment effort, has ceased operations at Pease.
- The largely vacant Newington Mall, adjacent to Pease, which was constructed at a cost of $27 million, has just been sold for $5 million.
- BRAC 91 & 93 are causing a glut of facilities for redevelopment/conversion resulting in increased competition among states for few potential industries.

*** The regional economy is trailing the national economy out of the recession in large part due to on-going cuts in defense industries.** (especially Portsmouth Naval Shipyard workforce reductions, Bath Iron Works workforce reductions, Pease Air Force Base closure and Loring Air Force Base closure.)

- The Maine income tax base has been reduced aggravating an already precarious State financial position.
- Public utilities are f[illegible]

DATA CALL 65
ECONOMIC AND COMMUNITY INFRASTRUCTURE DATA

- York County's civilian labor force has declined by 3,500 in 1993. This follows three consecutive years of no growth. Resident employment declined to a six year low in 1993.
- Manufacturing employment declined by 11 % between 1988 and 1992 in York County. Inflation adjusted manufacturing wages declined by 4.4%.

* **With the closing of Loring Air Force base in September 1994, major Maine** defense employers (Loring Air Force Base, Bath Iron Works, and Portsmouth Naval Shipyard) will have lost over 10,500 jobs (45%) since 1989.

- Approximately $250 million in state income is being lost per year.
- Jobs have been lost in high wage areas with minimal offsetting growth in lower wage areas. The 1991 average annual wage for shipbuilding and repair was $30,793 compared to $19,117 for service workers and $12,238 for retail workers.
- Many former defense workers are under-employed. Continuing downsizing in the defense industries have saturated the market with skilled craftsmen and professionals. Shipyard outplacement experience shows that most laid-off workers who remain in the seacoast area must accept a decrease in income and living standard. Workers must leave the area to receive comparable income.
- The Maine State Planning Office projects a net outward migration from the state of 40,000 people in the 1990s with 32,000 of that total attributable to defense cutbacks.

Source of Data (5. Other Socio/Econ):
KEYS Economic Future: Building Linkages and Building Capacity. May 1994.
Defense Dependency - Impacts and Conversion Efforts in Maine. June 1994.
Presentation to the Joint Select Committee on Housing & Economic Development by Joyce Benson, State Planning Office. April 1994.
University of Southern Maine Forecast for York County May 1994.
Defense Downsizing: The Economic Impacts in New England.
Yolanda K. Kodrycki, Senior Economist, Federal Reserve Bank of Boston. June 1994.
From Defense to Offense; Converting Maine's Economy. Presentation by

Document Separator

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
2531 JEFFERSON DAVIS HWY
ARLINGTON VA 22242-5160

IN REPLY REFER TO

11420
OPR 07Q2D
Ser 07Q2/260

16 DEC 1993

From: Commander, Naval Sea Systems Command
To: Commander, Portsmouth Naval Shipyard

Subj: CERTIFICATION OF PORTSMOUTH NAVAL SHIPYARD, GRAVING DOCKS NO. 1, 2 AND 3

Ref: (a) NAVSEA ltr 11420 OPR 07Q2D Ser 07Q2/165 of 12 Aug 93
(b) NAVSHIPYD Portsmouth ltr 1150.4:KPB:kpb 5040 Ser 1150/369 of 30 Sep 93

Encl: (1) Conditions to Sustain Certification of Portsmouth Naval Shipyard, Dry Docks No. 1, 2 and 3
(2) Dry Dock Safety Certificate - Dry Dock No. 1
(3) Dry Dock Safety Certificate - Dry Dock No. 2
(4) Dry Dock Safety Certificate - Dry Dock No. 3

1. Reference (a) provided the results of an expanded maintenance audit of Portsmouth Naval Shipyard, Graving Docks No. 1, 2 and 3, and listed the deficiencies to be corrected in order to sustain certification. Reference (b) provided the plan of action for correcting deficiencies.

2. We have reviewed reference (b) and concur with your plan of action, subject to the conditions to sustain certification listed in enclosure (1). Please provide periodic status reports as deficiencies are completed. Enclosures (2) through (4) are forwarded continuing certification of Dry Docks No. 1, 2 and 3 as follows:

a. Dry Dock No. 1: A maximum docking capacity of 8,000 long tons (LT) (30 LT/ft).

b. Dry Dock No. 2: A maximum docking capacity of 38,000 LT (80 LT/ft).

CONDITIONS TO SUSTAIN CERTIFICATION OF PORTSMOUTH NAVAL SHIPYARD DRY DOCKS NO. 1, 2 AND 3

To sustain certification in accordance with MIL-STD-1625C(SH) Notice 1, you shall comply with the following conditions by 28 February 1994:

1. Finding 3.A: Under paragraphs 4.10.4.2b and 4.10.5.3c, inspectors shall be individually qualified for their respective roles in the inspection. Shipyard control inspection instructions shall specify the responsibilities and qualification criteria for these inspectors. Mechanical and electrical control inspections should not be conducted by Planned Maintenance (PM) personnel but should be an independent assessment by qualified non-dry dock personnel. There is no requirement to incorporate inspection acceptance criteria into the inspection checklists. Training on this criteria should be included in the required training and qualification for inspection personnel.

2. Finding 4.A: In accordance with NAVSEA ltr 11420 OPR 07Q2D Ser 07Q2/188 of 21 Sep 92, shipyards shall conduct flooding drills at least semi-annually. Develop a program to comply with this emergency drill requirement.

DOCK SAFETY CERTIFICATE

Portsmouth Naval Shipyard
Dry Dock No. 1
Portsmouth, New Hampshire

ASIS OF A MAINTENANCE PROGRAM AUDIT CONDUCTED ON

NAVAL SEA SYSTEMS COMMAND HAS DETERMINED THAT PORTSMOUTH

D, DRY DOCK NO. 1, LOCATED AT PORTSMOUTH, NEW HAMPSHIRE, MEETS

RITERIA OF MIL-STD-1625C(SH) AND IS CONSIDERED ADEQUATE TO

NAVY SHIPS.

RESTRICTIONS: *8,000 long tons (LT)*
ed in NAVSEA letter 11420 OPR 07Q2D Ser
December 1993

N EXPIRES: *15 December 1995*

DOCK SAFETY CERTIFICATE

Portsmouth Naval Shipyard
Dry Dock No. 2
Portsmouth, New Hampshire

ASIS OF A MAINTENANCE PROGRAM AUDIT CONDUCTED ON

, NAVAL SEA SYSTEMS COMMAND HAS DETERMINED THAT PORTSMOUTH

RD, DRY DRY DOCK NO. 2, LOCATED AT PORTSMOUTH, NEW HAMPSHIRE,

FETY CRITERIA OF MIL-STD-1625C(SH) AND IS CONSIDERED ADEQUATE TO

NAVY SHIPS.

L RESTRICTIONS: *38,000 long tons*
ecified in NAVSEA letter 11420 OPR 07Q2D
16 December 1993

ON EXPIRES: *15 December 1995*

DOCK SAFETY CERTIFICATE

Portsmouth Naval Shipyard
Dry Dock No. 3
Portsmouth, New Hampshire

' BASIS OF A MAINTENANCE PROGRAM AUDIT CONDUCTED ON

93, NAVAL SEA SYSTEMS COMMAND HAS DETERMINED THAT PORTSMOUTH

ARD, DRY DRY DOCK NO. 3, LOCATED AT PORTSMOUTH, NEW HAMPSHIRE,

AFETY CRITERIA OF MIL-STD-1625C(SH) AND IS CONSIDERED ADEQUATE TO

S. NAVY SHIPS.

AL RESTRICTIONS: *11,400 long tons which impose block loading not in excess of 20 ard 140 feet and the outboard 160 feet, and not /ft on the remaining 180 feet of the dock floor as SEA letter 11420 OPR 07Q2D Ser 07Q2/260* er 1993

ION EXPIRES: *15 December 1995*

Document Separator

PORTSMOUTH COMMENTS ON CHARLESTON FACT SHEET NO. 23

ISSUE: NUCLEAR CAPACITY

Charleston contends that non-reactor plant work on nuclear powered vessels (submarines) is the same as work on conventionally powered ships (surface ships) and does not require special training.

DISCUSSION

The "nuclear capacity" necessary to accomplish overhauls of nuclear powered vessels cannot be limited to only the capacity needed for work performed directly on the reactor or reactor systems. Specific control requirements unique to nuclear submarines are required for work on non-reactor plant systems. These controls are mandatory and are in-place to ensure that shipyard work is performed in strict compliance with specifications in areas crucial to the submarines mission and survivability in both peacetime and under combat conditions.

Examples of specific areas of control are:

- Propulsion
- Hull Integrity
- Sea water system integrity
- Recoverability - (Ballast tanks/Air systems)
- Ships atmosphere (breathing air)
- Ships battery
- Silencing/Noise Control
- Weight
- Space
- Ships testing and Waterborne Conditions

Each of these subject areas is rigidly controlled for submarines and requires capabilities over and above those for surface ships. This increased control is driven by the need for absolute assurance that work is properly performed. The consequences of failure in these areas, and others, are the reasons for the level of requirements. Compliance with these requirements demands increased skills and capabilities necessary to ensure success. The requirements cannot be treated as generic skills generally available in the workforce. Specific training and experience are necessary to establish the capacity for this work.

Submarine control requirements also result in the

ISSUE: NUCLEAR CAPACITY

"*Lack of Compliance*

Forces Afloat, shipyards, and other repair activities have a basic obligation to effect repairs in full accordance with specifications and SUBSAFE requirements. There have been circumstances when all specifications or requirements have not been completely met, for reasons such as:

A misconception that specifications are only objectives rather than minimum requirements for acceptability. As a result, departures from specification requirements may never be recorded and/or may not be reviewed and approved by proper authority.

A lack of adequate inspection, quality control, and management of the process for determining compliance with specifications.

A lack of understanding of specification requirements.

A lack of resources to enable permanent repairs, resulting in emergency temporary repairs.

A lack of training in the skills necessary to meet specifications.

A generally lax attitude toward non-operational aspects of ship's configuration (e.g., installation of lockers/stowage not included in, or in accordance with, ship's plan)."

The control and certification requirements for submarines are specifically intended to offset these factors. The annual cost to ensure these necessary submarine skills are maintained is $11.6 million at Portsmouth out of a total training budget of $19 million.

These additional control requirements and the associated skills, capability and work items just described are not the only factors determining "nuclear capacity" required for submarines. Additional factors reflected in submarine capacity data, over and

ISSUE: NUCLEAR CAPACITY

Secondly, the differences in design and the requirements for monitoring and certification of critical components result in work process differences which are reflected in nuclear submarine capacity data (e.g., special inspections of the mating surfaces between the hull and sea water valves to ensure watertight integrity at deep ocean depths).

Thirdly, the ship design requires increased control of work and testing evolutions both in-dock and pierside to assure safety of the ship and personnel while work is on-going. Specifically, test organizations and ship safety organizations are mandated to control the overhaul process.

CONCLUSION

In summary, for nuclear powered vessels, non-reactor plant work cannot be equated to generic skills or capability which are readily available or transferrable from surface ship work. Nuclear submarine workloads are correctly assessed as nuclear capacity requirements due to the high degree of control required in all aspects of work and the potentially severe consequences of equipment or system failure.

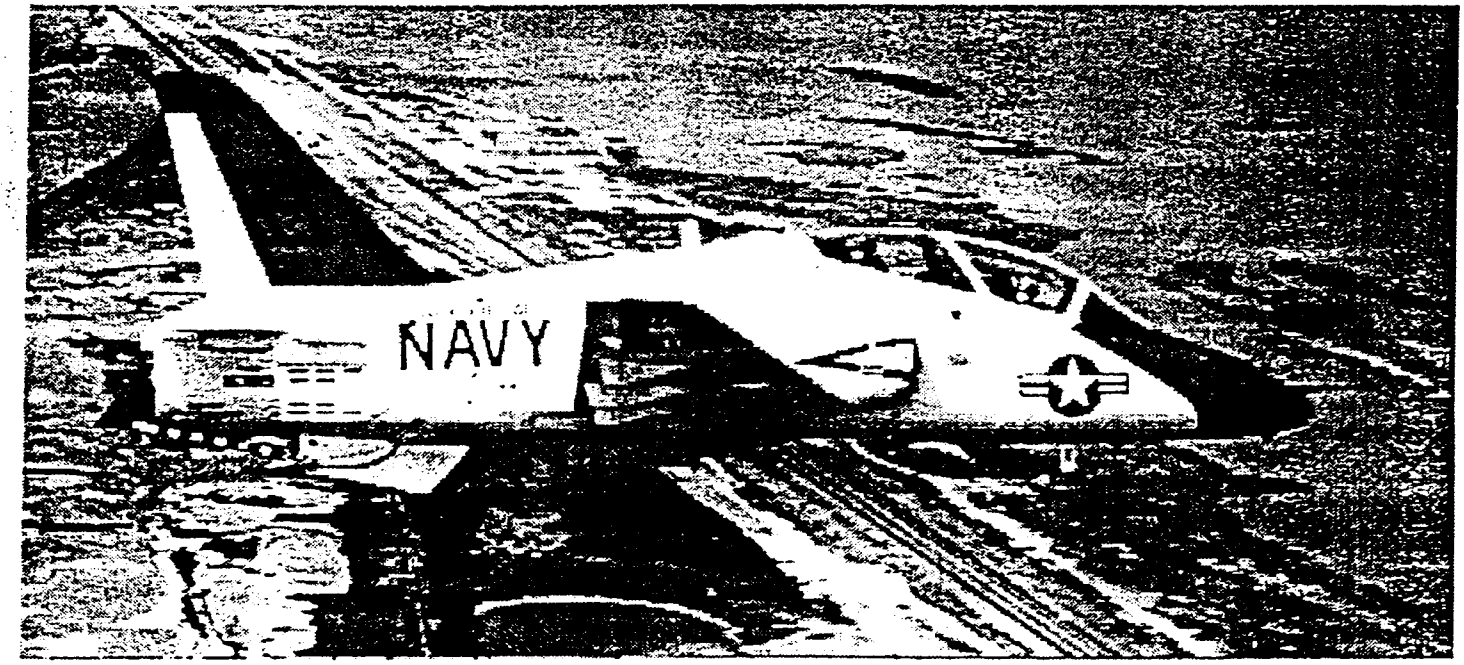
Document Separator

NAS KINGSVILLE

Airfield and Airspace Operational Study Report

DRAFT

February 21, 1995



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PREFACE

The NAS Kingsville Airfield and Airspace Operational Study was conducted by ATAC under Contract Number NG8925-93-C-A330. The Naval Aviation Simulation Model, NASMOD, the primary tool used in this study, was developed by ATAC for the Naval Facilities Engineering Command (NAVFAC).

The ATAC analysts for this study, and the authors of this report, are Douglas O'Neill and Myles Coleman. Michael Abkin is overall project manager. The authors acknowledge the indispensable contributions throughout this study of other members of ATAC's NASMOD team and Navy points of contact.

EXECUTIVE SUMMARY

Naval Air Station (NAS) Kingsville is the headquarters of Training Air Wing Two (TW II). TW II trains Navy and Marine Corps student naval aviators prior to their entry into fleet operational service, and qualifies instructor pilots to train the students. In 1991, operations at NAS Kingsville increased when TW II absorbed over half of the advanced tactical flight training operations that had been conducted at NAS Chase Field in Beeville, Texas. In the summer of 1992, the air wing conducted both intermediate and advanced training using T-2 and TA-4 aircraft; the wing trained approximately one-half of Navy and Marine Corps tactical jet aviators. Currently, TW II is implementing an entirely new flight training program for the T-45 aircraft. This new program combines the T-2 and TA-4 training syllabuses into one continuous training syllabus. This study examines TW II's ability to graduate student naval aviators under the new T-45 training syllabus, given specific airfield and airspace resources.

To study TW II operations, we conducted simulation analysis using a general simulation model for naval aviation operations, the Naval Aviation Simulation Model (NASMOD). Using data and information supplied by the Navy, we developed a set of input data that represent the facilities, procedures, and operations at NAS Kingsville and its auxiliary landing field at Orange Grove, Texas, and in the surrounding airspace. The first stage of the study was model calibration, which ensures that NASMOD properly simulates operations in the studied region. The calibration scenario, which examines T-2 and TA-4 operations during the August 1992 through October 1992 period, reasonably represents actual operations.

Following modeling methodology similar to that used in the calibration, we use NASMOD to model future T-45 operations at NAS Kingsville and estimate overall performance given specific operational assumptions. The study examines eight operational scenarios, each with a different strike pilot training rate (PTR): 168, 225, 250, 275, 300, 350, 400, and 500. In addition to strike pilots, the 225- and 275-PTR scenarios each include 53 E2/C2 syllabus students, and the 400- and 500-PTR scenarios each include 40 E2/C2 syllabus students. The 168-PTR scenario is the baseline scenario; it represents basic conditions, and serves as a reference point for other scenarios and as a check that T-45 operations are accurately modeled. As expected, the air wing has no difficulty achieving the PTR in this scenario; the total flight hours simulated per graduated student differ from the Chief of Naval Air Training's (CNATRA's) projections by only three percent.

more delay will be experienced. For example, as operations increase from a 168-PTR level to a 350-PTR level, the average delay experienced to complete a single X increases about 40 percent (to approximately 3 minutes per X). Note that "delay" includes the additional flight time experienced as patterns are extended to accommodate additional aircraft. Sufficient airspace resources exist to handle even more activity than generated at the 350-PTR level; the only operating area that cannot accommodate significantly more activity is Kingsville 1A.

Though airfield and airspace do not become saturated at any of the PTR levels and operating conditions assumed, other restrictions can limit the TW II's ability to meet its PTR goal. Weapons flights, for instance, are more sensitive to weather than any other required flight, and thus are particularly constrained. In the simulation, large numbers of these flights are canceled and must be repeatedly scheduled, competing with other events for the scheduling of aircraft. In most of the scenarios, one Weapons detachment is scheduled to reduce the large backlog of Weapons events that accumulates; even with this weapons detachment, completing all required weapons flights is difficult. However, given enough available aircraft, such as in the 350-PTR scenario, the squadron is able to complete the necessary number of flights even with the assumed weather constraints and only one detachment. The results suggest that a sufficient supply of aircraft, combined with the use of detachments, can offset impacts of weather constraints.

1 INTRODUCTION

The naval air station (NAS) at Kingsville, Texas, is the headquarters of Training Air Wing Two (TW II). The air wing trains Navy and Marine Corps student naval aviators prior to their entry into fleet operational service. TW II also qualifies instructor pilots to train the students. Following the 1991 closure of NAS Chase Field in Beeville, Texas, TW II absorbed over half of the advanced tactical flight training that was conducted at Chase Field. In the summer of 1992, the air wing conducted both intermediate and advanced training using T-2 and TA-4 aircraft; the wing graduated approximately one-half of Navy and Marine Corps tactical jet aviators.

NAS Kingsville is also the launch site for the McDonnell Douglas T-45 aircraft. TW II is implementing an entirely new flight training program for the T-45. This new program combines the T-2 and TA-4 training syllabuses into one continuous training syllabus.

This study examines Training Air Wing Two's ability to graduate student naval aviators under the new T-45 training syllabus, given specific airfield and airspace resources.

1.1 Study Methodology

To study TW II operations, we conducted simulation analysis using a general simulation model for naval aviation operations, the Naval Aviation Simulation Model (NASMOD). Using data and information supplied by the Navy, we developed a set of input data that represents the facilities, procedures, and operations at NAS Kingsville and its auxiliary landing field at Orange Grove, Texas, and in the surrounding airspace.

1.1.1 NASMOD Background

The Navy developed NASMOD because it needed a technically credible tool to analyze naval aviation issues objectively and efficiently. Issues the model is designed to study include:

(MOAs), warning areas, and other military special use airspaces (SUAs)? How are training and costs affected by restricting the availability or use of such areas? What are the impacts on civilian traffic?

- Interactions between civilian and military air traffic. How does the projected growth in civilian air traffic affect the costs and operations of military traffic? What are the impacts associated with proposed changes to instrument flight rule (IFR) routes or air traffic control (ATC) procedures?

- New aircraft types. What are the airfield and airspace impacts associated with the introduction of a new aircraft type and its training requirements? What procedural or operational changes in airfield and airspace management, schedules, and configurations can mitigate identified constraints?

- Changes in training and resource requirements. What airfield and airspace modifications are required to accommodate altered training requirements, such as an additional night bombing mission? What modifications are required if resource requirements, such as the number of support aircraft, change?

- Environmental assessments and environmental impact statements. How do proposed changes affect the number and types of noise-sensitive airfield operations? What operational costs are associated with an environmental restriction?

NASMOD is derived directly from two other simulation models — the Navy Air Training System Model (NATS) and the Airfield and Airspace Capacity Model (SIMMOD). The Navy developed NATS in the mid 1980s to analyze the usage of special use airspace and other resources at NAS Whiting Field in Florida. The model was designed exclusively for that application. SIMMOD, conversely, is the Federal Aviation Administration's (FAA's) official general-purpose simulation model for analyzing airfield and airspace capacity issues. Numerous analysts have used the model for studies examining airport layouts, runway and taxiway procedures, sectorization plans, air traffic control procedures, traffic management strategies, and traffic routing. NASMOD incorporates the functionality of NATS with the simulation and analytical capabilities of SIMMOD, and includes the advanced database and analytical capabilities necessary to model complex tactical military

- Relational databases of input and output data. The input reflects the model assumptions and parameters, and the output contains the results for the simulation period.

- Simulation modules. One module simulates scheduling — both squadron mission scheduling and central scheduling of airspace areas. A second module simulates the evolution of military missions and their interactions with other modeled traffic.

- A performance calculator. It computes selected measures of performance for squadrons and their training activities, airfield operations, and airspace and range area scheduling and utilization.

- A traffic animator. It graphically depicts a simulated day of air traffic and training operations, based on NASMOD output.

Appendix A provides an overview of NASMOD's simulation model components.

1.1.2 Study Process

A NASMOD study consists of four basic phases: (1) study design, (2) data collection, (3) database preparation and model calibration, and (4) simulation and analysis. A study is a highly iterative and interactive process, requiring extensive coordination between the analysts and the data sources during all phases. Often, information learned and insights gained during a later phase of the study necessitate revisiting an earlier phase before proceeding. Occasionally, assumptions are adjusted, data collection is revised, or the scenario design is modified.

1.1.2.1 Study Design

The initial phase of the study is study design. During this phase, analysts and Navy personnel identify several scenarios and corresponding assumptions. Typically, a scenario is designed to examine one or more of the study's primary issues. One scenario is called the baseline scenario. It represents the most basic conditions and is the "standard" against

training requirements, and other related factors. For the NAS Kingsville study, there were three general categories of data sources: publications; personal interviews and observations of operations; and actual recorded airfield and airspace operations. The Reference section lists all the documents, publications, and other direct and indirect data sources used. Examples of the published information include: standard operating procedures manuals, letters of agreement, maps and charts of airspace structures and airfield facilities, approach plates, computer-aided design (CAD) and other engineering drawings, airfield and air operations manuals, and range users manuals. Examples of information gathered through interviews and direct observations include: ATC procedures, pilot mission profiles, range scheduling techniques, and squadron detachment specifications. Actual operations records include: ATC facility logs, traffic analyzer data, squadron flight schedules, and range summary reports.

1.1.2.3 Database Preparation and Model Calibration

The third phase of the study is database preparation. Preparation of the NASMOD input database involves analyzing the collected data and extracting and assembling the information essential to representing each scenario. Analysts convert this information into the format required by the model. After entering the data, analysts test various parameters for accuracy.

As part of the NAS Kingsville study, we calibrated the model against actual data. A calibration scenario ensures that NASMOD properly simulates operations in the studied region. This study's calibration period was August 1992 through October 1992. We prepared NASMOD input data to reflect airfield and airspace operations during this period, ran the simulation, and then compared NASMOD's simulation results with actual traffic statistics, including traffic flows, travel times, squadron sorties, squadron hours, and airspace utilization. Navy personnel, who were knowledgeable of operations at NAS Kingsville, reviewed and approved the calibration results.

1.1.2.4 Simulation and Analysis

The final phase of the study is simulation and analysis of the various scenarios. Each scenario requires a separate database with parameters set to reflect the scenario's assumptions. The model simulates the air traffic and range operations associated with those assumptions. For the NAS Kingsville study, we used a one-year simulation period.

1.2 Report Contents

The purpose of this report is to document the process, assumptions, results, and analyses of the NAS Kingsville Airfield and Airspace Operational Study. The report contains four additional sections. These sections describe the calibration process and results, the baseline and alternative scenarios and assumptions, the comparative analysis of the baseline and alternatives, and the summary and conclusions. The appendices contain a description of the model and selected detailed results.

2 CALIBRATION OF T-2 AND TA-4 OPERATIONS

The study's calibration period, August 1992 through October 1992, represents a "normal" flight training period at NAS Kingsville. By reasonably replicating this period's operations with NASMOD, we can be certain that the model and the modeling methodology can accurately predict future operations at NAS Kingsville. Essentially, the calibration is a preliminary test of the study process. To calibrate, we collected data, prepared a database to represent 1992 operations, ran the simulation, and analyzed the results.

2.1 Modeling of T-2 and TA-4 Operations

A NASMOD simulation considers the many factors influencing training flights, including scheduling requirements, weather limitations, and airspace availability. The data collection process, therefore, was comprehensive, covering key aspects of TW II operations at NAS Kingsville. During the calibration period, TW II was evaluating T-45 operations; the T-45 was not used to train student naval aviators. Therefore, the calibration includes only TA-4 and T-2 operations. For modeling purposes, we divided NAS Kingsville's operations into three classifications: airfield, airspace, and squadron.

2.1.1 Airfield Operations

Nearly all of TW II's flight operations originate from NAS Kingsville; it is one of the busiest military air stations in the United States. NAS Kingsville is supported by the naval auxiliary landing field (NALF) at Orange Grove. TW II also uses the numerous support facilities and airfields in the southern coastal bend region of Texas; doing so reduces traffic congestion at NAS Kingsville and offers TW II pilots additional training opportunities away from their home field.

2.1.1.1 NAS Kingsville

NAS Kingsville is located approximately 30 miles southwest of Corpus Christi, Texas, and borders the southeast edge of the City of Kingsville, Texas (see Figure 2-1). There are no noise- or other environmentally sensitive areas near NAS Kingsville's flight paths. There are several airports in the region surrounding NAS Kingsville: the traffic generated by

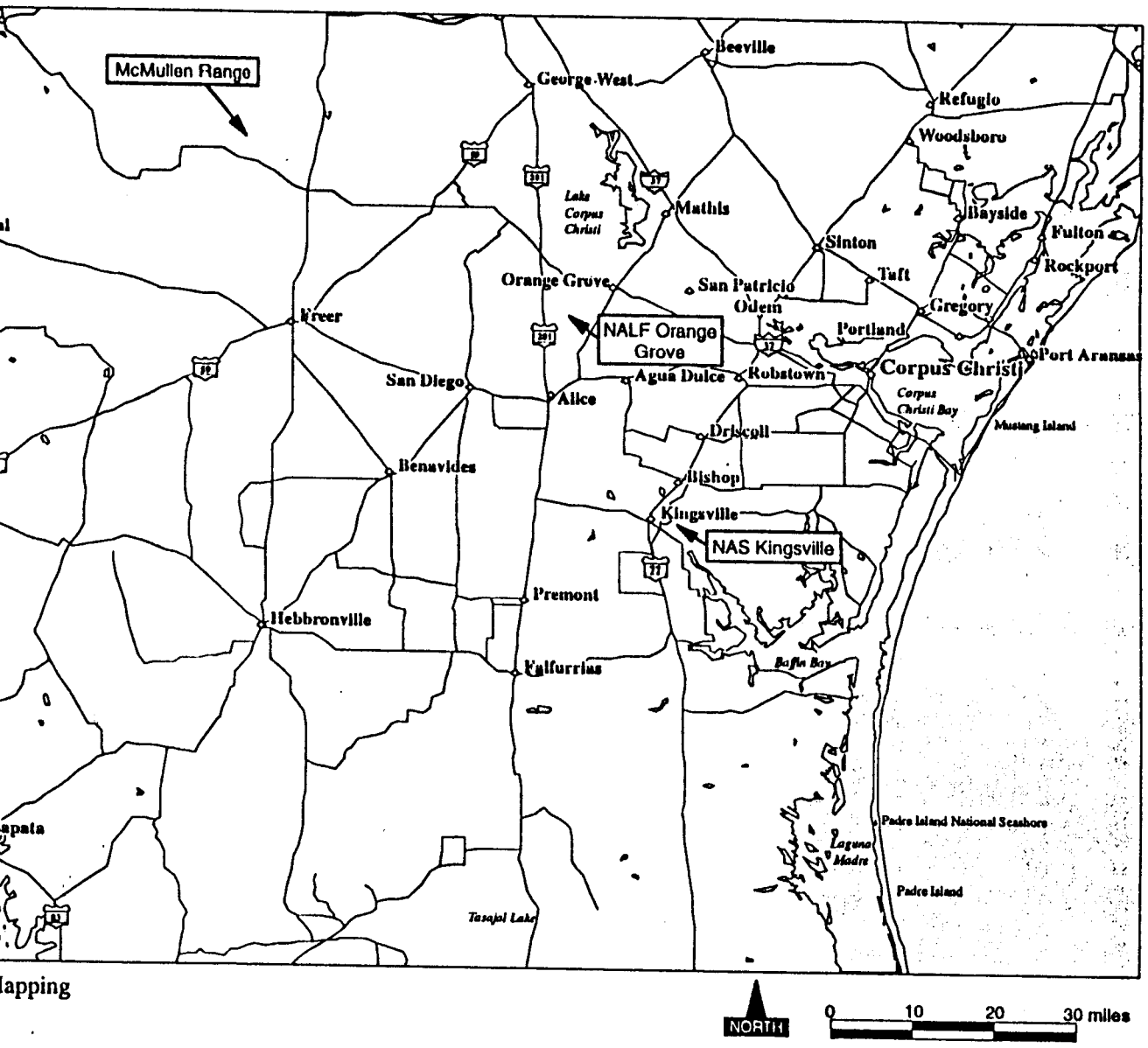


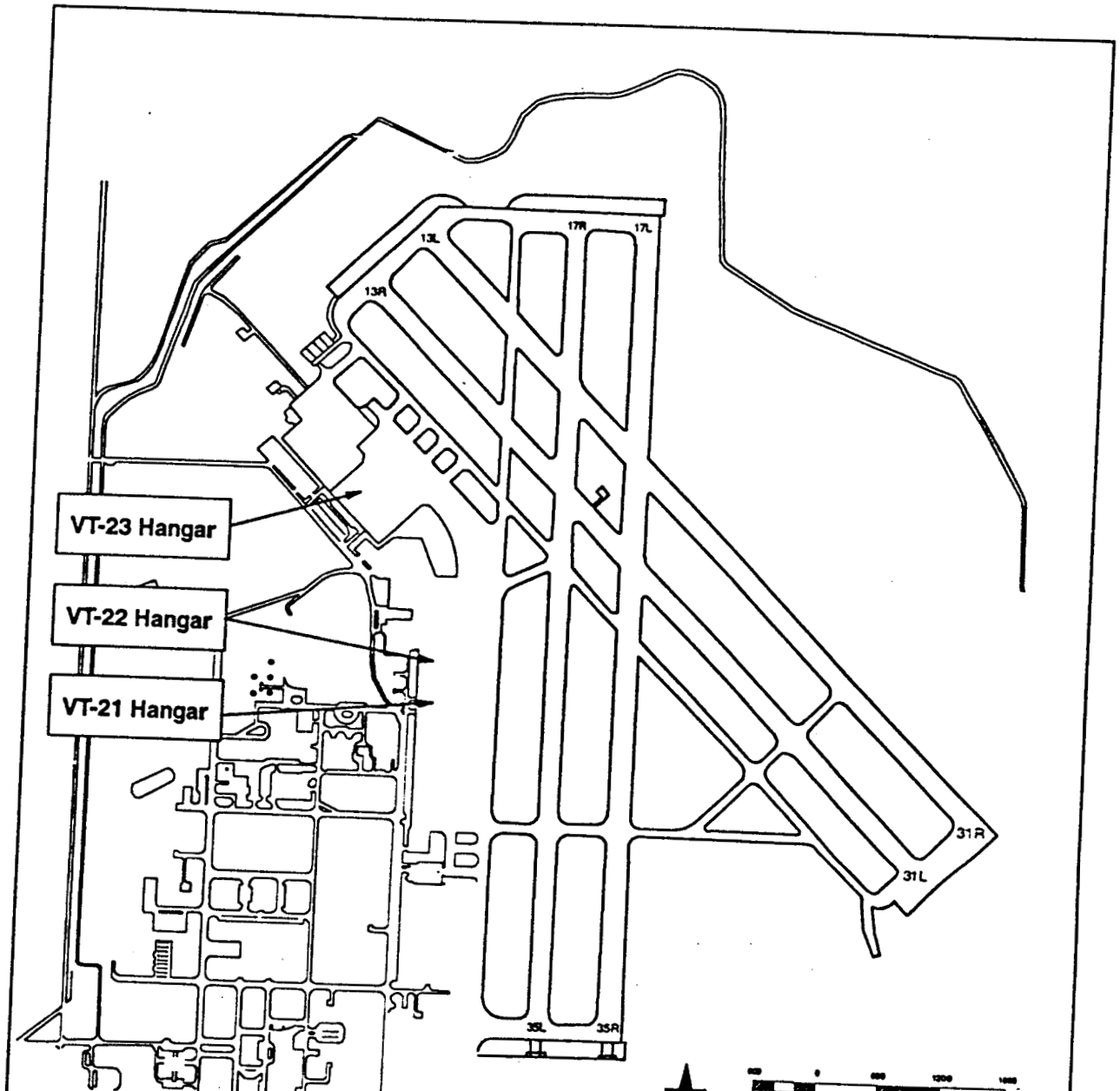
Figure 2-1: NAS Kingsville Study Region

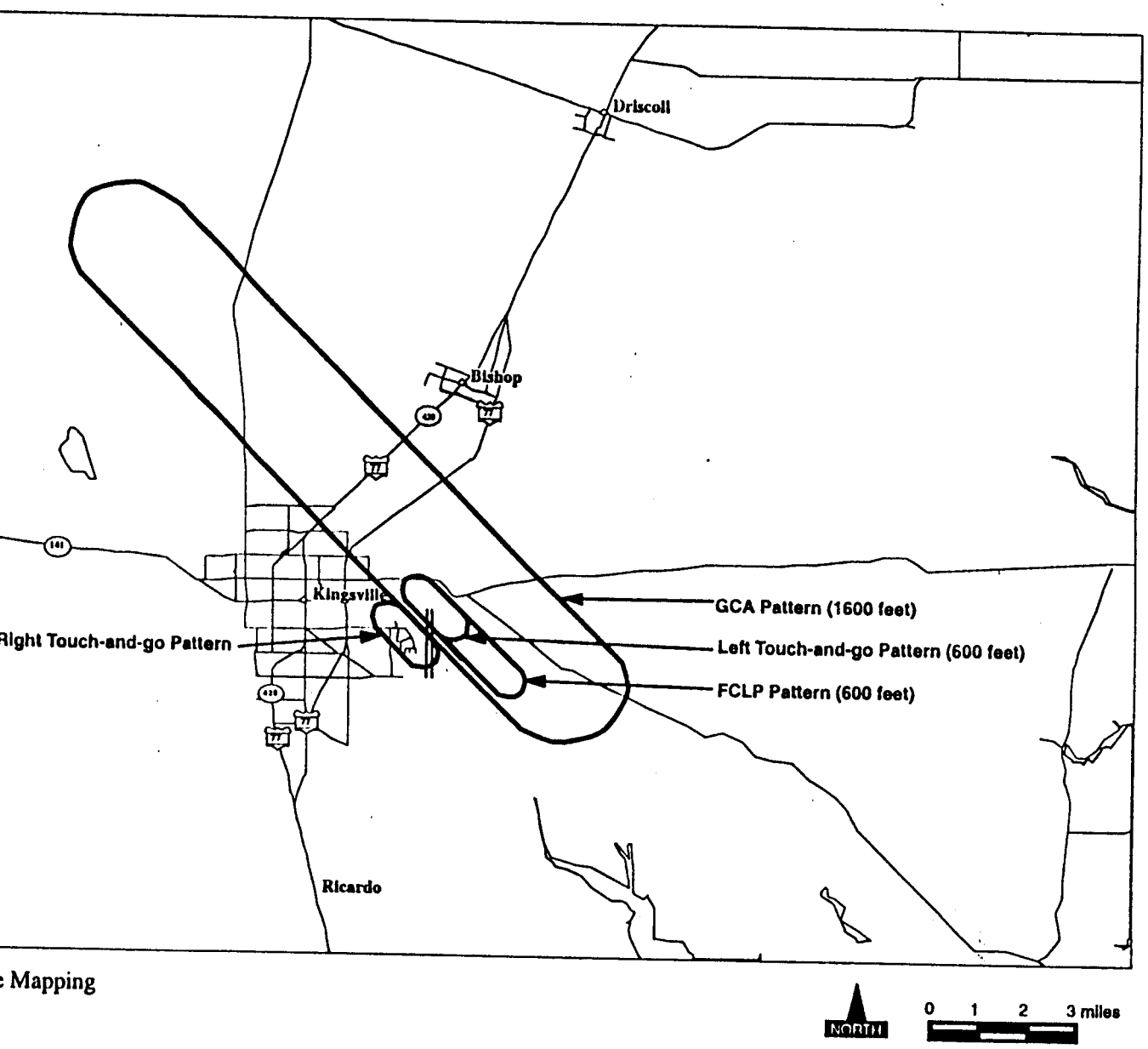
IFR (instrument flight rules) and VFR (visual flight rules) traffic. Though this traffic occasionally interacts with NAS Kingsville traffic, these interactions are rare and generally inconsequential; therefore, this traffic is not modeled, either.

Aircraft from NAS Corpus Christi, located 35 miles from NAS Kingsville, routinely use NAS Kingsville's instrument approaches for training; most often, these aircraft return directly to NAS Corpus Christi after a short training period at NAS Kingsville. Typically, two NAS Corpus Christi-based aircraft use NAS Kingsville on a given day. Because these NAS Corpus Christi-based operations compose less than two percent of NAS Kingsville's total operations, they have a minimal impact on TW II operations; we did not include them in the model.

NAS Kingsville's airfield consists of two pairs of parallel runways — Runways 13 Left and Right (L/R) or 31 L/R, and Runways 17 L/R or 35 L/R; all four are 8000 feet long and 200 feet wide (see Figure 2-2). The prevailing southeasterly winds from the Gulf of Mexico make Runways 13L/R the predominant runways; they are used approximately 55 percent of the time, mostly in the late spring, summer, and fall. Runways 35L/R are used next most frequently — 24 percent of the time, mostly in the winter. The remaining runways, 31 L/R and 17 L/R, are used approximately 21 percent of the time. For modeling purposes, we combined arrivals and departures on Runway 17 L/R with those on Runways 13 L/R to analyze a southeast traffic pattern, and we combined arrivals and departures on Runways 31 L/R with those on Runways 35 L/R to analyze a northwest traffic pattern.

To facilitate training, TW II uses a left VFR touch-and-go pattern; a right pattern is available, but is only used when the left pattern is full or when field carrier landing practice (FCLP) is in progress (see Figure 2-3). When the duty runway is Runway 13 L/R, departures and instrument arrivals use the inboard runway (13R), and touch-and-go training is done on the outboard runway (13L); visual arrivals typically enter through the overhead break and into the touch-and-go pattern. Visual arrivals transition to Runway 13R for landing if they do not interfere with other operations on that runway; otherwise, they land on Runway 13L. Runway 13R is preferred for full-stop landings because aircraft can taxi directly to the hangar area without crossing an active runway. Within the model, however, visual arrivals land on Runway 13L; doing so significantly simplifies the modeling effort while only minimally increasing taxi times.


VT-23 Hangar
VT-22 Hangar
VT-21 Hangar
13L
13R
17R
17L
31R
31L
35L
35R



e Mapping

Figure 2-3: NAS Kingsville Runways 13 L/R Patterns

The hangars and ramp areas are located on the southwest side of the airfield, west of Runway 17R and south of Runway 13R. The taxiway system directly connects the hangar areas to all runway hold-short areas and provides multiple runway exits. There are no unusually congested points on the airfield. All aircraft are fueled at the ramp area after shutdown by fueling vehicles; there are no hot refueling operations. Arresting gear is available on all runways, and E-5 chain-link arresting gear is in place in the overrun area of each runway. The dual runway layout allows emergency aircraft to make a safe arrested landing on one runway without significantly impacting routine operations.

Designated arming and dearming areas are located between the dual runways. Prior to takeoff or after landing, aircraft carrying forward-firing ordnance taxi to these areas where they are safely armed and dearmed by maintenance personnel. Because arming and dearming activities do not significantly affect airfield operations, we did not include them in the model.

2.1.1.2 NALF Orange Grove

NALF Orange Grove is TW II's primary outlying landing field. NALF Orange Grove's main purpose is to provide a safe and cost-effective auxiliary training airfield, relieving congestion at NAS Kingsville. NALF Orange Grove is located approximately 27 miles northwest of Kingsville, in a sparsely populated area. The airfield is situated directly underneath the far southeast corner of the Chase 3 MOA.

NALF Orange Grove is used most often by "out-and-in" missions. During these missions, aircraft depart NAS Kingsville, train at a designated MOA, and transit to NALF Orange Grove. At NALF Orange Grove, they practice touch-and-go landings and full-stop. After the aircraft are refueled and the aircrew debriefed, they continue with the second half of their training mission and return to NAS Kingsville.

The airfield has two intersecting runways, Runways 13/31 and 01/19, which are 8000 feet long and 200 feet wide. We modeled runway operations at NALF Orange Grove in the same manner as those at NAS Kingsville: Runway 13 is active when traffic flows to the southeast and Runway 01 is active when traffic flows to the northwest. All VFR flight patterns are on the left, and there are no noise restrictions at the airfield. NALF Orange Grove does not have precision instrument approaches; the field is closed when NAS Kingsville does not accept break traffic.

2.1.1.3 Other Airfields

Other airfields in southern Texas, such as Kelly Air Force Base (AFB) and NAS Corpus Christi, support operations from NAS Kingsville. Servicing and equipment requirements limit the number of airfields that TA-4 and T-2 aircraft can use in central and southern Texas. Instrument training is the most common type of training mission done at these alternative airfields. Typically, the aircrew will land, debrief, refuel, brief and return to NAS Kingsville.

The alternative airfields are not modeled in detail. Instead, we modeled these airfields as unconstrained areas that missions use for a specified time interval.

2.1.2 Airspace Operations

Southeast Texas airspace is one of the least restrictive areas used by military flight training squadrons. Not surprisingly, the Navy and Air Force have located numerous training bases in southern Texas.

2.1.2.1 Operating Areas

Training Air Wing Two uses the largest airspace area of any Chief of Naval Air Training (CNATRA) facility (approximately 18,000 square miles). The active NAS Kingsville airspace is composed of three MOAs, one warning area, and one bombing range: Kingsville 1 MOA, Chase 1 MOA, Chase 3 MOA, Warning Area 228 (W-228), and McMullen Target Complex (see Figure 2-4). Note that for analysis purposes we consider Chase 2 MOA as part of Chase 1 and Kingsville 2 MOA as part of Kingsville 1. Within this NAS Kingsville airspace, no noise sensitive areas, special departure procedures, or commercial airways significantly affect transit to or from or operations within any of the MOAs. In fact, the most restrictive condition is a hold-down altitude of 11,000 feet MSL (mean sea level) when transiting from NAS Kingsville to Chase 3 MOA; the route of flight, however, is direct at normal cruise speeds.

The most heavily used area is the Kingsville 1 MOA. NAS Kingsville is located in the far northeast corner of the MOA, which extends approximately 90 miles west and 60 miles south from the airfield. The area reaches from 8000 feet MSL to Flight Level (FL) 230 (approximately 23,000 feet). The Kingsville 1 MOA is divided into four major working areas. Three of these areas are located in the southern third of the airspace, delineated by

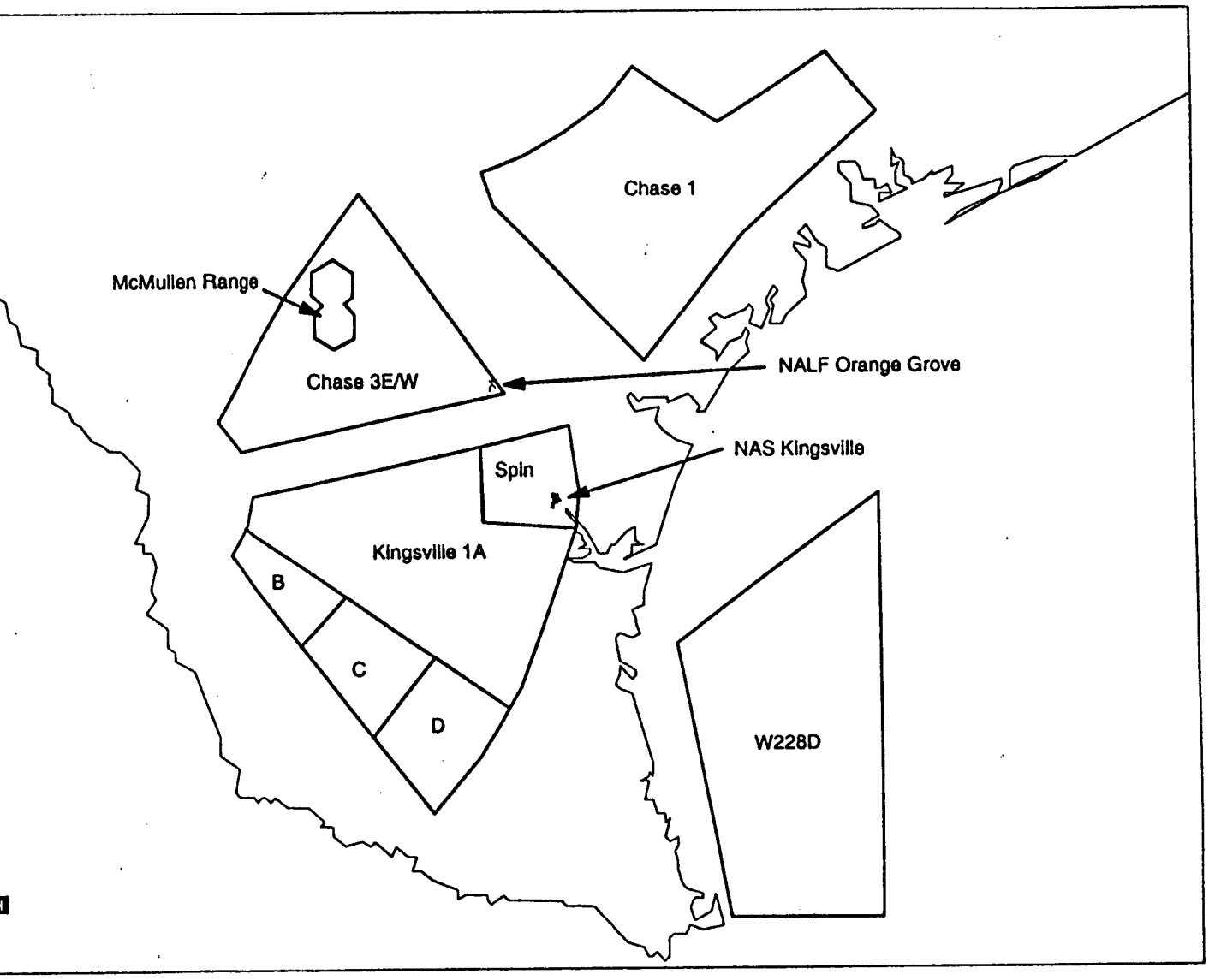


Figure 2-4: Kingsville Airspace

operations, such as FAM (familiarization) flights. Kingsville 1A is the busiest portion of the MOA. There are also three minor working areas within the MOA. Upon request from the FAA's Houston Air Route Traffic Control Center (ARTCC), the MOA is extended to FL 350; this additional area, known as the Kingsville 1 High MOA, is used for post-maintenance check flights. An alert area lies directly beneath the Kingsville 1A MOA; it is used for non-exclusive-use activities. Finally, a restricted "spin" area is also within the borders of the Kingsville 1 MOA. When active, this exclusive-use area allows only OCF (out-of-control) training flights due to the unusual flight paths of the "spin" aircraft.

Chase 1 MOA extends from the former NAS Chase Field in Beeville, Texas, to the northeast. TW II became the MOA's primary user in 1991, following the closure of NAS Chase Field. However, because the MOA is relatively far from NAS Kingsville and because users of Chase 1 must interact with the Houston ARTCC, TW II minimizes use of the area. Generally, the wing uses the MOA only when weather situations dictate or when sufficient working airspace is not available at one of the other areas closer to NAS Kingsville.

The Chase 3 MOA is located directly north of an airway between Laredo and Corpus Christi; the MOA extends from 8000 feet MSL to FL 230. The Chase 3 MOA is used for both exclusive- and non-exclusive-use activities, and is separated into an East and West activity area.

W-228 occupies an over-water area approximately 50 to 90 miles southeast of NAS Kingsville. Used for many on- and above-water military operations, this area is controlled by non-Kingsville airspace coordinators. The portion of the warning area used by TW II is generally not used by others, however. In fact, because crossing air traffic is so infrequent, TW II uses the area primarily for tactical training flights.

The McMullen Target Complex (Restricted Area R-6312) is located beneath the Chase 3 MOA, 65 miles northwest of NAS Kingsville. The range supports two visual bombing complexes: the Yankee and Dixie Targets. TW II uses the range to complete all of its local weapons training. The wing conducts these flights only during daylight hours; a maximum of four aircraft simultaneously use the targets for 30-minute periods. The target is closed one day a month for general maintenance. In addition to TW II, both the Air Force and the Air National Guard use the McMullen Complex. However, because they use the Dixie Target while TW II primarily uses the Yankee target, these other users do not impede TW II's use or scheduling of the range; therefore, we did not include these additional users in the model.

within the model some operations, such as a two-plane Formation flight, are considered equivalent to one aircraft.

Table 2-1: Operating Area Parameters

Area Name	Maximum Equivalent Aircraft	Open Hours
Alert Area	8	0700-2400
Chase 1	6	0700-2400
Chase 3 East	4	0700-2400
Chase 3 West	4	0700-2400
Kingsville 1A	8	0700-2400
Kingsville 1B	3	0700-2400
Kingsville 1C	3	0700-2400
Kingsville 1D	3	0700-2400
Kingsville 1 High	No Limit	0700-2400
McMullen	4	0700-1800
Spin	1	0700-2400
W-228	8	0700-2400

In addition to these areas, TW II also makes extensive use of the military training routes (MTRs) found in central and south Texas. MTRs are specified tracks over the ground, usually in sparsely populated areas; these routes are used to train pilots to navigate and fly at very low altitudes. The routes are usually circuitous and often terminate in the vicinity of a training complex or airfield. Because flying at high speeds and low altitudes is quite dangerous during low visibility, weather conditions must be favorable — at least a 3000-foot ceiling and five-mile visibility — to fly the routes. Aircraft using the MTRs — those conducting operational navigation — do not affect traffic in MOAs.

2.1.2.2 Routes

Aircraft departing from NAS Kingsville or NALF Orange Grove under visual weather conditions generally transit directly to their desired MOA (see Figure 2-5); typically, flights request clearance for direct transit shortly after takeoff. Similarly, aircraft returning to NAS Kingsville or NALF Orange Grove from one of the MOAs generally transit directly to the airfield's initial point (five to six miles from the extended runway centerline), where they enter the break. Under instrument weather conditions, most departures use published standard instrument departures (SIDs), and arrivals make either a

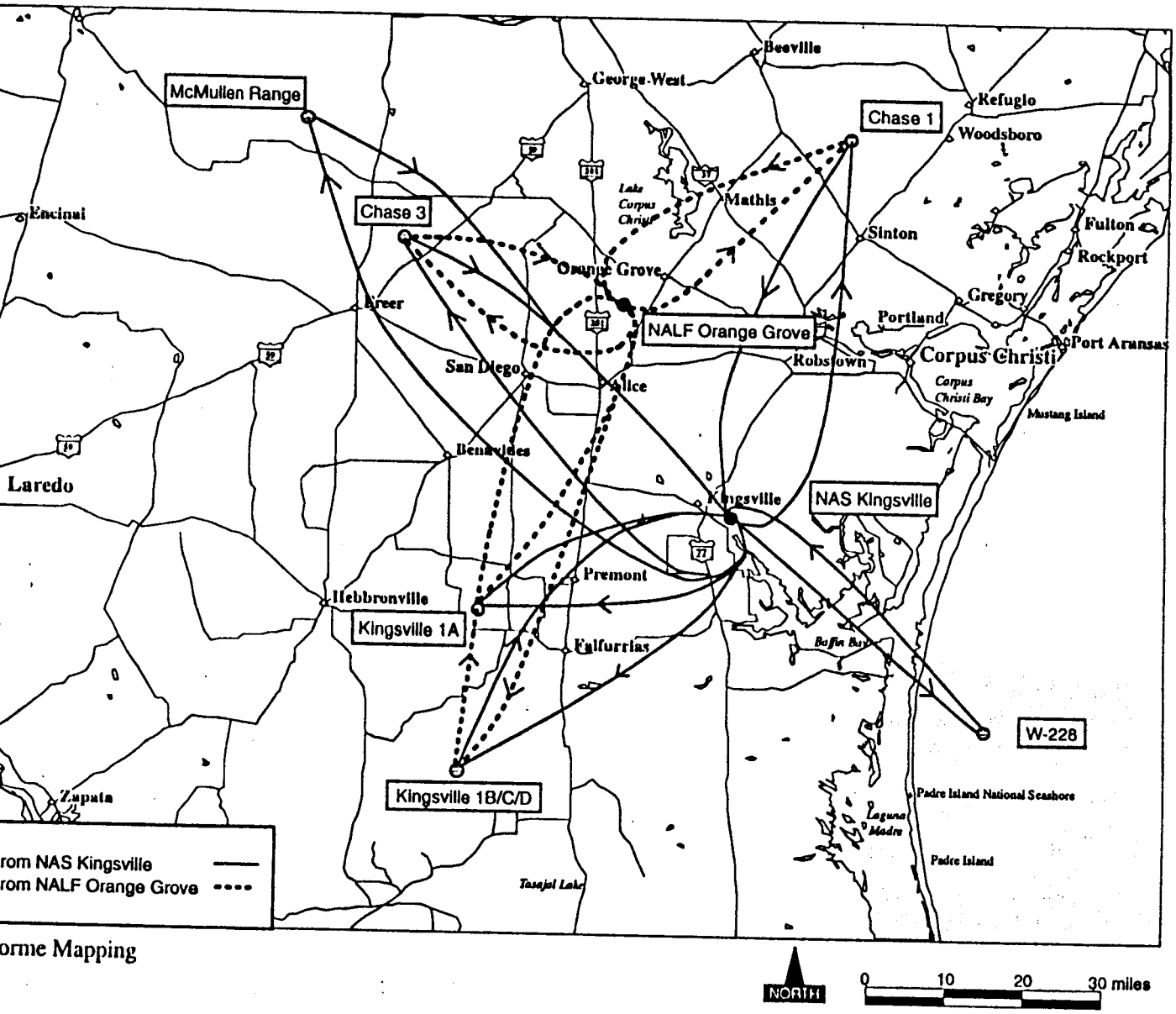


Figure 2-5: Schematic of Selected Routes between Airfields and Operating Areas

GCA until they descend below the cloud cover, when they proceed to the initial point and the break. We modeled over 200 routes that capture these flight conditions.

2.1.3 Squadron Operations

Training Air Wing Two is composed of three squadrons — VT-23, VT-22, and VT-21 — and a Strike Instructor Training School. VT-23 conducts intermediate training in the twin-engine T-2 jet aircraft, and VT-22 conducts advanced training in the single-engine TA-4 aircraft. VT-21 is the T-45 transition squadron; during the 1992 calibration period, this squadron was evaluating the new aircraft. The Strike Instructor Training School develops and administers the instructor training program for both intermediate and advanced training.

Because the goal of the calibration analysis is to ensure that the model and modeling methodology can reasonably replicate squadron operations, we focused our efforts on replicating VT-22 operations, rather than attempting to duplicate all operations at the field. In particular, we ensured that TA-4 mission lengths and cancellation rates matched the squadron's reported statistics. To capture interactions between T-2s and TA-4s, we modeled VT-23 operations, but with less accuracy. Because VT-21's operations were relatively insignificant throughout the 1992 calibration period, the T-45 squadron is not included in the calibration portion of the study. Finally, rather than explicitly modeling instructor training flights in the calibration, we adjusted operation counts when comparing model results to actual data (see Section 2.2.2).

2.1.3.1 Training

Each year, the Navy assigns each squadron a pilot training rate (PTR), a specific number of students the squadron must graduate that year. The Master Curriculum Guide, or training syllabus, specifies a precise sequence of classroom instruction, simulator exercises, and aircraft training that each student must complete in order to graduate. The squadron continuously monitors each student's progress and schedules missions to ensure that the student graduates in a specified amount of time and the PTR is met.

The T-2 syllabus, for example, begins with classroom instruction followed by some simulated flights and actual aircraft training. Introductory flight training familiarizes the student with the aircraft and the airfield. Eventually, the student demonstrates the ability to operate the aircraft without an instructor. At that point, training accelerates; the student is introduced to multiple aircraft flights, night flights, and tactical flight

Carrier qualification training is time-critical. This training can only be conducted when an aircraft carrier is available for training. Thus, the squadron usually adjusts class schedules to match a carrier's availability. In other words, classes are scheduled such that they will reach the carrier qualification stage when the boat is available.

NASMOD does not monitor each student or each class; it monitors the entire squadron and the squadron's overall graduation rate. Thus, rather than modeling the sequence of training stages, we model the total number of each event that the squadron needs to satisfy its PTR. The model randomly picks events that are needed to achieve the PTR goal, subject to some restrictions, such as limiting FCLP work to a two-week period prior to carrier qualification. The resulting schedule accurately represents a squadron's actual schedule. Though a given class follows a pre-specified sequence of training stages, each squadron conducts several classes simultaneously. As a result, there is nearly always a class in each stage of the syllabus.

Table 2-2 lists the events modeled from the T-2 syllabus, and Table 2-3 lists the events modeled from the TA-4 syllabus. Note that similar flight types are combined when possible.

The Strike Instructor Training School trains experienced fleet pilots to teach student naval aviators. Given the broad backgrounds of the fleet pilots, the instructor-under-training (IUT) syllabus is more flexible than the student program. Instructor training depends on the pilot's background and the squadron's need for instructors qualified in a certain stage. The squadrons compare the projected demand for student flights in a certain event to the number of qualified instructors in that event at that time. When there is a lack of instructors, new pilots undergo training.

Table 2-2: T-2 Training Requirements

Event	Symbol	Number per Student
Airways Navigation	AN	5
Basic Instruments	BI	3
Carrier Qualification	CQ DET	1
Field Carrier Landing Practice	CQ	10
Familiarization	FAM	16
Formation	FORM	[illegible]

Table 2-3: TA-4 Training Requirements

Event	Symbol	Number per graduate
Air Combat Maneuvering	ACM	13
Airways Navigation	AN	10
Basic Instruments	BI	2
Carrier Qualification Detachment	CQ DET	1
Field Carrier Landing Practice	CQ	13
Familiarization	FAM	9
Formation	FORM	5
Night Fly	NF	6
Operational Navigation	ONAV	7
Radio Instruments	RI	4
Tactical Formation	TACFORM	4
Air-to-Ground Weapons	WEPS	4

2.1.3.2 Resources

Equipment availability can affect the rate at which squadrons schedule and complete their training events. At Training Air Wing Two, training flights are scheduled to maximize utilization of aircraft. Specifically, missions are scheduled or launched at a rate that uniformly distributes the aircraft supply given the typical mission length and aircraft maintenance turnaround time. When squadrons require more missions than the aircraft supply permits, squadrons fly on weekends or schedule detachments.

Within NASMOD, aircraft are modeled as resources. When a resource is unavailable, missions requiring the resource are canceled. NASMOD schedules missions with respect to the squadron's aircraft launch rate. For the calibration scenario, we assume VT-22 and VT-23 each launch no more than eight aircraft in a one-hour period.

Other equipment or mission requirements, such as instructors, can be modeled as resources, too. For the calibration, however, aircraft are the only modeled resources. No other equipment or requirement sufficiently affected mission scheduling to warrant inclusion within the model.

feet, and ceiling below 200 feet. Table 2-4 lists each training event's average cancellation rate due to weather, given each event's sensitivity to these weather conditions.

Table 2-4: Weather Cancellation Rates

Training Event	Percent of time canceled due to weather
ACM	12
AN	2
BI	2
CQ	4
FAM	23
FORM	10
GUN	20
IR	2
NFLY	6
OCF	30
ON	10
TACFORM	10
WEPS	48

2.1.3.4 Detachments

Historically, TW II has completed various stages of the syllabus at locations other than NAS Kingsville. In these cases, the air wing coordinates the "detachment" of aircraft, aircrew, and support personnel to alternative locations where they complete training. Carrier qualification, for example, must be done at an aircraft carrier; thus a detachment is scheduled to a coastal location. Other events that require low-altitude, cloud-free weather conditions, such as Weapons flights and some introductory flights, frequently require detachments, too; weather at NAS Kingsville does not always permit timely completion of these flights, particularly during the winter months.

During the calibration period, there were two carrier qualification detachments. Each detachment lasted six days and removed twelve aircraft from the home base. The model monitors aircraft removed during the detachment, proportionally reducing other training

usually performs some pattern work. A compound "out-and-in" mission stops at an alternate airfield after completing one training requirement, and after a brief layover, the mission completes a second training requirement before returning to NAS Kingsville. Thus, out-and-in missions satisfy two syllabus requirements, or Xs. During longer cross-country missions, aircraft leave the local airspace, usually for a three-day weekend trip, and complete three or four training events.

NASMOD captures all types of mission sorties. Within the model, missions follow a profile. A mission profile is a sequenced list of resources required, routes flown, areas visited, and activities conducted during the mission. For example, a simple mission profile might request an aircraft, travel to the Kingsville 1A MOA (taxiing from the hangar to the runway and flying on the appropriate route), conduct a 25-minute activity, return to the airfield through the break, complete four touch-and-go landings followed by one full-stop landing, and return to the hangar where it returns the aircraft. More complicated profiles model out-and-in and cross-country missions.

Using complicated profiles, we also model missions that coordinate during certain phases of flight. For example, two aircraft — one flown by a student and a second flown by an instructor — may depart and perform an activity together, but separate upon return; the student might perform several touch-and-go landings while the instructor does a full-stop landing.

A given training event, therefore, may be completed in several ways. Based on information from TW II, we enter the probability that a given mission profile is selected to complete a particular training event.

2.2 Calibration Analysis

After simulating the three-month period, we compared the model's results to actual statistics compiled by NAS Kingsville Base Operations staff. In particular, we examined three primary measures — squadron flight hours, airfield operations, and airspace usage. Because these statistics represent the core of base operations, a successful replication of these statistics indicates that the model and the modeling process can represent NAS Kingsville, and can therefore be used to estimate future operations.

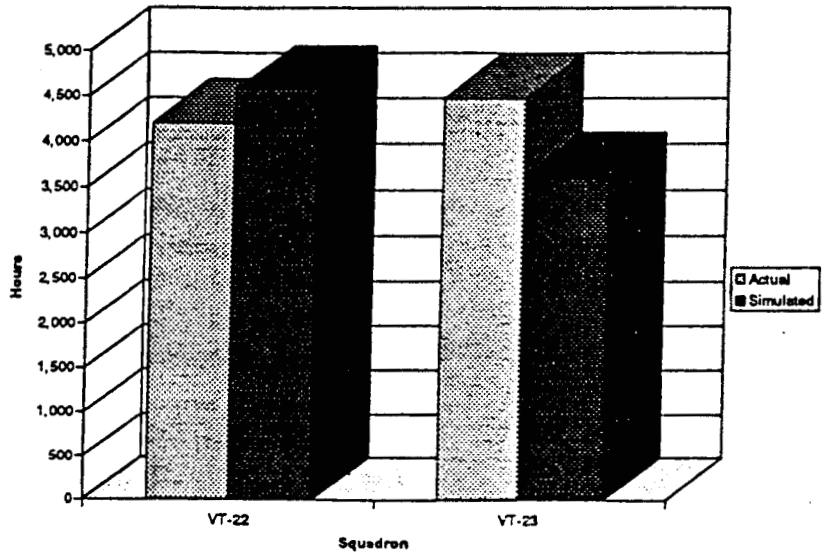


Figure 2-6: Comparison of Squadron Flight Hours during Calibration Period (August 1992 through October 1992)

model shows the squadron flying approximately seven percent more hours than it actually flew. For VT-23, the model shows the squadron flying approximately 900 fewer hours than it actually did (twenty percent less).

The apparent discrepancy between the model's ability to represent VT-22 and VT-23 is largely due the precision to which each squadron was modeled. Remember, to satisfy the goals of the calibration, we concentrated on accurately modeling VT-22's operations; the model's results reflect the accuracy to which each squadron was modeled.

2.2.2 Airfield Operations

Airfield operations measure runway usage. These operations include departures, arrivals, touch-and-go landings, FCLPs, GCAs, and TACAN approaches. Figure 2-7 compares actual airfield operations to simulated airfield operations. Note that the figure compares total operations. In determining the total, each touch-and-go landing and each FCLP is counted as two operations; all other operations are counted as one operation. The figure

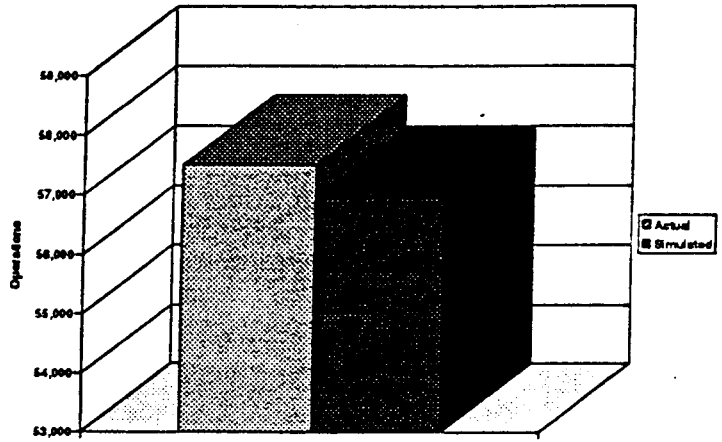


Figure 2-7: Comparison of NAS Kingsville Airfield Operations during Calibration Period (August 1992 through October 1992)

Simulated airfield operations are approximately one percent less than actual airfield operations. Given the data simplifications, such as the less-detailed modeling of T-2 operations, the results are quite reasonable.

2.2.3 Airspace Usage

The model also provides detailed information regarding area usage. Because TW II does not maintain detailed statistics regarding area usage, we could not compare actual area usage to simulated area usage. However, Navy personnel familiar with the airspace examined the simulated results and felt that they were reasonable. Figure 2-8 shows the total number of sorties that used each area during the simulated period, and Figure 2-9 shows the percentage of available hours that at least one aircraft used a given area.

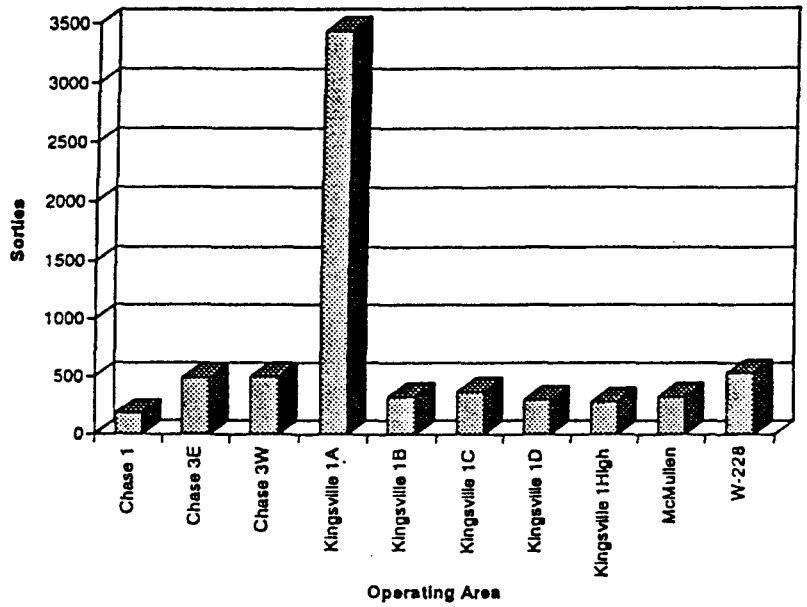
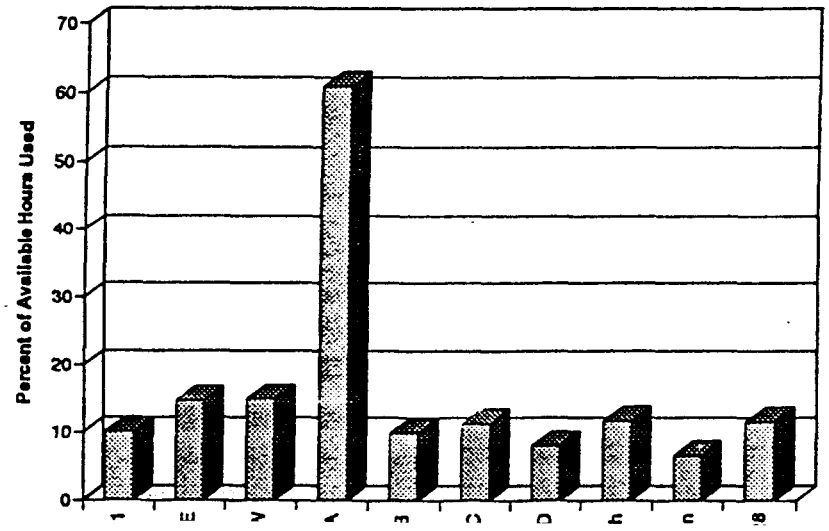


Figure 2-8: Simulated Sorties during Calibration Period (August 1992 through October 1992)



3 T-45 OPERATIONS AND SCENARIO ASSUMPTIONS

The calibration shows that NASMOD replicates T-2 and TA-4 operations reasonably well. Following similar modeling methodology, we can use NASMOD to model future T-45 operations at NAS Kingsville and make inferences about squadron performance given specific operational assumptions. This study examines eight different operational scenarios at NAS Kingsville.

3.1 Modeling of T-45 Operations

To accurately compare and measure the changes induced by each scenario's assumptions, we need a reference, or baseline, scenario. With some exceptions, the facilities, procedures, and operations modeled in the baseline scenario remain constant in the other scenarios. This section discusses the airfield, airspace, and squadron operations as modeled in the baseline scenario, highlighting differences between the T-45 operations and the calibrated T-2 and TA-4 operations. The assumptions associated with T-45 operations are summarized in Appendix Table B-1.

3.1.1 Airfield Operations

As in the calibration, nearly all of TW II's T-45 flight operations originate from NAS Kingsville. Improvements at NALF Orange Grove allow TW II to make greater use of that field in the future, and the greater flexibility offered by the T-45 allows TW II to make greater use of other local fields.

3.1.1.1 NAS Kingsville and NALF Orange Grove

For the most part, baseline operations at NAS Kingsville differ little from the calibration. Traffic generated by other local fields is expected to be minimal, managed procedurally under VFR, and traffic generated by other commands, such as the Air Force and Training Air Wing Four at NAS Corpus Christi, is assumed to remain constant as well; as in the calibration, neither type of traffic is modeled. Once again, we model operations under two runway configurations: Runways 13 L/R for southeast flow and Runways 35 L/R for northwest flow. Arrival, departure, and pattern procedures remain unchanged from the calibration.

Figure 3-1: Animation of NAS Kingsville Operations

experiencing "delay." The model "delays" or incorporates additional flight time into that mission to represent extension of the pattern; when the pattern is full, controllers extend the pattern to maintain safe separation. The aircraft labeled 44.79 is flying over the pattern, about to enter through the left break. On the ground, the aircraft labeled 14.35 is taxiing to the hangar, while the aircraft labeled 148.49 is completing its landing roll.

Unlike operations at NAS Kingsville, operations at NALF Orange Grove change somewhat from the calibration. In particular, the field is equipped with an instrument landing system, allowing instrument approaches. Thus, NALF Orange Grove is no longer closed during no-break weather conditions, and can relieve NAS Kingsville during peak periods of instrument traffic as well as peak periods of pattern traffic. Furthermore, NALF Orange Grove is fully equipped to conduct night operations; we extended its open hours to the period beginning one-half hour after NAS Kingsville opens and ending one-half hour before NAS Kingsville closes. Finally, in the baseline and other T-45 scenarios, a portion of FCLPs are conducted at NALF Orange Grove. By locating FCLP training at NALF Orange Grove, TW II is able to make more effective use of the dual runways at NAS Kingsville.

3.1.1.2 Other Airfields

Using the T-45, TW II is able to make greater use of the numerous other airfields in South Texas. Unlike other military aircraft, which require special support equipment to start and service the aircraft, the T-45 is able to self-start and requires no special service. In particular, the T-45 will make use of airports at Alice, Brownsville, Corpus Christi, Harlingen, Laredo, and McAllen, as well as Victoria Regional. The T-45 uses other military air stations in the region, such as Kelly AFB and NAS Corpus Christi, with the same frequency as T-2s and TA-4s.

These other fields are used for "out-and-in" missions and for instrument work. During an out-and-in mission, the mission lands, and the crew debriefs and briefs for approximately one hour before continuing with a second training mission. In addition to instrument events, other events, such as ACM and TACFORM, make use of these alternative fields. As in the calibration, we model these alternative fields as unconstrained areas that missions use for a specific time interval.

3.1.2 Airspace Operations

airfields. We created additional routes to model instrument approaches at NALF Orange Grove.

Figure 3-2 shows the NAS Kingsville airspace as simulated by NASMOD. The figure, reproduced from NASMOD's animation program, is a snapshot of the operations at approximately 17:10 on a simulated day in one of the scenarios. At that time several aircraft, shown in green, are "arriving"; they are transiting from MOAs to airfields or are at the airfields completing touch-and-go landings. For example, along the Chase 1 MOA boundary, an aircraft depicted by a double triangle is headed toward NAS Kingsville; the double triangle icon represents a section flight (a flight composed of two aircraft). Similarly, just south of the "Kings1A" label, two section flights are heading toward NALF Orange Grove and one toward NAS Kingsville. A departing aircraft, shown in orange, is located just east of the "Kings1A" label; it is transiting from NAS Kingsville to the Kingsville 1 MOA.

The numbers below the MOA labels indicate the number of actual aircraft currently in the MOA performing a training activity. (MOAs that are not labeled are not being used at the time of the snapshot.) For example, one aircraft is currently using Kingsville 1A and two aircraft are using Kingsville 1B. The subwindow, labeled "Current Area-Activity Information," provides information about the activities the aircraft are performing in the MOAs. The lines highlighted in yellow provide information about the current users. For example, the aircraft in Kingsville 1A is conducting a FAM activity, and the two aircraft in Kingsville 1B are conducting a FORM activity.

3.1.3 Squadron Operations

In the baseline and other T-45 scenarios, TW II operates as one squadron: VT-21. This squadron conducts all student and IUT training. Combining students and IUTs into one squadron allows the model to accurately reflect the allocation of available TW II aircraft. Compared to the calibration scenario, which modeled T-2s and TA-4s, squadron operations change considerably, and are modeled with greater precision.

3.1.3.1 Training

In each scenario, the model generates flights in order to graduate a target number of students or PTR. In the baseline scenario, the PTR is 168 students. As with T-2 and TA-4 students, a training syllabus specifies a precise sequence of

Table 3-1: T-45 Training Requirements

Event	Symbol	Number per graduate
Air Combat Maneuvering		
with two aircraft	ACM 2 PLANE	9
with three aircraft	ACM 3 PLANE	4
Airways Navigation	AN	10
Basic Instruments	BI	4
Carrier Qualification Detachment	CQ DET	2
Field Carrier Landing Practice		
first stage: no carrier	CQ NO BOAT	9
second stage: prior to carrier	CQ BOAT	9
Familiarization		
first stage: no overhead weather	FAM CLEAR	10
second stage: overhead weather	FAM OVHD	5
Formation		
with two aircraft	FORM 2 PLANE	12
with four aircraft	FORM 4 PLANE	5
Air-to-Air Gunnery	GUN	8
Instrument Rating	IR	5
Night Familiarization		
first stage: dual flight	NFAM1	1
second stage: solo flight	NFAM2	1
Night Formation	NFORM	4
Out-of-Control Flight	OCF	3
Operational Navigation		
with single aircraft	ONAV 1 PLANE	6
with multiple aircraft	ONAV 2 PLANE	3
Radio Instruments	RI	7
Tactical Formation	TACFORM	4
Air-to-Ground Weapons	WEPS	11

The two stages of FCLPs are scheduled somewhat differently than in the calibration. In the calibration, both the first and second stage of FCLPs were followed by a carrier

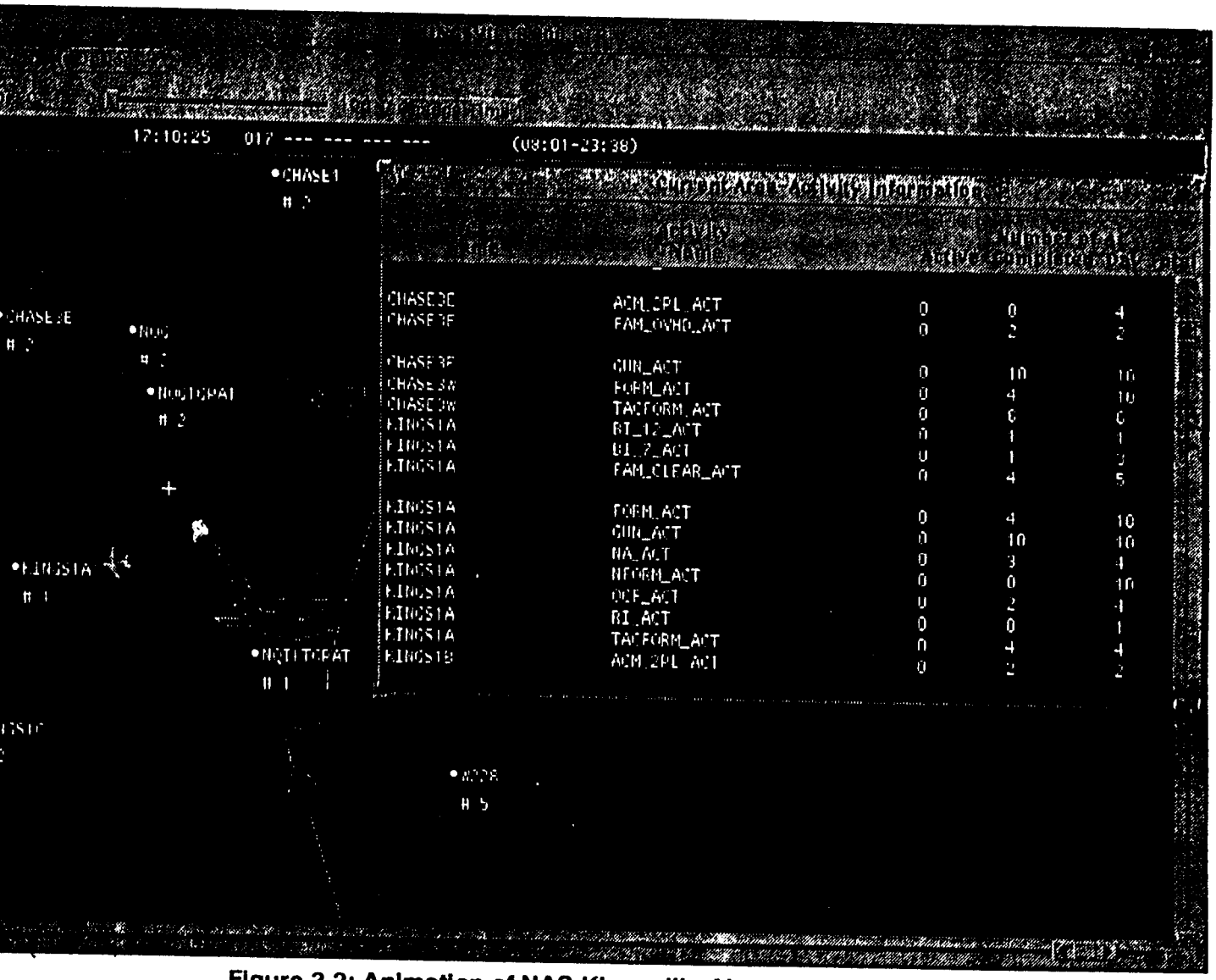
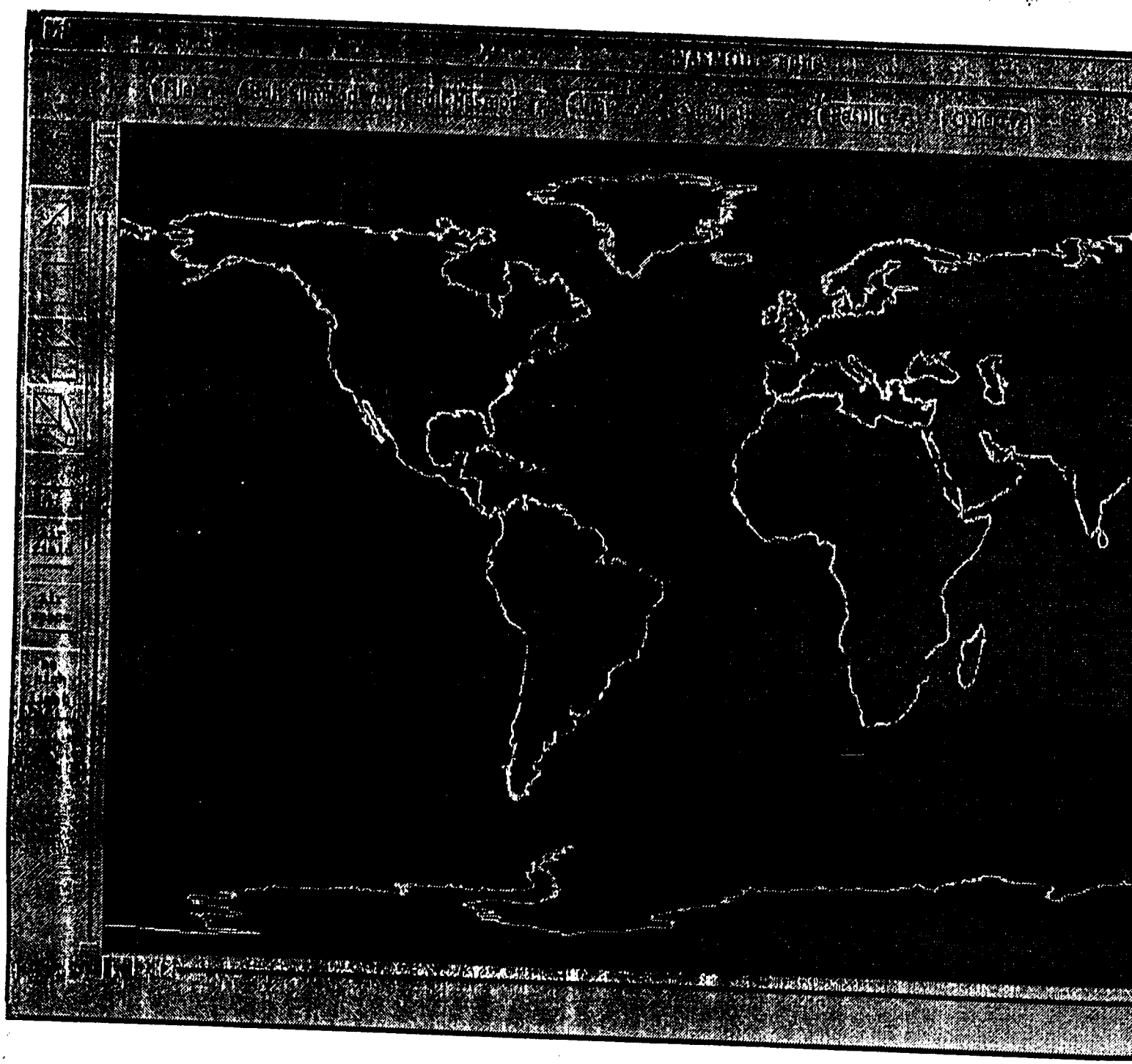


Figure 3-2: Animation of NAS Kingsville Airspace



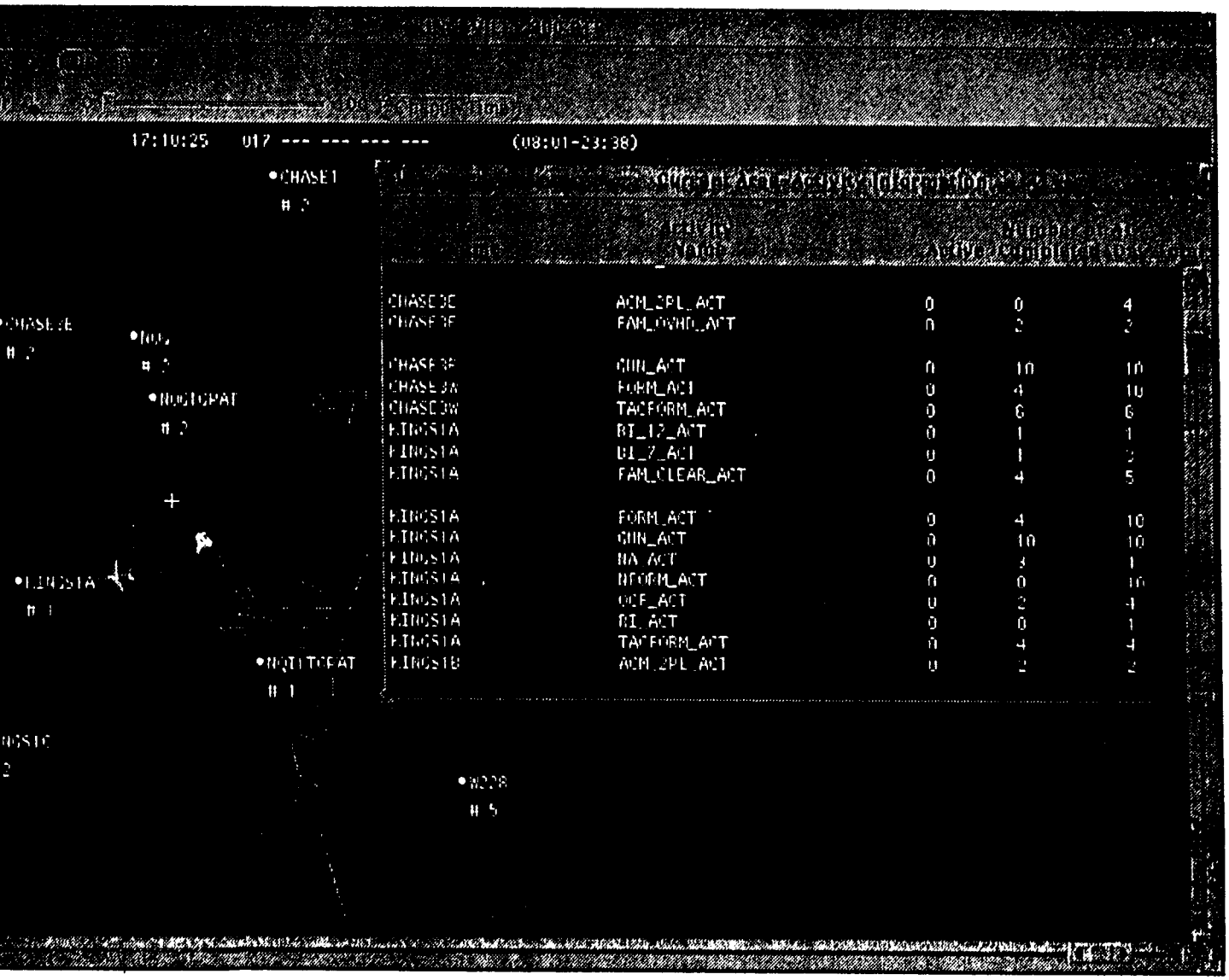


Figure 3.2: Animation of NAS Kingsville Airspace

3.1.3.2 Support Flights

Unlike the calibration, where we only modeled completed student and instructor chase flights, in the baseline and other T-45 scenarios, we model all support flights. These operations include student overhead and attrition missions, IUT training, and maintenance, logistics and ferry flights. Based on experience with T-2 and TA-4 students and the proposed T-45 syllabus, the Navy estimates that for each student graduated the squadron will accumulate 9.7 hours due to student attrition and 21.4 hours due to student overhead. To model these additional flight hours, we created additional missions commensurate with the needed hours; thus, after a mission is flown, its flight hours are occasionally tallied toward attrition or overhead rather than a completed X. Student attrition occurs only in those events associated with the first half of the syllabus — flights prior to CQ NO BOAT (FAM, OCF, BI, RI, AN, FORM, NFAM, and IR) — while student overhead is modeled on selected flights throughout the syllabus.

Similarly, the Navy estimates that the squadron will accumulate approximately 23.6 hours of flight time to conduct IUT training for each student graduated. Though instructor training depends on the squadron's need for certain instructor types and the pilot's background, all instructor pilots complete the initial portion of the IUT syllabus, such as FAM and NATOPS (Naval Aviation Training and Operational Procedures Standardization) flights, and the number of remaining flights completed is typically proportional to the total number of students graduated. Thus, we relate the number of events completed in the IUT syllabus to the target number of student graduates, such that 23.6 hours of IUT training is completed for each graduate. For example, in the model, IUTs complete 1.6 FORM events for each student graduated; when the PTR is 168, IUTs complete 269 FORM events during the year.

Finally, the Navy projects that the squadron will perform maintenance, logistics, and ferry flights at a rate that will generate 9.3 hours of additional flight time for each student graduated. Again, we translate these flights into a number completed per graduate. Specifically, we assume the squadron completes 6.9 maintenance, 2.6 logistics, and 0.9 ferry flights for each graduate.

3.1.3.3 Resources and Weather

Like the calibration, the only resource modeled in the baseline and other T-45 scenarios is aircraft. (Though we model IUT training, we assume that the appropriate type of

In the baseline and other T-45 scenarios, we assume overall weather conditions are similar to those experienced in 1992 and 1993. Thus, the same six weather conditions modeled in the calibration are modeled in all remaining scenarios. Though we make slight adjustments to more accurately reflect each event's sensitivity to each weather type, overall cancellation rates due to weather remain unchanged. Refer to Table 2-4 for a list of these cancellation rates.

Weapons flights are the most weather-sensitive flights. Because they require a visible target unobstructed by low-altitude clouds, these flights can rarely be completed during winter months at NAS Kingsville. Rather than scheduling and canceling these missions, we prohibit NASMOD from scheduling Weapons flights at NAS Kingsville during December, January, and February. Other seasonal variations in weather are modeled at an average rate. For example, we assume an equal chance of overcast skies occurring in July as in December. Thus, the squadron's ability to complete events other than Weapons does not differ due to seasonal weather effects.

3.1.3.4 Detachments

To complete the T-45 syllabus, each student must complete two carrier qualification Xs, performed at the carrier while on a detachment. In the baseline and other T-45 scenarios, there are six carrier qualification detachments. They are scheduled beginning August 15, October 17, December 12, February 20, May 1, and July 10. Each detachment lasts six days and removes aircraft from NAS Kingsville. During the detachment, activity at NAS Kingsville is proportionally reduced.

Because Weapons flights are subject to higher weather cancellation rates than other flights, completing the necessary flights at NAS Kingsville may not be possible. Hence, we allow the model to schedule weapons detachments. In particular, when the squadron's backlog of Weapons flights reaches 560 Xs, NASMOD schedules a two-week detachment using sixteen aircraft. During the two-week period, 50 students complete 550 Weapons Xs. With the 560-X-backlog "trigger," the model attempts to schedule most Weapons flights at NAS Kingsville; only when the backlog reaches 560 Xs does the squadron schedule a detachment. Because of the large number of resources required, eliminating a Weapons backlog of 560 or more Xs at NAS Kingsville would interfere with the squadron's timely completion of other requirements. Thus, the 560-X threshold ensures that detachments are scheduled only when absolutely necessary.

NALF Orange Grove. Similarly, because it has fewer turnaround requirements, the T-45 is able to make greater use of other local airfields. These and other changes are reflected in the T-45 mission profiles, which list the resources required, routes flown, areas visited, and activities conducted by each mission. Appendix Tables B-2 and B-3 list various parameters associated with T-45 profiles for the required training events. These data were provided by TW II personnel.

3.2 Description of Alternative Scenarios

While the baseline scenario provides a basic measure of T-45 operations at NAS Kingsville, seven alternative scenarios offer a means of predicting how the air station would operate under different conditions and quantifying effects induced by different assumptions. The primary purpose of the seven alternative scenarios is to examine the efficiency of operations at different PTR levels. A secondary purpose is to examine the effect of such parameters as aircraft availability, alternative syllabus events, and detachments.

3.2.1 Increasing PTR Scenarios

Three of the scenarios primarily examine effects of differing PTR. In these scenarios, TW II is assigned a PTR of 250, 300, and 350. Except for the number of available aircraft and launch rate, all other conditions are modeled as in the baseline scenario. Table 3-2 identifies all T-45 scenarios, and lists the assumed number of aircraft and maximum launch rate. Note that in the 350-PTR scenario, we assume the squadron has an unlimited supply of aircraft.

Table 3-2: T-45 Scenario Aircraft Availability Assumptions

Scenario	Total Aircraft	Ready-for-Issue Aircraft	Maximum Launch Rate (aircraft per half hour)
168 PTR	64	49	10
225 PTR	97	74	13
250 PTR	91	70	12
275 PTR	116	88	15
300 PTR	115	88	15

modified version of the first half of the strike syllabus. Table 3-3 lists the required training events in this syllabus; a total of 72 Xs are required.

Table 3-3: E2/C2 Syllabus Training Requirements

Training Event	Number of Events
AN	10
BI	4
CQ BOAT	9
CQ DET	2
FAM	15
FORM	17
IR	5
NFAM	2
RI	7
OCF	1

Note that in terms of total Xs required, the 225-PTR scenario with 33,516 required Xs is comparable to the 250-PTR scenario with 33,000 required Xs. Similarly, the 275-PTR scenario with 40,116 required Xs is comparable to the 300-PTR scenario with 39,600 required Xs. The primary difference between the scenarios is that the 225- and 275-PTR scenarios have a greater concentration of events from the first half of the syllabus — those events in the E2/C2 syllabus.

3.2.2 Maximum PTR Scenarios

The final two scenarios, the 400- and 500-PTR scenarios, are designed to determine the maximum possible PTR given certain constraints. In the 400-PTR scenario, for example, we assume only 98 available aircraft. In addition, no weapons detachments are scheduled in this scenario; all Weapons flights must be completed at NAS Kingsville. Finally, no weekend work is permitted. In the other scenarios, weekend work is permitted when the backlog in all events reaches five times the amount normally scheduled on any one day; in other words, the squadron will work any weekend day when it is about one week behind its PTR target. The 400-PTR scenario includes 40 E2/C2 students.

there is a four-week backlog in either event. When working at NAS Kingsville, the squadron cannot schedule more than two four-plane Weapons launches per day. As in the 400-PTR scenario, no weekend work is permitted, and 40 E2/C2 students are included.

4 COMPARATIVE ANALYSIS OF SCENARIO RESULTS

This section examines the simulation results for the eight NAS Kingsville T-45 scenarios. The analysis satisfies three major purposes: to ensure that T-45 operations are modeled properly, to assess operational performance at different PTR levels, and to examine detailed monthly and hourly operations.

4.1 Baseline T-45 Operations

Because the calibration only models T-2 and TA-4 operations, the baseline scenario is the first scenario to model T-45 operations. Therefore, in addition to serving as a reference point for other scenarios, the baseline scenario serves as a check that T-45 operations are accurately modeled.

As expected, the squadron has no difficulty meeting its PTR goal (168 students) in this scenario. One weapons detachment is scheduled at the end of February, when the backlog in weapons reaches 560 Xs, as a result of the weather conditions assumed at McMullen Range during December, January, and February. Other than this weapons detachment and six carrier qualification detachments, all other operations originate from NAS Kingsville. Table 4-1 shows the expected number of sorties and flight hours in various categories that would be generated by TW II if it were to operate at a 168 PTR. Note that the model's results compare favorably with CNATRA's projected flight hours, as shown in Table 4-2. Total flight hours per graduated student differ by only three percent.

Table 4-1: Baseline Scenario (168 PTR) Flight Summary

Flight Type	Sorties	Hours	Avg Hours per Sortie	Avg Hours per Student X	Avg Hours per Student
Student X	22,310	29,188	1.31	1.31	172.69
IUT X	2,890	3,916	1.36	0.18	23.17
Instructor Lead	7,194	8,530	1.19	0.38	50.47
Overhead and Attrition	3,149	4,493	1.43	0.20	26.58

Table 4-2: Flight Hours Per Graduate

Flight Type	Flight Hours Per Student Graduate	
	CNATRA Projection	Simulated Baseline
Student X	175.60	172.69
IUT X	23.63	23.17
Instructor Lead	52.20	50.47
Overhead and Attrition	31.12	26.58
Maintenance, Logistics, Ferry	9.31	9.22
TOTAL	291.86	282.14

Table 4-3 shows the expected airfield operations that TW II would generate at NAS Kingsville and NALF Orange Grove if it were to operate at a 168 PTR. Note that in this table a touch-and-go landing or an FCLP landing includes one count for each pass through the pattern. The results project that nearly one-third of all touch-and-go operations will be done at NALF Orange Grove.

As intended, congestion at NAS Kingsville is minimized by the use of NALF Orange Grove. The only significant congestion occurs during Gunnery flights, when a tow aircraft carrying the banner closes the primary runways as it uses the crossing runway. The banner launch typically takes about two minutes; each aircraft waiting to depart or to perform a touch-and-go landing accumulates additional operating time or delay during this two-minute period. For example, if one flight of three is waiting to depart and two aircraft are in the touch-and-go pattern, a total of ten minutes of delay is accumulated during the one banner launch. In total, these Gunnery flights impose approximately 87 hours of additional operating time during the one-year simulated period. This finding is consistent with the observations of TW II.

Table 4-3: Summary of Baseline Airfield Operations

Type of Operation	NAS Kingsville	NALF Orange Grove
Arrival	27979	4069
Departure	27979	4069
Touch-and-go	64829	31642
GCA or ILS	8570	95
TACAN Approach	1298	0

number of aircraft-hours (an aircraft-hour equals one aircraft using an area for one hour) that the area is used; thus, this figure provides a measure of how densely the area is used. "Hours Available" gives the total number of hours that the area is open and could potentially be used. For example, Kingsville 1A is open for use (and thus available) during the same hours as the airfield — 16 hours per day or 3840 hours per year. W-228 is open the same hours as the field but only used for daylight operations; thus, it is available 2640 hours per year.

Table 4-4: Summary of Baseline Training Area Usage

Area	Hours Available	Hours Used	Percent of Hours Used	Aircraft-Hours Used	Average Hours per Aircraft	Average Aircraft in Area
Alert	3840	753	19.6	2200	0.97	2.92
Chase 1	3840	427	11.1	993	0.79	2.33
Chase 3E	2640	659	24.9	1502	0.73	2.28
Chase 3W	2640	654	24.8	1378	0.75	2.11
Kingsville 1A	3840	2262	58.9	6724	0.79	2.97
Kingsville 1B	3840	592	15.4	1309	0.77	2.21
Kingsville 1C	3840	588	15.3	1301	0.77	2.21
Kingsville 1D	3840	748	19.5	1657	0.75	2.22
Kingsville 1High	3840	450	11.7	520	0.45	1.16
McMullen	2508	277	11.0	1021	0.49	3.68
W-228	2640	405	15.4	1345	0.70	3.32
NAS Kingsville Pattern	3840	1384	36.0	3713	0.16	2.68
NALF Orange Grove Pattern	3840	914	23.8	1945	0.32	2.13

The results fall within expected ranges, given TW II operations and area usage preferences. Not surprisingly, Kingsville 1A shows the greatest utilization; it is used nearly 59 percent of the available hours. Typically, the area is occupied by an average of three aircraft (the area may accommodate at most eight equivalent aircraft). Chase 1, Kingsville 1 High, and McMullen are each used between 11 and 12 percent of their available hours. This relatively low utilization is expected, too: Chase 1 is used primarily

4.2 Alternative PTR Loading

The baseline scenario shows that the model accurately represents expected T-45 operations and that TW II would be able to operate successfully at NAS Kingsville with a PTR of 168. The remaining scenarios examine TW II's ability to operate at NAS Kingsville at higher PTRs, with various numbers of aircraft available.

Though the primary difference between scenarios is the increased PTR, other assumptions affect each scenario's results, and should be considered when making comparisons. Table 4-5 summarizes some key assumptions that can affect results. For example, in the 350-PTR scenario, the squadron has unlimited aircraft: an entire constraint imposed on other scenarios is removed. Also note that several scenarios include students completing the E2/C2 syllabus, a modified version of the strike syllabus. Though two scenarios, such as the 225-PTR and 250-PTR scenarios, may require a similar number of total Xs, the mix of required events differs.

Table 4-5: Summary of Key Scenario Assumptions

Scenario	Number E2/C2 Students	Required Xs*	Available Aircraft	Weekend Work	Detachment Strategy
168 PTR	0	22,176	49	Allowed	Weapons detachment scheduled when backlog reaches 560 Xs
225 PTR	53	33,516	74	Allowed	Same as above
250 PTR	0	33,000	70	Allowed	Same as above
275 PTR	53	40,116	88	Allowed	Same as above
300 PTR	0	39,600	88	Allowed	Same as above
350 PTR	0	46,200	Unlimited	Allowed	Same as above
400 PTR	40	55,680	98	Not Allowed	None Scheduled
500 PTR	40	68,880	98	Not Allowed	Four scheduled detachments for WEPS and FAM

* Based on 132 required Xs for strike students and 72 required Xs for E2/C2 students

4.2.1 Event Completion Rates

The squadron's primary measure of success is the percentage of the PTR goal achieved — the percentage of students graduated. To graduate, a student must complete all events in the syllabus. Because the model does not track individual students, the simulated squadron does not necessarily complete enough of every event to graduate its target number of students. Events are scheduled independently, based on a rate to achieve the target PTR. Constraints can impact events differently; as a result, the squadron may be unable to successfully complete all the needed missions in one or more events. These events are completed at a rate commensurate with a lower PTR. Other events may be completed at rates commensurate with the target PTR.

In three of the scenarios — the 168-PTR, 225-PTR, and 350-PTR scenarios — the squadron meets its PTR target in all events. In another three scenarios — the 250-PTR, 275-PTR, and 300-PTR — the squadron meets its PTR target in all events except Weapons events. In two of the scenarios — the 400-PTR and 500-PTR scenarios — the squadron fails to meet its PTR target in several events.

Weapons flights are the most constrained because they are more sensitive to weather than any other required flight; within the model, the squadron does not attempt to schedule them locally during December, January, or February. Table 4-6 summarizes TW II's PTR completion rate for Weapons events in each scenario. An event's "PTR completion rate" is the number of student graduates the squadron could produce based solely on the number of Xs completed in that event. In determining an event's PTR completion rate, we assume the squadron produces sufficient Xs in other events.

The results indicate that TW II will have difficulty completing Weapons flights as the PTR requirement increases. However, completing the Weapons flights is not impossible: in the 350-PTR scenario all of the flights are completed, and in two of the "unsuccessful"

Table 4-6: PTR Completion Rates in Weapons

Scenario	Weapons PTR Completion Rate	Percent of Goal Achieved
168 PTR	168	100
225 PTR	225	100

scenarios, more than 95 percent of the needed flights are completed. The results suggest that, even with the assumed weather constraints, weapons flights could be completed given a sufficient number of available aircraft. Similarly, making detachments more available (by lowering the threshold that induces a detachment) is also likely to increase the completion rate of Weapons flights.

In the 400- and 500-PTR scenarios, several events have low PTR completion rates, indicating that the wing's capacity is somewhat lower than those scenarios' target PTR, when operating under the assumed conditions. Table 4-7 summarizes the PTR completion rates based on the number of events completed in each required training event in those scenarios. An event's PTR completion rate reflects the ease with which NASMOD is able to schedule the event. Generally, events with few time-of-day and weather restrictions, such as IR, have higher PTR completion rates, while events that have such restrictions,

Table 4-7: PTR Completion Rates at 400 and 500 PTR

Event	PTR Completion Rate	
	400 PTR	500 PTR
ACM 2 PLANE	265.6	243.2
ACM 3 PLANE	259.0	232.5
AN	401.3	501.9
BI	364.3	346.3
CQ BOAT	413.6	502.4
CQ DET	430.9	538.9
CQ NO BOAT	323.0	271.8
FAM CLEAR	236.5	236.6
FAM OVHD	248.5	218.7
FORM 2 PLANE	279.7	243.9
FORM 4 PLANE	279.3	231.1
GUN	302.4	232.8
IR	402.2	501.1
NFAM1	182.7	200.9
NFAM2	331.8	299.1
NFORM	344.3	309.0
OCF	352.9	245.8

such as NFAM1 and WEPS, have lower completion rates. For example, in the 400-PTR scenario, the squadron has the lowest PTR completion rate in WEPS — only 156 students.

The PTR completion rate is also influenced by scheduling and other assumptions. For example, the high completion rates in CQ DET are due to the way the simulated year is initialized and to the assumed scheduling of carrier qualification detachments relative to the start of the simulation. However, because these events are completed away from the local area using a predetermined number of aircraft, completion of extra CQ DET events does not add to the competition for the scheduling of other events. Similarly, the squadron meets its target PTR completion rate in CQ BOAT because there is a special two-week period designated for the squadron to complete that high-priority event. On the other hand, there is no special period for CQ NO BOAT; NASMOD schedules that event as it does all others, and as a result the target PTR completion rate is not met.

In the 400-PTR scenario, in which there are 98 available aircraft and no weapons detachments, the squadron completes 43,430 Xs. Assuming there are ten strike students for each E2/C2 student, the squadron completes enough events in total to graduate approximately 312 strike students and 31 E2/C2 students (strike students need 132 Xs and E2/C2 students need 72 Xs). Of course, the PTR completion rate varies by event (see Table 4-7).

In the 500-PTR scenario, the squadron completes 45,203 Xs. Assuming there are twenty-five strike students for two E2/C2 students, the squadron completes enough events to graduate roughly 328 strike students and 26 E2/C2 students. Again, the PTR completion rate varies by event, as shown in Table 4-7. In this scenario, the squadron has the lowest completion rate in NFAM1 — sufficient Xs for only 201 graduates. The squadron completes 2386 Xs in FAM and WEPS during four detachments. Specifically, 1101 FAM Xs and 1285 WEPS Xs are completed during detachment (this is 30 percent of the completed FAM Xs and 57 percent of the completed WEPS Xs).

Note that the 300-PTR and 275-PTR scenarios have aircraft restrictions similar to the 400-PTR and 500-PTR scenarios — 88 compared to 98 (see Table 4-5). Though a weapons-exclusive detachment occurs in each of the lower PTR scenarios, the squadron is more successful completing events in those scenarios, failing only to graduate a few weapons students. In these scenarios, we do not find the large variation in PTR

"Excess" events are those that cause the squadron to exceed its capacity graduation rate. To illustrate, consider a squadron whose students must complete two flights to graduate: one flight in event A and one flight in event B. Suppose that the capacity PTR is 350, but the NASMOD scenario has a target PTR of 400. Event A is not weather limited and thus is easier to schedule. As a result, the squadron meets its target completion rate in the event, completing 400 Xs in event A; because the capacity is only 350, it completes an excess 50 events. In event B, the squadron completes enough Xs to graduate 300 students; the squadron is 50 events short. If the target PTR had been 350 instead of 400, then NASMOD would not have attempted to schedule the 50 excess flights in event A; instead, resources would have been devoted to scheduling event B. In this simple example, there is a one-to-one correspondence between event A and event B; this may not be the case in other scenarios.

For reference purposes, Table 4-8 shows the number of Xs required and completed in each scenario and the number of weekend days worked. In all the scenarios except the 400- and 500-PTR scenarios, the squadron works on any weekend day in which the event backlog exceeds a week's worth of events when working at a rate that would achieve the PTR target. The number of weekend days worked provides an indication of the difficulty the squadron has meeting its target. In the 350-PTR scenario, with unlimited aircraft, the squadron requires no weekend work to meet its PTR target, while in the 275-PTR scenario the squadron requires 13 weekend days.

Table 4-8: Number of Xs Completed

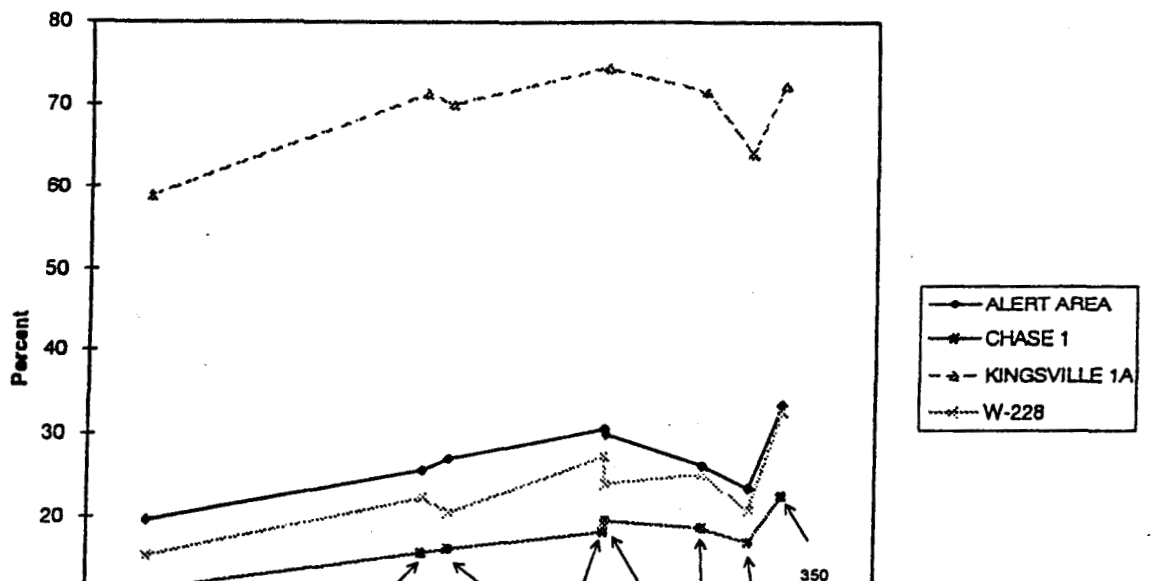
Scenario	Required Xs*	Xs Completed	Weekend Days Worked
168 PTR	22,176	22,310	5
225 PTR	33,516	33,752	4
250 PTR	33,000	32,752	10
275 PTR	40,116	39,750	13
300 PTR	39,600	39,682	8
350 PTR	46,200	46,460	0
400 PTR	55,680	43,430	0
500 PTR	68,880	45,203	0

* Based on 132 required Xs for strike students and 72 required Xs for E2/C2 students

4.2.2 Operating Area Usage

As expected, operating area usage increases as the PTR increases. An increase in area usage can appear as an increase in the number of hours that an area is used or as an increase in the number of aircraft that use the area at any single moment. In the eight scenarios, both types of increase occur. Figure 4-1 shows statistics on the percent of available hours that selected areas are used and Figure 4-2 shows statistics on the average number of aircraft in selected areas at any time (see Appendix B, Tables B-4 and B-5, for complete results on all areas). Note that in both graphs, the statistic is plotted as a function of the total number of Xs completed.

Though areas are generally used more often as the number of Xs completed increases, the graphs highlight several exceptions. For example, in the 400-PTR scenario, area usage declines somewhat. Because the squadron does not work weekends in the 400-PTR scenario, the percent of available hours that areas are used decreases relative to the earlier scenarios where occasional weekend work occurs. (The number of available hours is held constant in the calculation.) As expected, the decrease in hours that an area is used is accompanied by a corresponding increase in the density of aircraft in that area.



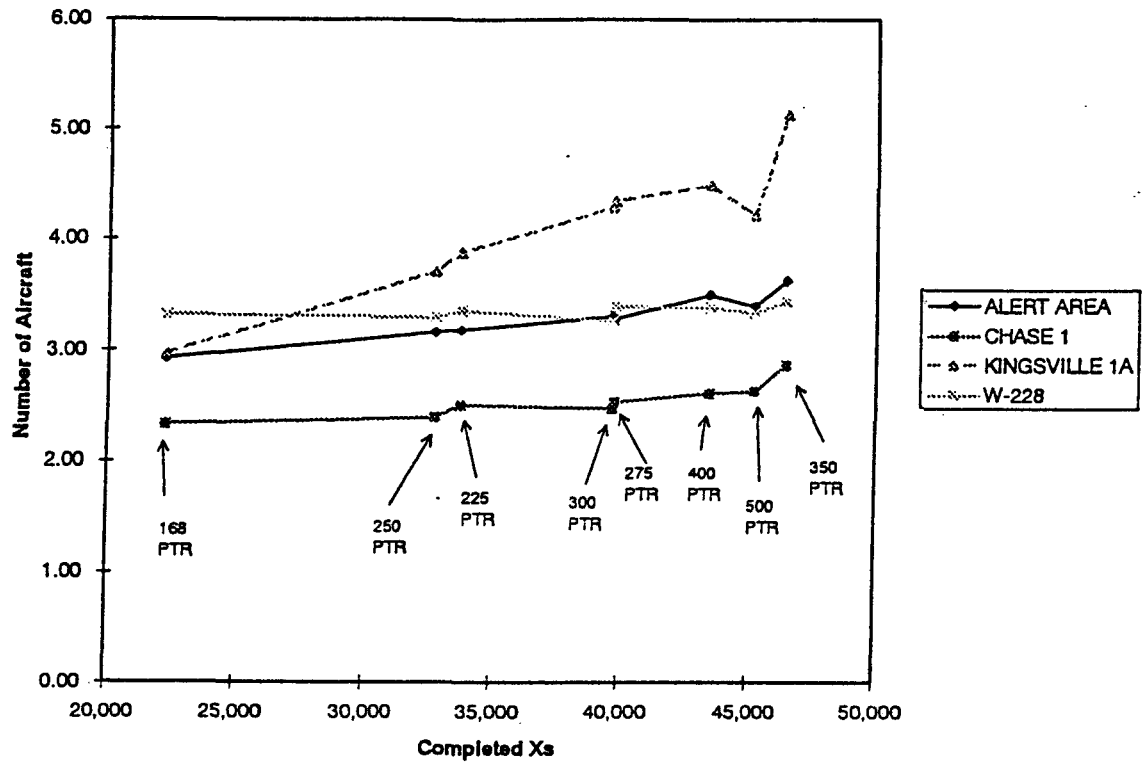


Figure 4-2: Average Number of Aircraft In Area

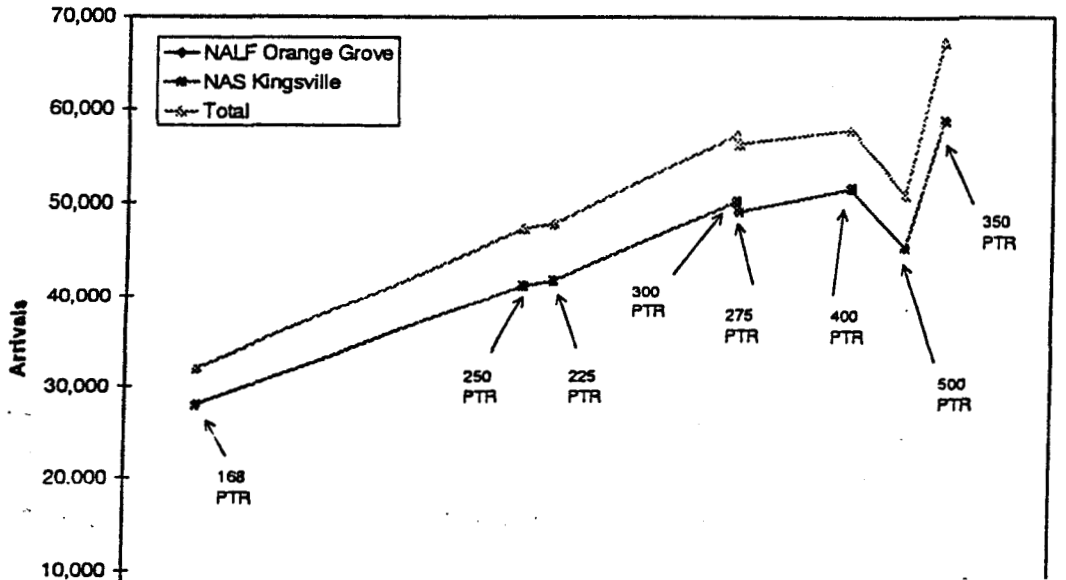
In the 500-PTR scenario, area usage declines further (use of Chase 1, for example, drops from 18.7 percent of available hours in the 400-PTR scenario to 16.9 percent of available hours in the 500-PTR scenario). This drop is attributable to detachments. Over 2300 Xs are completed during detachments in the 500-PTR scenario, while no Xs are completed on detachment in the 400-PTR scenario and only 550 Xs are completed on detachment in the other scenarios. Xs completed on detachment reduce the demand for local airspace. Though only FAM and WEPS are performed on the 500-PTR scenario's detachments, use of areas not used for these flights, such as Chase 1, is reduced. This is because use of all areas is automatically redistributed to reflect airspace availability. For example, a FORM mission that desired to use Kingsville 1A may be rescheduled to Chase 1 if a FAM mission is scheduled to use Kingsville 1A. However, if that FAM mission is conducted elsewhere during a detachment, the FORM mission may use Kingsville 1A as desired rather than Chase 1.

students, who only complete the first half of the syllabus, demand is greater for areas used by events in that part of the syllabus — the alert area rather than W-228.

Usage of Kingsville 1A increases from 58.9 percent of available hours in the baseline 168-PTR scenario to a maximum of 74.5 percent of available hours in the 300-PTR scenario. Unlike other areas, time usage does not increase at Kingsville 1A as completed Xs increase; instead it remains fairly constant, around 70 percent. The density of use in the area, however, does steadily increase, from an average of 2.97 aircraft in area at any one time in the baseline scenario to 5.13 aircraft in the 350-PTR scenario (at most eight aircraft may be scheduled to use the MOA simultaneously). These results indicate that the Kingsville 1A MOA is probably reaching capacity limits. As this occurs, missions are reassigned to other areas.

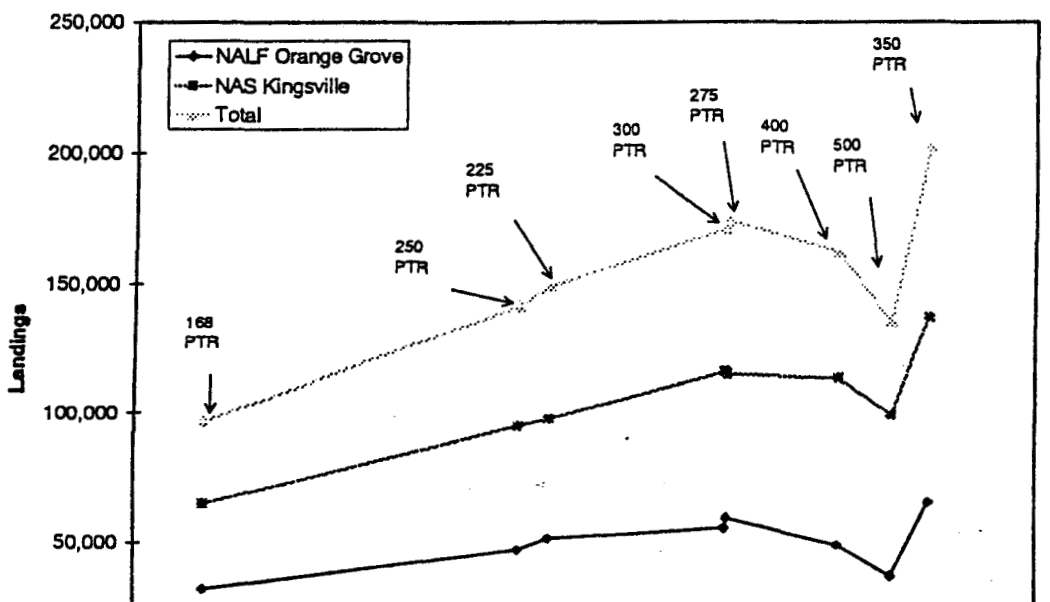
4.2.3 Airfield Usage

Airfield usage follows the same trends as operating area usage: use of airfields increases as the number of completed Xs increases. Figures 4-3 through 4-5 show the number of arrivals, pattern landings, and FCLP landings in each of the scenarios. Note that in these figures a pattern or FCLP landing generates one count for each pass through the pattern.



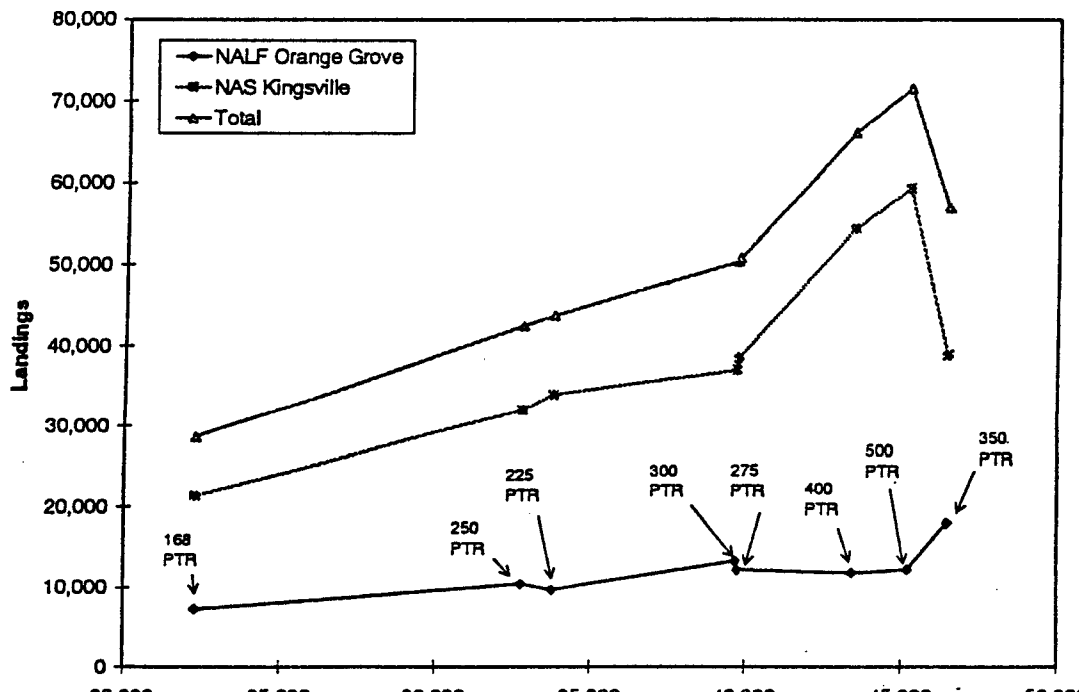
Generally, arrivals increase at both NAS Kingsville and at NALF Orange Grove as the number of completed Xs increases, and the fraction of total arrivals occurring at NALF Orange Grove remains fairly constant, around 13 percent. In the 400-PTR scenario total arrivals increases, as expected, but the fraction of arrivals occurring at NALF Orange Grove decreases to 11 percent because the number of completed flights includes a greater portion of instrument flights, which do not make frequent use of NALF Orange Grove. In the 500-PTR scenario, total arrivals decrease because a large number of Xs is completed on detachment and on the cross-country trips leading to the detachments. Again, the fraction of arrivals occurring at NALF Orange Grove is about 11 percent because a greater portion of instrument flights is completed in this scenario.

Similar to arrivals, touch-and-go pattern landings increase as the number of completed Xs increases, except in the 400- and 500-PTR scenarios, where these landings decrease. The decrease is particularly notable in the 500-PTR scenario. In this scenario, two phenomena contribute to the decrease in pattern landings. First, because they are less constrained by weather and time-of-day restrictions, a greater portion of instrument flights, which do not perform many touch-and-go landings, is completed. Second, approximately 30 percent of



FAM events, which generate a substantial number of pattern landings, occur during detachment. In all the scenarios, except for the 500-PTR scenario, the fraction of touch-and-go pattern landings completed at NALF Orange Grove remains around 32 percent.

Contrary to the trend found in arrivals and pattern landings, there is a greater increase in the number of FCLP landings in the 400- and 500-PTR scenarios than in the other scenarios. This increase occurs because pre-carrier-qualification FCLPs are among the most successful events (they are completed at rates commensurate with the target PTR). Because pre-carrier-qualification FCLPs are conducted only at NAS Kingsville and because non-boat FCLPs are not completed with the same success rates in these two scenarios, the fraction of FCLPs completed at NALF Orange Grove in these two scenarios declines to approximately 17 percent, compared to approximately 25 percent in the earlier scenarios. In the 350-PTR scenario, the fraction of FCLPs completed at NALF Orange Grove increases to 32 percent. This result indicates that relatively more non-boat FCLPs are scheduled at NALF Orange Grove than at NAS Kingsville, suggesting that the NAS Kingsville airfield becomes somewhat congested at this PTR level.

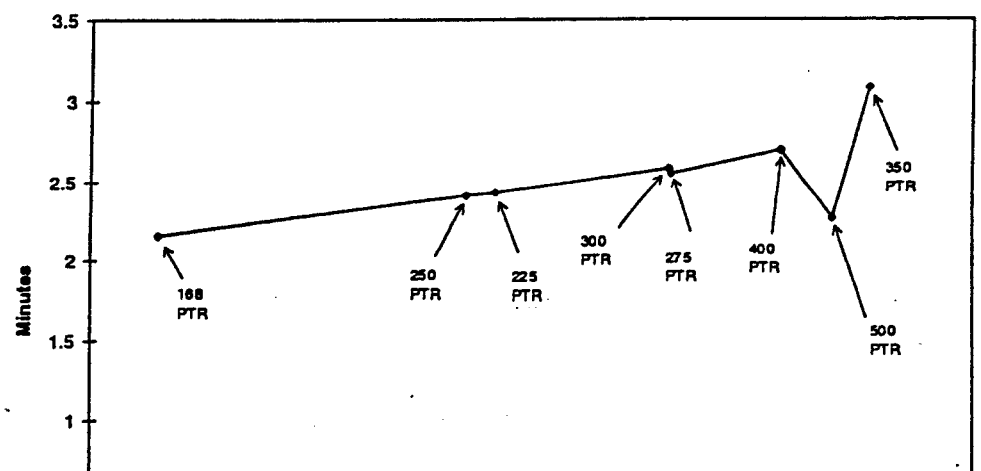


4.2.4 Mission Delay

Following the same pattern as other reported statistics, delay experienced by missions increases as the total number of missions performed increases. Total delay experienced by the squadron ranges from 801 hours in the 168-PTR scenario to 2386 hours in the 350-PTR scenario. Note that delay includes the additional flight time experienced by aircraft as patterns are extended to accommodate additional aircraft.

Figure 4-6 relates delay to the number of Xs completed, plotting the average delay experienced to obtain a single X when a given number of Xs is completed during the year. Generally, the delay increases as the number of Xs completed increases. One exception occurs at the 45,000-X level; this point represents the 500-PTR scenario. In this case, average delay per X actually decreases to a level comparable to approximately 26,500 Xs. This sizable reduction in delay is caused by the completion of FAM events during detachments. Approximately 30 percent of FAM missions are completed away from NAS Kingsville in this scenario, reducing delay experienced by other local missions.

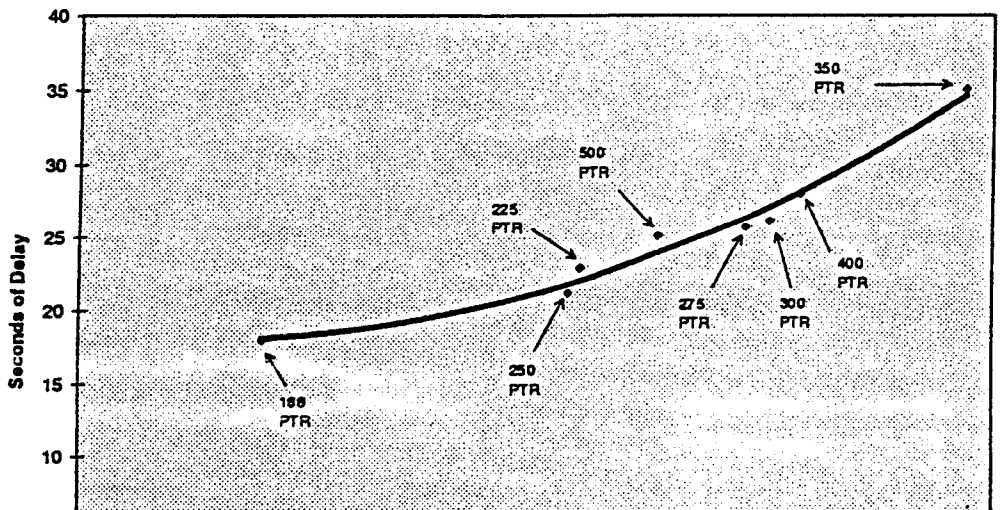
Through the 43,000-X level, average delay per completed X increases at a fairly constant rate: the average delay experienced to complete an X increases by approximately 0.00145 seconds for each additional X completed. Beyond that X level, average delay per completed X begins increasing at a quicker rate (ignoring the data point produced by the



500-PTR scenario). At the 46,000-X level (produced by the 350-PTR scenario), the average delay experienced to complete an X increases by approximately 0.00230 seconds for each additional X completed — a rate that is 1.59 times the rate at lower X levels. This observation suggests that once the squadron operates at a level that will generate more than 45,000 Xs, delay may begin to increase significantly. Note, however, that this observation is only supported by one scenario, which may have produced somewhat atypical results since no restrictions are assumed on the number of aircraft available.

Delay does not significantly affect operations in any of the scenarios. Average mission hours to obtain an X remains fairly constant in all scenarios, ranging from 2.12 hours to 2.17 hours. The minor fluctuations between scenarios are due to such factors as the number of incomplete missions rather than increases in delay.

In most cases, airfield ground delay (delay experienced by taxiing aircraft) is small. Although it increases as the number of airfield operations increases, the average delay per arrival is always less than four seconds. The average delay per departure is somewhat higher. Figures 4-7 and 4-8 plot the trends in average delay per departure at NAS Kingsville and NALF Orange Grove as a function of the number of departure operations. In both plots, a departure operation is a single departing aircraft; thus, a departing section flight counts as two operations. At NAS Kingsville, the average delay per departure



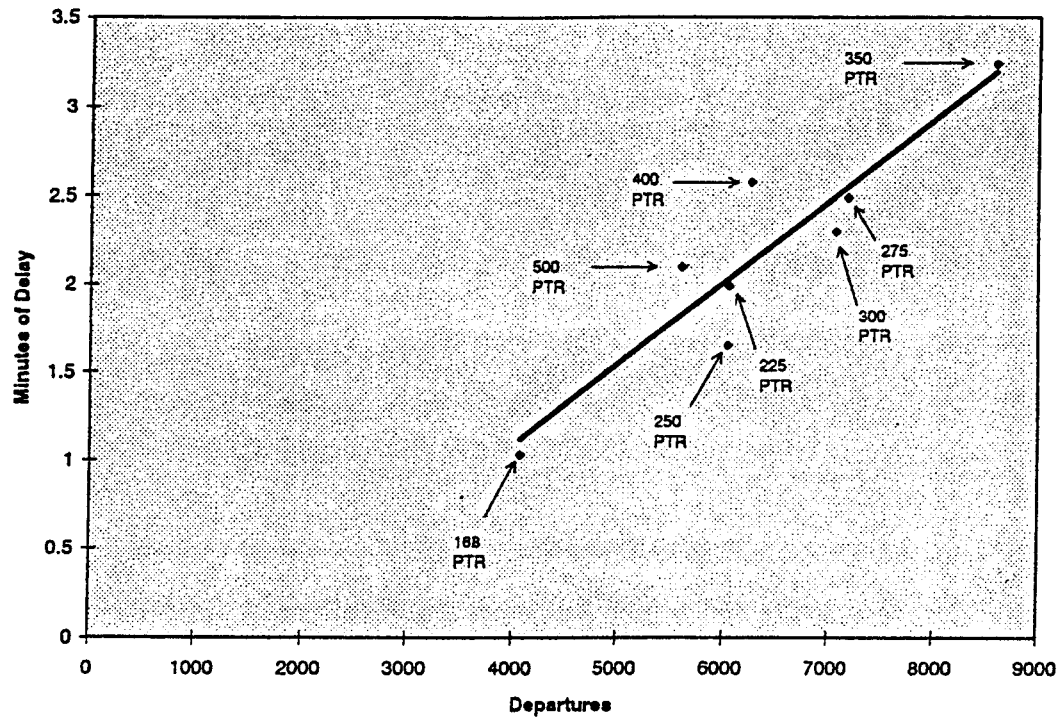


Figure 4-8: Trend of Delay per Departure at NALF Orange Grove

ranges from 18 seconds in the baseline scenario (28,000 departures) to 35 seconds in the 350-PTR scenario (58,800 departures). At NALF Orange Grove, average delay per departure is larger: it ranges from 1.0 minute in the baseline scenario (4,100 departures) to 3.2 minutes in the 350-PTR scenario (8,600 departures).

The larger delay at NALF Orange Grove is expected, since only one runway, which is shared for arrivals, departures, and pattern work, is available at any one time. The magnitude of the difference in delay per operation at different operational levels reveals the efficiency gained by dual runway operations.

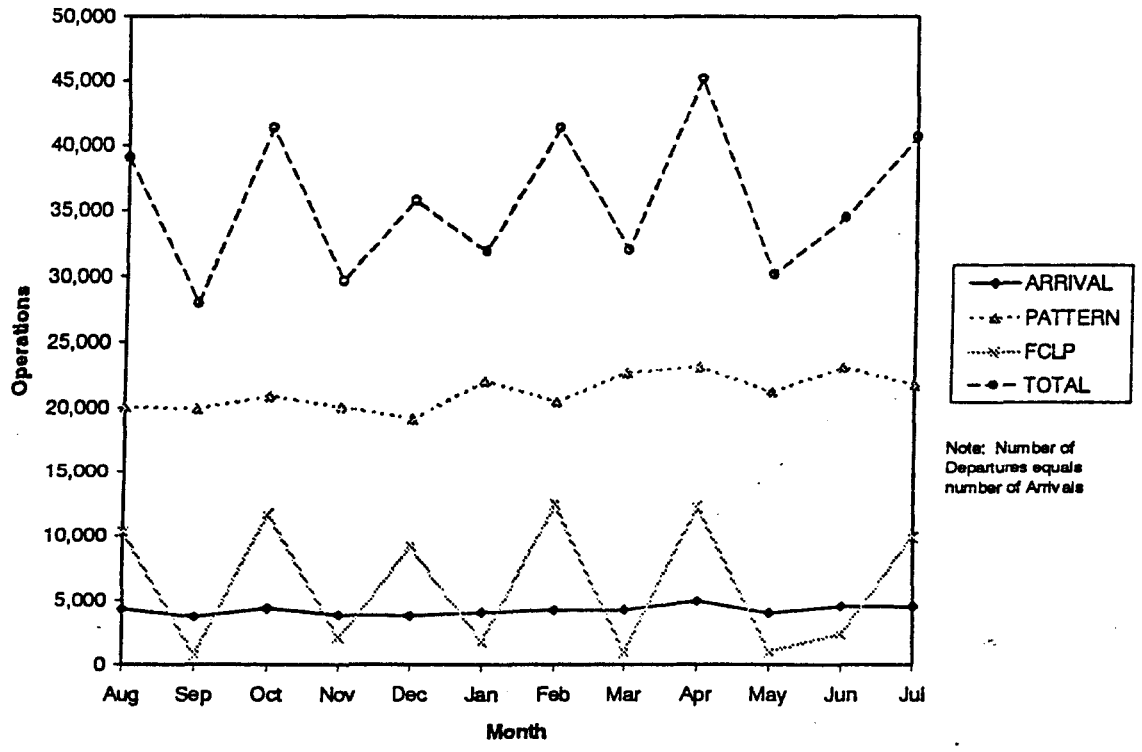
4.3 Monthly and Hourly Flows of Operations

NASMOD provides detailed daily statistics on airfield operations and SUA and range usage. This section examines these detailed data for the 300-PTR scenario.. The 300-PTR

Appendix B, Tables B-9 through B-11, for detailed data on derived airfield operations and training area sorties.

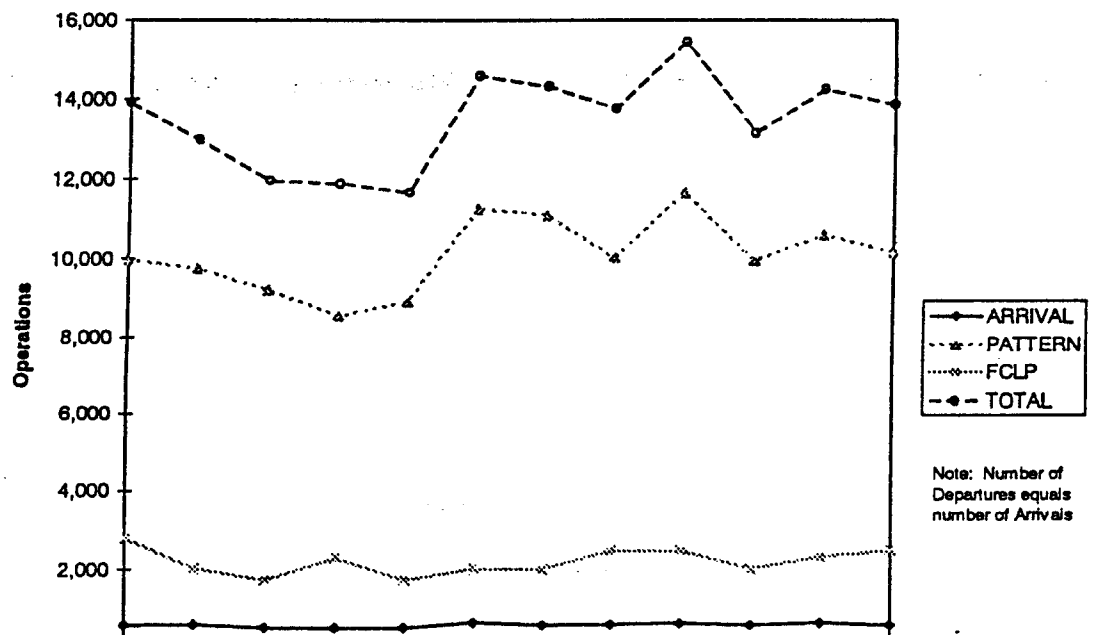
4.3.1 Monthly Airfield Operations

Figure 4-9 shows monthly airfield operations at NAS Kingsville for the simulated period beginning in August and ending in July. Each departing or arriving aircraft counts as one operation, while each pass through the touch-and-go or FCLP pattern counts as two operations. The results show that the number of airfield operations is highly dependent on carrier qualification periods. During the months when FCLPs are conducted in anticipation of carrier qualification — August, October, December, February, April, and July — the number of operations increases substantially, usually by 10,000 or more operations. The increase is smallest during December, when holidays limit the total operations that can be completed.



Orange Grove, operations there are not as dependent on the carrier qualification schedule. Intuitively, one expects the operations at NALF Orange Grove to mirror total operations, without the dramatic changes induced by the carrier schedule. Indeed, the total monthly operations at NALF Orange Grove remain fairly constant, ranging from about 12,000 operations to slightly more than 15,000 operations; the most operations occur during April, the peak month. However, September, TW II's least busy month (40,900 operations), was an average month at NALF Orange Grove (13,000 operations), and October, TW II's fourth busiest month (53,300 operations), was a below-average month at NALF Orange Grove (12,000 operations). The fraction of operations completed at NALF Orange Grove varies from 22 to 32 percent; the average is 27 percent.

Because NALF Orange Grove is used only during a subset of training events, scheduling variations cause fluctuations in NALF Orange Grove operations. Consider January: the second-busiest month at NALF Orange Grove (14,500 operations) but an average month for TW II in terms of total airfield operations (about 46,500 operations). During January, the squadron conducts a weapons detachment. Because aircraft are removed, operations at NAS Kingsville naturally decrease somewhat, but because those aircraft removed would



not use NALF Orange Grove in any case, operations there do not decrease; instead, they increase since remaining students concentrate on flights that use NALF Orange Grove, such as FAM flights.

TW II's peak month in terms of total operations is April, when nearly 60,000 operations are completed at the two airfields. In April, the first post-winter month with pre-carrier-qualification FCLPs, the squadron accumulates the largest scheduling backlogs in events; thus, more events are scheduled and more operations are completed. During April, the squadron completes approximately 10.3 percent of its total yearly operations and 9.6 percent of its total Xs. The number of operations per completed X is slightly higher during April compared to the yearly average (15.9 operations per X compared to 14.9) because pre-carrier-qualification FCLPs are conducted at NAS Kingsville during April; these events are based entirely at the airfield, producing larger numbers of airfield operations than other events. The squadron experiences 1706.3 hours of delay during the month, or 10.1 percent of the yearly amount.

4.3.2 Hourly Airfield Operations

Figure 4-11 plots hourly operations at NAS Kingsville during an average weekday during April. Four types of operations (arrivals, departures, FCLPs, and other pattern) and the total are plotted. Note that an arrival or departure operation is counted for each aircraft that arrives or departs, and that two pattern or FCLP operations are counted for each touch-and-go pass during the hour. The average operations are computed by summing the total operations in each category for all weekdays, and dividing by the total number of working weekdays.

NAS Kingsville's airfield opens at 08:00, and during the first hour approximately 100 operations are completed, mostly departures and FCLP operations. Morning operations peak during the 1000 hour at approximately 130 operations. During the early afternoon, the field operates at a fairly steady rate, around 100 operations per hour. Because FCLPs dominate the morning schedule, other pattern operations could not be scheduled then and instead are scheduled in the afternoon. Indeed, as the day progresses, pattern operations increase as missions return to the base, while arrivals and departures remain fairly constant and the number of FCLPs dwindles.

The sun sets around 20:00 and operations increase sharply this hour as night-training

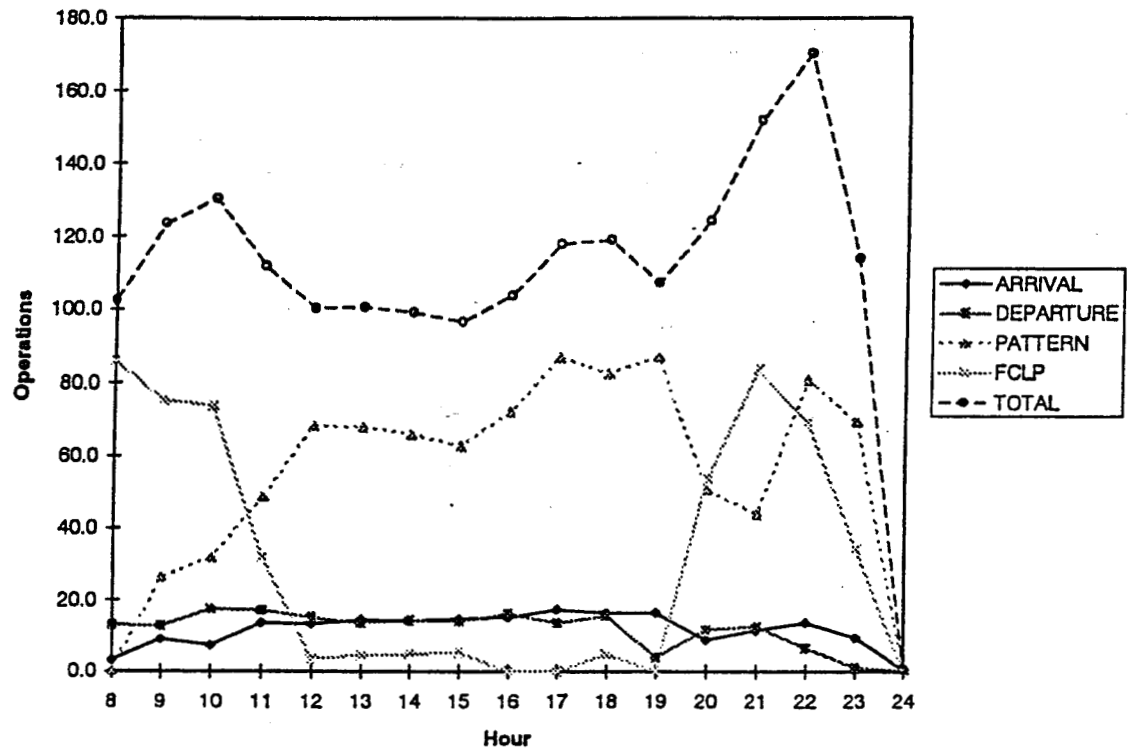


Figure 4-11: Hourly Operations at NAS Kingsville on an Average April Day (300-PTR Scenario)

week period. FCLP operations and pattern operations can dominate on different nights and produce the average statistics shown.

Figure 4-12 plots hourly operations at NALF Orange Grove during an average April weekday. Operations are computed in the same manner as the NAS Kingsville operations. Unlike NAS Kingsville, there are fewer early morning operations at NALF Orange Grove; instead, operations increase throughout the morning, peaking in the early afternoon during the 1300 hour at about 75 operations. NALF Orange Grove is dominated by pattern operations. Throughout the afternoon, from 12:00 to 16:00, TW II completes about 60 pattern operations an hour.

4.3.3 Monthly SUA Sorties

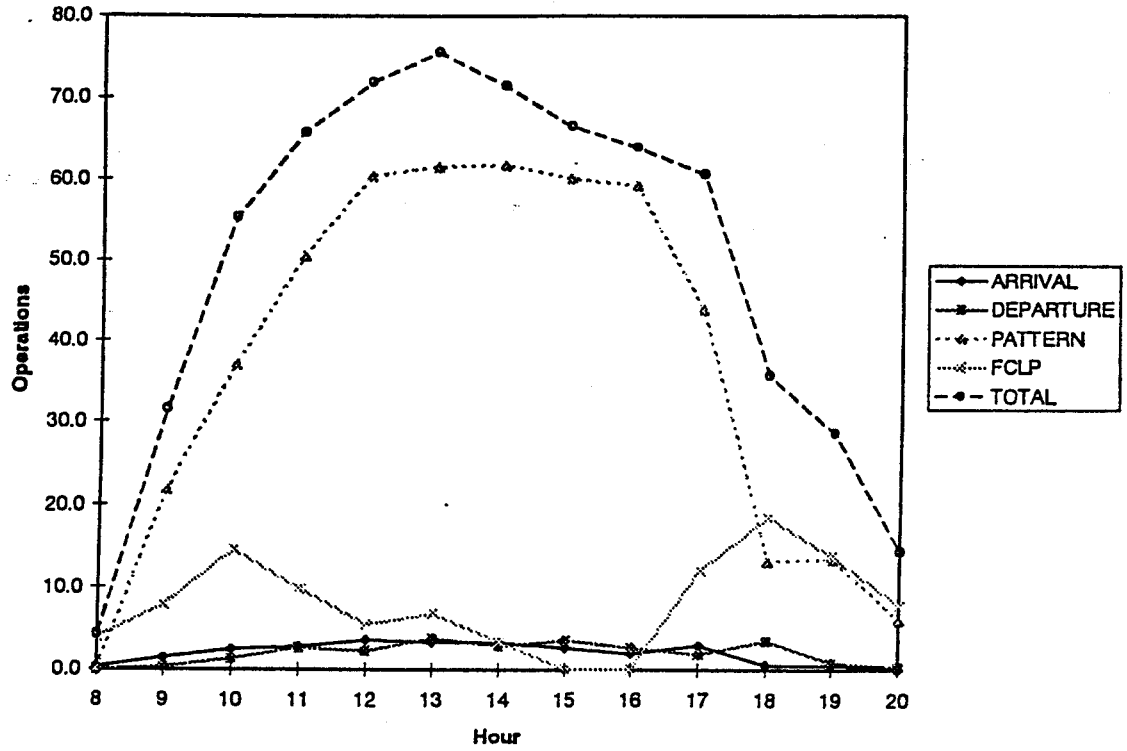


Figure 4-12: Hourly Operations at NALF Orange Grove on an Average April Day (300-PTR Scenario)

have their greatest number of sorties during March. Of course, during a given month, the number of events that can use a particular area may be higher than average, resulting in a greater fraction of operations being completed at that area. Similarly, because an area is usually selected probabilistically from a set of choices, variations in the areas selected by NASMOD can cause month-to-month differences.

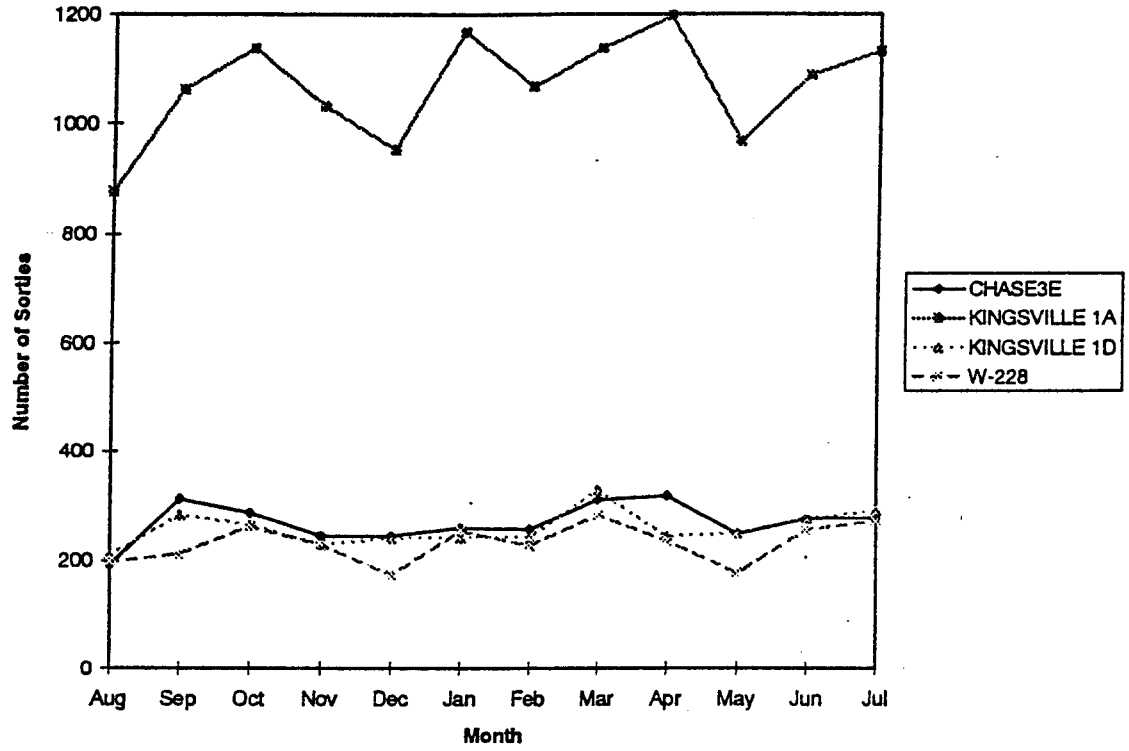


Figure 4-13: Monthly Sorties at Selected Areas (300-PTR Scenario)

5 SUMMARY AND CONCLUSIONS

Training Air Wing Two trains Navy and Marine Corps tactical jet aviators at NAS Kingsville. After nearly two decades of using different aircraft (T-2s and TA-4s) for separate levels of training, the Navy is implementing an entirely new training program using T-45 aircraft.

By simulating TW II operations at various PTR levels and with different assumptions about aircraft availability and detachment scheduling, this study examines TW II's ability to graduate student naval aviators under the new T-45 training syllabus. Specifically, we simulated TW II T-45 operations in eight scenarios, each with a different PTR: 168, 225, 250, 275, 300, 350, 400, and 500.

Intuitively, a higher PTR creates more demand for airfield and airspace resources, which could result in more delay; as airspace usage increases, the squadron may have difficulty meeting PTR goals. The scenario results confirm that when operating under similar assumptions delay and airspace usage increase as the PTR increases. However, in these tested scenarios, delay and airspace do not prevent the squadron from meeting its PTR goals. Specifically, given enough available aircraft, the model indicates that TW II is capable of graduating 350 students. When operating at a 350-PTR level, airspace usage increases and the squadron experiences more delay. For example, use of W-228 is projected to increase from 15 percent of available hours when operating with a 168-PTR target to 33 percent of available hours when operating with a 350-PTR target. Similarly, average delay experienced to complete a single X increases from 2.2 minutes when operating with a 168-PTR target to 3.1 minutes when operating with a 350-PTR target.

Not surprisingly, Kingsville 1A, the most-utilized area, appears to reach usage limits. In the baseline scenario (168-PTR), the area is used approximately 59 percent of available hours with an average of three aircraft in the area at any moment. In other scenarios, the area is used from 70 to 75 percent of available hours, with an average of 3.7 to 5.1 aircraft in the area. Because the percent of available hours that the MOA is used remains fairly constant at the higher PTR levels, the results suggest that Kingsville 1A is reaching capacity; additional PTR can only be accommodated by increasing the number of aircraft in Kingsville 1A (eight is the limit) and by increasing use of other areas.

Reported delay data reveal that when the squadron is operating at levels that produce

scenario, which may have produced somewhat atypical results since no aircraft restrictions are assumed.

The results also show that delay can be reduced substantially by using detachments. In the 500-PTR scenario, in which approximately 30 percent of FAM missions are completed away from Kingsville, delay experienced by other local missions is significantly reduced. In particular, the average delay per X actually decreases to a level comparable to 26,500 Xs (more than 45,000 Xs are produced in this scenario).

Though airfield and airspace do not become saturated at the PTR levels and operating conditions assumed, other restrictions limit the squadron's ability to meet its PTR goal. Weapons flights, for instance, are more sensitive to weather than any other required flight, and thus are particularly constrained. In the simulation, large numbers of these flights are canceled and must be repeatedly scheduled, competing with other events for the scheduling of aircraft. However, given no aircraft limits, such as in the 350-PTR scenario, the squadron is able to complete the necessary number of flights even with the assumed weather constraints. (To complete a 350 PTR, the squadron requires 117 available aircraft to meet 99 percent of simulated launches or 96 aircraft to meet 95 percent of simulated launches.) Similarly, scheduling more detachments at locations where weapons flights can easily be completed is also likely to reduce or eliminate the constraints that weapons flights impose on achieving the PTR goal.

The results from the 400- and 500-PTR scenarios, designed to estimate the maximum PTR when the squadron is limited to 98 available aircraft, suggest that the squadron could be capable of doing enough Xs to graduate 312 to 328 students, depending on the use of detachments. The results do not indicate, however, whether the squadron is capable of completing the necessary number of each event at such a PTR.

APPENDIX A: NASMOD OVERVIEW

The Department of the Navy developed the Naval Aviation Simulation Model (NASMOD) for use in analyzing problems and issues related to airfield and special use airspace operations. NASMOD provides the Department of the Navy with the capability to conduct simulation analyses that:

1. Quantitatively assess airfield and airspace capacity in support of proposed operational alternatives.

2. Calculate the impacts of changes in special use airspace on both military and civilian operations.

3. Analyze the operational impacts of interaction between military and civilian aircraft.

4. Analyze pilot training system resource requirements including airfields, airspace, instructors, syllabus, aircraft type, maintenance, fuel, and operating costs.

5. Analyze the impacts of using alternative aircraft types to meet training and operational objectives.

NASMOD merges the capabilities of the Federal Aviation Administration's (FAA's) SIMMOD model with enhancements to the Navy's Naval Aviation Training System (NATS) model developed in 1986. The FAA makes extensive use of SIMMOD, an advanced state-of-the-art model that simulates both airfield and airspace traffic operations, to study and analyze planned operational changes in the National Airspace System. The model has proven to be extremely valuable as a tool for analyzing airport and airspace problems, identifying potential solutions, and assessing the delay, capacity, traffic loading, and operating cost impacts of potential operational alternatives. Recently, the Navy and the FAA incorporated several key improvements into SIMMOD, including the capability to model dynamic runway plan changes and touch-and-go, FCLP, and GCA operations.

SIMMOD was designed to address enroute or IFR traffic. The Navy's NATS model was developed to address VFR traffic in the training environment. NASMOD combines these capabilities and includes other features necessary to model military aviation operations, such as special ground operations (hover and taxi to ordnance loading areas, high power run-up areas, and hot refueling pits) and the unique vertical and short takeoff and landing (V/STOL) characteristics and operating procedures of the AV-8B aircraft. The new

Thus, NASMOD is a tool that allows the Navy to evaluate proposed special use airspace alternatives and training requirements, to quantify impacts on other users of the National Airspace System (commercial and general aviation), and to work with the FAA to mutually resolve critical special use airspace issues. In addition, NASMOD allows the Navy to evaluate various base closure and realignment alternatives by examining impacts of airfield and airspace capacity, training requirements, and operational alternatives.

The NASMOD system has three primary components:

1. *A Graphical User Interface.* The Graphical User Interface facilitates data entry and management. NASMOD operates on a SUN workstation in the UNIX operating system. The user interface is window-based and mouse-driven. The system provides tools for building the airfield and airspace network, including routes and runways, for building the profiles of training missions that are used to complete Navy training requirements or syllabus objectives, for entering flight schedule data from the Official Airline Guides (OAG), for digitizing airfield and airspace charts, and for editing the database.

2. *A Simulation Processor.* The simulation processor simulates mission scheduling and operations, based on user input. Users may simulate multiple day periods. There are three major components of the simulation processor that are executed for each simulated day:

    a. The Scheduler, which selects the missions to be performed each simulated day and devises a conflict-free schedule of missions for that day. This component simulates scheduling performed by squadrons and by airspace and range scheduling authorities, such as a fleet area control and scheduling facility (FACSFAC).

    b. The Operations and Traffic Simulator, which simulates the day's flight and mission operations, including the utilization of special use airspace areas and interactions between civilian and military traffic.

    c. The Performance Calculator, which computes detailed and summary measures of daily squadron, airfield, and airspace operations and utilization performance, based on simulated results of the Scheduler and the Operations and Traffic Simulator.

NASMOD also provides database query tools to assist the analyst in extracting information from the system's output database and setting up reports.

This appendix discusses the Simulation Processor, focusing on the Scheduler and the Operations and Traffic Simulator. These components work in tandem: the Scheduler processes the inputs to derive a mission schedule, which serves as input for the Operations and Traffic Simulator. Typically, analysts use NASMOD to study Naval or Marine Corps Air Station operations for a multiple-day period, such as one year. A one-year simulation period provides results that account for seasonal variations in activity and the impacts of air wing deployment schedules. During a multiple-day simulation period, the Scheduler considers the dynamic output of the previous day from the Operations and Traffic Simulator in addition to the static database inputs.

Section A.1 describes the Operations and Traffic Simulator and Section A.2 describes the Scheduler.

A.1 The Operations and Traffic Simulator

NASMOD's Operations and Traffic Simulator (Simulator) is an extension of the SIMMOD simulation program; NASMOD includes additional capabilities to reflect military operations.

SIMMOD (and hence NASMOD) is a fast-time, Monte-Carlo computer simulation model. Users create operational scenarios, including a node-link network that represents the airfield structure and the airspace route system, and a flight schedule. The model tracks movements of individual aircraft traveling through the node-link network. As it tracks aircraft, the model detects potential violations of separation standards, flow constraints, or operating procedures, and takes air traffic control actions to resolve these potential conflicts and to ensure that all procedural rules are met. The model maintains various statistics relating to travel and delay times, airspace sector occupancy levels, and airport usage. See the *SIMMOD Version 2.0 Reference Manual* for further discussion of the logic and structure of flight simulation in SIMMOD.

NASMOD adds capabilities to monitor the usage and availability of scarce resources — such as aircraft, instructors, and TACTS pods — and activity areas — such as military operating areas and special use airspace. To make use of these features, NASMOD introduces the concept of a "mission." Missions can fly routes, use acquire and release a

in the model's database. The Simulator then "plays out" each day's schedule of missions and flights.

During the simulation, missions make requests. There are four types of requests:

1. Requests to obtain or release scarce or tangible resources, such as aircraft, instructors, or TACTS pods. A mission requests a specific number of units, and takes a certain amount of time to prepare the resource units once they are acquired (or the mission takes a certain amount of time to return the resource units and prepare them for the next mission).

2. Requests to use an activity area, such as a military operating area, warning area, target range, or fuel pit. A mission requests a specific volume of airspace (or other unit of capacity) in the activity area and uses that volume for a certain amount of time. The volume and the amount of time are dependent upon the activity conducted. The maneuvers associated with a FAM activity, for instance, may take longer than those associated with a FORM activity.

3. Requests to fly an airspace route. The model handles the mission as a flight on an airspace route. The mission's flight interacts with other flights, which may also be missions, and the model imposes appropriate air traffic control actions.

4. Requests to taxi between two ground activity areas, such as a fuel pit and a pad. The model creates a special ground movement "flight" when a mission wishes to taxi between two ground nodes at a modeled airfield. The mission interacts with other aircraft taxiing at the airfield.

Any of these requests may be coordinated. At coordinated requests, two or more missions join to complete the request together. A coordinated airspace route request, for example, can represent a section flight. The sequence of requests that a mission makes is pre-defined in its mission profile.

The Simulator monitors each mission's progress as it proceeds through its mission profile, taking corrective action as necessary. At requests for tangible resources, for example, the Simulator checks that the resource is available before allowing the mission to acquire and prepare the resource; missions will be delayed in a queue if there is not enough available. Similarly, although the Scheduler devises a schedule that should avoid airspace conflicts,

failure, and weather conditions that affect the ability of the mission to be completed. When a constraint is violated the mission aborts its current request. For some violated constraints, the mission may enter permanent abort mode, in which case it makes no new requests to acquire resources or use activity areas. Alternatively, a particular step can specify an abort profile; missions in abort mode transition to the abort profile and execute that profile's sequence of requests.

For example, NASMOD allows users to specify three weather types. A weather condition is modeled as a distinct intensity of each of the three weather types. At each mission profile step requesting a resource or activity, the mission checks the current intensities of each weather type; if the current intensity of any one weather type exceeds the mission's threshold intensity for that type, the mission aborts the request. Because each mission may have a unique profile, with different weather threshold intensities, users can easily create one or more missions that are more weather sensitive than other missions.

Thus, by combining resource and activity requests that are constrained in various ways and by using abort profiles, analysts can use NASMOD to model a variety of scenarios, including simple training missions or complex fleet training exercises with alternative return-to-base maneuvers.

For example, NASMOD is fully capable of modeling an AV–8B rolling vertical landing and hot refueling. During such a landing, the aircraft approaches the runway at a slower-than-normal speed, requiring greater separation with following aircraft than during a regular landing. A NASMOD analyst would separate that landing flight into two flight segment requests: during the initial segment the mission acts as a regular aircraft, and during the final approach segment, the mission acts as a special aircraft type that has longer runway occupancy times and for which the model imposes greater separations with other aircraft. After the landing, the aircraft taxis to the ground activity area associated with the fuel pit, where it requests another activity representing refueling. Following completion of that activity, the mission makes a request to taxi to a pad, another ground activity area, where it departs to perform further activities.

The Operations and Traffic Simulator produces several output files. One of these contains step-by-step information about the execution of each mission. The Performance Calculator uses this data file to produce extensive database tables that summarize area usage, resource usage, and squadron satisfaction of training requirements. Figure A–1 shows a hypothetical mission profile that might be produced by the Scheduler and read by

```
   VFA-1.FAM_PROF     #17
1  01 0 0 0 MOA.WXCHECK.NAS NONE 0 0 0 0 20 0 0
2  01 1 0 0 VFA-1.AIRCRAFT.FA18.NAS NONE 0 -1080 0 0
3  00 26 ? ? NAS 0 -1080 0       NAS_MOA_V
4  01 100 2940 3240 MOA NONE 3240 -1080 0 0 20 0 0
5  00 15 ? ? XXX 0 -1080 0       MOA_NAS_INI_V
6  01 0 0 0 NASFCLPPAT_RES ABORT_NASRTGPAT_1TNG_PROF
      0 -1080 0 1 50 0 0
7  01 1 0 0 NASLTGPAT_RES ABORT_NASRTGPAT_1TNG_PROF
      0 -1080 0 99 50 0 0
8  00 53 ? ? XXX 0 -1080 0       NAS_INI_LBRK
9  01 10 0 0 NASLTGPAT NONE 0 -600 0 0
      50 0 0
10 00 20 ? ? XXX 0 -600 0      NAS_LBRK_NASLTGPAT
11 01 -1 0 0 NASLTGPAT_RES NONE 0 -1080 0 0 50 0 0
12 00 24 ? ? NAS 0 -1080 0       NASLTGPAT_LAND
13 01 -1 4800 4800 VFA-1.AIRCRAFT.FA18.NAS NONE 0 -1080 0 0
```

Figure A–1: Sample Profile

Table A-1: Profile Description

Profile Step	Step Description
1	Check weather at activity area; if the weather exceeds a specified intensity (20), cancel the mission.
2	Request a F/A-18 aircraft from squadron VFA-1. If none is immediately available, wait up to 1080 seconds (18 minutes), and then cancel the mission.
3	Fly the route NAS_MOA_V from NAS to MOA.
4	Perform an activity at the MOA that requires 100 volume units. The activity takes between 2940 and 3240 seconds (49 to 54 minutes). Before commencing the activity, check the amount of daylight remaining; if there is not at least 54 minutes of day remaining, do not perform the activity (go to the next profile step). If the area is not immediately available, wait up to 18 minutes for it to become available, and then go to the next profile step. If the weather intensity at the activity area exceeds 20, do not perform the

7	Attempt to enter the left touch-and-go pattern. If it is full, abort to the right pattern to do touch-and-go landings.
8	Fly the route NAS_INI_LBRK from the initial through the left break.
9	Request the touch-and-go activity.
10	Fly the route NAS_LBRK_NASLTGPAT from the break through the first replication of the pattern.
11	Check out of the pattern, allowing others to enter.
12	Fly the route NASLTGPAT_LAND, which brings the aircraft to a full-stop landing.
13	Return the F/A-18 aircraft to VFA-1. Take 80 minutes to do maintenance on the aircraft before returning it to service for other missions to use.

A.2 The Scheduler

NASMOD's Scheduler generates the schedule of missions that is the input for the Operations and Traffic Simulator. Based on the input data, the schedule of missions reflects squadrons' requirements and preferences, as well as airspace limits. In fact, the Scheduler is a two-step process. During the first step, the Scheduler determines the events squadrons desire to perform, and devises a schedule to accomplish those events; during this step NASMOD's Scheduler performs the functions of a squadron scheduler. During the second step, the Scheduler considers all squadrons' schedules and the resulting requests for airspace, and resolves any conflicts; during this step, NASMOD's Scheduler performs the functions of a scheduling authority or central scheduler.

A.2.1 Squadron Scheduler

A squadron has a set of events that it is required to perform; those events must be performed at a certain frequency. The frequency at which those events are performed may vary, depending on the squadron's deployment cycle. On each simulated date, the Scheduler computes the average number of each event that the squadron must do. Next, the Scheduler selects a target number of the event to schedule; that target number reflects the amount performed on previous days. When a squadron has not performed a certain

Each set might request different activity areas, for example. The Scheduler selects one path, which contains one set of requests. Based on the selected path and the expected transit times, the Scheduler projects a mission length.

Every profile is associated with a range of starting times — times at which missions may begin performing the profile. In addition, a squadron has a specific number of aircraft available and a maximum rate at which it launches those aircraft, such as ten per hour. The Scheduler attempts to schedule all targeted events, subject to the limits imposed by the launch rate, aircraft availability, mission lengths, and profile starting times.

The resulting schedule represents the missions the squadron would like to accomplish that day, subject to internal aircraft availability and launch rate constraints but with no consideration to requests made by other squadrons or to airspace constraints.

A.2.2 Central Scheduler

During this second step of the scheduling process, the Scheduler resolves conflicts for airspace usage. As a result of the squadron scheduling process, multiple missions may be scheduled to use the same airspace simultaneously; in fact, the number of missions scheduled to use an airspace may exceed capacity or safety limits that airspace operators impose. To resolve these conflicts, the Scheduler ranks all missions, scheduling higher-priority missions first. (Users may create any number of mission ranks in terms of several criteria, including event, aircraft type, and days until deployment.) When the Scheduler determines that the squadrons are requesting that more missions use an airspace or other activity area than are permitted at any one time, it attempts to reschedule the surplus missions. First, the Scheduler attempts to schedule such a mission at that same activity area at a later time. If that is not possible, the Scheduler attempts to schedule the mission along a different path in its profile, if any are specified. If the mission cannot be scheduled at a later time or at an alternate area, the Scheduler cancels the mission; that event is added to the squadron's backlog, increasing the likelihood that the event will be scheduled on a subsequent day.

The resulting schedule becomes the input for the Operations and Traffic Simulator. Note that this schedule created by the central scheduling process may violate squadron launch requirements or aircraft availability. These violations, variations in travel time, and the interactive effects of non-centrally scheduled missions can lead to simulated activity area usage that differs from scheduled usage.

scheduled, the Scheduler considers many special types of events. For instance, the Scheduler can schedule detachments on pre-specified dates or on dates when the squadron's backlog reaches a pre-determined level. The events during a detachment may be pre-specified or determined by the Scheduler. In addition to detachments, the Scheduler may schedule multiple-day events that possibly occur away from the squadron's home base, such as events performed during cross-country missions. The Scheduler may also limit the dates on which events are performed. For example, the Scheduler might schedule carrier qualification missions only during the two-week period prior to the date on which a carrier is available.

Similarly, during the central scheduling process, the Scheduler considers various types of area usage. Missions may request the area for exclusive use, in which case only missions with which it is coordinated are permitted in the area, or missions may request the area for co-use, in which case either a pre-specified number of aircraft is permitted in the area or a pre-specified volume of the area may be used. (The scheduler permits missions to act as an equivalent number of aircraft, which may differ from the actual number of aircraft; a two-plane Formation flight, for instance, may act as one aircraft.) The Scheduler can also require that certain squadrons use areas during pre-specified time periods, even blocking other squadrons from using the area during those periods.

Finally, the Scheduler determines the sunrise and sunset times, and selects the weather conditions for each activity area on the simulated day. The Scheduler calculates the sunrise and sunset times based on the area's latitude and longitude and the day of the year. The Scheduler selects the weather intensities for each of the three weather types, based on the probabilistic data input by NASMOD analysts. Specifically, analysts enter the probability that each weather condition occurs at an area throughout the day during various seasons of the year.

APPENDIX B: MISCELLANEOUS DATA

Table B-1: List of T-45 Operational Assumptions

Number	Description
1	TW II will consist of one squadron with a total of 64 (A3 status) T-45A aircraft for a strike training PTR of 168 plus appropriate overhead (to include direct student overhead, IUT flights, and maintenance, logistic, and ferry flights). There will be an unlimited supply of flight instructors, with appropriate stage qualifications.
2	The syllabus, as identified in the Master Curriculum Guide for the Undergraduate Jet Pilot Training and Instructor Under Training, revision 1.2 dated January 20, 1994, will be used, except the first Carrier Qualification (CQ) stage will be a field qualification only. There will be six CQ detachments spaced evenly throughout the year.
3	Overhead will be a compromise of historical T-2/TA-4 and proposed T-45, specifically: Student syllabus: 175.60 hours Instructor chase: 52.20 hours Student overhead: 21.41 hours Student attrition: 9.71 hours IUT/NATOPS/INST/STAN: 23.63 hours Maintenance/logistics/ferry: 9.31 hours Total: 291.86 hours
4	Mission-specific cancellation rates, by quarter, related to weather conditions, will be based on 1992 - 1993 historical data.
5	McMullen Target Complex will be utilized for weapons training. A two-week detachment of 16 aircraft and 25 students will accomplish their weapons training in El Centro, California, when the squadron accumulates a backlog of 560 Xs due to cancellations at NAS Kingsville.
6	FCLP training, including night training, may be conducted at NALF Orange Grove and NAS Kingsville. Instrument training, both day and night, will be conducted at NAS Kingsville, NALF Orange Grove, NAS Corpus Christi, Corpus Christi International, and other comparable airfields in South Texas. Out-and-in flights will be flown primarily to NALF Orange Grove and back, with a smaller number (not to exceed one flight per three-hour cycle) to Brownsville and/or Laredo.
7	The Kingsville airspace will include the Kingsville MOA (including the Spin areas), Chase 1, 2, and 3 MOAs, W-228D, and the Alert area 632A; TW II will be the only user of these areas.
8	Other than as specified in Assumptions 1 through 6 above, the Chase and Kingsville MOAs and NALF Orange Grove will be utilized by the T-45s in a manner similar to the current utilization by T-2s and TA-4s.
9	Two runway plans will be modeled: (a) a southeast flow (Runways 13 and 17), and (b) a northwest flow (Runways 35 and 31). Use will be based on historical data.
10	Interaction with civilian traffic will not be addressed (it is managed procedurally under

Table B-2: T-45 Mission Profile Data: Area Usage

Percent of Xs Completed					Percent of Local Flights Using Area									
Night	NQI-NQI	NQI-NOG-NQI	NQI-other-NQI	X-ctry	Kings 1A	Kings 1B	Kings 1C	Kings 1D	Chase 3 E&W	Chase 1 and 2	W-228	Alert area	Time (min) spent in area	Syllabus Flight Type
*	100	0	0	0	100	0	0	0	0	0	0	0	**	BI
50	*	0	25	50	25	0	0	0	0	0	0	0	20	RI
0	40	60	0	0	100	0	0	0	0	0	0	0	35	FAM CLEAR
0	40	60	0	0	80	0	0	0	20	0	0	0	30	FAM OVHD
0	60	40	0	0	15	10	10	10	15	10	0	10	45	FORM 2 PLANE
0	60	40	0	0	15	10	10	10	15	10	0	10	60	FORM 4 PLANE
50	20	0	20	60	0	0	0	0	0	0	0	0	0	AN
100	100	0	0	0	0	0	0	0	0	0	0	100	35	NFAM1
100	100	0	0	0	0	0	0	0	0	0	0	100	35	NFAM2
50	10	0	10	80	0	0	0	0	0	0	0	0	0	IR
0	100	0	0	0	0	0	0	0	100	0	0	0	30	WEPS
100	100	0	0	0	60	7	7	7	0	0	0	20	50	NFORM
0	19	14	14	53	0	0	0	0	0	0	0	0	0	ONAV 1 PLANE
0	40	50	0	10	0	0	0	0	0	0	0	100	40	ONAV 2 PLANE
0	100	0	0	0	35	0	0	0	15	0	50	0	40	GUN
0	100	0	0	0	100	0	0	0	0	0	0	0	30	OCF
0	40	40	20	0	20	10	10	10	15	15	5	0	50	TACFORM
0	20	60	20	0	0	20	20	30	20	0	10	0	45	ACM 2 PLANE
0	20	60	20	0	0	20	20	30	20	0	10	0	40	ACM 3 PLANE
10	15	85	0	0	0	0	0	0	0	0	0	0	0	CQ NO BOAT
44	0	0	0	0	0	0	0	0	0	0	0	0	0	CQ BOAT
0	0	0	0	0	0	0	0	0	0	0	0	0	0	CQ DET

BI * BI-7 and BI-9: 20 percent day and 80 percent night; BI-11 and BI-12: 50 percent day and 50 percent night
** BI-7: 40 minutes; BI-9: 10 minutes; BI-11 and BI-12: 20 minutes
RI * Appropriate pairing of flights is entered
M OVHD * All solo flights will be in Kingsville 1A

NOG NALF Orange Grove
NQI NAS Kingsville
X-ctry Cross-country flight

Table B-3: T-45 Mission Profile Data: Miscellaneous

# of T&G Stud	# of T&G Lead	WX canc	Type of field entry	Instr. appr.'s	Time (min) on deck on O & I	Minimum number of aircraft in flight	T&G on rtb to NQI from O&I	Percent of non-O&I T&Gs at NOG (a)	Percent of O&I T&GS at NOG (b)	Flight Hours + or - MCG Time	Syllabus Flight Type
0	0	Type VI	GCA	***	0	1	****	0	0	-0.1	BI
0	0	Type VI	TACAN	*	45	1	0	0	0	0	RI
10	0	Type III	Break/EP	0	55	1	2	70	50	-0.2	FAM CLEAR
8	0	Type III	Break/EP	0	55	1	2	70	50	-0.1	FAM OVHD
5	1	Type IV	Break/GCA	1	45	2	2	30	30	-0.1	FORM 2 PLANE
5	1	Type IV	Break	0	0	3	2	20	20	0.1	FORM 4 PLANE
0	0	Type VI	GCA	*	45	1	0	0	0	0.1	AN
10	0	Type III	Break	0	0	2	0	0	0	0	NFAM1
10	1	Type III	Break	0	0	2	0	0	0	0	NFAM2
0	0	Type VI	GCA	*	45	1	0	0	0	0.1	IR
3	1	Type I	Break/Str-in	0	0	3	0	0	0	0	WEPS*
8	1	Type IV	Break/GCA	1	0	2	0	0	0	0	NFORM
4	0	Type III	Break	0	0	1	4	0	0	-0.1	ONAV 1 PLANE
3	2	Type III	Break	0	0	2	3	0	0	-0.1	ONAV 2 PLANE
3	1	Type II	Break/Tow	0	0	4	0	0	0	0	GUN
2	0	Type II	Break	0	0	1	0	0	0	0	OCF
4	1	Type VI	Break/GCA	0	55	2	4	0	0	0	TACFORM
3	1	Type II	Break/GCA	0	65	2	3	0	0	0	ACM 2 PLANE
2	1	Type II	Break/GCA	0	75	3	2	0	0	-0.1	ACM 3 PLANE
7-8	0	Type V	Break	0	0	1	0	0	0	0	CQ NO BOAT
7-8	0	Type V	Break	0	0	1	0	0	0	0	CQ BOAT
0	0	Type VI	*	*	0	24-26	0	0	0	0	CQ DET

ftung ordnance straight-in approaches are included.
wo instrument Xs will be completed to and from detachment.
** BI-7 and BI-12: 1 TACAN and 3 GCAs BI-9 and BI-11: 1 TACAN and 5 GCAs
**** BI-7 and BI-12: 0 Touch-and-go landings BI-9 and BI-11: 1 Touch-and-go Landing
All instrument approaches done as stated in Master Curriculum Guide.
* All instrument approaches done as stated in Master Curriculum Guide.

'ercent of time that non-out-and-in flights do touch-and-go landingas at NALF Orange Grove before returning to NAS Kingsville.
'ercent of time that out-and-in flights return to NALF Orange Grove to do touch-and-go landings on the "in" portion of the flight, before returning to NAS Kingsville.

KEY:
MCG -- Master Curriculum Guide
NOG -- NALF Orange Grove
NQI -- NAS Kingsville
O&I -- Out-and-in flight
RTB -- return to base
T&G -- touch-and-go landing
WX -- weather

Table B-4: Operating Area Usage: Total Annual Hours Used

	PTR SCENARIO							
AREA	168	250	225	300	275	400	500	350
ALERT AREA	753	984	1039	1175	1151	1006	899	1282
CHASE 1	427	601	620	701	752	717	651	864
CHASE 3E	659	994	959	1099	1095	1033	851	1239
CHASE3W	654	955	944	1128	1127	1020	867	1257
KINGS1A	2262	2737	2688	2862	2854	2747	2458	2774
KINGS1B	592	865	851	995	1022	943	853	1109
KINGS1C	588	891	870	999	955	857	859	1110
KINGS1D	748	1042	1003	1169	1110	1070	956	1265
KINGS1HIGH	450	626	579	720	663	711	597	736
MCMULLEN	277	374	405	551	489	358	199	683
W228	405	589	542	723	634	663	549	861
NQI PATTERN	1384	1868	1915	2117	2113	2289	2085	2245
NOG PATTERN	914	1240	1276	1371	1402	1249	1021	1459

Table B-5: Operating Area Usage: Average Number of Aircraft in Area

	PTR SCENARIO							
AREA	168	250	225	300	275	400	500	350
ALERT AREA	2.92	3.16	3.18	3.30	3.28	3.49	3.39	3.62
CHASE1	2.33	2.39	2.50	2.47	2.53	2.61	2.63	2.86
CHASE3E	2.28	2.37	2.30	2.44	2.36	2.44	2.39	2.45
CHASE3W	2.11	2.21	2.22	2.26	2.25	2.25	2.29	2.27
KINGS1A	2.97	3.70	3.87	4.28	4.34	4.48	4.21	5.13
KINGS1B	2.21	2.24	2.26	2.30	2.32	2.32	2.29	2.31
KINGS1C	2.21	2.26	2.32	2.27	2.28	2.56	2.26	2.34
KINGS1D	2.22	2.23	2.28	2.26	2.26	2.27	2.29	2.28
KINGS1HIGH	1.16	1.23	1.20	1.29	1.28	1.70	1.34	1.47
MCMULLEN	3.68	3.69	3.71	3.72	3.70	3.70	3.73	3.75
W228	3.32	3.29	3.35	3.26	3.39	3.38	3.33	3.43
NQI PATTERN	2.68	2.99	3.02	3.21	3.21	3.55	3.68	3.52
NOG PATTERN	2.13	2.33	2.37	2.56	2.57	2.65	2.70	3.01

Table B-6: Mission Delay: Airfield Delay (in minutes)

	PTR SCENARIO							
OP TYPE	168	250	225	300	275	400	500	350
DEP NOG	4197.3	9976.8	12035.3	16224.8	17854.4	16112.9	11755.9	27840.3
ARR NOG	3.4	12.3	11.8	16.3	15.9	15.4	12.7	18.1
DEP NQI	8389.4	14576.9	15954.9	21875.3	21034.3	24102.0	18931.5	34319.4
ARR NQI	502.4	1218.7	1082.6	2003.7	1733.5	2329.7	1619.8	3561.3
TOTAL	13092.5	25784.7	29084.6	40120.0	40638.2	42559.9	32319.9	65739.1

Table B-7: Mission Delay: Delay per Airfield Operation (in seconds)

	PTR SCENARIO							
OP TYPE	168	250	225	300	275	400	500	350
DEP NOG	61.9	99.1	119.3	137.8	149.3	154.4	125.8	194.6
ARR NOG	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
DEP NQI	18.0	21.2	22.9	26.2	25.7	28.1	25.1	35.0
ARR NQI	1.1	1.8	1.6	2.4	2.1	2.7	2.1	3.6

Table B-8: Mission Delay: Total Delay by Flight Category (in hours)

	PTR SCENARIO							
FLIGHT CATEGORY	168	250	225	300	275	400	500	350
Student X	534.3	846.2	861.5	1114.3	1069.5	1227.4	1084.2	1507.2
IUT X	52.5	92.0	92.8	115.2	110.5	124.3	99.3	153.8
Instructor Lead	121.5	213.2	225.0	279.4	276.0	279.0	215.2	374.7
Overhead & Attrition	79.7	142.2	163.6	173.6	210.0	274.9	278.9	314.5
Maintenance, Log, & Ferry	13.4	20.8	20.9	23.8	24.4	46.2	23.9	36.0
TOTAL	801.4	1314.4	1363.9	1706.3	1690.3	1951.9	1701.5	2386.2

Table B-9: Monthly Airfield Operations: Derived Operations at NAS Kingsville (300-PTR Scenario)

	MONTH												
OP TYPE	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Break Arrival	3060	2979	2961	3060	2541	3124	2872	3403	3485	3239	3662	3203	37589
Depart and Re-enter	102	144	105	98	111	112	147	127	134	132	135	133	1480
Depart	3783	3613	3730	3689	3279	3925	3559	4174	4279	3900	4367	3965	46263
GCA Arrival	419	402	475	358	468	443	408	481	501	411	416	533	5315
Visual Arrival	287	306	319	304	297	371	342	338	351	303	315	328	3861
FCLP	11392	756	12902	2220	10032	1944	13660	972	13442	1080	2606	10890	81896
GCA	1756	1532	1717	1456	1651	1610	1560	1773	1670	1493	1789	1575	19582
Visual Pattern	18249	18180	19075	18477	17379	20387	18732	20758	21266	19550	21170	19957	233180
TOTAL	39048	27912	41284	29662	35758	31916	41280	32026	45128	30108	34460	40584	429166

Note: Derived Operations in Tables B-9 and B-10 are calculated as follows:

Break Arrival: One count for each aircraft arriving at field through break.

Depart and Re-enter: One count for each aircraft that departs field and immediately returns through the break. (This aircraft may depart immediately upon arrival, without conducting a full-stop landing).

Depart: One count for each aircraft that departs the field to another location.

GCA Arrival: One count for each aircraft arriving at field through a GCA.

Visual Arrival: One count for each aircraft arriving at field visually.

Table B-10: Monthly Airfield Operations: Derived Operations at NALF Orange Grove (300-PTR Scenario)

	MONTH												
OP TYPE	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Break Arrival	779	783	708	700	681	863	844	800	878	781	857	771	9445
Depart and Re-enter	423	405	392	360	379	476	480	419	503	415	438	432	5122
Depart	883	868	797	775	779	976	930	910	985	870	946	888	10607
GCA Arrival	25	0	16	0	18	20	9	18	21	10	1	33	171
Visual Arrival	423	405	392	360	379	476	480	419	503	415	438	432	5122
FCLP	2901	2106	1788	2376	1794	2112	2106	2598	2604	2112	2430	2610	27537
GCA	0	0	0	0	0	0	0	0	0	0	3	0	3
Visual Pattern	8478	8415	7855	7299	7628	9659	9463	8598	9946	8553	9141	8690	103725
TOTAL	13912	12982	11948	11870	11658	14582	14312	13762	15440	13156	14254	13856	161732

Table B-11: Monthly SUA Sorties: Sorties in Area by Month (300-PTR Scenario)

	Month												
Area	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
ALERT_AREA	236	291	283	237	288	252	221	326	304	254	219	311	3222
CHASE1	128	154	174	138	122	120	162	202	164	126	154	168	1812
CHASE3E	192	312	287	244	244	258	257	311	318	248	276	278	3225
CHASE3W	172	238	227	242	192	241	224	309	238	207	271	258	2819
KINGS1A	877	1062	1136	1030	953	1167	1067	1136	1197	968	1088	1131	12812
KINGS1B	136	240	189	232	206	206	211	253	205	198	224	220	2520
KINGS1C	156	236	219	181	224	241	222	264	242	197	214	219	2615
KINGS1D	209	283	265	229	240	242	242	329	243	249	276	291	3098
KINGS1HIGH	120	149	155	133	138	150	134	161	152	132	141	158	1723
MCMULLEN	188	231	136	445	0	0	0	293	536	400	336	235	2800
W228	197	212	262	228	173	253	227	282	235	177	256	272	2774
Total	2611	3408	3333	3339	2780	3130	2967	3866	3834	3156	3455	3541	39420

Table B-12: Sorties: Total by Flight Category

	PTR SCENARIO							
FLIGHT CATEGORY	168	250	225	300	275	400	500	350
Student X	22310	32752	33752	39682	39750	43430	45203	46460
IUT X	2890	4215	4233	5083	4976	5673	5797	5873
Instructor Lead	7194	10718	10595	12802	12474	12005	10990	14994
Overhead & Attrition	3149	4550	4807	5331	5772	6198	5993	6405
Maintenance, Log, & Ferry	1733	2577	2321	3091	2820	4035	2707	3610
TOTAL	37276	54812	55708	65989	65792	71341	70690	77342

Table B-13: Flight Hours: Total by Flight Category

	PTR SCENARIO							
FLIGHT CATEGORY	168	250	225	300	275	400	500	350
Student X	29187.6	42941.8	44878.1	52056.3	52950.3	59118.7	62836.9	61165.1
IUT X	3916.2	5742.9	5816.3	6946.4	6877.7	8094.4	8393.6	8131.2
Instructor Lead	8530.2	12736.9	12636.5	15220.2	14883.2	14412.5	13231.6	17846.6
Overhead & Attrition	4493.1	6565.2	7004.5	7759.3	8436.2	9235.3	9114.1	9251.9
Maintenance, Log, & Ferry	1558.8	2314.6	2083.6	2775.2	2535.1	3627.4	2456.7	3241.3
TOTAL	47685.8	70301.3	72419.0	84757.4	85682.5	94488.3	96032.9	99636.0

Table B-14. Flight Hours: Hours per Estimated Graduate by Flight Category

	PTR SCENARIO							
FLIGHT CATEGORY	168	250	225	300	275	400	500	350
Student X	172.7	173.1	175.5	173.2	175.8	179.7	183.5	173.8
IUT X	23.2	23.1	22.7	23.1	22.8	24.6	24.5	23.1
Instructor Lead	50.5	51.3	49.4	50.6	49.4	43.8	38.6	50.7
Overhead & Attrition	26.6	26.5	27.4	25.8	28.0	28.1	26.6	26.3
Maintenance, Log, & Ferry	9.2	9.3	8.1	9.2	8.4	11.0	7.2	9.2
TOTAL	282.1	283.3	283.2	281.9	284.5	287.2	280.4	283.1

Table B-15: Statistics per Completed X

	PTR SCENARIO							
STATISTIC	168	250	225	300	275	400	500	350
Total Delay (min)	2.2	2.4	2.4	2.6	2.6	2.7	2.3	3.1
Total Flight Hours	2.14	2.15	2.15	2.14	2.16	2.18	2.12	2.14
Number of Sorties	1.67	1.67	1.65	1.66	1.66	1.64	1.56	1.66
Field Delay (sec)	35.2	47.2	51.7	60.7	61.3	58.8	42.9	84.9

GLOSSARY

Term	Acronym	Definition (* = adapted from FAA, 7110.65H Air Traffic Control, "Glossary")
Airfield event		An aircraft operation on the surface or in the vicinity of an airfield. Examples include a departure, an arrival, a touch-and-go pass, an FCLP pass, an overhead break, a pad landing, a low approach.
Airfield operation		An airfield event that is a landing or a takeoff. Examples include a departure, an arrival, a pad landing. Touch-and-go landings, FCLPs, and low approaches count as two airfield operations each (e.g., the "touch" and the "go").
Alert area	A-	*A type of special use airspace that may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
Arrival		An aircraft landing at the field into a full stop.
Cross-country		A type of flight that normally spans more than one day from time of departure from base to time of return to base.
Departure		An aircraft taking off from the airfield after having taxied there.
Detachment		The movement of all or part of a squadron from the normal home base to another location for a temporary period of time in order to conduct a prescribed set of training exercises.
Field carrier landing practice	FCLP	A training event that uses the airfield to practice landings on an aircraft carrier.
Final approach		*A component of an airfield's traffic pattern: a flight path in the direction of landing along the extended runway centerline, normally extending from the base leg to the approach end of the runway.
Flight		One or more aircraft departing a base airfield, conducting one or more missions, possibly including landings and takeoffs at other airfields, and returning to base.
Flight hour		An hour of airborne flight time, excluding ground taxi and other ground operations.
Flight level	FL	*A level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury; stated in three digits that represent hundreds of feet, e.g., flight level 250 (FL250) represents a barometric altimeter indication of 25,000 feet.
Ground controlled	GCA	*A radar approach system operated from the ground by air-

Instrument flight rules	IFR	*Rules governing the procedures for conducting instrument flight.
Landing		An aircraft approach to and touch down on the airfield surface.
Military operations area	MOA	*A type of special use airspace of defined vertical and lateral dimensions established outside Class A airspace (i.e., below 18,000 feet MSL) to separate/segregate certain military activities from IFR traffic and to identify for VFR traffic where these activities are conducted.
Military training route	MTR	*Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots.
Mission		A flight or part of a flight that accomplishes a specific purpose. Often used interchangeably with "flight."
Out-and-in flight		A flight that leaves the base airfield, operates in one or more training areas, lands at a second airfield for refueling and layover, departs the second airfield, operates in one or more training areas, and returns to the base airfield.
Overhead break		*Also "overhead maneuver" or "break." A series of predetermined maneuvers prescribed for aircraft (often in formation) for entry into the VFR traffic pattern and to proceed to a landing. A break usually includes the following components: (1) an initial approach three to five miles in length; (2) an elliptical pattern consisting of two 180-degree turns; (3) a break point at which the first 180-degree turn is started; and (4) altitude at least 500 feet above the conventional pattern.
Profile		Also "flight profile" or "mission profile." A sequence of steps that specifies the ordered elements of a flight, such as resources requested and returned, routes flown, training areas worked in and time spent there, and weather and other conditions that may abort or otherwise change the steps accomplished.
Resource		An asset whose supply is fixed and accounted for as flights request it in order to carry out their missions. If a resource is not available when requested, the mission is either delayed or aborted. Examples include aircraft, instructors, TACTS pods, and bomb racks.
Restricted area	R-	*A type of special use airspace within which the flight of aircraft, while not wholly prohibited, is subject to restriction.
Section flight		A flight of two aircraft.
Sortie		(1) In the context of [illegible]

		activities.
Tactical air navigation	TACAN	*An ultra-high frequency electronic air navigation aid that provides suitably equipped aircaft a continuous indication of bearing and distance to the TACAN station.
Takeoff		An aircraft lifting off the airfield surface.
Taxi		*The movement of an airplane or wheeled helicopter under its own power on the surface of an airfield.
Touch-and-go landing		*An operation by an aircraft that lands and takes off on a runway without stopping or exiting the runway.
Traffic pattern		*The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport.
Training area		A ground or airspace area where squadron flight operations take place, e.g., a range, outlying landing field, or special use airspace.
Training event		A type of mission that accomplishes a specific training requirement.
Visual approach		*An approach conducted on an IFR flight plan that authorizes the pilot to proceed visually and clear of clouds to the airfield, always with the airfield or the preceding aircraft in sight.
Visual flight rules	VFR	*Rules that govern the procedures for conducting flight under visual conditions.
Warning area	W-	* A type of special use airspace that may contain hazards to nonparticipating aircraft in international airspace.
X		A credit earned by a student pilot upon successful completion of a training event.

LIST OF ABBREVIATIONS

GENERAL ABBREVIATIONS

AFB	Air Force Base
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
CAD	Computer-Aided Design
CNATRA	Chief of Naval Air Training
FAA	Federal Aviation Administration
FACSFAC	Fleet Area Control and Scheduling Facility
FCLP	Field Carrier Landing Practice
FL	Flight Level
GCA	Ground-Controlled Approach
GUI	Graphical User Interface
IFR	Instrument Flight Rules
IUT	Instructor Under Training
MOA	Military Operations Area
MSL	Mean Sea Level
MTR	Military Training Route
NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NASMOD	Naval Aviation Simulation Model
NATS	Navy Air Training System Model
NATOPS	Naval Aviation Training and Operational Procedures Standardization
OAG	Official Airline Guides
PTR	Pilot Training Rate
SID	Standard Instrument Departure
SIMMOD	Airfield and Airspace Capacity Model
SUA	Special Use Airspace
TACAN	Tactical Air Navigation
TW II	Training Air Wing Two
VFR	Visual Flight Rules

TRAINING EVENT ABBREVIATIONS

CQ BOAT	Field Carrier Landing Practice, second stage: prior to carrier detachment
FAM CLEAR	Familiarization, first stage: requires weather clear of overhead clouds
FAM OVHD	Familiarization, second stage: can be conducted with overhead clouds
FORM 2 PLANE	Formation with two aircraft
FORM 4 PLANE	Formation with four aircraft
GUN	Air-to-Air Gunnery
IR	Instrument Rating
NFAM1	Night Familiarization, first stage: dual flight (instructor and student in one aircraft)
NFAM2	Night Familiarization, second stage: solo flight (instructor follows student in chase aircraft)
NFORM	Night Formation
OCF	Out-of-Control Flight
ONAV 1 PLANE	Operational Navigation with single aircraft
ONAV 2 PLANE	Operational Navigation with multiple aircraft
RI	Radio Instruments
TACFORM	Tactical Formation
WEPS	Air-to-Ground Weapons

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IV. PERSONNEL

USN ACC K. Banker, ATC, NAS Kingsville.

USMC Major R. Branch, TW I, Operations

USN Lieutenant Al Causey, TW II, Assistant Operations

USN Lieutenant Commander J. Cooper, TW II, Operations

GS Ms. I. Cora, TW II, Logs and Records

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Document Separator

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON, D C 20350-1000

Canc frp: Sep 95

SECNAVNOTE 11000
BSAT/JC
08 December 1993

SECNAV NOTICE 11000

From: Secretary of the Navy

Subj: BASE CLOSURE AND REALIGNMENT

Ref: (a) SECNAV Memorandum of 08 December 93; Subj: COMPLIANCE WITH DEFENSE BASE CLOSURE AND REALIGNMENT ACT OF 1990

Encl: (1) Plan of Action and Milestones for BRAC-95
(2) Department of the Navy Policy and Procedures for Certification of BRAC-95 Information

1. Purpose. To establish procedures for the Department of the Navy to support Department of Defense implementation of the Defense Base Closure and Realignment Act of 1990.

2. Cancellation. SECNAVNOTE 11000 of 22 April 1992 (Canc frp: Feb 93)

3. Background. The Defense Base Closure and Realignment Act of 1990 (P.L. 101-510, as amended by P.L. 102-190 dated 5 December 1991 and P.L. 102-484 dated 23 October 1992) (the Act) established a fair process that will result in the timely closure and realignment of military installations. Under this procedure, on 12 April 1991 and 12 March 1993, the Secretary of Defense transmitted to the Congressional oversight committees and the Defense Base Closure and Realignment Commission (the Commission) a list of military installations recommended for closure or realignment. In accordance with the Act, the same procedure will be employed during 1995 for closure or realignment of additional military installations. The mechanisms set forth in this notice are intended to ensure that the Secretary of the Navy can make sound and timely recommendations to the Secretary of Defense in compliance with the Act. This notice reflects and builds on the experience gained within the Department on the Navy during the 1993 base closure and realignment process, particularly in view of the validation of that process by both the General Accounting Office and the Commission after extensive review.

a. In general. To ensure a credible and comprehensive review of Department of the Navy installations and facilities, one that is conducted scrupulously in accordance with the Base Closure and Realignment Act, Department of Defense and Department of the Navy policy, there are hereby established:

(1) A Department of the Navy Base Structure Evaluation Committee (BSEC); and

(2) A Base Structure Analysis Team (BSAT).

In addition, the positions of an Executive Director of the BSAT; to the extent necessary, up to two Associate Directors of the BSAT; and a Recorder for the BSEC are created.

b. Organization. Under the authority of the Under Secretary, the base closure effort will be comprised of several base closure-unique entities and other standing Department of the Navy organizations.

(1) The BSEC will have 8 members:

(a) The Assistant Secretary of the Navy (Installations and Environment), ASN(I&E), who will be Chair;

(b) The Executive Director of the BSAT, who will be the Vice Chair. This Executive Director will be a senior Department of the Navy career civilian selected by the Under Secretary;

(c) Two Navy Flag officers and two Marine Corps General officers who will be recommended by the Chief of Naval Operations and the Commandant of the Marine Corps, respectively, to the Under Secretary, or in his absence the Secretary of the Navy, for his approval;

(d) Two individuals of Flag, General officers or Senior Executive Service rank, one of whom will be recommended by the Assistant Secretary of the Navy (Research, Development and Acquisition) (ASN(RD&A)) and one of whom will be recommended by the ASN(I&E) to the Under Secretary, or in his absence the Secretary of the Navy, for his approval;

(e) In addition to these members of the BSEC, a Navy or Marine Corps Judge Advocate will serve as the permanent Recorder for the sessions of the Base Structure Evaluation Committee and will participate fully in the activities of the Base Structure Analysis Team.

The Navy and Marine Corps Flag/General officers should have experience in

The Vice Chief of Naval Operations, the Assistant Commandant of the Marine Corps and the President of the Center for Naval Analyses will propose individuals for the BSAT to the Executive Director of the BSAT. The Executive Director will recommend the team composition to the Under Secretary, or in his absence the Secretary of the Navy, for his approval.

(3) The Office of General Counsel and the Naval Audit Service will also provide support to the Base Closure process as delineated below.

The Base Structure Evaluation Committee and the Base Structure Analysis Team will perform their functions in accordance with the Plan of Action and Milestones set out in enclosure (1).

c. Responsibilities. Under the guidance and direction of the Under Secretary of the Navy, the following Department of the Navy entities will execute the responsibilities delineated below.

(1) Base Structure Evaluation Committee. The BSEC is responsible for:

(a) Conducting analyses and developing recommendations for closure and realignment of Department of the Navy military installations for approval by the Secretary of the Navy;

(b) Ensuring that a fair and complete evaluation of all Navy and Marine Corps installations is conducted in accordance with the Act;

(c) Ensuring that the process utilized, the conduct of the deliberations, and the preparation of the report containing recommendations are timely, thorough, and in compliance with the Act, guidance from the Secretary of Defense, and this notice; and that the procedures used can be appropriately reviewed and analyzed by the Comptroller General as provided by the Act;

(d) Ensuring that operational factors of concern to the operational Commanders in Chief are considered;

(e) Providing base closure and realignment recommendations to the Under Secretary of the Navy for review not later than 30 December 1994;

The Chair of the BSEC may call into being special panels of the BSEC to consider unique issues dealing with, for example, interservice considerations.

(2) Base Structure Analysis Team. The BSAT, under the direction, guidance, and oversight of the Base Structure Evaluation Committee, will include analysts and supporting staff from throughout the Department of the Navy and from the Center for Naval Analyses. The individuals assigned to the Base Structure Analysis Team shall represent a broad spectrum of expertise and capability, with emphasis on senior officers with operational experience, and shall include public affairs and legislative affairs capability. One Navy or Marine Corps Judge Advocate will be assigned to the Base Structure Analysis Team to serve as the permanent Recorder for the sessions of the Base Structure Evaluation Committee. The Base Structure Analysis Team members will be drawn from throughout the Department of the Navy, and will be assigned to the Base Structure Analysis Team for the duration of BRAC-95, which, for planning purposes, will conclude on 30 September 1995.

The Base Structure Analysis Team is responsible for:

(a) Responding to the guidance and direction of the Base Structure Evaluation Committee in collecting data and performing analysis as necessary;

(b) Developing analytical methodologies and techniques for consideration by the Base Structure Evaluation Committee;

(c) Working with external organizations, to include the Secretary of Defense base closure staff, the Commission staff, the General Accounting Office, and Congressional staff, on day-to-day issues; and

(d) Controlling the development of the data base and associated documentation.

(e) Protecting the integrity of the process by ensuring that all data, considerations, and evaluations are treated as sensitive and internal to the process.

Throughout the process, the BSAT will provide staff support as requested by the Under Secretary and other senior Department of the Navy officials in the Base Closure process.

(3) Office of General Counsel, Department of the Navy. The General Counsel or his

(4) Naval Audit Service. The Naval Audit Service will discharge two independent responsibilities during BRAC-95. First, a Senior Executive Service auditor from the Naval Audit Service will be assigned full-time to and be in residence with the Base Structure Analysis Team. This individual will review the activities of the Base Structure Evaluation Committee and the Base Structure Analysis Team to determine whether they comply with the approved internal control plan; will periodically advise the Chair, Base Structure Evaluation Committee or the Executive Director, Base Structure Analysis Team on the results of that ongoing review; and will serve as the Base Structure Evaluation Committee's principal point of contact with the Naval Audit Service and the General Accounting Office. To carry out this responsibility, this auditor will attend Base Structure Evaluation Committee deliberations. Second, the Naval Audit Service also will have a field audit responsibility that includes verification of the accuracy of standard data bases and audit of both the manner and the quality of responses from Department of the Navy personnel to the Base Structure Evaluation Committee requests for data, with particular emphasis on compliance with the certification policy and procedures set out in enclosure (2).

d. Conduct of the Process. Rigorous standards for data compilation and analysis are essential for full compliance with the Act.

(1) The Base Structure Data Base. The Base Structure Data Base will contain all relevant data and information pertaining to all Department of the Navy military installations subject to the Act. It will include the information required by the Base Structure Evaluation Committee to evaluate installations on the basis of the final selection criteria and the force structure plan. Only information and data certified in accordance with enclosure (2) will be maintained in the Base Structure Data Base. In particular, for all Department of the Navy installations required to be considered under the Act, the Base Structure Data Base will contain a description of the Department of the Navy's existing domestic shore infrastructure by base categories and subcategories and all of the data and information required to enable the Base Structure Evaluation Committee to conduct analyses, to evaluate installations within each category/subcategory, and to develop recommendations for base closure and realignment.

The Base Structure Data Base shall be fully documented and endorsed by the Base Structure Evaluation Committee as the sole and authoritative Department of the Navy data base for making base closure and realignment recommendations. No changes to the Base Structure Data Base, other than necessary technical corrections and, at the request of the Base Structure Evaluation

of Department of the Navy military installations, as a result of which recommendations for closure and realignment will be developed. The Base Structure Evaluation Committee will apply the final selection criteria for selecting bases for closure or realignment provided by the Secretary of Defense in accordance with Section 2903 of the Act, considering all Department of the Navy military installations subject to the Act on an equal footing. The Base Structure Evaluation Committee's recommendations shall be based on the final Force Structure Plan provided by the Secretary of Defense as also required by that Section.

Specifically, the Base Structure Evaluation Committee will:

(a) Endorse the Base Structure Data Base;

(b) By base category/subcategory, identify projected future excess capacity that could be eliminated and produce savings, and determine which, if any, are to be eliminated from further study for closure or realignment at any step of the procedures as a result of capacity, cost, or impact on critical mission, reconstitution, Fleet operations, support or readiness;

(c) Within each base category/subcategory which the Base Structure Evaluation Committee determines has sufficient excess capacity to merit further review, evaluate all installations and activities subject to the Act under the military value criteria;

(d) Develop feasible options for closures and realignments, a cost/benefit analysis for each option, and an impact analysis for each option;

(e) As it performs the tasks noted in (b), (c), and (d) above, solicit comments from the major owners/operators of Navy and Marine Corps installations on impacts on Fleet operations, support and readiness;

(f) As it performs the tasks noted in (b), (c), (d), and (e) above, on a recurring basis, at least monthly, discuss progress with the Secretary, the Under Secretary, the Assistant Secretaries of the Navy and the General Counsel, with a particular view to ensuring conformance with Departmental policy;

(g) Develop recommendations for closure and realignment of specific installations and activities; and

(h) Provide that support necessary so that the Under Secretary of the Navy, in

5. Relationship to Other Department of the Navy Initiatives and Studies. The procedures set forth in this notice constitute the only valid process to develop specific recommendations for closure and realignment of Department of the Navy installations subject to the Act. Planning efforts outside the established base closure process must adhere to the guidance set forth in reference (a) and may be submitted to the Base Structure Evaluation Committee. The Base Structure Evaluation Committee then will determine whether such efforts are relevant for use in the development of analytical methodologies, data collection, or the Base Structure Data Base. These efforts may not be incorporated into the Base Structure Data Base, as they represent uncertified data.

6. Other Force Level Planning. All actions which meet the Act's definition of a closure or realignment must be approved under the Act. However, this does not obviate or alter the need to also comply with existing Department of the Navy requirements or procedures relating to the establishment or disestablishment of shore activities. Any proposed changes to which the Act would not be applicable, including certain force level or force level related planning decisions (e.g., decommissionings/draw-downs for Navy and Marine Corps operating forces) shall be supported with sufficient documentation.

7. Reports. The reporting requirement contained in this notice is exempt from reports control by SECNAVINST 5214.2B.

8. Cancellation Contingency. This notice is cancelled upon completion of BRAC-95, which, for record purposes, will be 30 September 1995.

John H. Dalton
Secretary of the Navy

Distribution:
(See next page)

SECNAVNOTE 11000
08 December 1993

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SECNAVNOTE 11000
08 December 1993

PLAN OF ACTION AND MILESTONES FOR BRAC-95

[All dates are "not later than" dates.]

13 Nov 93	Start initial assignment of individuals to Base Structure Evaluation Committee and Base Structure Analysis Team.
15 Nov 93	Start the turnover process from the BRAC-93 Base Structure Evaluation Committee/Base Structure Analysis Team to the BRAC-95 Base Structure Evaluation Committee/Base Structure Analysis Team.
29 Nov 93	Complete a list of Navy and Marine Corps installations and activities to be considered in BRAC-95. Issue a "general information" data call to all such installations and activities.
10 Jan 94	Responses to "general information" Data Call are due.
17 Jan 94	BSEC identify to the Under Secretary of the Navy those major issues of DoN policy requiring addressal and delineation, and those joint issues that need to be addressed and proposed mechanisms for their addressal.
15 Mar 94	Owners/operators and base commanders to Washington, DC to meet with the Under Secretary, Vice Chief of Naval Operations, Assistant Commandant of the Marine Corps and Base Structure Evaluation Committee/Base Structure Analysis Team to be briefed on base closure process, Secretary of Defense policy, Department of the Navy perspective and approach, to maximize understanding by those affected by the process.
22 Mar 94	ASN(I&E) presents to the BSEC policy imperatives relating to Navy and Marine Corps installations and the Department of the Navy Environmental Program. ASN(FM) will participate to ensure that appropriate financial policies are addressed.
23 Mar 94	ASN(M&RA) presents to the BSEC military and civilian manpower and

31 Mar 94	Complete base visits to "above threshold" BRAC-95 installations. Develop a detailed plan of action and milestones and standard operating procedures for BRAC-95. Identify individual installation and major owners/ operators points of contact. Develop analytical techniques. Draft the Data Calls required to elicit information for analysis and evaluation.
1 Apr 94	Provide draft Data Calls, reflecting policy imperatives articulated by the ASNs, to major owners/operators points of contact for review and to maximize understanding.
15 Apr 94	Points of contact provide Base Structure Analysis Team with written comments, concerns, and problems based on this review.
3 May 94	Owners/operators, interested base commanders and points of contact to Washington, DC to meet with Base Structure Evaluation Committee/Base Structure Analysis Team to discuss concerns/problems.
10 May 94	BSEC briefs ASN(I&E) and ASN(FM) on the BRAC-95 analytic approach and how it addressed the policy imperatives presented in March 1994, as well as the implications of the evaluation process in satisfying those imperatives.
11 May 94	BSEC briefs ASN(M&RA) and ASN(FM) on the BRAC-95 analytic approach and how it addressed the policy imperatives presented in March 1994, as well as the implications of the evaluation process in satisfying those imperatives.
12 May 94	BSEC briefs ASN(RD&A) and ASN(FM) on the BRAC-95 analytic approach and how it addressed the policy imperatives presented in March 1994, as well as the implications of the evaluation process in satisfying those imperatives.
16 May 94	Issue final Data Calls with clarification as necessary.
14 June 94	Naval Facilities Engineering Command, Engineering Field Divisions, and installation Facilities representatives to Washington, DC to meet with Base Structure Evaluation Committee/Base Structure Analysis Team to be advised

16 Sep 94	Commence issuing COBRA scenario Data Calls with 7-day response requirement.
15 Nov 94	ASNs briefed on proposals under consideration and provide comments on conformance with policy imperatives..
1 Dec 94	Vice Chief of Naval Operations/Assistant Commandant of the Marine Corps and major owners/operators briefed on proposals under consideration and provide comments on readiness/operational impacts.
30 Dec 94	Provide base closure and realignment recommendations to the Under Secretary.
6 Jan 95	Executive Steering Group, Vice Chief of Naval Operations, and Assistant Commandant of the Marine Corps review Base Structure Evaluation Committee findings and recommendations, and recommend disposition to the Secretary of the Navy.
18 Jan 95	Secretary of the Navy decision on BSEC recommendations. Commence writing report. Deliver the Base Structure Data Base to printer for reproduction.
3 Feb 95	Final report to printer for reproduction.
15 Feb 95	Report due to Secretary of Defense. Base Structure Data Base ready for delivery to Base Closure and Realignment Commission contemporaneous with delivery of Secretary of Defense's report. Minutes/deliberative reports completed, printed and ready for delivery to Commission contemporaneous with delivery of Secretary of Defense's report.
15 Mar 95- 30 Sep 95	Respond to requirements for analyses and requests for additional data (e.g., from the Defense Base Closure and Realignment Commission, members of Congress, General Accounting Office, the media, and local communities).

SECNAVNOTE 11000
08 December 1993

DEPARTMENT OF THE NAVY POLICY AND PROCEDURES FOR CERTIFICATION OF BRAC-95 INFORMATION

1. **Purpose.** Under the Defense Base Closure and Realignment Act of 1990, as amended, the Secretary of the Navy is required to certify that information provided to the Secretary of Defense concerning the realignment or closure of a military installation "is accurate and complete to the best of his knowledge and belief." As a basis for the certification by the Secretary of the Navy, individuals who provide information as part of the 1995 base realignment and closure (BRAC-95) process will be required to certify as to the accuracy and completeness of such information. The purpose of this notice is to establish this BRAC-95 certification policy and procedure.

2. **Requirement.** Every officer or employee of the Department of the Navy, uniformed and civilian, who provides information for use in the BRAC-95 process shall be required to provide therewith a signed certification as follows:

> "I certify that the information contained herein is accurate and complete to the best of my knowledge and belief."

The signing of such a certification shall constitute a representation that the certifying official has reviewed the information and either (1) personally vouches for its accuracy and completeness or (2) has possession of, and is relying upon, a certification executed by a competent subordinate.

In accordance with these procedures, absent certification from the point of origin of data through the chain of command, no information provided for use in the BRAC-95 process shall become part of the Base Structure Data Base (BSDB) or be relied upon by the Base Structure Evaluation Committee (BSEC) for analysis or evaluation.

3. **Procedures.** When information is forwarded to the next higher level of the chain of command, the transmittal document will contain a certification signed by the individual transmitting such information. Each succeeding level of the chain of command shall maintain a copy of the information transmitted and any certifications received from subordinates.

a. **Activities Generating Information.** A certification will be executed both by the individual responsible for generating the information and by the head of the organization in

submitted as certified by a lower echelon activity with revisions clearly noted. A copy of the revised data call, annotating any changes made, shall be sent to the originator of the data, so that subordinates have a complete record of the final certified package.

c. **Major Claimants.** A certification will be executed by the commander of a major claimant for information provided by the claimant.

d. **Headquarters.** A certification will be executed by any Assistant Chief of Naval Operations (ACNO), Deputy Chief of Naval Operations (DCNO), or Deputy Chief of Staff (DC/S) whose office provides information for use in the BRAC-95 process.

e. **Base Structure Analysis Team (BSAT).** The Executive Director, BSAT will execute a certification with regard to the BSDB.

f. **BSEC.** All members of the BSEC will execute a certification with regard to information provided to the Secretary of the Navy.

4. **Naval Audit Service.** The Naval Audit Service will conduct periodic audits to verify whether the Department of the Navy is in substantial compliance with this certification process.

5. **Guidance.** Questions concerning this certification requirement should be directed to the Office of the Assistant General Counsel (Installations and Environment) at (703) 602-2252 (DSN 332-2252) (fax number 703-602-3551).