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219

BRAC-95

DATA CALL NUMBER TWELVE

Data for

Naval Command, Control and Ocean
Surveillance Center, RDT&E Division
San Diego, CA

Entire Data Call
Revision
219

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BRAC-95
Joint Cross-Service Laboratories Data Call Certification

Reference: SECNAVNOTE 11000 of 08 December 1993

In accordance with policy set forth by the Secretary of the Navy, personnel of the Department of the Navy, uniformed and civilian, who provide information for use in the BRAC-95 process are required to provide a signed certification that states "I certify that the information contained herein is accurate and complete to the best of my knowledge and belief."

The signing of this certification constitutes 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.

Each individual in your activity generating information for the BRAC-95 process must certify that information. Enclosure (1) is provided for individual certifications and may be duplicated as necessary. You are directed to maintain those certifications at your activity for audit purposes. For purposes of this certification sheet, the commander of the activity will begin the certification process and each reporting senior in the Chain of Command reviewing the information will also sign this certification sheet. This sheet must remain attached to this package and be forwarded up the Chain of Command. Copies must be retained by each level in the Chain of Command for audit purposes.

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief WITH THE FOLLOWING EXCEPTION:

I have included the Common Support Function of Afloat C4I in addition to Airborne C4I, Fixed Ground-Based C4I, and Ground Mobile C4I Common Support Functions (CSFs). These functions are, by design and direction, increasingly common. The same C4I systems are used for airborne, fixed, and ground based platforms. In fact, the integration of C4I across platforms and services is the single overarching thrust in modern command and control. I believe C4I as a whole is in and of itself an inseparable common support function. We have answered the questions as requested. The breakout of data between Afloat C4I, Airborne C4I, Fixed Ground-Based C4I, and Ground Mobile C4I is based on parametric estimates. The estimates are themselves reasonable, however their meaning in terms of separation of actual work, in reality, is largely hypothetical. It is an accounting exercise. No decision should be based on the break-out within C4I common support functions.

UIC N66001

NCCOSC RDTE DIV SAN DIEGO CA
BRAC DATA CALL 12

ACTIVITY COMMANDER

KIRK E. EVANS, CAPT., USN	
NAME (Please type or print)	Signature
COMMANDING OFFICER	29 JUNE 94.
Title	Date
NCCOSC RDTE DIV	
Activity	

UIC N66001

Joint Cross-Service Laboratories Data Call #12

for the

Director of Defense Research and Engineering
1995 Base Realignment and Closure Laboratories
Joint Cross-Service Group

1 July, 1994

Prepared for:
Commander
Space and Naval Warfare Systems Command
Washington, DC 20350

Prepared by:
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BRAC-95
JOINT CROSS-SERVICE LABORATORIES DATA CALL #12

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SECTION I: TASKING

Note: Section I only provides guidance and contain no data and are not included in this submission

SECTION II: CAPACITY OF DoD COMPONENTS

2.1 Workload. Use the following table to describe historic and projected workload at each activity in terms of funding and workyears. Assume previous BRAC closures and realignments are implemented on schedule. Projected funding will be derived from FY95 President's Budget Submission (Then year dollars). Past fiscal year data shall begin with FY86 or at the inception of the activity as it existed on 1 Oct 93. (BRAC Criteria I & IV)

Information Required	Fiscal Years											
	86	87	88	89	90	91	92	93	94	95	96	97
Total Funds Programmed ($M)	557	601	577	602	602	609	639	683	630	593	596	596
Total Actual Funds ($M)	551	631	576	623	671	648	663	733				
Programmed Workyears	3812	3630	3680	3722	3705	3619	3841	3746	3146	2868	2808	2738
Actual Workyears	3834	3699	3774	3666	3694	3672	3905	3638				

- Budgeted workyears are the selected indicator of the "lab" infrastructure's capacity at an aggregate level for each Military Department. They include both workyears funded directly by the Military Department and the workyears funded from organizations outside the Military Department.

Workyears = government personnel and on-site FFRDCs and SETAs

NCCOSC RDTE DIV SAN DIEGO CA NOTES:

NCCOSC RDTE DIV SAN DIEGO CA was established on 2 Jan 92. Since then, the following changes have occurred: personnel and facilities were removed at the Hawaii Lab, Arctic Lab, and Morris Dam facilities; personnel were removed from the Torpedo and Fire Control Programs; and personnel and facilities were added from FCDSSA San Diego, NSSA Los Angeles, Philadelphia Detachment, and Warminster Detachment.

For Table 2.1, UICs N63152 (FCDSSA, SD) and N65576 (NSSA) are included from FY92 through FY97. In FY92, FCDSSA and NSSA were Resource Management System (RMS) activities. In FY93, they were RMS for approximately one quarter of the fiscal year. Additionally, the following significant considerations were made for Table 2.1: the Philadelphia and Warminster Detachments are included for all years; FFRDC workyears are included in all actual workyears; the actual workyears for FY92 and FY93 were estimated for FCDSSA and NSSA; all funds include direct cite and reimbursable; and the workyears include civilian regular, civilian overtime and military workyears. Since budgets have not been prepared for FY96 and FY97, the total funds budgeted are based on current estimates.

2.2 Excess "Lab" Capacity -- Measured at the DoD Component Level

-- Excess "Lab" Capacity = Sum of the Peak Workyears - Sum of the Projected Workyears

-- Peak at each activity = Highest value between FY86 (or since inception of organization) and FY93

-- Projected at each activity = Estimated at FY97

Excess "Lab" Capacity = 3905 (Actual FY92) - 2738 (Prog. FY97) = 1167 workyears.

SECTION III: CAPABILITY OF ACTIVITIES TO PERFORM COMMON SUPPORT FUNCTIONS (CSFs): Provide the information described for each common support function listed in Appendix C in which you are actively engaged.

3.0 Mission: Describe the major capabilities at your activity contributing to the common support function in bulletized format. Describe any relationship and interconnectivity with other functions (common or otherwise) in support of the overall activity mission.

We have added a Common Support Function for C4I Systems - Afloat. We realize this is unsolicited but we feel that it will help the BSAT better understand the interconnectivity between C4I Systems - Fixed Ground-Based and C4I Systems-Afloat if we include Section 3.0 data for this Common Support Function.

Although NCCOSC RDTE DIV SAN DIEGO CA is being asked to respond to each Common Support Function as though it were accomplished in isolation of all others, this is nearly impossible since our primary effort in C4I is integrated across all related activities. Our primary mission is the integration of all C4I into a single interoperable system, as envisioned in *Copernicus* and *C4I for the Warrior*. To that end, our personnel and facilities are not readily separable into identifiable elements that support one Common Support Function or another. Therefore, <u>any</u> listing which purports to do that is an estimate at best. Our particular capabilities, people and facilities, may on one day be supporting land based communications and on the next day be supporting mobile communications, so our responses are approximations, heavily caveated, applicable only in a snapshot in time, tightly integrated with all other C4I efforts.

NCCOSC RDTE DIV SAN DIEGO CA is the only place that does afloat C4I integrated with land based fixed, airborne, (and to a lesser extent) ground mobile C4I. This integration is the essential part of *C4I for the Warrior*, and the separation or distribution of these functions by geographical location would be a giant step backward in achieving that goal.

Although the above paragraphs apply to all Common Support Functions, the following C4I Systems are directly applicable:

- **C4I Systems - Airborne**
- **C4I Systems - Fixed Ground-Based**
- **C4I Systems - Afloat**
- **C4I Systems - Ground Mobile**

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The following 13 Common Support Functions are applicable to this activity:

- **CSF 1. Air Vehicles - Fixed Propulsion**
- **CSF 2. Air Vehicles - Fixed Avionics**
- **CSF 3. Air Vehicles - Rotary Avionics**
- **CSF 4. Weapons - Cruise Missiles**
- **CSF 5. Space Systems - Satellites**
- **CSF 6. C4I Systems - Airborne**
- **CSF 7. C4I Systems - Fixed Ground-Based**
- **CSF 8. C4I Systems - Afloat**
- **CSF 9. C4I Systems - Ground Mobile**
- **CSF 10. Electronic Devices**
- **CSF 11. Environmental Sciences**
- **CSF 12. Environmental Quality**
- **CSF 13. Advanced Materials**

CSF 1. Air Vehicles - Fixed Propulsion **R**

MISSION:

-- Leadership in applying advanced signal processing and statistical classifiers to mechanical fault diagnosis

-- Experience and expertise in collecting vibration data (MK-46/50)

-- Expertise in Real time signal/data processing systems

-- Expertise with COTS VME/VSB hardware

-- Expertise in time series analysis and statistical classifiers

-- Concepts being applied to mechanical fault diagnosis originated in undersea surveillance

-- Real time hardware expertise obtained on undersea surveillance problems

-- 4 engineers and technicians with 69 years combined experience

INTERCONNECTIVITY: None

CSF 2. Air Vehicles - Fixed Avionics

MISSION:

-- Leadership in research and development of Air Vehicles Avionics.

-- Principal full-spectrum RDTE Laboratory for development and system platform integration of airborne communications equipment, avionics, navigation, and airborne RF electronic devices

-- 8 specialized labs support this function; GPS Laboratory, RF/Microelectronics Laboratory, CARCO Flight Motion Simulator, HC/KC-130 GPS/CDNU System Integration Lab, CH-46 GPS System Integration Lab, Airborne Communications Lab, Low-Probability of Intercept Lab, and the CDNU Software Development Lab

-- The only DoD System Integration Labs with C-130 and CH-46 communication/navigation equipment suites for testing the Weapons Replaceable Assemblies (WRS) in the avionics system and integration of GPS user equipment

-- Radio frequency, circuit miniaturization and assembly for designing and fabricating miniaturized airborne prototypes such as MMIC and discrete components such as inductors, capacitors, field effect transistors, etc.

-- DoD lead laboratory for developing GPS receivers and GPS receiver test tools with complete GPS host environment through a coordinated, real-time, hardware in-the-loop simulation of both the GPS satellite signals and host vehicle communications to conduct dynamic, precise and repeatable operational scenarios in the lab

-- 68 engineers and technicians with over 1,176 years combined experience

-- These facilities also support C4I Afloat, C4I Airborne, Pervasive Electronic Devices and Weapons Cruise Missile CSFs

INTERCONNECTIVITY:

-- GPS efforts exists in several of the Center programs, and provide a key element in all components of C4I platforms. The Center has developed a microelectronics version of this for use by individual troops. GPS is being integrated into the electronic suites of Naval aircraft, ships, ground based mobile systems, and most recently cruise missiles. This effort relates to CSFs 4,6,7,8,9 and 10. The Microelectronics Laboratory supports the technology discussed in CSF 10 and 13.

-- Since 1974, all of the Navy's Navigation R&D has been consolidated at NRaD, Warminster providing a strong synergism among the various navigation

programs from inertial sensor development to GPS receiver testing and development. In addition, the development of common avionics systems such as Integrated Communication Navigation Identification Avionics (ICNIA) to provide both communications and navigations and the similarity of radio communication systems with radio navigation systems has resulted in an intertwining of development skills among these two technological areas.

CSF 3. Air Vehicles - Rotary Avionics **R**

MISSION:

-- To provide leadership in testing and development of the overall CH-46 GPS electronics systems

-- To test and develop the overall CH-46 electronics system for the integration of GPS user equipment and various other avionics into the CH-46 helicopter

-- 2 engineers with 34 years experience

INTERCONNECTIVITY:

-- Concepts being applied to mechanical fault diagnosis originated in undersea surveillance

-- Real time hardware expertise obtained on undersea surveillance problems

-- Since 1974, all of the Navy's Navigation R&D has been consolidated at NRaD, Warminster providing a strong synergism among the various navigation programs from inertial sensor development to GPS receiver testing and development. In addition, the development of common avionics systems such as Integrated Communication Navigation Identification Avionics (ICNIA) to provide both communications and navigations and the similarity of radio communication systems with radio navigation systems has resulted in an intertwining of development skills among these two technological areas.

CSF 4. Weapons - Cruise Missiles

MISSION:

-- Principal full-spectrum RDTE Laboratory for navigation sensors and

systems for all platforms including ships, submarines, aircraft, and missiles

-- 3 specialized labs, the Simulated Ships Motion Test Facility, the Navigation Sensor System Integration Lab, and the GPS Laboratory support this CSF

-- GPS Laboratory with it's unique simulator and closed loop environment (see above)

-- One of a kind ship motion simulator (weight and accuracy) for evaluating AN/WSN-5 inertial navigation system dynamic inputs, critical to Tomahawk missile alignment and for investigation resolution of fleet reported problems involving Tomahawk performance (e.g. OTL-148 investigation)

-- 8 engineers and technicians with over 138 years in combined experience in this field

-- These facilities also support C4I Afloat, and Pervasive Electronic Devices CSFs

INTERCONNECTIVITY:

-- GPS efforts exist in several of the Center programs, and provide a key element in all components of C4I platforms. The Center has developed a microelectronics version of this for use by individual troops. GPS is being integrated into the electronic suites of Naval aircraft, ships, ground based mobile systems, and most recently cruise missiles. This effort relates to CSFs 4,6,7,8,9 and 10. The Microelectronics Laboratory supports the technology discussed in CSF 10 and 13.

-- Since 1974, all of the Navy's Navigation R&D has been consolidated at NRaD, Warminster providing a strong synergism among the various navigation programs from inertial sensor development to GPS receiver testing and development. In addition, the development of common avionics systems such as Integrated Communication Navigation Identification Avionics (ICNIA) to provide both communications and navigations and the similarity of radio communication systems with radio navigation systems has resulted in an intertwining of development skills among these two technological areas.

CSF 5. Space Systems - Satellites R

MISSION:

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-- The Communications Department supports the services in UHF, SHF and EHF communications as well as use of commercial satellite communications capability

-- Major SATCOM systems engineer for SPAWAR

-- Systems, component, installation for Fleet support

-- SATCOM facilities and operational support of satellite communications systems with SPAWAR and fleet units

-- Communications systems development with C4I networks, both ground based and afloat

-- Software Process (NCCOSC RDTE DIV possesses the most advanced skills in the Navy) is applicable to all software development functions.

-- Software Development Process as applied to automatic communications systems and networks

-- Communications Planning Modeling tools for Triservice use

-- This is across all Satcom and C4I Functions

-- 242 engineers and technicians with over 4,187 years combined experience

-- Supports C4I development, installation, and operation

-- SCIF interconnections for support of Fleet operations

INTERCONNECTIVITY: R

-- Every one of the CSFs have a communications component to them. Satellite communications is more specifically unique to the C4I Systems CSFs. This CSF is concerned with systems aspects of each communication system. All Navy, some Marine, and mobile Army units have some form of Satellite communications. A typical Navy link is ship-to-shore. This then requires equipment, design, etc. for C4I Afloat (CSF8), the satellite (CSF5), and the shore site (CSF7) just for each link. The TRE program developed at NRaD is an integral portion of the Intellegence component of C4I. The Air Force is specifically tasked with control of the Milstar satellite complex. They are using NRaD to develop the satellite control and circuit assignment algorithms.

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CSF 6. C4I Systems - Airborne

MISSION:

-- **Principal full-spectrum RDTE Laboratory for development and system platform integration of airborne communications equipment, avionics, navigation, and airborne RF electronic devices**

-- **Airborne Tactical Data Systems for E2C aircraft; Air Traffic Control and identification system development (E2C) - provides a dedicated multi-configuration development center designed to support the Navy's effort in the design, development, test and evaluation of E2C tactical software, software development tools and simulation; provides capability for the development and evaluation of software for foreign military sales cases; and supports Navy and Joint interoperability systems testing**

-- **The only DoD laboratory supporting the USN operational fleet in the analysis, design, development and distribution of the planning and control data for the JTIDS/Link 16 system**

-- **The JTIDS Network Design Facility supports this CSF**

-- **157 engineers and technicians with over 2,716 years combined experience**

INTERCONNECTIVITY:

-- **Tied to CSF7 as it is part of an overall C4I system. JTIDS links are an integral part of the fleet communication and combat functions. E2C aircraft are an integral component of the Intellegence portion of C4I.**

-- **Since 1974, all of the Navy's Navigation R&D has been consolidated at NRaD, Warminster providing a strong synergism among the various navigation programs from inertial sensor development to GPS receiver testing and development. In addition, the development of common avionics systems such as Integrated Communication Navigation Identification Avionics (ICNIA) to provide both communications and navigations and the similarity of radio communication systems with radio navigation systems has resulted in an intertwining of development skills among these two technological areas.**

CSF 7. C4I Systems - Fixed Ground-Based

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MISSION:

-- The integration of all C4I Fixed Ground-Based Systems into a single interoperable system supporting C4I afloat, airborne, ground mobile and fixed

-- Command Centers such as the Global Command Control System, the OSIS Baseline Upgrade and Operations Support System

-- Support of major demonstrations such as the Joint Warfare Interoperability Demonstration (JWID)

-- Secure distributed systems technology to integrate the Services information database, decision aids and processing R

-- Development of intelligence fusion centers

-- Knowledge of parallel computation algorithms and architectures in signal and image processing

-- Multiple major specialized laboratories to address unique SIGINT (ELINT/COMINT) and ACINT system development and integration

-- Extensive worldwide operational experience at Navy and Joint commands

-- Electromagnetic Theory and Technology: Major unique capability and skills in communications and electromagnetic theory and modeling

-- Network Theory, design and implementation

-- NCCS-A provides land-based test site of a theater command center command and control system installation supporting development, integration and interoperability testing plus online communications to ships and shore activities worldwide to support the gathering of requirements and defining user system needs

-- OSIS OED provides a land-based test site of an OSIS Evolutionary Development facility to support development, integration and interoperability testing as well as provides online communications to ships and selected intelligence shore activities worldwide

-- Navy Intel provides a land-based test site of an OSIS Evolutionary Development facility to support development, integration and interoperability testing of major intelligence systems and advanced applications such as collection requirements management

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-- HPC provides a land-based test site of a major theater level planning system and is capable of adapting technology and the use of high performance computers to increase the accuracy, performance and timeliness of the planning

-- DASL/SISL provides hardware, software, simulations and gateways to other simulations

-- MTWS provides a simulated combat environment for commanders and their staffs to practice and sharpen decision-making skills and to assist in the command and control aspects of tactical field exercises

-- DC2 supports the development, demonstration and transition of distributed technologies for combat systems and command and control systems as well as their integration into a distributed computing environment to support current and future Navy, joint, dual use and non-DoD applications R

-- RESA provides command, control and communications simulation in support of RDT&E and joint training requirements

-- Thorough understanding of: SIGINT (COMINT/ELINT); ACINT; radar; IR; electromagnetic; imaging technologies and sensors; and electronic support measures for application to ashore C4I systems

-- Multi-Link supports the development and production testing of current and new versions of Navy tactical data link terminals (Links 11, 4A and 22) and the Link 11 Display System and to support integration and interoperability testing for tactical surface and air platforms for the U.S. Navy, navies of allied countries, the U.S. Coast Guard and the U.S. Customs Service

-- Communications System design, simulation, development, integration, testing, and analysis

-- Knowledge and understanding of design, development and implementation of systems to collect and disseminate surveillance data and information to multi-service, special forces, and national tactical users

-- Knowledge of specialized SIGINT technology applications to ashore requirements

-- Large scale SCI/SAP level communications capabilities to operational tactical commands and national authorities to support systems engineering requirements

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-- Large scale GENSER level communications capabilities to operational commands afloat and ashore

-- Direct access to the Fleet in the immediate locale

-- Large-scale high resolution simulation that can analyze Space and Electronic Warfare systems across spectrum of Army, Navy, Air Force and Marines

-- Manages such Joint/Allied projects

-- High speed common networks (e.g. ATM) that link all services and command centers in simulated C4I operations and war games R

-- Leadership in defining open system network architecture for Joint C4I systems

-- Software Process for development of Network Control Systems

-- Development and maintenance of ELF/VLF/LF shore sites for submarine communications

-- Entire Point Loma Center laboratories, development, and test facilities and technical personnel provide an interconnected capability to provide full support for C4I simulations as well as complete operation as any component of a combat group in C4I operations (including Command Center) R

-- Major world-wide war games and simulations and integration into joint systems along with major demonstrations

-- Display Systems Development supports the testing and verification of Advanced Combat Direction Systems (ACDS) hardware engineering tasks as well as supports the advanced system design and testing for new systems

-- Program management and development of the Cross-service TAC series of computers

-- DoD unique indoor robotics development and test facility; and development of indoor automated systems, including robotics software and hardware architectures

-- 409 engineers and technicians with over 7,076 years combined experience

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INTERCONNECTIVITY:

-- C4I Systems - Fixed Ground-based and Afloat are two CSFs which are impossible to completely separate. A communication system has both ends of a link; a command control segment in a shore site is directing afloat forces thru airborne surveillance; the computers in all locations are exchanging data and establishing a common war environment for all participants; data fusion algorithms are the same in all C4I command centers; etc. Thus, interconnectivity with CSFs 2, 5, 6, 7, 8, 9, and 10 are readily apparent.

-- Interconnectivity with all C4I areas; application to all platforms of C4I systems

-- Interconnects with all aspects of C4I components and units; interrelates with C4I Airborne, C4I Ground Mobile and Afloat units

-- NRaD leadership in the software management process: interrelates to all programs; the software development processes are applicable to any software system development task

-- Application to Joint and Allied communications system both mobile and afloat

-- Skills in modeling and simulation applied to C4I Afloat, Combat senarios, warfare battle orders, wargames, and NAVSEA shipboard design

-- Electronic devices are a major component in all aspects of C4I Systems: some being built for specific systems, others of more general nature being applied to the C4I requirements.

-- Direct connectivity to both ashore and afloat C4I systems under development under CSFs C4I Systems - Airborne, C4I Systems - Afloate and C4I Systems Ground Mobile.

-- Direct connectivity to National users (NSA), Fleet units and ashore commands under CSFs C4I Systems - Airborne, C4I Systems - Afloat and C4I Systems Ground Mobile.

CSF 8. C4I Systems - Afloat R

MISSION:

-- The integration of all C4I Afloat Systems into a single interoperable system supporting C4I afloat, airborne, ground mobile and ground fixed C4I

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-- Thorough technical knowledge and understanding of surveillance technologies for use in afloat C4I systems

-- Technical experts in high resolution radar, inverse synthetic aperture radar, electromagnetic sensors, electrooptics, IR, multi-spectral, and acoustic sensors

-- Extensive operational knowledge and experience in Fleet operations

-- Extensive experience in shipboard surveillance systems design, development, integration, deployment and testing

-- Detailed technical understanding of development, integration, installation, operational support and qualification of systems for multi-service platforms

-- Direct access to Fleet in immediate locale

-- Seagoing platforms to support afloat systems development and testing

-- Joint Afloat C4I systems such as Contingency TACS Automated Planning System (CTAPS), Joint Maritime Operations Command Center (JMOCC) and Joint Maritime Command Information Systems (JMCIS)

-- Tactical data networks such as JTIDS and Links 4, 11, 14 and 22

-- Decision support systems and collaborative planning systems R

-- 555 engineers and technicians with over 9,532 years combined experience.

INTERCONNECTIVITY:

-- C4I Systems - Afloat and other C4I System breadouts are CSFs which are impossible to completely separate. As discussed above, a communication system has both ends of a link; a command control segment in a shore site is directing afloat forces thru airborne surveillance; the computers in all locations are exchanging data and establishing a common war environment for all participants; data fusion algorithms are the same in all C4I command centers; etc. Some of the submarine antennas are unique to this CSF, but they only operate as well as the shore and aircraft components transmitting to them operate. A spinoff of the submarine work is the hightly valued software management process: now being applied to all aspects of Naval C4I software development. Thus, interconnectivity with CSFs 2, 5, 6, 7, 8, 9, and 10 are readily apparent. Reiterating this as well as that in the C4I Systems

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Fixed discussion:

-- Interconnectivity with all C4I areas; application to all platforms of C4I systems

-- Interconnects with all aspects of C4I components and units; interrelates with C4I Airborne, C4I Ground Mobile and Afloat units

-- NRaD leadership in the software management process: interrelates to all programs; the software development processes are applicable to any software system development task

-- Application to Joint and Allied communications system both mobile and afloat

-- Skills in modeling and simulation applied to C4I Afloat, Combat senarios, warfare battle orders, wargames, and NAVSEA shipboard design

-- Electronic devices are a major component in all aspects of C4I Systems: some being built for specific systems, others of more general nature being applied to the C4I requirements.

-- Since 1974, all of the Navy's Navigation R&D has been consolidated at NRaD, Warminster providing a strong synergism among the various navigation programs from inertial sensor development to GPS receiver testing and development. In addition, the development of common avionics systems such as Integrated Communication Navigation Identification Avionics (ICNIA) to provide both communications and navigations and the similarity of radio communication systems with radio navigation systems has resulted in an intertwining of development skills among these two technological areas.

-- Extensive development, engineering and integration with tactical support Command and Control systems under CSFs C4I Systesm - Afloat and C4I - Ground Fixed.

-- Extensive interoperability support to facilitate ashore - afloat information exchange including systems under CSFs C4I - Afloat and C4I - Ground Mobile.

-- Application of technology supports wide range of common support functions of weapons and space systems under VSFs Air Vehicles - Fixed Avionics, Weapons - Cruise Missiles, Space Systems - Satellites, C4I - Airborne, C4I - Ground-Based and C4I Systems - Ground Mobile.

-- Worldwide SCI level communications to Fleet Units unde rCSF Space Systems - Satellites.

-- Worldwide Genser level communications to Fleet Units under CSF Space Systems - Satellites.

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CSF 9. C4I Systems - Ground Mobile R

MISSION:

-- **Principal Navy Laboratory in mobile ground based surveillance systems and integration into Navy C4I Network**

-- **Experience conducting Coastal Surveillance system development, and operational test and evaluation**

-- **Amphibious Warfare C4I Systems**

-- **Shore-based C4I systems such as the Mobile Ashore Support Terminal (MAST)**

-- **18 engineers and technicians with over 317 years combined experience**

-- **War games and Simulations for the Marine Corps and Army**

INTERCONNECTIVITY:

-- **Just as the C4I efforts apply to the other mobile units, all problems are generally common to this CSF as well. Only the scope is different as the Ground Mobile units may be smaller and have different requirements: still meeting the ability to respond to commands in real time. GPS systems are being considered for all shore troops, as well as the vans, hospitals, etc. CSFs in the C4I are all interrellated.**

CSF 10. Electronic Devices R

MISSION:

-- **Leadership in the research, development, test and evaluation of Electronic Devices**

-- **Development of Photonic probes for shipboard electromagnetic environment sensing supports the NCCOSC Command, Control and Surveillance Missions**

-- **Test and evaluation of strategic sensor system components in benign and nuclear environments supports the NCCOSC Command, Control and Surveillance missions**

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-- Active matrix displays apply to high resolution projection displays and compact heads-up displays which support the Command and Control mission

-- Experience in design and testing of integrated circuits (includes radiation hardened devices)

-- Leadership in developing and implementing DoD electronic packaging strategies

-- Experience in design and manufacture of power electronics components

-- Leadership in developing analog neural network circuits

-- Full tool-set for fabrication of silicon integrated circuits

-- Hands-on experience in silicon process development and enhancement

-- Experience in computer modeling of silicon IC fabrication processes

-- Experience in computer and analytical modeling of silicon device behavior

-- Experience in development of radiation hard silicon fabrication processes

-- Leadership in developing silicon-on-insulator devices, materials and circuits

-- Leadership in development of optically-activated switching devices

-- Experience in development of silicon-based sensors including CCD arrays, chemical sensors and magnetic sensors

-- Experience in development of active-matrix display technologies

-- Internationally recognized personnel who have served on NATO technology assessment panels

-- Optically activated switches supports the development of reconfigurable antennas under the Communications 6.2 Technology Area.

-- Fabrication of high-voltage RF diodes for electron beam amplifier under Communications 6.2 Technology Area.

-- Silicon-on-insulator technology developed under Microelectronics 6.2

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-- Detailed technical understanding of unique properties, design, and application of technology to undersea, electromagnetic and space systems

-- Principal full-spectrum RDTE Laboratory for navigation sensors and systems for all platforms including ships, submarines, aircraft, and missiles

-- Principal full-spectrum RDTE Laboratory for development of airborne communications equipment and airborne RF electronic devices

-- INFAC located and specifically designed to meet the unique, stringent (long-term) RDT&E navigation requirements for Navy submarines

-- 45 engineers and technicians with over 779 years combined experience

-- These facilities also support Air Vehicle Fixed Avionics

INTERCONNECTIVITY:

-- Virtually no system in the present day arsenals lack electronic components. The newer ones are using the latest technologies: unheard of five years ago. To rapidly incorporate such devices into systems, knowledge of the system, the electronics devices, risks, value added and ability to test components and systems are all required in a single organization. Every CSF System has components from this Center incorporated in them: with more in development. For example, millimeter wavelength and laser systems apply to virtually all weapon, space, air and C4I systems. Continued exposure to the technology, the materials (CSF13), and the fleet are required to assure optimum combat systems. NCCOSC RDTE DIV's capabilities and R resources, in addition to supporting the above CSFs for the Navy also support a number of Joint DoD Programs (GPS, JTIDS, MIDS) and a number of non-DoD government agencies in the area of navigation and aircraft communications including: the Coast Guard, Federal Aviation Agency (FAA), and National Oceanic and Atmospheric Agency (NOAA).

-- The knowledge gained during the investigation of advanced materials and processes for integrated circuits and electronic packaging (CSF 1) is demonstrated by the design, fabrication, and testing of radiation hardened electronic devices (CSF 2). The composite technology developed within the two support functions manifests itself as components within communication equipment and space and missile applications.

-- Optically activated switches supports the development of reconfigurable antennas under the Communications 6.2 Technology Area.

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Technology Area supports communications mission through applications to wireless communications hardware

-- Silicon-based sensor development supports the surveillance mission by providing enabling technologies for smart, widely distributed sensor arrays, e.g., GENIE program

-- Photonic modulator development for shipboard sensor probe characterization

-- Expertise in electronic/Photonic shipboard sensor probe characterization

-- Lead DoD lab for long wavelength infrared detector/focal plan array radiometric performance testing

-- Electronic and opto-electronic device fabrication

-- Knowledge of technical risks and preferred DoD investment strategy

-- Well equipped millimeter wavelength and laser laboratories

-- Anechoic chambers, antennas, ranges, electro-optic and laser laboratories

-- Radio frequency, circuit miniaturization and assembly for designing and fabricating miniaturized prototypes such as MMIC and discrete components such as inductors, capacitors, field effect transistors, etc.

-- 2 specialized labs support this function; Inertial Navigation Facility and the RF/Microelectronics Laboratory R

-- Transistor power, noise, gain testing at microwave frequencies

-- Personnel who have served, or are serving, on the following committees: DoD Manufacturing Advisory Group, Project Reliance, Advisory Group on Electronic Devices,

DoD Title III strategy committee for radiation hardened devices, Technical Advisor to COCOM, Department of Commerce Electronics Technical Advisory Committee

-- Experience in development of materials and devices based on Group-IV alloy semiconductors

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-- Fabrication of high-voltage RF diodes for electron beam amplifier under Communications 6.2 Technology Area.

-- Silicon-on-insulator technology developed under Microelectronics 6.2 Technology Area supports communications mission through applications to wireless communications hardware.

-- Silicon-based sensor development supports the surveillance mission by providing enabling technologies for smart, widely distributed sensor arrays, e.g. GENIE program.

-- Active matrix displays apply to high resolution projection displays and compact heads-up displays which support the command and control mission.

-- Development of photonic probes for shipboard electromagnetic environment sensing supports the NCCOSC command, control and surveillance missions.

-- Test and evaluation of strategic sensor system components in benign and nuclear environments supports the NCCOSC command, control and surveillance missions.

-- Millimeter wavelength and laser systems have application to virtually all CFSs including all air vehicles, weapons, C4I systems, and support CSF of environmental sciences and environmental quality. Applications range from communications, radar, LIDAR, surveillance, Infrared sensing systems and a multitude of sensors.

CSF 11. Environmental Sciences

MISSION:

-- Leadership in Environmental Sciences research in support of the Department of Defense

-- United States coordinator for the joint Canada/US Project Spinnaker, governed by a formal signed Memorandum of Understanding between the US and Canadian governments

-- Extensive support of the ONR Wide Area Undersea Surveillance area in terms of signal processing, experiment planning and execution, deployable arrays and other areas

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-- Only DoD lab group whose exclusive focus is tropospheric electromagnetic/electro-optical propagation

-- Support of Research and Development for Navy Ocean Towed Arrays

-- Corporate history of theoretical and experimental investigations in propagation dating back to the establishment of the U.S. Navy Radio and Sound Laboratory on Point Loma in 1940

-- Detailed knowledge and understanding of environmental sciences for application to undersea warfare surveillance and C4I systems

-- The group has developed and maintains for signal processing purposes ocean acoustic models with unique capabilities, including the world's only "production-usable" 3-dimensional propagation code, based on 3-D Gaussian Beams, a superfast normal mode model (ATLAS), an error-controlled Parabolic Equation propagation code, a 2-D Gaussian Beam code, a Parabolic Equation Noise field correlation propagation code (PEN), and others

-- Leadership in developing electromagnetic propagation models under Project Reliance

-- Data processing, simulation, prototyping and test facilities and sea going platforms support development

-- Extensive staff knowledge and experience in ocean sensor design, construction, and deployment, including the world-leading group for lightweight, low-power, easily deployable ocean arrays

-- Extensive experience in conducting ocean sensor deployment and measurement at-sea experiments, including all SLAC line deployment tests, the Southern California Shallow Water Environmental CeLL multi-laboratory Experiments (SWELLEx series), and others

-- Extensive experience in processing ocean acoustic data, including model comparison, signal processing, environmental condition measurement and incorporation, for experiment analysis, experiment preparation and planning, and signal processing development R

-- Extensive experience and world-leading personnel in ocean model development and application, including Dr. Homer Bucker, winner of the Acoustical Society of America Pioneers in Underwater Acoustics Prize for inventing Matched

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Field Processing and other contributions

-- Extensive experience in transporting, deploying, operating and retrieving ocean sensors and arrays in the several Arctic environment, including the Feasibility Demonstration Module (FDM) Arctic satellite-link arrays, the Iceshelf series of experiments, and Project Spinnaker, the on-going joint US/Canada Arctic lightweight low-power array demonstration and deployment task

-- Experience in ocean shallow-water littoral data processing, model comparison, experiment planning, and experiment execution

-- Personnel on national Acoustical Society of America committees

-- Experience in directing and conducting major multinational and multilab propagation experiments. Marine Aerosol Properties and Thermal Imager Performance (MAPTIP) and Variability of Coastal Atmospheric Refractivity (VOCAR)

-- Membership and participation in NATO AGARD Research study Groups 8 and 21

-- Memberships in Commission F, U.S. National Committee, International Radio Science Union (URSI)

-- Collaboration with wide range of other environmental scientists inside and outside the Navy

-- Coordinator for the multilab SWEllEx series of experimental involving NRaD, NRL, MPL, Scripps Institution of Oceanography, NUWC, SAIC and others

-- 9 engineers and technicians with over 156 years combined experience

INTERCONNECTIVITY:

-- Interconnectivity with the other CSFs is far more subtle than in C4I. Each of the bullets above represent an interrelation of the specific technology with the environment, the country, and the world in which C4I operates. Undersea, air and land based operations all are involved. The new emphesis on Littorial warfare brings all of these into play: as the dumping of oil, the unexpected destruction of oil wells, and other environmentally related actions demonstrate. Future C4I actions will now emphasize these issues as part of their plans. This discussion, of course, applies to the Environmental Quality CSF as well.

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-- **Coordinator for the multilab SWEllEx series of experiments involving, NRaD, NRL, MPL, Scripps Institution of Oceanography, NUWC, SAIC, and others.**

-- **Support of Research & Development for Navy Ocean Towed Arrays.**

CSF 12. Environmental Quality **R**

MISSION:

-- **Leadership in Environmental Quality research and the development of methodologies in support of the Department of Defense mission**

-- **Extensive staff expertise and experience in marine environmental quality assessment, ecological risk assessment, marine chemistry and chemical and radiation sensor development. Numerous publications in peer reviewed literature and patents**

-- **Experienced in conducting both laboratory and field studies to evaluate the impacts of chemicals and processes on the marine environment. Expertise in developing and transitioning field site assessment and sensor technology at hazardous waste sites, spill/leak areas and effluents**

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-- Membership in numerous, regional, national and international committees

National Research Council - 1) Navy representative, Marine Board, Committee on Contaminated Sediments; 2) Committee on Ecological Risk; 3) Panel on New Measurement Technologies for the Ocean; 4) Applied Analytical Chemistry for Organic Carbon Cycle Studies

Member, International Union of Pure & Applied Chemistry

Scientific Committee on Oceanic Research, International Council of Scientific Unions

DoD/Navy representative to the Federal/Western States Cooperative Environmental Restoration and Wastes Management Program

Chairman, Coastal America, Southwest Region

Adjunct Faculty Positions - San Diego State University Dept of Chemistry; Visiting Professor, Institute of Biophysics, University of Pisa
Regional Committees such as San Diego Interagency Water Quality Panel, San Diego Unified Port District Technical Advisory Panel, Oceans Foundation Pollution Committee, etc.

New York Academy of Sciences

Proposal Referees, NSF, ONR, DoD

-- 14 engineers and technicians with over 242 years combined experience

-- Division provides leadership in applied marine environmental sciences, site assessment and sensor development. We are the Navy and DoD leaders in marine environmental quality and through our Marine Environmental Support Office provide direct marine assessment support to Fleet and facilities

INTERCONNECTIVITY:

-- Interconnectivity with the other CSFs is far more subtle than in C4I. Each of the bullets above represent an interrelation of the specific technology with the environment, the country, and the world in which C4I operates. Undersea, air and land based operations all are involved. The new emphesis on Littorial warfare brings all of these into play: as the dumping of oil, the unexpected destruction of oil

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wells, and other environmentally related actions demonstrate. Future C4I actions will now emphasize these issues as part of their plans. This discussion, of course, applies to the Environmental Sciences CSF as well.

CSF 13. Advanced Materials R

MISSION:

-- Leadership in the research, development, test and evaluation of Advanced Materials

-- Microelectronics Technology: develops new concepts in microelectronic circuits to extend capability in speed, power, etc

-- Metal-organic-chemical-vapor-deposition growth of a wide variety of III-V binary and ternary semiconductor compounds

-- Electrical and crystallographic characterization of III-V compounds

-- Van der Pauw resistivity and Hall Effect measurements as a function of temperature from room temperature to 825 C in a controlled, high purity Argon ambient

-- Active electronic device fabrication and testing

-- Microelectronics in the form of processors, analog to digital converters sensors, etc. apply across all support functions

-- 13 engineers and technicians with over 225 years combined experience

INTERCONNECTIVITY:

-- This CSF is generally connected to other ones through Electonic Devices (CSF 10). Most electronic devices are in need of new materials for their processes and packaging. Thus, this technology has many more ties than is originally estimated.

-- Development of diamond electronics for high power, high frequency applications, such as radar emitters, supports the NCCOSC surveillance mission.

The following 13 Common Support Functions are applicable to this activity:
-- CSF 1. Air Vehicles - Fixed Propulsion
-- CSF 2. Air Vehicles - Fixed Avionics
-- CSF 3. Air Vehicles - Rotary Avionics
-- CSF 4. Weapons - Cruise Missiles
-- CSF 5. Space Systems - Satellites
-- CSF 6. C4I Systems - Airborne
-- CSF 7. C4I Systems - Fixed Ground-Based
-- CSF 8. C4I Systems - Afloat
-- CSF 9. C4I Systems - Ground Mobile
-- CSF 10. Electronic Devices
-- CSF 11. Environmental Sciences
-- CSF 12. Environmental Quality
-- CSF 13. Advanced Materials

CSF 1. Air Vehicles - Fixed Propulsion

MISSION:

-- Leadership in applying advanced signal processing and statistical classifiers to mechanical fault diagnosis

-- Experience and expertise in collecting vibration data (MK-46/50)

-- Expertise in Real time signal/data processing systems

-- Expertise with COTS VME/VSB hardware

-- Expertise in time series analysis and statistical classifiers

-- Concepts being applied to mechanical fault diagnosis originated in undersea surveillance

-- Real time hardware expertise obtained on undersea surveillance problems

-- 4 engineers and technicians with 69 years combined experience

CSF 2. Air Vehicles - Fixed Avionics

MISSION:

-- Leadership in research and development of Air Vehicles Avionics.

-- Principal full-spectrum RDTE Laboratory for development and system platform integration of airborne communications equipment, avionics, navigation, and airborne RF electronic devices

-- 8 specialized labs support this function; GPS Laboratory, RF/Microelectronics Laboratory, CARCO Flight Motion Simulator, HC/KC-130 GPS/CDNU System Integration Lab, CH-46 GPS System Integration Lab, Airborne Communications Lab, Low-Probability of Intercept Lab, and the CDNU Software Development Lab

-- The only DoD System Integration Labs with C-130 and CH-46 communication/navigation equipment suites for testing the Weapons Replaceable Assemblies (WRS) in the avionics system and integration of GPS user equipment

-- Radio frequency, circuit miniaturization and assembly for designing and fabricating miniaturized airborne prototypes such as MMIC and discrete components such as inductors, capacitors, field effect transistors, etc.

-- DoD lead laboratory for developing GPS receivers and GPS receiver test tools with complete GPS host environment through a coordinated, real-time, hardware in-the-loop simulation of both the GPS satellite signals and host vehicle communications to conduct dynamic, precise and repeatable operational scenarios in the lab

-- 68 engineers and technicians with over 1,176 years combined experience

-- These facilities also support C4I Afloat, C4I Airborne, Pervasive Electronic Devices and Weapons Cruise Missile CSFs

CSF 3. Air Vehicles - Rotary Avionics

MISSION:

-- To provide leadership in testing and development of the overall CH-46 GPS electronics systems

-- To test and develop the overall CH-46 electronics system for the integration of GPS user equipment and various other avionics into the CH-46 helicopter

-- 2 engineers with 34 years experience

CSF 4. Weapons - Cruise Missiles

MISSION:

-- Principal full-spectrum RDTE Laboratory for navigation sensors and systems for all platforms including ships, submarines, aircraft, and missiles

-- 3 specialized labs, the Simulated Ships Motion Test Facility, the Navigation Sensor System Integration Lab, and the GPS Laboratory support this CSF

-- GPS Laboratory with it's unique simulator and closed loop environment (see above)

-- One of a kind ship motion simulator (weight and accuracy) for evaluating AN/WSN-5 inertial navigation system dynamic inputs, critical to Tomahawk missile alignment and for investigation resolution of fleet reported problems involving Tomahawk performance (e.g. OTL-148 investigation)

-- 8 engineers and technicians with over 138 years in combined experience in this field

-- These facilities also support C4I Afloat, and Pervasive Electronic Devices CSFs

CSF 5. Space Systems - Satellites

MISSION:

-- The Communications Department supports the services in UHF, SHF and EHF communications as well as use of commercial satellite communications capability

-- Major SATCOM systems engineer for SPAWAR

-- Systems, component, installation for Fleet support

-- SATCOM facilities and operational support of satellite communications systems with SPAWAR and fleet units

-- Communications systems development with C4I networks, both ground based and afloat

-- Software Process (NCCOSC RDTE DIV possesses the most advanced skills in the Navy) is applicable to all software development functions.

-- Software Development Process as applied to automatic communications systems and networks

-- Communications Planning Modeling tools for Triservice use

-- This is across all Satcom and C4I Functions

-- 242 engineers and technicians with over 4,187 years combined experience

-- Supports C4I development, installation, and operation

-- SCIF interconnections for support of Fleet operations

CSF 6. C4I Systems - Airborne

MISSION:

-- Principal full-spectrum RDTE Laboratory for development and system platform integration of airborne communications equipment, avionics, navigation, and airborne RF electronic devices

-- Airborne Tactical Data Systems for E2C aircraft; Air Traffic Control and identification system development (E2C) - provides a dedicated multi-configuration development center designed to support the Navy's effort in the design, development, test and evaluation of E2C tactical software, software development tools and simulation; provides capability for the development and evaluation of software for foreign military sales cases; and supports Navy and Joint interoperability systems testing

-- The only DoD laboratory supporting the USN operational fleet in the analysis, design, development and distribution of the planning and control data for the JTIDS/Link 16 system

-- The JTIDS Network Design Facility supports this CSF

-- 157 engineers and technicians with over 2,716 years combined experience

CSF 7. C4I Systems - Fixed Ground-Based

MISSION:

-- The integration of all C4I Fixed Ground-Based Systems into a single interoperable system supporting C4I afloat, airborne, ground mobile and fixed

-- Command Centers such as the Global Command Control System, the OSIS Baseline Upgrade and Operations Support System

-- Support of major demonstrations such as the Joint Warfare Interoperability Demonstration (JWID)

-- Secure distributed systems technology to integrate the Services information database, decision aids and processing

-- Development of intelligence fusion centers

-- Knowledge of parallel computation algorithms and architectures in signal and image processing

-- Multiple major specialized laboratories to address unique SIGINT (ELINT/COMINT) and ACINT system development and integration

-- Extensive worldwide operational experience at Navy and Joint commands

-- Electromagnetic Theory and Technology: Major unique capability and skills in communications and electromagnetic theory and modeling

-- Network Theory, design and implementation

-- NCCS-A provides land-based test site of a theater command center command and control system installation supporting development, integration and interoperability testing plus online communications to ships and shore activities worldwide to support the gathering of requirements and defining user system needs

-- OSIS OED provides a land-based test site of an OSIS Evolutionary Development facility to support development, integration and interoperability testing as well as provides online communications to ships and selected intelligence shore activities worldwide

-- Navy Intel provides a land-based test site of an OSIS Evolutionary

Development facility to support development, integration and interoperability testing of major intelligence systems and advanced applications such as collection requirements management

-- HPC provides a land-based test site of a major theater level planning system and is capable of adapting technology and the use of high performance computers to increase the accuracy, performance and timeliness of the planning

-- DASL/SISL provides hardware, software, simulations and gateways to other simulations

-- MTWS provides a simulated combat environment for commanders and their staffs to practice and sharpen decision-making skills and to assist in the command and control aspects of tactical field exercises

-- DC2 supports the development, demonstration and transition of distributed technologies for combat systems and command and control systems as well as their integration into a distributed computing environment to support current and future Navy, joint, dual use and non-DoD applications

-- RESA provides command, control and communications simulation in support of RDT&E and joint training requirements

-- Thorough understanding of: SIGINT (COMINT/ELINT); ACINT; radar; IR; electromagnetic; imaging technologies and sensors; and electronic support measures for application to ashore C4I systems

-- Multi-Link supports the development and production testing of current and new versions of Navy tactical data link terminals (Links 11, 4A and 22) and the Link 11 Display System and to support integration and interoperability testing for tactical surface and air platforms for the U.S. Navy, navies of allied countries, the U.S. Coast Guard and the U.S. Customs Service

-- Communications System design, simulation, development, integration, testing, and analysis

-- Knowledge and understanding of design, development and implementation of systems to collect and disseminate surveillance data and information to multi-service, special forces, and national tactical users

-- Knowledge of specialized SIGINT technology applications to ashore requirements

-- Direct connectivity to both ashore and afloat C4I systems under development

-- Direct connectivity to National users (NSA), Fleet units and ashore commands

-- Large scale SCI/SAP level communications capabilities to operational tactical commands and national authorities to support systems engineering requirements

-- Large scale GENSER level communications capabilities to operational commands afloat and ashore

-- Direct access to the Fleet in the immediate locale

-- Large-scale high resolution simulation that can analyze Space and Electronic Warfare systems across spectrum of Army, Navy, Air Force and Marines

-- Manages such Joint/Allied projects

-- High speed common networks (e.g. ATM) that link all services and command centers in simulated C4I operations and war games

-- Leadership in defining open system network architecture for Joint C4I systems

-- Software Process for development of Network Control Systems

-- Development and maintenance of ELF/VLF/LF shore sites for submarine communications

-- Entire Point Loma Center laboratories, development, and test facilities and technical personnel provide an interconnected capability to provide full support for C4I simulations as well as complete operation as any component of a combat group in C4I operations (including Command Center)

-- Major world-wide war games and simulations and integration into joint systems along with major demonstrations

-- Display Systems Development supports the testing and verification of Advanced Combat Direction Systems (ACDS) hardware engineering tasks as well as supports the advanced system design and testing for new systems

-- Program management and development of the Cross-service TAC series of computers

-- DoD unique indoor robotics development and test facility; and development of

indoor automated systems, including robotics software and hardware architectures

-- 409 engineers and technicians with over 7,076 years combined experience

-- Interconnectivity with all C4I areas; application to all platforms of C4I systems

-- Interconnects with all aspects of C4I components and units; interrelates with C4I Airborne, C4I Ground Mobile and Afloat units

-- NRaD leadership in the software management process: interrelates to all programs; the software development processes are applicable to any software system development task

-- Application to Joint and Allied communications system both mobile and afloat

-- Skills and simulation applied to C4I Afloat and NAVSEA shipboard design

CSF 8. C4I Systems - Afloat

MISSION:

-- The integration of all C4I Afloat Systems into a single interoperable system supporting C4I afloat, airborne, ground mobile and ground fixed C4I

-- Thorough technical knowledge and understanding of surveillance technologies for use in afloat C4I systems

-- Technical experts in high resolution radar, inverse synthetic aperture radar, electromagnetic sensors, electrooptics, IR, multi-spectral, and acoustic sensors

-- Extensive operational knowledge and experience in Fleet operations

-- Extensive experience in shipboard surveillance systems design, development, integration, deployment and testing

-- Detailed technical understanding of development, integration, installation, operational support and qualification of systems for multi-service platforms

-- Extensive development, engineering and integration with tactical support Command and Control systems

-- Extensive interoperability support to facilitate ashore - afloat information

exchange

-- Direct access to Fleet in immediate locale

-- Seagoing platforms to support afloat systems development and testing

-- Joint Afloat C4I systems such as Contingency TACS Automated Planning System (CTAPS), Joint Maritime Operations Command Center (JMOCC) and Joint Maritime Command Information Systems (JMCIS)

-- Tactical data networks such as JTIDS and Links 4, 11, 14 and 22

-- Decision support systems and collaborative planning systems

-- 555 engineers and technicians with over 9,532 years combined experience.

-- Interconnectivity with all C4I areas; application to all platforms of C4I systems

-- Interconnects with all aspects of C4I components and units; interrelates with C4I Airborne, C4I Ground Mobile and Ground Fixed units

-- NRaD leadership in the software management process: interrelates to all programs; the software development processes are applicable to any software system development task

-- Application to Joint and Allied communications system both mobile and ground fixed

-- Skills and simulation applied to C4I Ground Fixed and NAVSEA shipboard design

CSF 9. C4I Systems - Ground Mobile

MISSION:

-- Principal Navy Laboratory in mobile ground based surveillance systems and integration into Navy C4I Network

-- Experience conducting Coastal Surveillance system development, and operational test and evaluation

-- Amphibious Warfare C4I Systems

-- Shore-based C4I systems such as the Mobile Ashore Support Terminal (MAST)

-- 18 engineers and technicians with over 317 years combined experience

-- War games and Simulations for the Marine Corps and Army

CSF 10. Electronic Devices

MISSION:

-- Leadership in the research, development, test and evaluation of Electronic Devices

-- Development of Photonic probes for shipboard electromagnetic environment sensing supports the NCCOSC Command, Control and Surveillance Missions

-- Test and evaluation of strategic sensor system components in benign and nuclear environments supports the NCCOSC Command, Control and Surveillance missions

-- Active matrix displays apply to high resolution projection displays and compact heads-up displays which support the Command and Control mission

-- Experience in design and testing of integrated circuits (includes radiation hardened devices)

-- Leadership in developing and implementing DoD electronic packaging strategies

-- Experience in design and manufacture of power electronics components

-- Leadership in developing analog neural network circuits

-- Full tool-set for fabrication of silicon integrated circuits

-- Hands-on experience in silicon process development and enhancement

-- Experience in computer modeling of silicon IC fabrication processes

-- Experience in computer and analytical modeling of silicon device behavior

-- Experience in development of radiation hard silicon fabrication processes

-- Leadership in developing silicon-on-insulator devices, materials and circuits

-- Leadership in development of optically-activated switching devices

-- Experience in development of silicon-based sensors including CCD arrays, chemical sensors and magnetic sensors

-- Experience in development of active-matrix display technologies

-- Internationally recognized personnel who have served on NATO technology assessment panels

-- Optically activated switches supports the development of reconfigurable antennas under the Communications 6.2 Technology Area.

-- Fabrication of high-voltage RF diodes for electron beam amplifier under Communications 6.2 Technology Area.

-- Silicon-on-insulator technology developed under Microelectronics 6.2 Technology Area supports communications mission through applications to wireless communications hardware

-- Silicon-based sensor development supports the surveillance mission by providing enabling technologies for smart, widely distributed sensor arrays, e.g., GENIE program

-- Photonic modulator development for shipboard sensor probe characterization

-- Expertise in electronic/Photonic shipboard sensor probe characterization

-- Lead DoD lab for long wavelength infrared detector/focal plan array radiometric performance testing

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-- Knowledge of technical risks and preferred DoD investment strategy

-- Well equipped millimeter wavelength and laser laboratories

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-- Personnel who have served, or are serving, on the following committees: DoD Manufacturing Advisory Group, Project Reliance, Advisory Group on Electronic Devices, DoD Title III strategy committee for radiation hardened devices, Technical Advisor to COCOM, Department of Commerce Electronics Technical Advisory Committee

-- Experience in development of materials and devices based on Group-IV alloy semiconductors

-- Detailed technical understanding of unique properties, design, and application of technology to undersea, electromagnetic and space systems

-- Millimeter wavelength and laser systems apply to virtually all weapon, space, air and C4I systems

-- Principal full-spectrum RDTE Laboratory for navigation sensors and systems for all platforms including ships, submarines, aircraft, and missiles

-- Principal full-spectrum RDTE Laboratory for development of airborne communications equipment and airborne RF electronic devices

-- INFAC located and specifically designed to meet the unique, stringent (long-term) RDT&E navigation requirements for Navy submarines

-- 45 engineers and technicians with over 779 years combined experience

-- These facilities also support Air Vehicle Fixed Avionics

NOTE: NCCOSC RDTE DIV's capabilities/resources, in addition to supporting the above CSFs for the Navy also support a number of Joint DoD Programs (GPS, JTIDS, MIDS) and a number of non-DoD government agencies in the area of navigation and aircraft communications including: the Coast Guard, Federal Aviation Agency (FAA), and National Oceanic and Atmospheric Agency (NOAA)

CSF 11. Environmental Sciences

MISSION:

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-- 9 engineers and technicians with over 156 years combined experience

-- Leadership in Environmental Sciences research in support of the Department of Defense

CSF 12. Environmental Quality

MISSION:

-- Leadership in Environmental Quality research and the development of methodologies in support of the Department of Defense mission

-- Extensive staff expertise and experience in marine environmental quality assessment, ecological risk assessment, marine chemistry and chemical and radiation sensor development. Numerous publications in peer reviewed literature and patents

-- Experienced in conducting both laboratory and field studies to evaluate the impacts of chemicals and processes on the marine environment. Expertise in developing and transitioning field site assessment and sensor technology at hazardous waste sites, spill/leak areas and effluents

-- **Membership in numerous, regional, national and international committees**

National Research Council - 1) Navy representative, Marine Board, Committee on Contaminated Sediments; 2) Committee on Ecological Risk; 3) Panel on New Measurement Technologies for the Ocean; 4) Applied Analytical Chemistry for Organic Carbon Cycle Studies

Member, International Union of Pure & Applied Chemistry

Scientific Committee on Oceanic Research, International Council of Scientific Unions

DoD/Navy representative to the Federal/Western States Cooperative Environmental Restoration and Wastes Management Program

Chairman, Coastal America, Southwest Region

Adjunct Faculty Positions - San Diego State University Dept of Chemistry; Visiting Professor, Institute of Biophysics, University of Pisa

Regional Committees such as San Diego Interagency Water Quality Panel, San Diego Unified Port District Technical Advisory Panel, Oceans Foundation Pollution Committee, etc.

New York Academy of Sciences

Proposal Referees, NSF, ONR, DoD

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-- **Division provides leadership in applied marine environmental sciences, site assessment and sensor development. We are the Navy and DoD leaders in marine environmental quality and through our Marine Environmental Support Office provide direct marine assessment support to Fleet and facilities**

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MISSION:

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-- Metal-organic-chemical-vapor-deposition growth of a wide variety of III-V binary and ternary semiconductor compounds

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-- Active electronic device fabrication and testing

-- Microelectronics in the form of processors, analog to digital converters sensors, etc. apply across all support functions

-- 13 engineers and technicians with over 225 years combined experience

3.1 Location

3.1.1 Geographic/Climatological Features: Describe any geographic/climatological features in and around your activity that are relevant to each CSF. Indicate and justify those that are required versus those that just serve to enhance accomplishing the mission of the activity. For example, clear air at high altitude that increases quality of atmospheric, ground-based laser experiments in support of the weapons CSF. (BRAC Criteria I)

CSF 1. Air Vehicles - Fixed Propulsion **R**

-- **None**

CSF 2. Air Vehicles - Fixed Avionics

-- **None**

CSF 3. Air Vehicles - Rotary Avionics

-- **None**

CSF 4. Weapons - Cruise Missiles

-- **None**

CSF 5. Space Systems Satellites

-- **SHF/EHF Satellite Communication Test Facilities: It contains a complete SHF SATCOM terminal and test equipment to support follow-on SHF equipment development. The location on Pt. Loma provides direct access to all CONUS operational satellites to allow participation in system tests and evaluations.**

CSF 6. C4I Systems - Airborne

-- **Adjacent to Fleet Operations: Allows facility to directly participate in Fleet exercises, as a Command Center and simulated ship.**

-- The close proximity to the Miramar Naval Air Station provides ready access to E2-C aircraft for testing the Airborne Tactical Data System developed at NRaD and the air crew provides the resource for requirements and trouble reports.

CSF 7. C4I Systems - Fixed Ground-Based **R**

-- Adjacent to Fleet Operations: Allows facility to directly participate in Fleet exercises, as a Command Center and simulated ship.

-- HF Propagation range adjacent to the ocean: Provides an ocean ground plane for testing HF systems.

-- Southern California Communications Networking Test Range: This is composed of communications sites at Pt. Mugu, San Nicholas Island, San Clemente Island, Seal Beach and NCCOSC RDTE DIV. NCCOSC RDTE DIV maintains and controls these sites for use in multiforce communications testing and support of west coast Fleet Exercises.

CSF 8. C4I Systems - Afloat

-- The close proximity of the large contingent of Naval forces in San Diego provides for a close interaction between the operational forces and the researchers and developers of future C4I afloat systems. This interaction is essential in developing systems that are effective and fully meet the needs of the afloat warfighter. Naval forces are practically always available for testing in port or in the Southern California Operational Area exercises with advanced systems.

CSF 9. C4I Systems - Ground Mobile

-- Adjacent to Fleet Operations: Allows facility to directly participate in Fleet exercises, as a Command Center and simulated ship.

-- The close proximity of Camp Pendleton provides a ready resource for testing and evaluating C4I systems developed for the Marine Corp, such as the Marine Corps MAGTF Tactical Warfare Simulation.

CSF 10. Electronic Devices

-- At the Warminster Detachment, the geologic conditions in Bucks County are unique. A feasibility study performed by the Kearfott Company in the late 1950's determined that Bucks County was an ideal site for a Navy Inertial Sensor Test Facility because of its low seismic noise level (10-5 to 10-6 g's), rare occurrence

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of seismic disturbances (such as earthquakes), and the proximity of the surface to bedrock. As a result of this study, a unique test facility was built in 1964. This building allows very precise measurement of inertial sensors and has demonstrated performance to a noise floor (vibration) of less than 1x10-6 g's and a stability of 0.8 arcsec in 40 days. These numbers are typical of performance levels required of inertial systems on submarines.

CSF 11. Environmental Sciences R

Propagation Test Facility

-- The primary purpose of the Propagation Test Facility is to simulate typical radio, radar, and electrooptic shipboard environments from which both propagation measurements and system performance assessment studies can be made. The most important aspects of this facility are an unobstructed view of the ocean's horizon at typical shipboard heights (50 to 100 feet above sea level); the rise of Point Loma peninsula to an altitude of approximately 400 feet behind the facility, providing reduction of nearby electromagnetic transmissions from the greater San Diego metropolitan area; the concave coastline and offshore islands of Southern California that provide many options for propagation paths; the Mediterranean climate that produces frequent ducting that is typical of other militarily important areas like the eastern Mediterranean, the Arabian Gulf, and the northern Arabian Sea; the prevailing westerly wind which produces propagation conditions that are predominately representative of the open-ocean and coastal regions. The nearby Naval Station San Diego makes the fleet and the offshore exercise areas readily accessible for shipboard tests and evaluations.

Unique to US: The Propagation Test Facility is unique to the U.S. because of its physical siting, geographic configuration, climatic regime, and its proximity to both the fleet and offshore fleet operating areas. ~~This facility can not be replicated anywhere in the world.~~ WHC 7/27/94

CSF 12. Environmental Quality

-- The proximity of San Diego Bay to the NCCOSC RDTE DIV Environmental Sciences Division Ocean Sciences Laboratory is key to the success of the Marine Environmental Quality Program. San Diego Bay, less than 100 yards from the Ocean Sciences Laboratory, is a marine embayment which supports the San Diego Naval Complex and several Cities surrounding the Bay. The bay is used constantly by the Environmental Sciences Division as a resource and test bed for environmental quality RDT&E. Specifically, the Bay is necessary and used for the following purposes:

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-- San Diego Bay is the source of pumped sea water into the Ocean Sciences Laboratory and the Portable Environmental Test Facility for marine biological and chemistry studies to evaluate Navy environmental issues.

-- San Diego Bay is used as an effective test bed for environmental instrumentation, sensors and ecological risk assessment methods developed by Environmental Sciences Division. The close proximity of the San Diego Navy "Megaport" including Navy Fleet assets, shore facilities and environmental issues such as aquatic hazardous waste sites is needed for both effective technology demonstration and transfer. The proximity of a full spectrum of Navy ships is important for ongoing project to evaluate the impacts of shipboard effluents and hull coatings. The Navy Environmental Leadership Program site for the West Coast is North Island Naval Air Station, with many Bay issues that will be addressed. R

-- San Diego Bay is used extensively to develop and test coating materials for Antifouling properties and durability; test the Marine Environmental Survey Capability (MESC) housed on a 40 ft craft and to provide a number of areas for the study of marine pollution, and housing marine mammals for environmental health and care research. Piers for small boats and the MESC system, as well as test platforms, are required in close proximity of the Ocean Sciences Laboratory to carry out ongoing RDT&E programs and to support the in-house Marine Environmental Support Office, a support office of the Naval Facilities Command, Naval Environmental Protection Support Service (OPNAVINST 5090.1A).

3.1 Location

3.1.1 Geographic/Climatological Features: Describe any geographic/climatological features in and around your activity that are relevant to each CSF. Indicate and justify those that are required versus those that just serve to enhance accomplishing the mission of the activity. For example, clear air at high altitude that increases quality of atmospheric, ground-based laser experiments in support of the weapons CSF. (BRAC Criteria I)

CSF 1. Air Vehicles - Fixed Propulsion

-- Geographic/climatological features in and around our activity serve to enhance accomplishing the mission of this activity.

CSF 2. Air Vehicles - Fixed Avionics

-- Geographic/climatological features in and around our activity serve to enhance accomplishing the mission of this activity.

CSF 3. Air Vehicles - Rotary Avionics

-- Geographic/climatological features in and around our activity serve to enhance accomplishing the mission of this activity.

CSF 4. Weapons - Cruise Missiles

-- Geographic/climatological features in and around our activity serve to enhance accomplishing the mission of this activity.

CSF 5. Space Systems Satellites

-- SHF/EHF Satellite Communication Test Facilities: It contains a complete SHF SATCOM terminal and test equipment to support follow-on SHF equipment development. The location on Pt. Loma provides direct access to all CONUS operational satellites to allow participation in system tests and evaluations.

CSF 6. C4I Systems - Airborne

-- Adjacent to Fleet Operations: Allows facility to directly participate in Fleet exercises, as a Command Center and simulated ship.

CSF 7. C4I Systems - Fixed Ground-Based

-- Adjacent to Fleet Operations: Allows facility to directly participate in Fleet exercises, as a Command Center and simulated ship.

-- HF Propagation range adjacent to the ocean: Provides an ocean ground plane for testing HF systems.

-- Southern California Communications Networking Test Range: This is composed of communications sites at Pt. Mugu, San Nicholas Island, San Clemente Island, Seal Beach and NCCOSC RDTE DIV. NCCOSC RDTE DIV maintains and controls these sites for use in multiforce communications testing and support of west coast Fleet Exercises.

CSF 8. C4I Systems - Afloat

-- The close proximity of the large contingent of Naval forces in San Diego provides for a close interaction between the operational forces and the researchers and developers of future C4I afloat systems. This interaction is essential in developing systems that are effective and fully meet the needs of the afloat warfighter. Naval forces are practically always available for testing in port or in the Southern California Operational Area exercises with advanced systems.

CSF 9. C4I Systems - Ground Mobile

-- Adjacent to Fleet Operations: Allows facility to directly participate in Fleet exercises, as a Command Center and simulated ship.

CSF 10. Electronic Devices

- At the Warminster Detachment, the geologic conditions in Bucks County are unique. A feasibility study performed by the Kearfott Company in the late 1950's determined that Bucks County was an ideal site for a Navy Inertial Sensor Test Facility because of its low seismic noise level (10-5 to 10-6 g's), rare occurrence of seismic disturbances (such as earthquakes), and the proximity of the surface to bedrock. As a result of this study, a unique test facility was built in 1964. This building allows very precise measurement of inertial sensors and has demonstrated performance to a noise floor (vibration) of less than 1x10-6 g's and a stability of 0.8 arcsec in 40 days. These numbers are typical of performance levels required of inertial systems on submarines.

CSF 11. Environmental Sciences

-- Geographic/climatological features in and around our activity serve to enhance accomplishing the mission of this activity.

CSF 12. Environmental Quality

-- The proximity of San Diego Bay to the NCCOSC RDTE DIV Environmental Sciences Division Ocean Sciences Laboratory is key to the success of the Marine Environmental Quality Program. San Diego Bay, less than 100 yards from the Ocean Sciences Laboratory, is a marine embayment which supports the San Diego Naval Complex and several Cities surrounding the Bay. The bay is used constantly by the Environmental Sciences Division as a resource and test bed for environmental quality RDT&E. Specifically, the Bay is necessary and used for the following purposes:

-- San Diego Bay is the source of pumped sea water into the Ocean Sciences Laboratory and the Portable Environmental Test Facility for marine biological and chemistry studies to evaluate Navy environmental issues.

-- San Diego Bay is used as an effective test bed for environmental instrumentation, sensors and ecological risk assessment methods developed by Environmental Sciences Division. The close proximity of the San Diego Navy "Megaport" including Navy Fleet assets, shore facilities and environmental issues such as aquatic hazardous waste sites is needed for both effective technology demonstration and transfer. The proximity of a full spectrum of Navy ships is important for ongoing project to evaluate the impacts of shipboard effluents and hull coatings. The Navy Environmental Leadership Program site for the West Coast is North Island Naval Air Station, with many Bay issues that will be addressed.

-- San Diego Bay is used extensively to develop and test coating materials for Antifouling properties and durability; test the Marine Environmental Survey Capability (MESC) housed on a 40 ft craft and to provide a number of areas for the study of marine pollution, and housing marine mammals for environmental health and care research. Piers for small boats and the MESC system, as well as test platforms, are required in close proximity of the Ocean Sciences Laboratory to carry out ongoing RDT&E programs and to support the in-house Marine Environmental Support Office, a support office of the Naval Facilities Command, Naval Environmental Protection Support Service (OPNAVINST 5090.1A).

CSF 13. Advanced Materials

-- Geographic/climatological features in and around our activity serve to enhance accomplishing the mission of this activity.

3.1.2 Licenses & permits: Describe and list the licenses or permits (e.g., environmental, safety, etc.) that your activity currently holds and justify why they are required to allow tests, experiments, or other special capabilities at your location for each CSF. For example, permit to store and use high explosives. (BRAC Criteria I)

CSF 1. Air Vehicles - Fixed Propulsion

-- Currently no licenses or permits are held by this activity for this particular CSF.

CSF 2. Air Vehicles - Fixed Avionics

-- Currently no licenses or permits are held by this activity for this particular CSF.

CSF 3. Air Vehicles - Rotary Avionics

-- Currently no licenses or permits are held by this activity for this particular CSF.

CSF 4. Weapons - Cruise Missiles

-- Currently no licenses or permits are held by this activity for this particular CSF.

CSF 5. Space Systems - Satellites

-- Currently no licenses or permits are held by this activity for this particular CSF.

CSF 6. C4I Systems - Airborne

-- Currently no licenses or permits are held by this activity for this particular CSF.

CSF 7. C4I Systems - Fixed Ground-Based

-- Currently no licenses or permits are held by this activity for this particular

CSF.

CSF 8. C4I Systems - Afloat

-- Currently no licenses or permits are held by this activity for this particular CSF.

CSF 9. C4I Systems - Ground Mobile

-- Currently no licenses or permits are held by this activity for this particular CSF.

CSF 10. Electronic Devices

-- Water Discharge Permit 08-0017 (conn. no. 110) (City of San Diego Water Utilities Department)

-- Purpose: Discharge of treated/neutralized acid waste to City Sewer from the Product Development Lab.

-- Justification: Allows for the fabrication of silicon semiconductor devices.

-- Hazardous Waste Permit H80075 (San Diego County Department of Health Services Hazardous Material Management Division)

-- Purpose: Allows the use and resulting waste of Hazardous Materials at the Research and Technology Branch, Product Development Lab.

-- Justification: The use of several Hazardous Materials are required in the fabrication of semiconductor devices.

-- Hazardous Waste Permit H80079 (San Diego County Department of Health Services Hazardous Material Management Division)

-- Purpose: Allows the use and resulting waste of Hazardous Materials used in the manufacture, repair, and refurbishment of electroacoustic transducers and windows.

-- Justification: Hazardous polyurethanes and other chemicals are required for the processes involved in the manufacture, repair, and refurbishment of electroacoustic transducers and windows.

-- Hazardous Waste Permit H80107 (San Diego County Department of Health

Services Hazardous Material Management Division)

-- Purpose: Allows the use and resulting waste of Hazardous Materials used in the fabrication of printed circuits and printed antennas.

-- Justification: The use of several Hazardous Materials are associated with printed circuit board preparation, photo-lithography, and board etching.

-- Hazardous Waste Permit H80108 (San Diego County Department of Health Services Hazardous Material Management Division)

-- Purpose: Allows the use and resulting waste of Hazardous Materials at the Solid State Electronics Lab.

-- Justification: The use of several Hazardous Materials are associated with semiconductor materials development and electronic and optoelectronic device development programs.

-- Application for permit for operation of hazardous waste treatment units (State of California Environmental Protection Agency Department of Toxic Substance Control).

-- Purpose: CALIFORNIA EPA PERMIT application is for the acid neutralization tank in the Research and Technology Branch, Product Development Lab, BLDG 560.

-- Justification: Supports the fabrication of semiconductor devices.

-- Navy Radioactive Materials Permit No. 04-66001-E1NP; a Broad-Scope Type A permit (1 of 3 world wide) issued to NCCOSC RDTE DIV by the Navy Radiation Safety Committee (NRSC).

-- Purpose: Serves as the authority of NCCOSC RDTE DIV's Ionizing Radiation Control Committee to issue use permits for an x-ray diffractometer facility and possession, storage, and use of two radioactive sources.

-- Justification: These use permits support semiconductor materials development programs and radiation hardness testing of IR detectors and focal-plane-array programs.

-- 890034, BLDG A-35, Chemical Vapor Deposition System, Solid State Electronics Laboratory.

-- Purpose: To allow operation of two chemical vapor deposition systems. Issued to NCCOSC RDTE DIV SAN DIEGO CA by the Air Pollution Control District.

-- Justification: The permit is required for the operation of two chemical vapor deposition systems within the Solid State Electronics Laboratory that require the use of toxic gases. These systems are an integral part of a semiconductor materials development program and electronic device development programs.

CSF 11. Environmental Sciences

-- Currently no licenses or permits are held by this activity for this particular CSF.

CSF 12. Environmental Quality

-- Hazardous Waste Permit H80112 (San Diego County Department of Health Services Hazardous Material Management Division).

-- Purpose: Allows the use and resulting waste of Hazardous Materials at Environmental Sciences Lab.

-- Justification: The Environmental Chemistry Laboratory generates wastes in support of the Marine Environmental Quality Program.

-- EPA Radioactive Materials Disposal Permit No. CA-99-0010-6271 and California Radioactive Materials Disposal Permit No. CAR-99-001-6842.

-- Purpose: Used in radioisotope labeling and disposal of material for environmental fate and effects work.

-- Justification: Supports work in Radiation Physics for using sealed radioactive sources, their eventual disposal, and for developing and calibrating radiation detection equipment and sensors.

-- DOE Loan Agreement 78SR1062.

-- Purpose: Loan agreement with DOE for "Special Nuclear Materials."

-- Justification: This covers the special radioisotope and elements (as defined by Congress) for use in radiation physics research.

-- 005638, BLDG 111 Degreaser, Cold Solvent, Environmental Sciences Lab.

-- Purpose: To support ongoing work in Environmental Sciences research.

-- Justification: Required for chemistry laboratories' work in Building 111 to support the Marine Environmental Quality Program.

CSF 13. Advanced Materials

-- Water Discharge Permit 08-0017 (conn. no. 110) (City of San Diego Water Utilities Department).

-- Purpose: Discharge of treated/neutralized acid waste to City Sewer from the Product Development Lab.

-- Justification: Allows for the fabrication of silicon semiconductor devices.

-- Hazardous Waste Permit H80075 (San Diego County Department of Health Services Hazardous Material Management Division).

-- Purpose: Allows the use and resulting waste of Hazardous Materials at the Research and Technology Branch, Product Development Lab.

-- Justification: The use of several Hazardous Materials are required in the fabrication of semiconductor devices.

-- Hazardous Waste Permit H80079 (San Diego County Department of Health Services Hazardous Material Management Division).

-- Purpose: Allows the use and resulting waste of Hazardous Materials used in the manufacture, repair, and refurbishment of electroacoustic transducers and windows.

-- Justification: Hazardous polyurethanes and other chemicals are required for the processes involved in the manufacture, repair, and refurbishment of electroacoustic transducers and windows.

-- Hazardous Waste Permit H80107 (San Diego County Department of Health Services Hazardous Material Management Division).

-- Purpose: Allows the use and resulting waste of Hazardous Materials used in the fabrication of printed circuits and printed antennas.

-- Justification: The use of several Hazardous Materials are associated with printed circuit board preparation, photo-lithography, and board etching.

-- **Hazardous Waste Permit H80108 (San Diego County Department of Health Services Hazardous Material Management Division).**

-- **Purpose: Allows the use and resulting waste of Hazardous Materials at the Solid State Electronics Lab.**

-- **Justification: The use of several Hazardous Materials are associated with semiconductor materials development and electronic and optoelectronic device development programs.**

-- **Application for permit for operation of hazardous waste treatment units (State of California Environmental Protection Agency Department of Toxic Substance Control).**

-- **Purpose: California EPA Permit application is for the acid neutralization tank in the Research and Technology Branch, Product Development Lab, BLDG 560.**

-- **Justification: Supports the fabrication of semiconductor devices.**

-- **Navy Radioactive Materials Permit No. 04-66001-E1NP; a Broad-Scope Type A permit (1 of 3 world wide) issued to NCCOSC RDTE DIV by the Navy Radiation Safety Committee (NRSC).**

-- **Purpose: Serves as the authority of NCCOSC RDTE DIV's Ionizing Radiation Control Committee to issue use permits for an x-ray diffractometer facility and possession, storage, and use of two radioactive sources.**

-- **Justification: These use permits support semiconductor materials development programs and radiation hardness testing of IR detectors and focal-plane-array programs.**

-- **890034, bldg A-35, Chemical Vapor Deposition System, Solid State Electronics Laboratory.**

-- **Purpose: To allow operation of two chemical vapor deposition systems. Issued to NCCOSC RDTE DIV by the Air Pollution Control District.**

-- **Justification: The permit is required for the operation of two chemical vapor deposition systems within the Solid State Electronics Laboratory that require the use of toxic gases. These systems are an integral part of a semiconductor materials development program and electronic device development programs.**

3.1.3 Environmental constraints: Describe and list the environmental or land use constraints present at your activity which limit or restrict your current scope for each CSF, i.e., would not allow increased "volume" or "spectrum" for the CSF. Example -- Volume: frequency of a type of experiment. Example -- Spectrum: Current permit to detonate high explosives will not allow detonation or storage of increased quantity of explosives without legal waiver (state law) or relocation of surrounding (non-govt) buildings. (BRAC Criteria II)

CSF 1. Air Vehicles - Fixed Propulsion

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 2. Air Vehicles - Fixed Avionics

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 3. Air Vehicles - Rotary Avionics

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 4. Weapons - Cruise Missiles

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 5. Space Systems - Satellites

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 6. C4I Systems - Airborne

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 7. C4I Systems - Fixed Ground-Based

-- NCCOSC RDTE DIV's work in Command, Control and Communications is concentrated in the seaside area of Point Loma and this work requires the area to be electromagnetic free. In this area, the use of transmitting signals is restricted, and in many areas buildings are not permitted due to signal paths or possible reflections (multipath interference).

CSF 8. C4I Systems - Afloat

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 9. C4I Systems - Ground Mobile

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 10. Electronic Devices

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 11. Environmental Sciences

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 12. Environmental Quality

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

CSF 13. Advanced Materials

-- There are no significant environmental or land use constraints present at our activity which limit or restrict our current scope for this Common Support Function.

3.1.4 Special Support Infrastructure: List and describe the importance of any mission related special support infrastructure (e.g. utilities) present at your location for your activity. (BRAC Criteria I)

CSF 1. Air Vehicles - Fixed Propulsion

-- **All portions of our mission related special support infrastructure present at this activity are adequate.**

CSF 2. Air Vehicles - Fixed Avionics

-- **All portions of our mission related special support infrastructure present at this activity are adequate.**

CSF 3. Air Vehicles - Rotary Avionics

-- **All portions of our mission related special support infrastructure present at this activity are adequate.**

CSF 4. Weapons - Cruise Missiles

-- **All portions of our mission related special support infrastructure present at this activity are adequate.**

CSF 5. Space Systems - Satellites

-- **All portions of our mission related special support infrastructure present at this activity are adequate.**

CSF 6. C4I Systems - Airborne

-- **All portions of our mission related special support infrastructure present at this activity are adequate.**

CSF 7. C4I Systems - Fixed Ground-Based

-- **All portions of our mission related special support infrastructure present at this activity are adequate.**

CSF 8. C4I Systems - Afloat

-- All portions of our mission related special support infrastructure present at this activity are adequate.

CSF 9. C4I Systems - Ground Mobile

-- All portions of our mission related special support infrastructure present at this activity are adequate.

CSF 10. Electronic Devices

-- All portions of our mission related special support infrastructure present at this activity are adequate.

CSF 11. Environmental Sciences

-- All portions of our mission related special support infrastructure present at this activity are adequate.

CSF 12. Environmental Quality

-- Sea Water Flow Through Facility

The flow-through seawater system associated with Building 111 is important to the Environmental Quality RDT&E Program. The system consists of pumps, filters and a distribution system that provides fresh seawater for laboratories and bioassay facilities in the Ocean Sciences Laboratory. Seawater is needed to test toxicity of compounds to marine organisms, develop marine instrumentation and sensors and use in realistic exposure studies. The availability of seawater is critical to marine environmental quality assessment projects and the Marine Environmental Support Office.

CSF 13. Advanced Materials

-- All portions of our mission related special support infrastructure present at this activity are adequate.

3.1.5. Proximity to Mission-Related organizations: List and describe the importance and impact of not having nearby organizations which facilitate accomplishing or performing your mission -- e.g. operational units FFRDCs, universities/colleges, other government organizations, and commercial activities. Restrict your response to the top five. Complete the following: (BRAC Criteria I)

CSF 1. Air Vehicles - Fixed Propulsion

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
None	None	None	None	None

CSF 2. Air Vehicles - Fixed Avionics

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego and Warminster	Industry	1-25 miles	68 est	88 est
Center for Navigation	COALITION: UNIVERSITIES GOV'T/FEDERAL AND STATE INDUSTRIES	WITHIN 75 MILES	0	0.5 (FN 1)
Center for Advanced Communications	UNIVERSITY (VILLANOVA)	WITHIN 20 MILES	0.5	0.5 (FN 2)
masters degree program for navigation	UNIVERSITY (WILKES)	WITHIN 100 MILES	1	0.5 (FN 3)

FOOTNOTES:

(1) Coalition formed to exploit unique facilities and capabilities available at NCCOSC RDTE DIV. Proposals will be generated for FAA, NOAA, Technology Reuse Program (TRP) and other non-DoD activities. Although work level is small it is expected that this will become a major NCCOSC RDTE DIV initiative in Technology Transfer. Loss would reduce Defense Conversion, dual use and technology transfer opportunities.

(2) NCCOSC RDTE DIV Warminster Detachment, Code 30 is administering a DoD

grant to Villanova University for advanced Communication techniques. The work is the product line of the detachment and would need to continue. Relocation would incur travel costs to oversee the University efforts.

(3) Unique educational program developed by NCCOSC RDTE DIV and Wilkes offering a MS in Navigation. Both students and adjunct professor are dependent on location. Relocation would destroy the program.

CSF 3. Air Vehicles - Rotary Avionics

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
None	None	None	None	None

CSF 4. Weapons - Cruise Missiles

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
None	None	None	None	None

CSF 5. Space Systems - Satellites

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego	Industry	1-25 miles	233 est	311 est

CSF 6. C4I Systems - Airborne

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego	Industry	1-25 miles	138 est	203 est
Miramar	Naval Air Station	12 miles	15.4 est	44.6 est

CSF 7. C4I Systems - Fixed Ground-Based

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego	Industry	1-25 miles	392 est	527 est
AIRPAC	Fleet	5 miles	6 est	11 est
SURFPAC	Fleet	5 miles	5 est	8 est
THIRDFLT	Fleet	5 miles	3 est	5 est

CSF 8. C4I Systems - Afloat

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego	Industry	1-25 miles	503	734
AIRPAC/ SURFPAC	Fleet	3 miles	68	142

CSF 9. C4I Systems - Ground Mobile

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego	Industry	1-25 miles	11 est	23 est
Camp Pendleton	Marine Corp	20 miles	6 est	6 est

CSF 10. Electronic Devices

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego	Industry	1-25 miles	45 est	58 est

CSF 11. Environmental Sciences

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego	Industry	1-25 miles	9 est	12 est

CSF 12. Environmental Quality

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego	Industry	1-25 miles	14 est	18 est

CSF 13. Advanced Materials

Name	Type of Organization	Distance	Workyears Performed by Your Activity	Workyears Funded by Your Activity
San Diego	Industry	1-25 miles	13 est	17 est

THE IMPORTANCE OF THESE ORGANIZATIONS

Fleet, North Island, Camp Pendleton

Carrier battle groups deploy out of San Diego. These battle groups work-up their operations and C4I capabilities in the Southern California operating areas. This gives us unparalleled capabilities to develop, integrate, test and support C4I capabilities (including joint capabilities, e.g. JTIDS, JMCIS, CTAPS...) as an integrated whole across multiple platforms (carriers, cruisers, destroyers, submarines, E-2C, F-14,...) and services (AWACS, F-15, PLRS...). Future combat operations will be combined arms with a high degree of integrated joint C4I interoperability. Our location in San Diego provides a juxtaposition across a variety of warfighting capabilities unmatched except perhaps by Hawaii. For example: Naval Station San Diego (carrier battle groups), NAS North Island (E-2C, S-3A, and HSL squadrons), NAS/MCAS Miramar (F-14, F/A-18), Camp Pendleton (USMC amphibious operations, ground vehicles), NAB Coronado (special warfare operations, amphibious operations, mobile EOD units), NSG Imperial Beach (intelligence).

Because of our location, our interaction with operating units and the fleet is frequent, at no cost, at many levels, and often serendipitous. This enables us to

remain close to our primary customer -- the warfighter. Many of our employees spend significant time aboard vessels and at Camp Pendleton, and are well known to operating units and their staffs. I, as Commanding Officer, can look out my office window and see two carrier battle groups and an early warning aircraft squadron. No other laboratory/warfare center commander can make this claim. We believe our location, so close to the wide variety of customers, to be a tremendous asset for serving the fleet.

AIRPAC and SURFPAC are responsible for the ships that provide major command centers for both naval and joint service operations. The ability of a C4I laboratory to have ready access to these ships both in port and during exercises in the Southern California operating area significantly reduces response time and travel costs. The frequent contact with operating personnel and participation in exercises is also used to develop system requirements that drive the science and technology developments for future C4I systems. The contribution to the development of new systems through these contacts is significant and cannot be measured in work years performed or funded.

NCCOSC RDTE DIV develops improvements to the C4I system of the E2C aircraft and also maintains the software. Frequent liaison between the laboratory development efforts, naval flight operators, and the aircraft systems are necessary to translate operational requirements into system improvements and then evaluate the system in the aircraft during flight. NCCOSC RDTE DIV also represents the U.S. Government in the development and sale of the E2C C4I system to the governments of Egypt, France, Israel and Singapore.

Close proximity to Camp Pendleton is necessary for USMC and Navy Projects. The evolutionary development of many systems is allowed by development of system increments at NCCOSC RDTE DIV and obtaining a rapid operational evaluation at Camp Pendleton. This allows increment modification and further system increment development to proceed in a very efficient and cost effective manner.

A number of efforts are ongoing between NCCOSC RDTE DIV and Camp Pendleton (I MEF) to conduct operational requirements analysis and to determine USMC and Naval system functional requirements. This requires frequent commutes between NCCOSC RDTE DIV and Camp Pendleton to maintain an ongoing line of communication as these functional requirements are developed.

The USMC is involved in frequent exercises which occur at Camp Pendleton. NCCOSC RDTE DIV's involvement in these exercises has been instrumental in providing information critical to Navy and USMC interoperability, information transfer between the two services and command and control and joint information management. Without the easy access to Camp Pendleton, this would occur very infrequently.

The USMC software development and maintenance facility (Marine Corps Tactical Software Support Activity -- MCTSSA) is a resident activity at Camp Pendleton. Much of the software integration with Navy systems software takes place here. Without the ready and frequent accessibility between NCCOSC RDTE DIV and MCTSSA, the software integration work would be far more difficult.

The AIRPAC, SURFPAC and THIRDFLT commands in San Diego, CA, utilize planning systems and command centers that have been developed at NCCOSC RDTE DIV. NCCOSC RDTE DIV is also developing new systems that will be utilized by these commands and providing major support to demonstrations of new technology in major exercises such as TANDEM THRUST. The frequent contact with these organizations that is required to carry out these programs necessitates close geographical proximity.

Universities

With the University of California San Diego, San Diego State University, and University of San Diego, this location is one of three leading regions in the country for providing higher education in technical and scientific fields. In addition, the Scripps Institution of Oceanography (with whom we share joint programs) is one of the world's leading oceanographic institutions.

In the area of Environmental Quality, we have existing and building collaborative work and associations with Scripps Institution of Oceanography, UC San Diego, and San Diego State University. This includes collaborative research projects being developed with ONR in hydrodynamic modeling and validation, including use of the UC Supercomputer Center, and marine chemistry, bioindicator and remediation work. A Memorandum of Agreement has been established with NCCOSC RDTE DIV and growing interests in joint environment/sensor work and TRP Dual Use Programs. The proximity of these universities is particularly important because they can provide technical expertise and capabilities (instrumentation, computing power, etc.), regional liaison, technology transfer and manpower in a time of drawdown when hiring is impracticable or impossible.

We're involved in cooperative research with the Department of Electrical and Computer Engineering, at the University of California, San Diego (UCSD). This research is in the area of Optoelectronic Systems Packaging. We provide assembly services, design, and engineering expertise for packaging complex optoelectronics systems under development at UCSD. These services are essential to UCSD's Advanced Research Projects Agency sponsored effort in optoelectronic computing. UCSD has three full time graduate students committed to this project.

Our microelectronics facility has had long-standing, mutually beneficial relationships with both University of California, San Diego (UCSD) and San Diego State University (SDSU). We are in close contact with several professors working in the area of electronic devices at UCSD.

We've had both formal and informal cooperative research efforts with the University of California, San Diego (UCSD) for many years. These efforts currently involve optoelectronic and electronic materials research and device development. The work being performed in our lab and at UCSD is frequently for the same sponsor and invariably both efforts are being funded by Federal Government agencies. These cooperative efforts offer timely access to equipment and expertise that could not be duplicated at NCCOSC RDTE DIV with current funding levels.

We have worked and continue to work collaboratively on projects with UCSD (Scripps Institution of Oceanography and Applied Mechanics and Engineering

Science). We author joint proposals. We have seminars and UCSD and SDSU are members of the Center for the Control of Fluids. At SDSU we have collaborations with the Aero and Mechanical Engineering Departments.

The San Diego State Foundation provides quality students from all local universities to support RDT&E Projects. These students must be within short range commuting distance to provide support.

The San Diego Supercomputer Center is one of four National Science Foundation sponsored national supercomputer centers, and is located on the University of California San Diego campus. Our access to the San Diego Supercomputer Center and our collaborative R&D work is essential to our high performance computing research in the areas of visualization and simulation.

Commercial and Industrial Base

San Diego provides a large commercial and industrial base from which we draw upon its highly technical and skilled work force. This surrounding industry contains a wealth of readily available talent and support for all phases of our work, and provides us with a rapid workload growth capability. Additionally, San Diego is quickly becoming a leading national telecommunications industry center with a special emphasis on satellite and high-speed terrestrial communications. The San Diego Mayor, Susan Golding, has committed to making San Diego the "Communications City of the Future -- the Telecommunications Capital." The Mayor has established a major ongoing effort to achieve this goal through industry incentives and through a major cooperative effort between government, industry, and academia. San Diego easily provides the much needed technological infrastructure required to support a large military research lab.

3.2 Personnel:

Although NCCOSC RDTE DIV SAN DIEGO CA is being asked to respond to each Common Support Function as though it were accomplished in isolation of all others, this is nearly impossible since our primary effort in C4I is integrated across all related activities. Our primary mission is the integration of all C4I into a single interoperable system, as envisioned in *Copernicus* and *C4I for the Warrior*. To that end, our personnel are not readily separable into identifiable elements that support one Common Support Function or another. Therefore, <u>any</u> listing which purports to do that is an estimate at best. Our particular capabilities, people and facilities, may on one day be supporting land based communications and on the next day be supporting mobile communications, so our responses are approximations, heavily caveated, applicable only in a snapshot in time, tightly integrated with all other C4I efforts.

3.2.1 Total Personnel: What is the total number of government (military and civilian), on-site federally funded research and development center (FFRDC), and on-site system engineering technical assistance (SETA) personnel engaged in science and technology (S&T), engineering development and in-service engineering activities as of end FY93? For individuals that predominantly work in CSFs, involved in more than one CSF, account for those individuals in the CSF that represents the preponderance of their effort. (BRAC Criteria I)

The following data differs from the May 20, 1994 submission in the total number of personnel. The May 20th submission was derived from the command's personnel database and reported the combined overall number of personnel based on the best available database criteria. This submission provides a more accurate overall count of personnel since it is derived from our official personnel records. However, the breakout of personnel among the various CSF's is an artificially imposed extrapolation based on estimates of workload.

CSF 1. Air Vehicles - Fixed Propulsion

Types of personnel	Number of Personnel			
	Government			
	Civilian	Military	On-Site FFRDC	On-Site SETA
Technical	**3**	**0**	**0**	**0**
Management (Supv)	**1**	**0**	**0**	**0**
Other	**0**	**0**	**0**	**0**

CSF 2. Air Vehicles - Fixed Avionics

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**55**	**0**	**0**	**0**
Management (Supv)	**6**	**0**	**0**	**0**
Other	**7**	**0**	**0**	**0**

CSF 3. Air Vehicles - Rotary Avionics

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**2**	**0**	**0**	**0**
Management (Supv)	**0**	**0**	**0**	**0**
Other	**0**	**0**	**0**	**0**

CSF 4. Weapons - Cruise Missiles

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**7**	**0**	**0**	**0**
Management (Supv)	**0**	**0**	**0**	**0**
Other	**1**	**0**	**0**	**0**

CSF 5. Space Systems - Satellites

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**189**	**8**	**0**	**0**
Management (Supv)	**20**	**1**	**0**	**0**
Other	**24**	**0**	**0**	**0**

CSF 6. C4I Systems - Airborne

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**123**	**4**	**0**	**0**
Management (Supv)	**14**	**0**	**0**	**0**
Other	**16**	**0**	**0**	**0**

CSF 7. C4I Systems - Fixed Ground-Based

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**329**	**3**	**0**	**0**
Management (Supv)	**36**	**0**	**0**	**0**
Other	**41**	**0**	**0**	**0**

CSF 8. C4I Systems - Afloat

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**447**	**4**	**15**	**0**
Management (Supv)	**47**	**0**	**0**	**0**
Other	**57**	**0**	**0**	**0**

CSF 9. C4I Systems - Ground Mobile

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**14**	**1**	**0**	**0**
Management (Supv)	**1**	**0**	**0**	**0**
Other	**2**	**0**	**0**	**0**

CSF 10. Electronic Devices

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**39**	**0**	**0**	**0**
Management (Supv)	**5**	**0**	**0**	**0**
Other	**1**	**0**	**0**	**0**

CSF 11. Environmental Sciences

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**7**	**0**	**0**	**0**
Management (Supv)	**2**	**0**	**0**	**0**
Other	**0**	**0**	**0**	**0**

CSF 12. Environmental Quality

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**12**	**0**	**0**	**0**
Management (Supv)	**2**	**0**	**0**	**0**
Other	**0**	**0**	**0**	**0**

CSF 13. Advanced Materials

Types of personnel	Number of Personnel			
	Government		On-Site FFRDC	On-Site SETA
	Civilian	Military		
Technical	**11**	**0**	**0**	**0**
Management (Supv)	**2**	**0**	**0**	**0**
Other	**0**	**0**	**0**	**0**

3.2.2 Education: What is the number of government personnel actively engaged in S&T, engineering development and in-service engineering activities by highest degree and type of position? Provide the data in the following table: (BRAC Criteria I)

CSF 1. Air Vehicles - Fixed Propulsion

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	0	0	0
Associates	0	0	0
Bachelor	2	0	0
Masters	1	1	0
Doctorate (include Med/Vet/etc.)	0	0	0

CSF 2. Air Vehicles - Fixed Avionics

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	6	0	5
Associates	4	0	1
Bachelor	25	2	1
Masters	15	3	0
Doctorate (include Med/Vet/etc.)	5	1	0

CSF 3. Air Vehicles - Rotary Avionics

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	0	0	0
Associates	0	0	0
Bachelor	1	0	0
Masters	1	0	0
Doctorate (include Med/Vet/etc.)	0	0	0

CSF 4. Weapons - Cruise Missiles

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	1	0	1
Associates	0	0	0
Bachelor	3	0	0
Masters	2	0	0
Doctorate (include Med/Vet/etc.)	1	0	0

CSF 5. Space Systems - Satellites

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	22	1	17
Associates	13	0	4
Bachelor	92	6	3
Masters	53	12	0
Doctorate (include Med/Vet/etc.)	17	2	0

CSF 6. C4I Systems - Airborne

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	14	1	11
Associates	8	0	3
Bachelor	60	4	2
Masters	34	7	0
Doctorate (include Med/Vet/etc.)	11	2	0

CSF 7. C4I Systems - Fixed Ground-Based

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	39	2	29
Associates	23	1	7
Bachelor	165	13	5
Masters	92	19	0
Doctorate (include Med/Vet/etc.)	13	1	0

CSF 8. C4I Systems - Afloat

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	51	2	40
Associates	29	1	9
Bachelor	211	14	7
Masters	121	25	1
Doctorate (include Med/Vet/etc.)	39	5	0

CSF 9. C4I Systems - Ground Mobile

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	2	0	1
Associates	1	0	1
Bachelor	7	0	0
Masters	4	1	0
Doctorate (include Med/Vet/etc.)	1	0	0

CSF 10. Electronic Devices

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	0	0	0
Associates	0	0	0
Bachelor	5	1	1
Masters	20	2	0
Doctorate (include Med/Vet/etc.)	14	2	0

CSF 11. Environmental Sciences

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	0	0	0
Associates	0	0	0
Bachelor	1	0	0
Masters	2	0	0
Doctorate (include Med/Vet/etc.)	4	2	0

CSF 12. Environmental Quality

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	0	0	0
Associates	0	0	0
Bachelor	1	0	0
Masters	4	1	0
Doctorate (include Med/Vet/etc.)	7	1	0

CSF 13. Advanced Materials

Type of Degree/ Diploma	Number of Government Personnel by Type of Position		
	Technical	Management (Supv)	Other
High School or Less	0	0	0
Associates	0	0	0
Bachelor	0	0	0
Masters	0	0	0
Doctorate (include Med/Vet/etc.)	11	2	0

The above tables includes military and civilian personnel involved in science, technology, engineering development and in-service engineering.

3.2.3 Experience: What is the experience level of government personnel? Fill in the number of government personnel in the appropriate boxes of the following table. (BRAC Criteria I)

CSF 1. Air Vehicles - Fixed Propulsion

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**0**	**1**	**2**	**0**	**0**
Management (Supv)	**0**	**0**	**0**	**1**	**0**
Total	**0**	**1**	**2**	**1**	**0**

CSF 2. Air Vehicles - Fixed Avionics

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**1**	**14**	**10**	**7**	**23**
Management (Supv)	**0**	**0**	**1**	**1**	**4**
Total	**1**	**14**	**11**	**8**	**27**

CSF 3. Air Vehicles - Rotary Avionics

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**0**	**1**	**1**	**0**	**0**
Management (Supv)	**0**	**0**	**0**	**0**	**0**
Total	**0**	**1**	**1**	**0**	**0**

CSF 4. Weapons - Cruise Missiles

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**0**	**2**	**1**	**1**	**3**
Management (Supv)	**0**	**0**	**0**	**0**	**0**
Total	**0**	**2**	**1**	**1**	**3**

CSF 5. Space Systems - Satellites

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**3**	**51**	**37**	**25**	**81**
Management (Supv)	**0**	**1**	**2**	**3**	**15**
Total	**3**	**52**	**39**	**28**	**96**

CSF 6. C4I Systems - Airborne

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**2**	**32**	**24**	**16**	**53**
Management (Supv)	**0**	**1**	**1**	**2**	**10**
Total	**2**	**33**	**25**	**18**	**63**

CSF 7. C4I Systems - Fixed Ground-Based

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**5**	**85**	**62**	**42**	**138**
Management (Supv)	**0**	**2**	**3**	**5**	**26**
Total	**5**	**87**	**65**	**47**	**164**

CSF 8. C4I Systems - Afloat

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**7**	**116**	**84**	**58**	**186**
Management (Supv)	**0**	**2**	**4**	**7**	**34**
Total	**7**	**118**	**88**	**65**	**220**

CSF 9. C4I Systems - Ground Mobile

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**0**	**4**	**3**	**2**	**6**
Management (Supv)	**0**	**0**	**0**	**0**	**1**
Total	**0**	**4**	**3**	**2**	**7**

CSF 10. Electronic Devices

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**1**	**9**	**8**	**6**	**15**
Management (Supv)	**0**	**0**	**0**	**1**	**4**
Total	**1**	**9**	**8**	**7**	**19**

CSF 11. Environmental Sciences

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**0**	**2**	**1**	**1**	**3**
Management (Supv)	**0**	**0**	**0**	**0**	**2**
Total	**0**	**2**	**1**	**1**	**5**

CSF 12. Environmental Quality

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**0**	**3**	**3**	**1**	**5**
Management (Supv)	**0**	**0**	**0**	**1**	**1**
Total	**0**	**3**	**3**	**2**	**6**

CSF 13. Advanced Materials

Type of Position	Years of Government and/or Military Service				
	Less than 3 years	3-10 years	11-15 years	16-20 years	More than 20 years
Technical	**0**	**3**	**2**	**1**	**5**
Management (Supv)	**0**	**0**	**0**	**0**	**2**
Total	**0**	**3**	**2**	**1**	**7**

NCCOSC RDTE DIV NOTE: "Other" category not included (e.g. as in 3.2.1 and 3.2.2) as per original 3.2.3 table.

3.2.4 **Accomplishments During FY91-93:** For government personnel answer the following questions.

3.2.4.1 How many patents were awarded and patent disclosures (only count disclosures with issued disclosure numbers) were made? (BRAC Criteria I)

CSF	Disclosures	Awarded	Patent Titles (List)
CSF 1. Air Vehicles - Fixed Propulsion	0	0	(See Appendix D)
CSF 2. Air Vehicles - Fixed Avionics	0	1	
CSF 3. Air Vehicles - Rotary Avionics	0	0	
CSF 4. Weapons - Cruise Missiles	0	0	
CSF 5. Space Systems - Satellites	0	0	
CSF 6. C4I Systems - Airborne	2	5	
CSF 7. C4I Systems - Fixed Ground-Based	37	12	
CSF 8. C4I Systems - Afloat	0	0	
CSF 9. C4I Systems - Ground Mobile	10	1	
CSF 10. Electronic Devices	49	46	
CSF 11. Environmental Sciences	1	1	
CSF 12. Environmental Quality	20	1	
CSF 13. Advanced Materials	9	2	
Total	128	69	

3.2.4.2 How many papers were published in peer reviewed journals? (BRAC Criteria I)

CSF	Number Published	Paper Titles (List)
CSF 1. Air Vehicles - Fixed Propulsion	2	(See Appendix E)
CSF 2. Air Vehicles - Fixed Avionics	2	
CSF 3. Air Vehicles - Rotary Avionics	0	
CSF 4. Weapons - Cruise Missiles	0	
CSF 5. Space Systems - Satellites	0	
CSF 6. C4I Systems - Airborne	2	
CSF 7. C4I Systems - Fixed Ground-Based	19	
CSF 8. C4I Systems - Afloat	16	
CSF 9. C4I Systems - Ground Mobile	3	
CSF 10. Electronic Devices	43	
CSF 11. Environmental Sciences	11	
CSF 12. Environmental Quality	13	
CSF 13. Advanced Materials	23	
TOTAL	134	

3.2.4.2 How many papers were published in peer reviewed journals? (BRAC Criteria I)

CSF	Number Published	Paper Titles (List)
CSF 1. Air Vehicles - Fixed Propulsion	7	(See Appendix E)
CSF 2. Air Vehicles - Fixed Avionics	14	
CSF 3. Air Vehicles - Rotary Avionics	1	
CSF 4. Weapons - Cruise Missiles	2	
CSF 5. Space Systems - Satellites	2	
CSF 6. C4I Systems - Airborne	23	
CSF 7. C4I Systems - Fixed Ground-Based	180	
CSF 8. C4I Systems - Afloat	158	
CSF 9. C4I Systems - Ground Mobile	13	
CSF 10. Electronic Devices	127	
CSF 11. Environmental Sciences	89	
CSF 12. Environmental Quality	48	
CSF 13. Advanced Materials	67	
TOTAL	731	

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3.3 Workload

3.3.1 FY93 Workload

3.3.1.1 **Work Year and Lifecycle:** Identify the number of actual workyears executed for each applicable CSF in FY93 for each of the following: government civilian; military; on-site FFRDCs; and on-site SETAs. (BRAC Criteria I)

CSF	Lifecycle Phase	FY93 Actual			
		Civilian	Military	FFRDC	SETA
CSF 1. Air Vehicles - Fixed Propulsion	**Science & Technology**	**0**	**0**	**0**	**0**
	Engineering Development	**4**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 2. Air Vehicles - Fixed Avionics	**Science & Technology**	**0**	**0**	**0**	**0**
	Engineering Development	**68.3**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 3. Air Vehicles - Rotary Avionics	**Science & Technology**	**0**	**0**	**0**	**0**
	Engineering Development	**2**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 4. Weapons - Cruise Missiles	**Science & Technology**	**0**	**0**	**0**	**0**
	Engineering Development	**8.1**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 5. Space Systems - Satellites	**Science & Technology**	**24**	**0**	**0**	**0**
	Engineering Development	**151**	**6**	**0**	**0**
	In-Service Engineering	**58**	**3**	**0**	**0**

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3.3 Workload

3.3.1 FY93 Workload

3.3.1.1 **Work Year and Lifecycle:** Identify the number of actual workyears executed for each applicable CSF in FY93 for each of the following: government civilian; military; on-site FFRDCs; and on-site SETAs. (BRAC Criteria I)

CSF	Lifecycle Phase	FY93 Actual			
		Civilian	Military	FFRDC	SETA
CSF 1. Air Vehicles - Fixed Propulsion	**Science & Technology**	**0**	**0**	**0**	**0**
	Engineering Development	**4**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 2. Air Vehicles - Fixed Avionics	**Science & Technology**	**0**	**0**	**0**	**0**
	Engineering Development	**68.3**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 3. Air Vehicles - Rotary Avionics	**Science & Technology**	**0**	**0**	**0**	**0**
	Engineering Development	**2**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 4. Weapons - Cruise Missiles	**Science & Technology**	**0**	**0**	**0**	**0**
	Engineering Development	**8**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 5. Space Systems - Satellites	**Science & Technology**	**24**	**0**	**0**	**0**
	Engineering Development	**151**	**6**	**0**	**0**
	In-Service Engineering	**58**	**3**	**0**	**0**

CSF 6. C4I Systems - Airborne	Science & Technology	65.1	0	0	0
	Engineering Development	88	4.4	0	0
	In-Service Engineering	0	0	0	0
CSF 7. C4I Systems - Fixed Ground-Based	Science & Technology	54.3	1	0	0
	Engineering Development	352.1	2.2	0	0
	In-Service Engineering	0	0	0	0
CSF 8. C4I Systems - Afloat	Science & Technology	20.6	15	0	0
	Engineering Development	530.6	4.4	0	0
	In-Service Engineering	0	0	0	0
CSF 9. C4I Systems - Ground Mobile	Science & Technology	17	1	0	0
	Engineering Development	0	0	0	0
	In-Service Engineering	0	0	0	0
CSF 10. Electronic Devices	Science & Technology	45	0	0	0
	Engineering Development	0	0	0	0
	In-Service Engineering	0	0	0	0

CSF 11. Environmental Sciences	**Science & Technology**	**9**	**0**	**0**	**0**
	Engineering Development	**0**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 12. Environmental Quality	**Science & Technology**	**14**	**0**	**0**	**0**
	Engineering Development	**0**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**
CSF 13. Advanced Materials	**Science & Technology**	**13**	**0**	**0**	**0**
	Engineering Development	**0**	**0**	**0**	**0**
	In-Service Engineering	**0**	**0**	**0**	**0**

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3.3.1.2 **Engineering Development By ACAT:** For each Common Support Function (e.g. airborne C4I) at each activity engaged in engineering development, provide:
- For each ACAT IC, ID, and II program (as defined in DoDI 5000.2):

    - The name of the program
    - A brief program description

- For each ACAT III and IV programs:
    - The number of such programs
    - A list of program names

- For each program not an ACAT I, II, III, IV:
    - The number of such programs
    - A list of program names

- For the purpose of this question, any program between Milestone I and IV and containing demonstration and validation (Dem/Val 6.4)/Engineering and Manufacturing Development (EMD 6.5) funds in the FY95 PBS is considered to be engaged in engineering development (BRAC Criteria I).

The following data differs from the May 20, 1994 submission in the total number of personnel. The May 20th submission was derived from the command's personnel database and reported the combined overall number of personnel based on the best available database criteria. However, this submission provides a more accurate count of personnel involved in CSF's based on the actual count of personnel directly involved in the CSF's and on their demographic data derived from our personnel records.

CSF 1. Air Vehicles - Fixed Propulsion

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				

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Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
Other	1	4	1025K	1. CARCO Flight Motion Simulator is an electonics upgrade to the control circuitry for a dynamic flight simulator used to test inertial navigation systems under simulated aircraft angular dynamics. System errors are identified, system performance evaluated, system characterized and system readiness for flight test is evaluated resulting in lower system test costs.

3.3.1.2 **Engineering Development By ACAT:** For each Common Support Function (e.g. airborne C4I) at each activity engaged in engineering development, provide:
- For each ACAT IC, ID, and II program (as defined in DoDI 5000.2):

  - The name of the program
  - A brief program description

- For each ACAT III and IV programs:
  - The number of such programs
  - A list of program names

- For each program not an ACAT I, II, III, IV:
  - The number of such programs
  - A list of program names

- For the purpose of this question, any program between Milestone I and IV and containing demonstration and validation (Dem/Val 6.4)/Engineering and Manufacturing Development (EMD 6.5) funds in the FY95 PBS is considered to be engaged in engineering development (BRAC Criteria I).

The following data differs from the May 20, 1994 submission in the total number of personnel. The May 20th submission was derived from the command's personnel database and reported the combined overall number of personnel based on the best available database criteria. However, this submission provides a more accurate count of personnel involved in CSF's based on the actual count of personnel directly involved in the CSF's and on their demographic data derived from our personnel records.

CSF 1. Air Vehicles - Fixed Propulsion

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other	1	4	1025K	CARCO Flight Motion Simulator

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CSF 2. Air Vehicles - Fixed Avionics

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	Tacamo GPS	1.0 45.4	$155.0K $18.7M	1. TACAMO is an airborne communications platform that provides a relay between the National Command Authority and Fleet strategic submarines. 2. GPS is a tri-service, satellite-based UHF navigation system providing accurate 3-dimensional position, velocity and time to user platforms.
ACAT ID	V-22	2.0	$342.0K	Provide GPS navigation engineering and communication support.
ACAT II	ICNIA	.4	$60.0K	ICNIA is a tri-service integrated avionics system that supplies all airborne communications and navigation functions.

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ACAT III/IV	6	3.5	$479.0K	1. COMPASS/AHARS (Attitude and Heading Reference Systems) is a joint AF/Navy program to develop an integrated compass and attitude and heading reference system for aircraft. 2. Radiant Outlaw is a classified surveillance system used on selected Navy aircraft. 3. JSOW (Joint Stand-Off Weapon System) System and technology engineering support in guidance and system integration, especially inertial and global positioning systems via simulations, jamming mission scenarios, and antijamming requirements. 4. P3/S3 Antenna Study is an investigation into integrating some of the antennas on the two Navy ASW aircraft: P-3 Orion and the S-3 Skyhawk. 5. UHF/Satellite Communications is a program to improve the equipment used to provide Ultra High Frequency (or UHF) communications on Navy aircraft. 6. Transmitter Components is a program to exploit the latest device technology such as Monolithic Microwave Integrated Circuit to be used in airbonre transmitter applications.	R

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Other	**3**	**16**	**$2.2M**	**1. GPSIU (Global Positioning System Interface Unit) is the development of an interface and control unit required to use GPS on certain airborne platforms.** **2. Communications Network is the development of networking tools for fleet operators required for the deployment of the Joint Tactical Information Distribution System (or JTIDS).** **3. TRSS (Tactical Relay Surveillance System) is a forward deployed sensor and surveillance system used by the Marine Corps.**	**R**

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CSF 2. Air Vehicles - Fixed Avionics

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	Tacamo GPS	1.0 45.4	$155.0K $18.7M	1. TACAMO is an airborne communications platform that provides a relay between the National Command Authority and Fleet strategic submarines. 2. GPS is a tri-service, satellite-based UHF navigation system providing accurate 3-dimensional position, velocity and time to user platforms.
ACAT ID	V-22	2.0	$342.0K	Provide GPS navigation engineering and communication support.
ACAT II	ICNIA	.4	$60.0K	ICNIA is a tri-service integrated avionics system that supplies all airborne communications and navigation functions.
ACAT III/IV	7	3.5	$479.0K	COMPASS/AHARS Radiant Outlaw JSOW P3/S3 Antenna Study UHF/Satellite Comm Transmitter Components
Other	3	16	$2.2M	GPSIU Comm. Network TRSS

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CSF 2. Air Vehicles - Fixed Avionics

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	Tacamo GPS	1.0 36.8	$155.0K $18.7M	1. TACAMO is an airborne communications platform that provides a relay between the National Command Authority and Fleet strategic submarines. 2. GPS is a tri-service, satellite-based UHF navigation system providing accurate 3-dimensional position, velocity and time to user platforms.
ACAT ID	V-22	2.0	$342.0K	Provide GPS navigation engineering and communication support.
ACAT II	ICNIA	.4	$60.0K	ICNIA is a tri-service integrated avionics system that supplies all airborne communications and navigation functions.
ACAT III/IV	7	3.5	$479.0K	COMPASS/AHARS Radiant Outlaw JSOW P3/S3 Antenna Study UHF/Satellite Comm Transmitter Components
Other	3	16	$2.2M	GPSIU Comm. Network TRSS

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CSF 3. Air Vehicles - Rotary Avionics

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other	1	2	703K	1. CH46 SIL (System Integration Lab) is the GPS integration lab for implementation of GPS on a CH-46 helicopter.

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CSF 4. Weapons - Cruise Missiles

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II	CRUISE MISSILE	8.1	$1.6M	Provide engineering support for the GPS Software Support Activity and IV&V of the Cruise Missile GPS receiver software.
ACAT III/IV				
Other				

CSF 3. Air Vehicles - Rotary Avionics

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other	1	2	703K	CH46 SIL

CSF 4. Weapons - Cruise Missiles

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II	CRUISE MISSILE	8.1	$1.6M	Provide engineering support for the GPS Software Support Activity and IV&V of the Cruise Missile GPS receiver software.
ACAT III/IV				
Other				

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CSF 5. Space Systems - Satellites

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	Navy EHF Satellite	37	$3.9M	Development of a computer controlled method to provide automatic routing of EHF Satcom links.
ACAT ID				
ACAT II				

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ACAT III/IV	7	120	$14.2M	1. DAMA - Demand Assigned Multiple Access system. Development of hardware and software in support of the DAMA satellite communications equipment. 2. UHF SATCOM - UHF Satellite Communications. Development of upgraded hardware and software in support of the UHF satellite communications equipment. 3. Mini-DAMA - Miniaturized Demand Assigned Multiple Access system. Development of hardware and software in support of the mini-DAMA satellite communications equipment. 4. WSC-3 Follow-on - WSC-3 Satellite Transceiver Upgrade. Development of upgraded hardware support of UHF satellite communications. 5. DDP - Defense Dissemination Program. Development of a multichannel, fiber optic communications system. 6. SHF SATCOM - SHF Satellite Communications. Development of upgraded hardware and software in support of the SHF satellite communications equipment. 7. TRE - Tactical Receive Equipment. Development of hardware and software in support of the Tactical Data Information Exchange Subsystem (TADIX-B) satellite communications equipment.	R
Other					

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CSF 5. Space Systems - Satellites

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	Navy EHF Satellite	37	$3.9M	Development of a computer controlled method to provide automatic routing of EHF Satcom links.
ACAT ID				
ACAT II				
ACAT III/IV	7	120	$14.2M	DAMA UHF SATCOM Mini-DAMA WSC-3 Follow-on DDP SHF SATCOM TRE
Other				

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CSF 6. C4I Systems - Airborne

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	JTIDS Class 2 Terminal	49.5	$19.3M	Joint Tactical Information Distribution System (JTIDS) provides an integrated communications - navigation-identification system featuring multichannel, multinet, high data rate communications, and relative navigation capabilities for tactical operations.

CSF 5. Space Systems - Satellites

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	Navy EHF Satellite	12	$3.9M	Development of a computer controlled method to provide automatic routing of EHF Satcom links.
ACAT ID				
ACAT II				
ACAT III/IV	7	50	$14.2M	DAMA UHF SATCOM Mini-DAMA WSC-3 Follow-on DDP SHF SATCOM TRE
Other				

CSF 6. C4I Systems - Airborne

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	JTIDS Class 2 Terminal	37.5	$19.3M	Joint Tactical Information Distribution System (JTIDS) provides an integrated communications - navigation-identification system featuring multichannel, multinet, high data rate communications, and relative navigation capabilities for tactical operations.

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ACAT ID	JTIDS	15.3 7.0	$6.8M	1. JTIDS is an advanced radio system which provides information distribution, position location, and identification capabilities in an integrated form for tactical military operations. Provides for improved capabilities for tactical forces of the U. S. military and NATO and is intended to become a vital part of the currently existing Joint Tactical Air Operations (JTAO) system.
ACAT II	E-2C Weapon System	18	$3.5M	Develop and maintain E-2C aircraft weapons systems tactical and diagnostic computer programs.
ACAT III/IV	1	2.6	$378.7K	1. Uplink Telemetry Evaluation Dual Frequency Synthesizer Radio Relay Airship Demo ATARS Data Link - Program to build components for a dual frequency synthesizer to be demonstrated for a radio relay deployable on an airship. The signal will be capable with the AF ATARS data link design.
Other				

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CSF 6. C4I Systems - Airborne

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	JTIDS Class 2 Terminal	49.5	$19.3M	Joint Tactical Information Distribution System (JTIDS) provides an integrated communications - navigation-identification system featuring multichannel, multinet, high data rate communications, and relative navigation capabilities for tactical operations.

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CSF 5. Space Systems - Satellites

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	Navy EHF Satellite	37	$3.9M	Development of a computer controlled method to provide automatic routing of EHF Satcom links.
ACAT ID				
ACAT II				
ACAT III/IV	7	120	$14.2M	DAMA UHF SATCOM Mini-DAMA WSC-3 Follow-on DDP SHF SATCOM TRE
Other				

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CSF 6. C4I Systems - Airborne

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	JTIDS Class 2 Terminal	49.5	$19.3M	Joint Tactical Information Distribution System (JTIDS) provides an integrated communications - navigation-identification system featuring multichannel, multinet, high data rate communications, and relative navigation capabilities for tactical operations.

CSF 5. Space Systems - Satellites

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	Navy EHF Satellite	12	$3.9M	Development of a computer controlled method to provide automatic routing of EHF Satcom links.
ACAT ID				
ACAT II				
ACAT III/IV	7	50	$14.2M	DAMA UHF SATCOM Mini-DAMA WSC-3 Follow-on DDP SHF SATCOM TRE
Other				

CSF 6. C4I Systems - Airborne

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	JTIDS Class 2 Terminal	37.5	$19.3M	Joint Tactical Information Distribution System (JTIDS) provides an integrated communications - navigation-identification system featuring multichannel, multinet, high data rate communications, and relative navigation capabilities for tactical operations.

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ACAT ID	JTIDS	15.3 7.0	$6.8M	1. JTIDS is an advanced radio system which provides information distribution, position location, and identification capabilities in an integrated form for tactical military operations. Provides for improved capabilities for tactical forces of the U. S. military and NATO and is intended to become a vital part of the currently existing Joint Tactical Air Operations (JTAO) system.	R
ACAT II	E-2C Weapon System	18	$3.5M	Develop and maintain E-2C aircraft weapons systems tactical and diagnostic computer programs.	
ACAT III/IV	1	2.6	$378.7K	1. Uplink Telemetry Evaluation Dual Frequency Synthesizer Radio Relay Airship Demo ATARS Data Link - Program to build components for a dual frequency synthesizer to be demonstrated for a radio relay deployable on an airship. The signal will be capable with the AF ATARS data link design.	
Other					

ACAT ID	**JTIDS MIDS**	**15.3 7.0**	**$6.8M**	**1. JTIDS is an advanced radio system which provides information distribution, position location, and identification capabilities in an integrated form for tactical military operations. Provides for improved capabilities for tactical forces of the U. S. military and NATO and is intended to become a vital part of the currently existing Joint Tactical Air Operations (JTAO) system.**
ACAT II	**E-2C Weapon System**	**18**	**$3.5M**	**Develop and maintain E-2C aircraft weapons systems tactical and diagnostic computer programs.**
ACAT III/IV	**4**	**2.6**	**$378.7K**	**Uplink Telemetry Eval Dual Frequency Synthesizer Radio Relay Airship Demo ATARS Data Link**
Other				

CSF 7. C4I Systems - Fixed Ground-Based

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID	SDS FDS MATT	10.6 5.1 12	$2.3M $1.5M $5.7M	1. SDS (Surveillance Direction System) provides command, control, communications, and intelligence capabilities for the Integrated Undersea Surveillance System. 2. FDS (Fixed Distributed System) updates both the underwater sensors and shore based signal and information processing systems. 3. MATT (Multi-Mission Advanced Tactical Terminal) is a highly miniaturized C4I terminal being procured to meet USSOCOM, Navy and Air Force near-term tactical intelligence broadcast reception and data processing requirements for space and weight constrained platforms.
ACAT II	OSIS Baseline Upgrade	4.4	$1.6M	Provides the intelligence processing systems, both hardware and software, for the Unified and Specified Intelligence Centers. This system receives, processes, and displays intelligence information for a wide range of Navy and Joint warfighting capabilities.

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ACAT III/IV	10	57.8	$24.2M	1. Operations Support System (OSS) provides an automated command control support system to receive, process, display and assess the readiness and warfighting capabilities of own and allied forces to carry out the full range of Navy missions; and to receive, correlate and display neutral and enemy positional data in near realtime. 2. VERDIN (O&MN) - VLF/LF communications system. Develop software upgrades for the VERDIN VLF/LF communications system in support of current mission requirements. 3. EVS - Enhanced VERDIN System. Develop hardware and software upgrades to the VERDIN VLF/LF communications system to enable operation in all modes. 4. ISABPS - Integrated Submarine Broadcast Processing System. Develop hardware and software upgrades to the ISABPS communications system to support the Improved Emergency (Action) Message Automatic-Transmission System (IEMATS). 5. IRR - Trident Integrated Radio Room. Development of a new radio communications system in support of the Integrated Submarine Communications System. 6. SLVR - Submarine LF and VLF Receiver. Development of a compact LF and VLF receiving set as a part of the VERDIN.	R

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ACAT III/IV (cont.)				7. TMPS - TACAMO Message Processing System. Development of TMPS software that will support near-term fleet submarine VLF/LF operational needs. 8. MMPS - MEECN Message Processing System. Development of MMPS software that will support near-term fleet submarine VLF/LF operational needs. 9. NECC - Navy EHF Communications Controller. Development of software to provide the fleet with the capability to use the Navy EHF Satellite Program (NESP) terminals for tactical communications in an automated network environment. 10. SMB - Submarine Message Broadcast. Development of hardware and software to support the SLVR (compact LF and VLF receiving set) as a part of the VERDIN system.

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Other	74	264.4	$120.9M	1. VERDIN (R&D) - Development of software upgrades for the VERDIN VLF/LF communications system in support of future mission requirements. 2. CPIP - Coverage Prediction Improvement Program. Development of hardware and software to provide predictions and evaluations of the optimum use of VLF/LF submarine communications. 3. FVLF Engineering - Fixed VLF system upgrade. Development of hardware and software upgrades to the FVLF system. 4. Baseband Switch - Submarine Communications. Development of hardware and software to implement the submarine version of the Ship Automated Communications Control System (SACCS). 5. Circuit Mayflower - Radio Communications System. Development of hardware and software to upgrade the 1960's era Circuit Mayflower radio communications system. 6. Clarinet Merlin - Communications Decode Hardware. Development of communications decode hardware in support of the Circuit Mayflower upgrade program.	R

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Other (cont.)				**7. Radar Target Imaging To demonstrate feasibility of indentification of non-cooperative air and surface targets by wideband radar techniques using waveforms suitable for a wide range of existing and planned Navy radars in both surveillance and track modes. Measurements were taken of radar scattering from Navy aircraft and processsed to produce radar cross sections and inverse synthetic aperture radar images.** **8. UWB Field Test determines the susceptibility of selected typical missiles to an agile, adaptable, ultra-wideband (UWB) waveform generated by a special multi-spectral-line transmitter and antenna. Testing of an ultra-wideband 0.5-10 GHz radar was carried out against various targets at an NRaD test site.** **9. Parallel Image Processing An ONR SDIO/IST 6.1 project to determine the usefulness of regularized pseudoinverse algorithm in processing imagery formed by aberrated optical systems for SDI applications.** **10. Electro-Mag Theory An ONR SDIO/IST 6.1 project to determine the usefulness of matrix algebra in solving electromagnetic wave propagation boundary-value problems.**	R

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Other (cont.)				**11. Advanced Test Equipment/Meterology Provides for the development of a wide range of advanced test equipment, measurement improvements, and calibration capabilities needed in the Fleet to support Precision Strike, Command, Control, Communications, Navigation, Surveillance and other Navy systems. This project is yielding orders of magnitude improvements in the ability to make power, frequency, sensitivity, time interval, and many other parameter measurements needed to support Fleet readiness, improve affordability, and achieve improved sustainability.** **12. Program Management Support Description is classified.** **13. Gusty Dairy Description is classified.** **14. Gusty Dairy Task 9 Description is classified.** **15. Tactical Data Acquisition & Correlation ATD An Army effort to demonstrate the utility of an advanced tracker/correlator along with intelligence data to provide automated situational assessment for Army aviation.**	R

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Other (cont.)				16. RASSP Coordination An ARPA project to plan, develop, and evaluate the Rapid Prototyping of Application-Specific Processors (RAASP) Program. 17. Cryptologic Test and Evaluation Execution of full TDA and SSA responsibilities for afloat cryptologic programs to bring them into a common open systems architecture consistent with the JMCIS/UB environment. 18. Surface Ship Measurement Conduct full-scale ship RCS measurements and RCS diagnostics to locate and assess backscatter contributions from various parts of the target. Radar scattering measurements of surface ships are taken at the NRaD Ship Test Range. 19. Full Spectrum Processing. An Advanced Development program for the exploitation of passive sonar signals. The objective is specifically to analyze viability of transient sonar signal classification, using hidden Markov models and neural networks.	R

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Other (cont.)				**20. Dam Neck System Validation The development and installation of a suite of equipment, allowing system developers access to real time data from the Integrated Undersea Surveillance System. The suite was initially installed at the Naval Oceanographic Processing Facility at Dam Neck, Virginia, to allow concept validation of new systems on a not-to-interfere basis with ongoing operations.** **21. Special Project Support System development, installation and support for system components of the Integrated Undersea Surveillance; installed at special classified sites.** **22. THAW (Theatre Acoustic Warfare) An advanced development to identify the required technology to support the processes of association, correlation, and combination of data and information from single and multiple sources. Following the identification of the required technology, validation of the data fusion concept, using new or existing algorithms, will be accomplished.**	R

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Other (cont.)				**23. IUSS Communications Engineering The development and integration of software supporting data communication between sites of the Integrated Undersea Surveillance System. This data is alpha-numeric message traffic supporting the mission of IUSS.** **24. Listing Error.** **25. Surveillance Test and Integration Center (STIC) A land -based facility supporting the system software development, integration and test, prior to introduction into the fleet. Additionally, used for life cycle support of the software during the system life in the fleet.** **26. ICS Replacement. An upgrade of the hardware and software for the Integrated Communications System, moving from AN/UYK-20's to DTC-2 hardware. The ICS provides the communication between NAVFAC's for the IUSS.** **27. Site 7800 System Engineering and Testing Provide the system engineering required for a totally new suite of equipment to be installed at a site designated as 7800. After the prime item equipments are installed, the integration testing will be accomplished to ensure total system integrity.**	**R**

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Other (cont.)				**28. Statistical Models of Ocean Noise An ONR/NRL 6.2 project to understand the fluctuations that arise from moving acoustic sources in shallow water, to compare theoretical and simulation results with data, to develop algorithms to exlpoit characteristics of moving target sources and compare with current techniques.** **29. Spotlight An Advanced Technology Demonstration of correlation and tracking algorithms. The processing was accomplished in a Sun computer based system, which was evaluated in the laboratory and in the field.** **30. Surveillance Long-Range Planning Study (SLRPS) A study to determine the direction for undersea surveillance in general, and the Integrated Undersea Surveillance System, in particular. The study utilized cost models and performance prediction models to generate a report for the future.** **31. Ferroelectric Liquid Crystal (FLC) Optical Processing ATD An Advanced Technology Demonstration to evaluate the applicability of optical processing of undersea surveillance data using ferroelectric liquid crystals. The concept was validated in the laboratory using a limited number of processing nodes.**	R

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Other (cont.)				**32. IUSS System Software Support Activity (SSSA) Software life cycle support for the multiple subsystems in the Integrated Undersea Surveillance System. The functional elements include system engineering, software maintenance, configuration management, independent verification and validation, and documentation control.** **33. HULTEC-Tech Support Provide development, test and evaluation, SSA, and signal recognizer validation support for theater level SIGINT processing and exploitation systems in support of DoD.** **34. Relocatable Over The Horizon Radar (ROTHR) A land-based, bi-static, frequency agile, phased array, active HF surveillance system using the ionosphere to refract HF energy beyond the curvature of the earth. The current mission of the system is to provide detection and monitoring of suspected narcotics smugglers in surveillance of the Caribbean and Eastern Pacific regions. The tasks supporting ROTHR include system engineering, installation support, interoperability, and test and evaluation.**	R

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Other (cont.)				**35. Sensor Processing Algorithms and Architectures Organizing and coordinating SCORE (SDIO Cooperative Research Exchange) Sensor Signal processing subgroup activities with the United Kingdom to pursue innovative approaches to achieving high-throughput, real-time on-board signal processing capabilities for target detection, track initiation, and track file maintenance.** **36. HF Broadboard Antenna Project description is classified.** **37. Advanced Unattended Ground Sensor IUGS (Internetted Unattended Ground Sensors). Develop unattended smart sensor fields which provide timely, accurate and continuous surveillance data on the status and movement of TCTs (Time Critical Targets) for the tactical user. TCTs include mobile missiles, mobile commands, and change in operational status of military sites. MOAs and MOUs exist with DIA, DNA, ARMY and NAVY to transition IUGS technology.** **38. Project Kingpin Project description is classified.**	R

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Other (cont.)				**39. EHF Support/Receiver Characterization The EHF Receiver Upgrade Program provides the Air Force Frequency Management Group at Edwards AFB with instrumentation that will extend their operational coverage to 110 GHz. Equipment will be used to augment their mobile surveillance units.** **40. Coherent Radar Data Processing Assist NAWC/AD Patuxent River Test Range Facility in specifying, integrating, and testing hardware needed to make coherent, wideband, radar measurements of full-scale aircraft in flight. Software written for the NAWC/AD Patuxent River Aircraft Test Range to produce inverse synthetic aperture radar images from radar data taken on the range. Develop procedures for data collection, data processing, and software support.** **41. MMW IFF Interrogator Design and fabricate an experimental millimeter wave (MMW) interrogator and receiver which will use UHF and VHF transponders for air/ground IFF.**	R

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Other (cont.)				42. System Integration Environment TCAC supports the follow-on integration of the Technical Control Analysis Center (TCAC) System in the Systems Integration Environment (SIE). This effort will lead to an information security architecture that is capable of supporting multi-level security in support of the SIE effort. 43. Advanced Integrated Display Station provides support of the production of Advanced Information Display System which incorporates the UYQ-65 for ASW applications in the SQQ-89(V)10 program. 44. Tactical Offboard Data Integration provides technical support in the analysis and design of systems for receipt, integration and fusion of Platform, Battle Force Organic and Shore Non-Organic data for the purpose of multiplatform detection, localization and tracking. 45. Fusion Algorithm Development. Develops information fusion technologies in support of C3I for ASW and ASUW at the platform and battle group level as well as the integration of these technologies with higher levels of battle force and shore commands, within a region, sector or theater. 46. Display Systems Analysis and Support performs display system analysis, development, test and evaluation in support of future command and control system requirements.	R

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Other (cont.)				47. Command, Control & Computer Engineering Support provides technical support in requirements identification, test and evaluation in the replacement of or improvement of Navy standard products. 48. Data Base Fusion/OSGP provides analysis, design and development of tactical and status of forces databases to display a consolidated command and control presentation at workstations and on large screen displays. The information presented is used by decision makers at Navy and/or Joint Command Centers. 49. MTWS System is the next generation Marine Corps Tactical Training System to provide a capability to conduct computer-assisted command and control exercises in support of Marine Corps amphibious training programs. The system simulates primary aspects of Marine Corps tactical operations, incluidng air, ground and amphibious operations. 50. SEW/Copernicus is the lead lab for C4I integration across pillar programs and into the Joint and Allied forces integration. 51. Link 11 Developments develops and fabricate Data Link Test Sets for testing performance and verifying interoperability. 52. Counternarcotics Intelligence Support provides system engineering to develop the Intelligence Fusion Center to support the detection and monitoring of narcotics activities.	R

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Other (cont.)				53. FAA Command and Control Support provides the Federal Aviation Administration with engineering and technical support for the design and development of future air traffic management systems. 54. Battleforce Tactical Training is the evolutionary acquisition of hardware and software to interconnect embedded training simulators. Initial focus is ships in distributed homeports. 55. Research, Evaluation & Systems Analysis (RESA) is a large scale computer simulation/wargaming system used to support a variety of applications including C3I architecture assessment, concept of operations development, advanced technology evaluation, joint exercises, test and evaluation of advanced systems, distributed simulation, and simulation/simulator interoperability. 56. Space System Technical Support exploits tactical products in the area of data fusion and information processing including enhancing the dissemination of National products to tactical users. 57. AFWTF/PMRF NTDS Upgrade. Upgrades the existing NTDS systems at the Atlantic Fleet Weapons Training Facility, Puerto Rico and the Pacific Missile Range Facility (PMRF), Hawaii to current fleet standards.

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Other (cont.)				58. Tech Transition at PACOM provides technical support for the development of prototype expert systems. These prototypes lead to development of an integrated support system for effective, rapid and flexible warfare assessment, planning and execution. 59. COSIP establishes a program facilitating the acquisition of computing resources of Open Systems Architecture (OSA) components, Commercial Off-the-Shelf (COTS) technology and non-developmental (NDI) to provide for rapid implementation of Next Generation Computer Resources and other open systems technologies into Navy systems. 60. Next Generation Computer Resources Support is participation in adopting and adapting non-proprietary industry interface standards in the areas of operating systems, database and high speed data transfer networks for use in Navy and DoD mission critical computer resources. 61. CINCPACAF Command Center Upgrade provides an integrated operational status and unit readiness picture via the Commander's Integrated Decision Support System (CIDSS) and to participate in development of in-theater connectivity.	R

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Other (cont.)				62. Interoperability develops a Link-11 Display System for non-TDS ships and to provide multi-media (HF/UHF/SATCOM) interoperability servies for NTDS ships, shore sites and EP-3 aircraft, and provide transition to new technologies. 63. Drug Interdiction System Support provides data link interoperability support to drug interdiction efforts by JTF4/5, U.S. Customs Service and U.S. Coast Guard. 64. Ashore Command Centers Support provides systems engineering, Support integration and technical support to the SACLANT C3I baseline system (Alpha CCIS). 65. CINCPACFLT Communications Upgrade supports CINCPACFLT in the Communications Upgrade design and implementation of local and wide area networks; develop systems and procedures to ensure optimum use of and connectivity among the several VTC systems. 66. DODIIS Connectivity Provide system engineering support for DoD Intelligence Information System connectivity throughout the PACOM and consolidation of major intelligence ADP services at regional USPACOM locations. Also provide DODIIS connectivity, database accesses, local applications and JICPAC support to Marine Forces Pacific organizations.	R

ACAT III/IV	10	57.8	$24.2M	1. Operations Support System 2. VERDIN (O&MN) 3. EVS 4. ISABPS 5. IRR 6. SLVR 7. TMPS 8. MMPS 9. NECC 10. SMB
Other	74	264.4	$120.9M	1. VERDIN (R&D) 2. CPIP 3. FVLF Engineering 4. Baseband Switch 5. Circuit Mayflower 6. Clarinet Merlin 7. Radar Target Imaging 8. UWB Field Test 9. Parallel Image Processing 10. Electro-Mag Theory 11. Advanced Test Equipment/Meterology 12. Program Management Support 13. Gusty Dairy 14. Gusty Dairy Task 9 15. Tactical Data Acquisition & Correlation ATD 16. RASSP Coordination 17. Cryptologic Test and Evaluation

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Other (cont.)				67. JINTACCS Support provides US. Navy test unit services in support of Joint Operational Maintenance Test (OMT) program. 68. Speech Normalization and Processing adapts speech signal processing algorithms to perform required waveform analysis for speaker normalization. Also investigates innovative speech signal algorithms that may potentially benefit speech recognition and speech synthesis development. 69. MILSTAR Operational Requirements Aid MORA addesses the man-machine interface for satellite communications with directed attention to user-computer interface design and evaluation, and computer-based operator performance aid development and application. The end product is to be a single terminal for control of four independent EHF SATCOMM systems. This work includes transition of the earlier 6.3A developed MILSTAR Operational Requirement Aid. 70. ADA Message Processing Support to DCA integrates previously developed WIS JPMO ADA tools in the production of a C3I character oriented message system which will accommodate all JINTACCS message formats. Provides both update and upgrade support for the Joint Automated Message Editing System (JAMES).

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Other (cont.)				18. Surface Ship Measurement 19. Full Spectrum Processing 20. Dam Neck System Validation 21. Special Projects Support 22. THAW 23. IUSS Communications Engineering 25. Surveillance Test and Integration Center (STIC) 26. ICS Replacement 27. Site 7800 System Engineering and Testing 28. Statistical Models of Ocean Noise 29. Spotlight 30. Surveillance Long-Range Planning Study (SLRPS) 31. Ferroelectric Liquid Crystal (FLC) Optical Processing ATD 32. IUSS System Software Support Activity (SSSA) 33. HULTEC-Tech Support 34. Relocatable Over The Horizon Radar (ROTHR) 35. Sensor Processing Algorithms and Architectures 36. HF Broadboard Antenna 37. Advanced Unattended Ground Sensor 38. Project Kingpin 39. EHF Support/Receiver Characterization 40. Coherent Radar Data Processing 41. MMW IFF Interrogator 42. System Integration Environment TCAC 43. Advanced Integrated Display Station

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Other (cont.)				71. ADA Joint Program supports the AJPO in their production of ADA Programming Support Environments (APSE's) by deriving interface standards which will facilitate the transportability of tools and databases between APSE's. Office/Support Environment 72. ASIST is the development and maintenance of a portable, easy to use system which enables the intelligence community to rapidly retrieve and utilize information. 73. Collection Requirements Management Application provides collection management tools and tasking function in an online system. 74. SMARTS/SUNSCREEN designed, developed, integrated, tested, installed and maintained the Strategic Maritime Relocatable Targets System and included SUNSCREEN software. Further development of SUNSCREEN software continues. This project also includes software system which provides to the Intelligence Analyst tools to manipulate data and access to multiple, dynamic, contact databases.	R

Other (cont.)				44. Tactical Offboard Data Integration 45. Fusion Algorithm Development 46. Display Systems Analysis and Support 47. Command, Control & Computer Engineering Support 48. Data Base Fusion/OSGP 49. MTWS System 50. SEW/Copernicus 51. Link 11 Developments 52. Counternarcotics Intelligence Support 53. FAA Command and Control Support 54. Battleforce Tactical Training 55. Research, Evaluation & Systems Analysis 56. Space System Technical Support 57. AFWTF/PMRF NTDS Upgrade 58. Tech Transition at PACOM 59. COSIP 60. Next Generation Computer Resources Support 61. CINCPACAF Command Center Upgrade 62. Interoperability 63. Drug Interdiction System Support 64. Ashore Command Centers Support 65. CINCPACFLT Communications Upgrade 66. DODIIS Connectivity 67. JINTACCS Support

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CSF 8. C4I Systems - Afloat

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative	
ACAT IC	GPS	10	$2.8M	A tri-service, satellite-based UHF navigation system providing accurate 3-D position, velocity and time to user platforms. GPS is currently in the production phase of a three phase program.	R
ACAT ID					
ACAT II	Navy Tactical Command Systems Afloat	35	$16.2M	NTCS-A provides an affordable C2I system to support flag and unit level information requirements. NTCS-A is the first program to receive production approval using nondevelopmental item (NDI) and commercial off-the-shelf (COTS) software and open system standards.	
	Advanced Combat Direction System Block 0, CDS Model 4.1	30	$8.6M	Advanced Combat Direction System Block 0 program develops and maintains CV, CVN, LCC, LHA and LHD combat direction system computer programs, other support programs and related documentation.	R
	Command and Control Processor (C2P) System/ Subsystem	18	$5.1M	The Command and Control Processor (C2P) provides centralized management and control of tactical digital information links in a multi-threat environment.	

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Other (cont.)				68. Speech Normalization and Processing 69. MILSTAR Operational Requirements Aid MORA 70. ADA Message Processing Support to DCA 71. ADA Joint Program Office/Support Environment 72. ASIST 73. Collection Requirements Management Application 74. SMARTS/SUNSCREEN

CSF 8. C4I Systems - Afloat

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC	GPS	10	$2.8M	A tri-service, satellite-based UHF navigation system providing accurate 3-D position, velocity and time to user platforms. GPS is currently in the production phase of a three phase program. phase program.
ACAT ID				
ACAT II	Navy Tactical Command Systems Afloat	35	16.2	NTCS-A provides an affordable C2I system to support flag and unit level information requirements. NTCS-A is the first program to receive production approval using nondevelopmental item (NDI) and commercial off-the-shelf (COTS) software and open system standards.

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	Advance Combat Direction System Block 1	52	$14.7M	The Advanced Combat Direction System Block 1 program develops a replacement and upgrade for the Naval Tactical Data System, providing significant enhancements in the areas of sensor management tactical data exchange, warfare area coordination, and system reliability.	R
ACAT III/IV	5	14	$3.6M	1. Ring Laser Gyro Navigator Phase I is a program to apply ring Laser Gyroscope technology now used in aircraft as a common module for use on submarines and ships. 2. Doppler Sonar Velocity Log is an upgrade to the sensor used on submarines to determine velocity. 3. IRR - Trident Integrated Radio Room. Development of a new radio communications system in support of the Integrated Submarine Communications System. 4. MMPS - MEECN Message Processing System. Development of MMPS software that will support near-term fleet VLF/LF operation needs. 5. Ring Laser Gyro Navigator Phase II is a program to apply ring Laser Gyroscope technology now used in aircraft as a common module for use on submarines and ships.	

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	Advanced Combat Direction System Block 0, CDS Model 4.1	30	$8.6M	Advanced Combat Direction System Block 0 program develops and maintains CV, CVN, LCC, LHA and LHD combat direction system computer programs, other support programs and related documentation.	R
	Command and Control Processor (C2P) System/ Subsystem	18	$5.1M	The Command and Control Processor (C2P) provides centralized management and control of tactical digital information links in a multi-threat environment.	
	Advance Combat Direction System Block 1	52	$14.7M	The Advanced Combat Direction System Block 1 program develops a replacement and upgrade for the Naval Tactical Data System, providing significant enhancements in the areas of sensor management tactical data exchange, warfare area coordination, and system reliability.	
ACAT III/IV	5	14	$3.6M	Ring Laser Gyro Navigator Doppler Sonar Velocity Log IRR MMPS Ring Laser Gyro Nav.	

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Other	71	376	$111.8M	1. Ship IR Volume Search and Tracking The InfraRed Search and Track (IRS&T) system will provide 360 degree surveillance and detection coverage for sea skimming low observable cruise missiles. The IRS&T system development is based on acquisition of a technology based focal plane array, stabilized optical director and designing detection/tracking algorithms and processors which allow exploitation of spatial, temporal, and spectral signal characteristics. 2. SHF Antennas The SHF Antenna Program is an effort to demonstrate phased array technology implementation in shared aperture antennas. The goal of the project is to provide a single antenna that can simultaneously serve both surveillance and communication missions. Patterning Antennas. Provide the Navy and Marine Corps with design and technical support in the areas of microwave and millimeter antennas for radar and communications systems. Technical support is provided to solve current antenna related Fleet problems and new ship design/modifications. Current work is Navy and Marine Corps surveillance and fire control antennas.	R

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Other	73	376	$111.8M	1. Ship IR Volume Search and Tracking 2. SHF Antennas 3. ART 4. DARPA Maritime Warfare 5. Electrical ARC Acoustic Source Physics 6. Coastal Remote Sensing 7. RF and Microwave Tech. Construction 8. Electro-Optics Systems 9. Crytologic Test and Evaluation 10. Photonics Mast 11. Cluster CERES 12. Cluster ARGUS 13. E-O Surveillance Helmut 14. Air Defense Initiative-Anti-Submarine Warfare (ADI-ASW) 15. Deployable Undersea Surveillance Project16. Surveillance with Deployable Distributed Systems 17. Signal Processing Support for SOSUS Shore Processing 18. Surveillance Test and Integration Center (STIC)19. Hardware Engineering Support for Design, Production 20. FDS Cable Development 21. Low Frequency Acoustics 22. Advanced Deployable Array (ADDA)

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Other (cont.)				3. ART The ART program is developing a technique for making digital recordings of high resolution imaging sensors. The sensors are deployed to conduct surveillance from subsurface, surface, and airborne platforms to provide intelligence data to the Navy. 4. DARPA Maritime Warfare Evaluate the signal processing technology, hardware, sensor-to-sensor interpretation and C3I related to Navy warfare applications. Develop maritime campaign plans and optimize plans across maritime mission areas. 5. Electrical ARC Acoustic Source Physics Electrical ARC Acoustic Source Physics: This program is designed to develop an analytical model that will predict the acoustic radiation from a thermo-acoustic source. 6. Coastal Remote Sensing NRaD was tasked to develop models and make measurements of optical properties in littoral regions to facilitate the prediction of surveillance sensor performance. The capability to perform operational assessment supports both intelligence and tactical objectives.	R

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Other (cont.)				24. Project Skylight 25. High Gain Initiative 26. Gusty Elk 27. RDC Support 28. Surface Surveillance 29. Cluster YANKEE!! 30. HULTEC-Tech Support 31. NRD-93-004 RDEP HFDF 32. JADE 33. Magic Lantern Sensor System (MLSS)/ML90 Program 34. Multispectral Imaging (MS) 35. Radiant Outlaw 36. REsonant Periscope Detection 37. IRFPA Program 38. Project Nestlab 39. ASROC 40. MK 116 Support 41. Source Projector Support for SACLANTCTR 42. Upsounder EDM Development 43. Caribroc Communications Critical Design Review (CDR) 44. Electrical ARC Acoustic Source Physics 45. CDS Development and Evaluation Site 46. ICER 47. Battle Group Assessment CINCLANTFLT 48. Control System Integration Planning/Implementation 49. Shipboard Contact Mgmt System

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Other (cont.)				7. RF and Microwave Tech. Construction Provide consulting services to the RF and Microwave Technology Branch, Naval Air Warfare Center/Weapons Division (NAWC/WD), China Lake, California, in the area of reduced antenna radar crossection (RCS) using high temperature superconductors (HTS). 8. Electro-Optics Systems The design of minature electro-optical imaging systems and associated control, recording, and display components for application to a variety of surveillance tasks where integration and application constrain system size; e.g., intelligence collection. 9. Crytologic Test and Evaluation Execution of full TDA and SSA responsibilities for afloat cryptologic programs to bring them into a common open systems architecture consistent with the JMCIS/UB environment. 10. Photonics Mast To design, develop, test, and evaluate innovative advanced technologies to support the Photonics Mast System.

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Other (cont.)				50. Radar Display and Distribution System 51. Technical Direction Agent - ASWCS Mod 7 52. Battle Force EMI Evaluation System 53. Combat Direction Systems Development Support 54. Human Engineering /ILS for new ship acuqisition 55. AEGIS CIG User Interface Human Factors Study 56. Human Factors Engineering for Ships 57. Human Factors Support for Advance TOMAHAWK 58. SMATCALS 59. Shipboard ID System Development 60. Combat ID/Cooperative Aircraft ID Support 61. WSA&E 62. ASW Multi-Configuration Environmental Sim. 63. Emulation System Development 64. Ocean Survey Program 65. ESGN 66. SWS 67. Fiber Optic Gyrocompass 68. Surface Ship Nav. System 69. FOAL 70. SSBN Nav. System 71. SSBN RLGN

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Other (cont.)				11. Cluster CERES A tactical passive bistatic geolocation technique which uses an omni-directional antenna to present a high-resolution, near-real-time surface-plot display of radar transmitters, bistatic surface targets and area geographical features. 12. Cluster ARGUS Develop a broadband electromagnectic collection system and provide life cycle support service to the Fleet for a sensor designed to collect ELINT type signals. 13. E-O Surveillance Helmet. Design and develop a miniature electro-optical imaging systems for integration into small/lightweight submarine damage control helmets. 14. Air Defense Initiative-Anti-Submarine Warfare (ADI-ASW) One part of this program was to design, develop, install and operate an ADI-ASW Technical Demonstration System (TDS). The TDS was to contain both active and passive acoustic technologies configured to operate as an integrated test bed. The Low Low Frequency Active part of this project was established to investigate very low frequency monostatic and bistatic active acoustic performance, processing systems, and C4I capable of operating in shallow littoral areas.	R

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Other (cont.)				15. Deployable Undersea Surveillance Project This program is to develop advanced technology for rapidly deployable, reconfigurable, multi-purpose distributed undersea surveillance systems. The higher classification of this program prohibits further description. 16. Surveillance with Deployable Distributed Systems - Non-Acoustic. This purpose of this program is to develop advanced non-acoustic technology for deployable distributed undersea surveillance systems. The higher classification of this program prohibits further description. Surveillance with Deployable Distributed Systems. The purpose of this program is the development of a miniature Helium-3 magnetic sensor, develop a laser-diode pump source, test and demonstrate its high-sensitivity performance. 17. Signal Processing Support for SOSUS Shore Processing Project information is of a higher classification than can be reported.	R

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Other (cont.)				18. Surveillance Test and Integration Center (STIC) A land-based facility supporting the system software development, integration and test, prior to introduction into the fleet. Additionally, used for life cycle support of the software during the system life in the fleet. 19. Hardware Engineering Support for Design, Production The purpose of this program is to engineer, design, develop specifications and certify the production and operation of the Phase Two Subsystems of IUSS. 20. FDS Cable Development The purpose of this program is to provide technical review and monitoring of the FDS cable development and production effort for the FDS program. An additional task is to ensure that the contractor's design is consistent with requirements specifications. 21. Low Frequency Acoustics Low Frequency Acoustics (LFA) is an active adjunct to SURTASS. LFA consists of a large low frequency acoustic source, the SURTASS towed array, and a processor suite to analyze and display the active echoes and passive signatures to the operator. There is currently one system in operation installed on the commercially leased M/V Cory Chouest.	R

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Other (cont.)				22. Advanced Deployable Array (ADDA) This program is designed to meet the needs of data collection on existing and emerging threats in shallow water. The focus is on development of new deployable system technologies and providing required environmental and target measurements. 23. Port Area Surveillance (PAS) This program evaluates the detection capabilities in shallow water of candidate acoustic and non-acoustic sensors against anticipated threats. 24. Project Skylight Develop imaging sensors for collection of intelligence information in the subsurface environment. Additional project information is classified. 25. High Gain Initiative Conduct research, sea tests, analysis and reporting in passive undersea surveillance. Emphasis on matched field processing, acoustic array design, acoustic tomography, and supercomputer processing. 26. Gusty Elk Project information is of a higher classification level than can be reported.	R

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Other (cont.)				27. RDC Support RDC (RUTLEY Data Collection) support provides on-call technical support (per NSA requests) and periodic field site maintenance, RF environment site surveys, and upgrades for the special purpose RUTLEY antenna developed at NRaD. RUTLEY is an NSA project name. 28. Surface Surveillance Investigate the application of electro-optical sensor and optical processing techniques to improve surface surveillance. The operational objective was anti-submarine warfare. 29. Cluster YANKEE II Provides UHF direction finding capability to the Cluster Yankee II special signal detection/recognition system by modifying the Type 18 periscope antenna stack and the addition of a special processor card in the Cluster Yankee chassis. 30. HULTEC-Tech Support Provide development, test and evaluation, SSA, and signal recognizer validation support for theater level SIGINT processing and exploitation systems in support of DoD.

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Other (cont.)				31. NRD-93-004 RDEP HFDF Provides for rapid calibration (down from two days to three hours) of OUTBOARD and COMBAT DF ship HFDF systems without being tied to the current shore based transmitter sites (Ft. Story and Camp Pendleton). Extensions are planned to support future carry-on HF DF suites. 32. JADE Investigate the vulnerability of ballistic missile submarines to detection and classification by electro-optical surveillance sensors. Additional project description is classified. 33. Magic Lantern Sensor System (MLSS)/ML90 Program Provide test support (planning, ocean truth measurements), sensor performance modeling, and data analysis support to the Magic Lantern mine countermeasures program. 34. Multispectral Imaging (MS) Conduct data collection experiments and develop data processing techniques to investigate the capability of multispectral imaging electro-optical sensors to perform surveillance of subsurface, surface, and airborne objects from an airborne platform.	R

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Other (cont.)				35. Radiant Outlaw Conduct experiments to quantify the performance of a multisensor (micro-doppler LIDAR, infrared imaging sensor, television) system to perform non-cooperative target surveillance (detection and identification) from a surface platform. 36. Resonant Periscope Detection To quantify the phenomenology associated with a technique to detect submarine periscopes by using an ultra-wide fractional bandwidth (UWFB) waveform (narrow pulse) radar operating in the very high frequency (VHF) and the lower ultra-high frequency (UHF) bands (approximately 50 MHz to 400 MHz). 37. IRFPA Program Provide guidance concerning the performance and application of infrared focal plane arrays (IRFPA) to Navy requirements. 38. Project NESTLAB Develop, test, and evaluate optical radiation detection and characterization sensors. The NESTLAB facility allows sensor calibration prior to field testing. This project is in support of intelligence collection objectives. 39. ASROC (Antisubmarine Rocket). This program involves design continuity of the ASROC missile production, Fleet support and configuration control of missiles and component parts.	R

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Other (cont.)				40. MK 116 Support Development of a Vertical Launch ASROC missile to provide a medium range, all weather ASW missile capable of delivering the MK 6 Mod 5 torpedo. 41. Source Projector Support for SACLANTCTR Provide acoustic projectors with improved source level and bandwidth to SACLANTCTR for acoustic propagation measurements. 42. Upsounder EDM Development Provide engineering and production support and modify the upsounder design to accommodate new impedance-matching requirments and verify electro-acoustic performance. 43. Caribroc Communications Critical Design Review (CDR) Project description is classified. 44. Electrical ARC Acoustic Source Physics Project description is classified.

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Other (cont.)				45. CDS Development and Evaluation Site provides facilities and equipment for development of Ship Combat Direction Systems. 46. ICER provides systems engineering support for planning and decision aids; perform proof of concept prototype demonstrations. 47. Battle Group Assessment provides CINCLANTFLT with the capability to rapidly assess the performance of fleet units during exercises, through use of nondevelopmental items and integration of existing systems and to provide exercise participants with timely feedback. 48. Control System Integration Planning/ Implementation - Provides technical support in the analysis, planning and design of control systems for integration with combat and command systems. 49. Shipboard Contact Mgmt System provides technical support in the analysis and design of systems for receipt, integration and fusion of Platform, Battle Force Organic and Shore Non-Organic data for the purpose of multi-platform localization and tracking. 50. Radar Display and Distribution System provides technical support for acceptance test and evaluation; production engineering; procurement; production improvement; and Enhanced Radar Display and Distribution System (ERADDS) development and shipboard demonstration.

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Other (cont.)				51. Technical Direction Agent - ASWCS Mod 7 provides technical support in the definition, planning, design and engineering of ASWCS Mod 7. 52. Battle Force EMI Evaluation System provides the acquisition managers and operational planners an automated tool to quantify EMI effects on Battle Force performance. 53. Combat Direction Systems Development Support provides lead laboratory management and direction to the Advanced Combat Direction Systems (ACDS) Program. Technically monitor the CG and CV Clock 0 CDS developments and perform independent verification and validation on the CV Block 0 development. 54. Human Engineering /ILS for new ship acuqisition provides human factors engineering, training, safety, manning and integrated logistics support in ship design, production, and test and evaluation to ensure operable and maintainable system and habitability of living and working spaces.	R

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Other (cont.)				55. AEGIS CIG User Interface Human Factors Study develops and test alternate design configurations for future combat information center consoles and workstations. Results of human performance testing for CIC tasks will provide design guidance to system developers for the upgrade of present CIC consoles and for the introduction of new technology. 56. Human Factors Engineering for Ships develops and proves advanced concepts in human factors technology that improve the operability, effectiveness and safety of Navy systems, or reduce manpower and training requirements. 57. Human Factors Support for Advance TOMAHAWK provides human engineering design, analysis and testing to the Advanced Tomahawk Weapon Control System engagement planning user-interface, including NRaD lead role on display and USI requirements definition, software prototyping, and user-system performance data collection and analysis. 58. SMATCALS develops an around the clock, all weather, LPI Air Traffic Control and precision approach/landing capability with an independent monitor to touch down during EMCON condition.	R

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Other (cont.)				59. Shipboard ID System Development is to develop technical and operational improvements for IFF and target identification related to the Naval environment. 60. Combat ID/Cooperative Aircraft ID Support develops the system which will replace MK XII with anti-jam and anti-exploitation features. Shipboard integration of the CI/CAI on major surface combatants and integration into Marine Corps System. 61. WSA&E provides technical and analytical support necessary to support Space and Electronic Warfare systems engineering. Provide systems engineering support for current systems baseline and long term goal architecture. 62. ASW Multi-Configuration Environmental Sim. provides hardware units and a simulation software package to support ASWCS UFC testing and training at land-based test and training sites. 63. Emulation System Development is to develop and evaluate emulation systems for militarized combat direction systems equipment. 64. Ocean Survey Program - Program to develop bottom mapping data for use by the Trident submarine in navigation.	R

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Other (cont.)				65. ESGN (Electrostatically Suspended Gyro Navigator) is the navigation system used on Fleet Ballistic Missile Submarines. Efforts involve upgrading system. 66. SWS (Strategic Weapon System). Support the Polaris, Posiedon and Trident programs by conducting studies and providing consultation and assistance for the SWS navigation subsystem. This includes developing plans for future implementation of a Passive Navigation System containing Ring Laser Gyro Navigator and Gravity Gradiometer. 67. Fiber Optic Gyrocompass is a developmental program to replace the ring laser gyro with a fiber optic version for alternative applications. 68. Surface Ship Nav. System. Provides engineering and consultant services to multiple NAVSEA sponsors in the areas of integrated navigation system design, development, acquisition, test and evaluation. 69. FOAL (Fiber optic antenna link) is a program to use fiber optics as the cable to carry the GPS signal from the GPS antenna at the top of a mast on a ship to the actual receiver in the bottom of the ship. 70. SSBN Nav. System. 71. SSBN RLGN SSBN Nav. System and SSBN RLGN are programs addressing improvements to fleet ballistic submarine navigation systems.	R

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CSF 9. C4I Systems - Ground Mobile -- **None**

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other				

Other (cont.)				**68. Speech Normalization and Processing** **69. MILSTAR Operational Requirements Aid MORA** **70. ADA Message Processing Support to DCA** **71. ADA Joint Program Office/Support Environment** **72. ASIST** **73. Collection Requirements Management Application** **74. SMARTS/SUNSCREEN**

CSF 8. C4I Systems - Afloat -- **None**

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other				

CSF 9. C4I Systems - Ground Mobile -- **None**

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other				

CSF 10. Electronic Devices -- **None**

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other				

CSF 11. Environmental Sciences -- **None**

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other				

CSF 12. Environmental Quality -- **None**

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other				

CSF 13. Advanced Materials -- **None**

Engineering Development	Name or Number	Workyears (FY93 Actual)	FY93 Funds Received (Obligation Authority)	Narrative
ACAT IC				
ACAT ID				
ACAT II				
ACAT III/IV				
Other				

3.3.1.3 **In-Service Engineering:** For each Common Support Function at each activity engaged in in-service engineering, list the in-service engineering efforts, the FY93 funds (from all sources) obligated for these efforts, the FY93 workyears for these efforts, and the weapon system(s) supported by these efforts. In-service engineering consists of all engineering support of fielded and/or out of production systems and includes efforts to improve cost, throughput, and schedule to support customer requirements as well as mods and upgrades for reliability, maintainability, and performance enhancements. (BRAC Criteria I)

NCCOSC RDTE DIV is only engaged in in-service engineering efforts in one Common Support Function:

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 1. Air Vehicles - Fixed Propulsion	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 2. Air Vehicles - Fixed Avionics	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 3. Air Vehicles - Rotary Avionics	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 4. Weapons - Cruise Missiles	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 5. Space Systems - Satellites	SATCOM Software Support Activity	7.1M	61	None

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 6. C4I Systems - Airborne	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 7. C4I Systems - Fixed Ground-Based	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 8. C4I Systems - Afloat	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 9. C4I Systems - Ground Mobile	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 10. Electronic Devices	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 11. Environmental Sciences	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 12. Environmental Quality	None			

Common Support Functions	In-Service Engineering Efforts (List)	FY93 Actual		Weapon System(s) Supported
		Funds Received (Obligation Authority)	Workyears	
CSF 13. Advanced Materials	None			

3.3.2 **Projected Funding**

3.3.2.1 **Direct Funding:** For each applicable CSF, identify direct mission funding by appropriation from FY94 to FY97. Use FY95 PBS for FY95-FY97. (BRAC Criteria I)

CSF	FY94	FY95	FY96	FY97
Not applicable				

NCCOSC RDTE DIV NOTES:

- NCCOSC RDTE DIV is a DBOF activity. We assume that "direct mission funding" refers to block funding used by Army and Air Force activities. Since this activity is DBOF funded, our funding is reimbursable and direct cite; not block funded.

3.3.2.2 **Other Obligation Authority:** For each applicable CSF, identify reimbursable and direct-cite funding (other obligation authority expected) from FY94 to FY97. Funding allocation must be traceable to FY95 PBS. (BRAC Criteria I)

CSF	FY94	FY95	FY96	FY97
CSF 1. Air Vehicles - Fixed Propulsion	925K reimb. 100K RCP	1.3M reimb. 200K RCP	1.1M reimb. 200K RCP	1.1M reimb. 1.0M RCP
CSF 2. Air Vehicles - Fixed Avionics	13.6M reimb. 4.1M RCP	12.8M reimb. 5.4M RCP	12.4M reimb. 4.3M RCP	12.4M reimb. 2.8M RCP
CSF 3. Air Vehicles - Rotary Avionics	703K reimb.	500K	500K	500K
CSF 4. Weapons - Cruise Missiles	1.4M reimb.	1.1M reimb.	1.2M reimb.	1.1M reimb.
CSF 5. Space Systems - Satellites	13.0M reimb. 3.0M RCP	14.1M reimb. 2.5M RCP	17.0M reimb. 4.0M RCP	15.0M reimb. 4.0M RCP
CSF 6. C4I Systems - Airborne	19.6M reimb. 12.6M RCP	17.4M reimb. 8.9M RCP	17.8M reimb. 9.3M RCP	15.1M reimb. 9.3M RCP
CSF 7. C4I Systems - Fixed Ground-Based	126.3M reimb. 141.2M RCP	127.8M reimb. 81.3M RCP	128.9M reimb. 76.3M RCP	130.5M reimb. 78.2M RCP

CSF 8. C4I Systems - Afloat	56.2M reimb. 26.1M RCP	47.5M reimb. 25.7M RCP	47.3M reimb. 25.4M RCP	47.2M reimb. 23.6M RCP
CSF 9. C4I Systems - Ground Mobile	6.2M reimb. 4.4M RCP	6.6M reimb. 5.2M RCP	7.5M reimb. 4.1M RCP	7.1M reimb. 5.3M RCP
CSF 10. Electronic Devices	15.8M reimb. 12.1M RCP	18.6M reimb. 11.2M RCP	15.3M reimb. 5.6M RCP	14.7M reimb. 5.3M RCP
CSF 11. Environmental Sciences	10.9M reimb. 2.2M RCP	11.0M reimb. 1.5M RCP	9.3M reimb. 1.0M RCP	9.4M reimb. 1.4M RCP
CSF 12. Environmental Quality	10.3M reimb. 685K RCP	8.7M reimb. 1.1M RCP	9.1M reimb. 2.2M RCP	8.7M reimb. 2.1M RCP
CSF 13. Advanced Materials	1.7M reimb. 13.3M RCP	1.8M reimb. 16.0M RCP	1.8M reimb. 10.0M RCP	1.8M reimb. 11.0M RCP

3.4 Facilities and Equipment

3.4.1 Major Equipment and Facilities: Describe major facilities and equipment necessary to support each Common Support Function (include SCIFs). If the facilities and equipment are shared with other functions, identify those functions and the percentage of total time used by each of the functions. Provide labeled photographs that picture the breadth and scope of the equipment and facilities described. If it is unique to DoD, to the Federal Government, or to the US, describe why it is unique. Insert the replacement cost. For this exercise, Replacement cost = (Initial cost + capital investment) multiplied by the inflation factor for the original year of construction. (BRAC Criteria II)

Common Support Function	Major Facility or Equipment Description	Unique To			Replacement Cost ($K)	Photo No.
		DoD	Federal Gov't	U. S.		
CSF 1. Air Vehicles - Fixed Propulsion	**None**					**None**
CSF 2. Air Vehicles - Fixed Avionics	**RF/Microelectronics Laboratory**				**$3,000**	**1**
	HC/KC-130 System Integration Lab (SIL)	**X**			**$1,750**	**None**
	Carco Flight Motion Simulator (CFMS)				**$600**	**2**
CSF 2. Air Vehicles Fixed Avionics 59%, C4I Afloat 29%, Weapons Cruise Missiles 12%	**GPS Laboratory**			**X**	**$4,750**	**56**
CSF 3. Air Vehicles - Rotary Avionics	**CH-46 GPS System Integration Laboratory (SIL)**	**X**			**$800**	**None**

CSF 4. Weapons Cruise Missiles 12%, Air Vehicles Fixed Avionics 59%, C4I Afloat 29%,	GPS Laboratory			X	$4,750	56
CSF 5. Space Systems - Satellites	SHF Satellite Communications Test Facility				$2,000	3
	Navy UHF Satellite Communications Test Facility				$9,000	4
CSF 6. C4I Systems - Airborne	JTIDS Network Design Lab			X	$1,320	None
	E-2C Airborne Tactical Data Systems (ATDS) Integration Laboratory	X			$15,600	5
CSF 6. C4I Airborne 20%, C4I Fixed Ground Based 40%, C4I Afloat 40%	Systems Integration Facility (SIF)	X			$38,700	49
	Multi-Link Laboratory	X			$4,000	50
CSF 7. C4I Systems - Fixed Ground Based	Information Transfer Management Structure				$800	16
	Surveillance Test and Integration Center		X		$32,000	17
	Tactical Engineering Analysis Lab	X			$308	18
	Tactical Systems Lab	X			$1,927	19
	High Performance Computing And Theater Level Planning Laboratory	X			$1,800	20

CSF 7. C4I Systems - Fixed Ground Based (cont.)	Navy Command and Control System Ashore Integration Test Facility	X			$3,300	21
	Navy Intelligence Development, Integration And Test Facility	X			$1,800	22
	Ocean Surveillance Information System (OSIS) Evolutionary Development (OED) Laboratory	X			$900	23
	Surveillance Systems Offices and Labs				$15,000	14
	Distributed Command/Control (DC2) Laboratory				$1,000	24
	Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Laboratory	X			$2,200	25
	Distributed Simulation Internet (DSI) Advanced Simulation Laboratory (DASL)/Secure DSI Integration Simulation Laboratory (SISL)				$2,800	26
	Command Center of the Future	X			$300	27
	Processing and Data Exploitation Center	X			$1,858	28
	Space and Electronic Warfare Simulator (SEWSIM)			X	$4,500	29
	Special Signals Equipment Space Simulator (SWIFT)			X	$29,000	30

CSF 7. C4I Systems - Fixed Ground Based (cont.)	Microwave and Millimeter-wave Antenna Range Complex		X		$4,300	31
	Radar Signal Processing Laboratory			X	$2,050	32
	Secure Facilities, Vaults And Underground Bunkers	X			$20,000	33
	Indoor Robotics Development/Test Facility	X			$650	34
	Communications Support System Simulation Facility				$500	35
CSF 7. C4I Fixed Ground Based 40%, C4I Airborne 20%, C4I Afloat 40%	Systems Integration Facility (SIF)	X			$38,700	49
	Multi-Link Laboratory	X			$4,000	50
CSF 7. C4I Fixed Ground Based 50%, C4I Afloat 50%	High Performance Computing Processing Facility	X			$12,483	51
	Research Evaluation and Systems Analysis (RESA) Facility	X			$4,000	52
	Display Systems Development Laboratory	X			$4,000	53
	Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS)	X			$5,000	54

CSF 8. C4I Systems - Afloat	Ship Antenna Model Range and Simulation Facility			X	$20,000	6
	VLF/LF Test Facility			X	$97,000	7
	EHF Satellite Communications Terminal Test Facility				$3,000	8
	Radar Test Range			X	$17,000	31
	Surveillance Systems Offices and Labs				$11,000	None
	Deployable Surveillance Integration Facility	X			$2,750	9
	Bayside Acoustic Systems Computational Facility	X			$4,000	10
	Combat Direction System (CDS) Development and Evaluation Site (CDES)	X			$75,700	11
	Navy Tactical Command System Afloat (NTCS-A) Testbed And Integration Facility	X			$2,000	12
	Simulated Ships Motion Test Facility			X	$4,500	13
	Oceanographic Systems Program (OSP) Laboratory			X	$12,500	None
	Survivable Adaptable Fiber-Optic Embedded Network Development Site				$3,000	15

CSF 8. C4I Afloat 50%, Electronic Devices 50%	Inertial Navigation Facility (INFAC)			X	$29,000	55
CSF 8. C4I Afloat 40%, C4I Airborne 20%, C4I Fixed Ground Based 40%	Systems Integration Facility (SIF)	X			$38,700	49
	Multi-Link Laboratory	X			$4,000	50
CSF 8. C4I Afloat 29%, Air Vehicles Fixed Avionics 59%, Weapons Cruise Missiles 12%	GPS Laboratory			X	$4,750	56
CSF 8. C4I Afloat 50%, C4I Fixed - Ground Based 50%	High Performance Computing Processing Facility	X			$12,483	51
	Research Evaluation and Systems Analysis (RESA) Facility	X			$4,000	52
	Display Systems Development Laboratory	X			$4,000	53
	Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS)	X			$5,000	54
CSF 9. C4I Systems - Ground Mobile	None					None

CSF 10. Electronic Devices	Microelectronic Computer Aided Design (CAD) Facility				$3,230	41
	Radiometric Measurements Facility				$1,000	42
	Optoelectronic Device Characterization Facility				$750	43
	Infrared Focal Plane Array Test Facility			X	$2,400	44
	Long Wavelength Infrared (LWIR) Filters and Materials Evaluation Laboratory			X	$800	45
	Electronic Packaging Facility				$2,210	46
	Micro-electronics Laboratory				$43,800	47
	Electronic Materials Science Facility				$2,380	48
CSF 10. Electronic Devices 50%, C4I Afloat 50%	Inertial Navigation Facility (INFAC)			X	$29,000	55
CSF 11. Environmental Sciences	Environmental Sciences Facility			X	$1,400	None
	Propagation Test Facility			X	$500	40
CSF 12. Environmental Quality	Ocean Sciences Laboratory		X		$12,500	36
	Marine Environmental Survey Capability		X		$1,500	37
	Site Characterization and Analysis Penetrometer System (SCAPS)				$1,000	38

CSF 13. Advanced Materials	**Materials Research Laboratory**				**$900**	**39**

FACILITY DESCRIPTIONS AND UNIQUENESS STATEMENTS

CSF 1. Air Vehicles - Fixed Propulsion

None

CSF 2. Air Vehicles - Fixed Avionics

RF/Microelectronics Laboratory

The laboratory functions are design, development, prototyping and test of state-of-the-art thin film, thick film, and surface mount microelectronic circuit assemblies with emphasis on radio frequency and microwave circuits. The laboratory supports ongoing communication and navigation projects within the Detachment and is funded primarily by direct project funds. The laboratory also fabricates microelectronic test assemblies for evaluation of new military and commercial components and devices which are candidates for improving performance of radio frequency subsystems.

The combination of facility and expertise is unique within the Navy, in that the specialty is radio-frequency, circuit miniaturization and assembly. Microelectronics is as important and pervasive for radio frequency and microwave circuitry as it had been for digital and analog circuitry. The RF/Microelectronics laboratory designs and fabricates miniaturized prototypes using military and commercial integrated circuits such as Monolithic Microwave Integrated Circuits (MMIC), as well as military and commercial miniaturized discrete components such as inductors, capacitors, field effect transistors, etc.

The HC/KC-130 GPS/CDNU System Integration Lab (SIL) (unique to DoD)

Used primarily as a tool to test and develop the overall system design which will culminate with the integration of GPS user equipment (UE), control display navigation units (CDNUs) and various other avionics into the HC-130 and KC-130 aircraft. This laboratory provides an excellent vehicle to debug the CDNU HC-130 and KC-130 specific software that is used to control each of the Weapons Replaceable Assemblies (WRS) in the avionics system, allowing for the delivery of a fully functioning software package to the fleet.

The SIL consists of the following equipment: C-130 COMMON EQUIPMENT: one GPS FRPA-3 (Fixed Reception Pattern Antenna); one GPS AE-4 (Antenna Electronics Amplifier); one RCVR-3A (Airborne GPS Receiver); one GPS FILL PANEL (Crypto Fill Panel); one GPS SWITCHING UNIT (Developed In-house for Integration); three CDNUs (Control Display Navigation Units); one HSI-45 (Horizontal Situation Indicator); one ADI-55V (Attitude Direction Indicator); one LED ANNUNCIATOR PANEL (For

Integration); two BDHIs (Bearing Distance Heading Indicators); one TAS (True Airspeed Computer); one PRESSURE ALTIMETER; one ALTITUDE ALERTER; one COURSE/HEADING CONTROL PANEL; one FLIGHT MODE SELECTOR PANEL (For Flight Computer Control); one FCS-105 (Flight Computer); one MDL (Mission Data Loader); two ISSs (Interface Shipsets Developed for Integration); two ARN-118 TACAN RADIO SYSTEMS; one HARRIS DAC (Signal Data Converter); one INDICATOR/CONTROL PANEL (Developed for Integration); one POWER PANEL (Developed for Integration); one IFR ATC-T1400A/T1401 TACAN TEST SET; one IFR NAV-750B VOR TEST SET; one AM/FM-1200S COMMUNICATION TEST SET; two IBM COMPATIBLE 486 COMPUTERS; two ANDOR (1553 Computer Cards); two DTI-1072 (ARINC Computer Cards); one DDC (1553 Computer Card); two NATIONAL INSTRUMENTS (IEEE-488 Computer Cards). HC-130 SPECIFIC EQUIPMENT: two ARN-123 VOR RADIOS; two ARC-182 VHF/UHF COMMUNICATION RADIOS; one 618M-3A VHF COMMUNICATION RADIO; one ARC-182 Emergency Select Panel; one LTN72-9-24 STRAPDOWN INERTIAL NAVIGATION SYSTEM. KC-130 SPECIFIC EQUIPMENT: one ARN-139 TACAN RADIO; two ARN-126 VOR RADIOS; two ARC-186 VHF COMMUNICATION RADIOS; one ARC-186 Emergency Select Panel; two ARC-210 VHF/UHF COMMUNICATION RADIOS; one LTN72-9-20 STRAPDOWN INERTIAL NAVIGATION SYSTEM; one LTN72-9-21 STRAPDOWN INERTIAL NAVIGATION SYSTEM; one LTN72-9-90 STRAPDOWN INERTIAL NAVIGATION SYSTEM;

The facilities and equipment of this lab are not shared with any other functions. This facility is unique to the DoD, in that, it is the only C-130 communication/navigation equipment replication laboratory in existence and allows for a complete range of testing for both hardware and software which will ultimately be integrated into the fleet.

CARCO Flight Motion Simulator (CFMS)

The CFMS supports aircraft integration, C3I Airborne, and RDT&E Engineering Development. The CFMS is used to identify system errors, evaluate system performance and system readiness for flight testing. It consists of a three axis rate table, CFMS control electronics and a i486PC with a IEEE488 interface card. The equipment is not unique, however, the CFMS resides in the Inertial Facility at NCCOSC RDTE DIV DET Warminster which is located in the most seismically quiet area in the United States.

GPS laboratory (unique to U.S.) (59% used by this CSF).

Since 1980, NCCOSC RDTE DIV SAN DIEGO CA's GPS laboratory has been DoD's lead laboratory for developing GPS receivers and GPS receiver test tools. The lab reproduces a complete host vehicle environment through a coordinated, real-time simulation of both the GPS satellite signals and host vehicle communications. In this unique development, integration, and test and evaluation environment, GPS receiver hardware and software can be exercised dynamically, under precise and repeatable

laboratory conditions. The common support function Air Vehicles Fixed Avionics is 59% of the usage, C4I Afloat is 29% and Weapons Cruise Missiles 12%.

The following major equipment suites comprise the GPS Laboratory: Satellite Signal Generator - Generation of GPS satellite constellations with effects of user dynamics under scenario control; Cryptographic Satellite Signal Simulator - same as above including effects of Military denial of accuracy (Selective Availability) and Anti-Spoofing; Monitor Station Receiver Element - GPS control station receiver used primarily for calibration of the lab's GPS simulators; Cesium Beam Frequency Standard (3) - lab frequency synthesis, clocking and synchronization; Commercial GPS Survey Receiver Pair - Centimeter level range calibration of lab simulators, differential references (test controls); Military 3A GPS Receiver (2) - test controls; Military 3S GPS Receiver (2) - test controls; Military MAGR GPS Receiver (2) - test controls; Jammer Rack - Configured to represent RF threats or GPS interference; Screen room (RF shielding) - T&E area immune to stray RF for evaluation of antennae and antennae electronics; Host Vehicle Interface Emulators - reproduction of electrical protocols found on platforms which integrate or will integrate GPS, including: TLAM MK-82; 1397; Synchro; ARINC (various); 1553; PTTI; Supporting Computer Systems - host platform and sensor modeling software, implement real-time controls and support data reduction and analysis, including: VAX Alpha Computers (4); VAX Computers (4); IBM Compatible Computers (Various).

The depth of NCCOSC RDTE DIV SAN DIEGO CA's GPS/navigation expertise and experience is unique within the Government, with the most versatile and comprehensive GPS test and evaluation facilities in the United States. The laboratory's Satellite Signal Simulator (SSS) is a system of processors and transmitters that calculates trajectory data and generates realistic RF signals that a GPS receiver would encounter in a live satellite vehicle (SV) environment. To achieve the testing accuracy required for GPS, cesium clocks allow precise time-coordinated RF and host-platform simulation. NCCOSC RDTE DIV SAN DIEGO CA has also developed very precise calibration techniques for its simulators, using the monitor station receiver element (MSRE), which is the same receiver the GPS control segment uses for monitoring the satellites. Flexibility in simulation is accomplished by downloading almanac data into the SSS, enabling simulation of a mix of healthy and unhealthy SV'S. NCCOSC RDTE DIV SAN DIEGO CA's GPS engineers also readily provide related technological skills and any modifications (or adaptations) the facility requires.

CSF 3. Air Vehicles - Rotary Avionics

The CH-46 GPS System Integration Laboratory (SIL) (unique to DoD)

Used primarily as a tool to test and develop the overall system design which will culminate with the integration of GPS user equipment and various other avionics into the CH-46 helicopter. This lab provides an excellent vehicle to debug the software that is

used to control each of the Weapons Replaceable Assemblies (WRS) in the avionics system, allowing for the delivery of a fully functioning software package to the fleet.

The SIL consists of the following equipment: one GPS FRPA (Fixed Reception Pattern Antenna); one MAGR (Miniature Airborne GPS Receiver); one ARC-182 communications radio; one DDS (Digital Data Set); two ICUs (Interface Control Units); one Doppler Radar; two CDNUs (Control Display Navigation Units); one TAS (True Airspeed Computer); two HHSIs (Horizontal Hover Situation Indicators); one ARN-118 TACAN radio; one APX-72 IFF (Identify Friend or Foe) transponder; one APX IFF Test Set; one IFF KIT-1A (crypto); one AHARS (Attitude and Heading Reference System) Displacement Gyro; one AHARS electr. amplifier; one ARC-94 HF radio; one ARC-94 HF Dummy Load; one Radar Altimeter; one I-1400 & I-1402 IFF Transponder Test/Display Unit; two IBM compatible 486 computer systems; and two Andor 1553 cards. The facilities and equipment are not shared with any other functions. This facility is unique to the DoD in that it is the only CH-46 replication laboratory in existence and allows for a complete range of testing, both the hardware and software, which will ultimately be integrated into the fleet.

CSF 4. Weapons - Cruise Missiles

GPS laboratory (unique to U.S.) (12% used by this CSF).

Since 1980, NCCOSC RDTE DIV SAN DIEGO CA's GPS laboratory has been DoD's lead laboratory for developing GPS receivers and GPS receiver test tools. The lab reproduces a complete host vehicle environment through a coordinated, real-time simulation of both the GPS satellite signals and host vehicle communications. In this unique development, integration, and test and evaluation environment, GPS receiver hardware and software can be exercised dynamically, under precise and repeatable laboratory conditions. The common support function Air Vehicles Fixed Avionics is 59% of the usage, C4I Afloat is 29% and Weapons Cruise Missiles 12%.

The following major equipment suites comprise the GPS Laboratory: Satellite Signal Generator - Generation of GPS satellite constellations with effects of user dynamics under scenario control; Cryptographic Satellite Signal Simulator - same as above including effects of Military denial of accuracy (Selective Availability) and Anti-Spoofing; Monitor Station Receiver Element - GPS control station receiver used primarily for calibration of the lab's GPS simulators; Cesium Beam Frequency Standard (3) - lab frequency synthesis, clocking and synchronization; Commercial GPS Survey Receiver Pair - Centimeter level range calibration of lab simulators, differential references (test controls); Military 3A GPS Receiver (2) - test controls; Military 3S GPS Receiver (2) - test controls; Military MAGR GPS Receiver (2) - test controls; Jammer Rack - Configured to represent RF threats or GPS interference; Screen room (RF shielding) - T&E area immune to stray RF for evaluation of antennae and antennae electronics; Host Vehicle Interface Emulators - reproduction of electrical protocols found on platforms which

integrate or will integrate GPS, including: TLAM MK-82; 1397; Synchro; ARINC (various); 1553; PTTI; Supporting Computer Systems - host platform and sensor modeling software, implement real-time controls and support data reduction and analysis, including: VAX Alpha Computers (4); VAX Computers (4); IBM Compatible Computers (Various).

The depth of NCCOSC RDTE DIV SAN DIEGO CA's GPS/navigation expertise and experience is unique within the Government, with the most versatile and comprehensive GPS test and evaluation facilities in the United States. The laboratory's Satellite Signal Simulator (SSS) is a system of processors and transmitters that calculates trajectory data and generates realistic RF signals that a GPS receiver would encounter in a live satellite vehicle (SV) environment. To achieve the testing accuracy required for GPS, cesium clocks allow precise time-coordinated RF and host-platform simulation. NCCOSC RDTE DIV SAN DIEGO CA has also developed very precise calibration techniques for its simulators, using the monitor station receiver element (MSRE), which is the same receiver the GPS control segment uses for monitoring the satellites. Flexibility in simulation is accomplished by downloading almanac data into the SSS, enabling simulation of a mix of healthy and unhealthy SV'S. NCCOSC RDTE DIV SAN DIEGO CA's GPS engineers also readily provide related technological skills and any modifications (or adaptations) the facility requires.

CSF 5. Space Systems - Satellites

SHF Satellite Communications Test Facility

It contains a complete SHF Satcom terminal and test equipment to support follow-on SHF equipment development.

Navy UHF Satellite Communications Test Facility

Supports information exchange subsystem development and testing, direct support to fleet exercises, determining new requirements, and support developing system improvements. It includes an operating fleet satcom radio room with all RF systems. In addition, it contains a complete test and analysis capability.

CSF 6. C4I Systems - Airborne

JTIDS Network Design Lab (unique to U.S.)

The JTIDS Network Design Facility is currently the only DoD laboratory supporting the USN operational fleet in the analysis, design, development and distribution of the planning and control data for the JTIDS/Link 16 system. This data enables fleet users of the JTIDS/Link 16 to dynamically tailor their communications equipment to the operational need at hand. The JTIDS Network Design Facility is a fully functional fleet

support asset, and has been developed in concert with the JTIDS system now deployed in the Carl Vinson Battlegroup, and soon to be deployed in the Constellation Battlegroup. By 1998, all USN major ship combatants and a majority of USN air wings will be outfitted with the JTIDS/Link 16 System. Additionally, the MIDS program, a NATO partnership development of a smaller JTIDS terminal, lead by the USN, is intending to use the Network Design and Development function built for the JTIDS life cycle.

The JTIDS Network Design Facility occupies a separate laboratory within the building complex of the NCCOSC RDTE DET Warminster, PA. This laboratory provides 1100 sq. ft. of dedicated space to development and implementation of this fleet support function. This facility is unique in its functionality by virtue of the operational requirement designating a single source for all fleet Link 16 planning and control data, as well as the by the unique experience and talent of the engineers, and software design tools developed by those engineers, to support this function. The USN is currently the largest user of the JTIDS/Link 16, and has the only mature network management system, (directly supported by this facility), in full conformance with the JCS Concept of Operations for JTIDS. This combination of engineering talent, hardware and software development environment, and an average of ten (10) years of experience among the seven primary system experts with the practice of JTIDS network design and development, has provided a consistent and fault-free product to the fleet throughout the JTIDS/Link 16 test program and into the system IOC. Additionally, this laboratory has demonstrated through several test program activities, and OSD-sponsored demonstration programs (such as the Joint Air Defense Organization/Joint Engagement Zone), that it is fully capable of supporting and implementing all Joint Tactical C4I operational requirements.

Coupled with the NCCOSC RDTE DIV SAN DIEGO CA System Integration Facility, NCCOSC RDT&E Division offers a federated system of laboratories to support Joint Requirements in JTIDS Network Design. This latter capability is especially significant in timely response to new and unfolding events, allowing NCCOSC RDTE DIV SAN DIEGO CA to deal rapidly with all players in all tactical arenas. Both east and west coast operations can provide rapid access to JTIDS System experts to virtually all Commands (USN, USA, USAF) requiring it. In particular, between both east and west coast operations, the capability to handle the full Joint Service Network Design function is possible without requiring additional space.

E-2C Airborne Tactical Data Systems (ATDS) Integration Laboratory (unique to DoD)

The E-2C ATDS Integration Laboratory is a dedicated multi-configuration development center designed to support the Navy's effort in the design, development, test, and evaluation of tactical software, software development tools and simulation. This is the Navy's only software support facility for E-2C aircraft. Three configurations of E-2C aircraft are supported. Development and evaluation of software for Foreign Military

Sales cases is also supported in this facility. This laboratory is designated the software support activity for intelligence files utilized by the E-2C aircraft. This facility supports Navy and Joint interoperability systems testing.

Unique to DoD. Lab is made up of Airborne, militarized electronics (computers, tape units, displays, simulators, disks, etc.). There is no other use for the system other than to build and integrate tactical software for the E-2C ATDS.

Systems Integration Facility (SIF) (unique to DoD) (20% used by this CSF)

The primary purpose of the System Integration Facility (SIF) is to conduct integration testing of Link-16 systems, including Joint Tactical Information Distribution System (JTIDS); Multi-Function Information Distribution System (MIDS); Advanced Combat Direction Systems (ACDS); Airborne Tactical Data Systems (ATDS); and Command and Control Processor (C2P) on Tactical Aircraft and Surface Combatants. SIF also provides C4I test support in preparation for Carrier Battle Group deployments.

This facility is unique to DoD. The RF network delay capability and simultaneous simulation capability for Link 11 and Link 4A is unique to DoD and Allied JTIDS testbed.

Multi-Link Laboratory (unique to DoD) (20% used by this CSF)

The primary purpose of the Multi-Link Laboratory is to (1) perform development and production testing of current and new versions of Navy tactical data link terminals, including Links 11, 4A and 22; the Link-11 Display System (LEDS); and (2) to support integration and interoperability testing of Advanced Combat Direction Systems (ACDS); Airborne Tactical Data Systems (ATDS); Command and Control Processor (C2P); and other Command and Control Systems for tactical surface and air platforms for the U.S. Navy, navies of allied countries, the U.S. Coast Guard and the U. S. Customs Service.

Unique to DoD: Provides Links 11/4A/22/CSS certification facility for Navy data terminal sets.

CSF 7. C4I Systems - Fixed Ground-Based

Information Transfer Management Structure

This facility provides integrated management of the automated, distributed, fiber optics connected information transfer system and provides management of the connectivity between all major command, control, communications, computers and intelligence and ocean surveillance facilities, and the interconnect between ELF to EHF and lasers. It also provides a controlled environment in which to determine the applicability and utility of commercial off-the-shelf and non developmental item

equipment in providing joint C4I and ocean surveillance capabilities. It includes termination of networks, secure cables, cryptos, etc. in a locked facility

Surveillance Test and Integration Center (STIC) (unique to Fed Govt)

STIC is a secure, environmentally controlled computer laboratory comprised within three interconnected working spaces, totaling approximately 24,000 square feet. STIC provides the facilities and resources to support research, development, integration, test, and life-cycle support of undersea surveillance subsystems. STIC is also used to support evaluation of Undersea Warfare concepts, Over the Horizon Radar, display technology, algorithms, systems analysis and technology insertion demonstrations for the Navy, Contractors, and other agencies.

STIC has a minimum of one each surveillance system hardware and simulators which are interconnected so as to provide full integration for any user. There are over 300 instrument racks, 4 VAX systems, 10 large display consoles, 200 computer monitors or terminals interconnected by FDDI, ethernet, hard wire, or high speed data switches.

STIC is unique within the Navy. Although there are fleet facilities and contractor facilities that possess similar equipment, there are no other lab facilities which have all the equipment and simulators assembled and integrated for testing and development work. STIC is unique to the Federal Government in its support of the Drug Enforcement Administration.

Tactical Engineering Analysis Lab (unique to DoD)

A SCIF providing computers and communications for the analysis and development of classified intelligence tasks. Unique to the DoD because of its utilization and processing of multi-service classified intelligence information.

Tactical Systems Lab (unique to DoD)

A multi-service/multi-user development and demonstration lab at the GENSER Secret level. It operates with multiple TRE (Tactical Receive Equipment) and TDDS (TRAP Data Dissemination System) processors along with an array of fielded and developmental Tactical Data Processor (TDP) systems which, together with reception, broadcast and relay capabilities, give the TSL the flexibility it needs to provide a wide variety of services and functions to the TADIXS-B intelligence community. Unique to the DoD because of its utilization and processing of multi-service classified intelligence information.

High Performance Computing And Theater Level Planning Laboratory (unique to DoD)

Provides a land-based test site of a major theater level planning system; supports development, integration and interoperability testing; and adapts technology and the use of modern high performance computers to increase the accuracy, performance and timeliness of the planning.

Unique to DoD: This facility is unique to DoD due to its communications connectivity to Navy/Joint systems and ready availability of command and control systems and technology laboratories.

Navy Command and Control System Ashore Integration Test Facility (unique to DoD)

Provides a land-based test site of a theater command center command and control system installation. It supports development, integration and interoperability testing plus on-line communications to ships and shore activities worldwide to support the gathering of requirements and to define user system needs.

Unique to DoD: This facility is unique to DoD due to its communications connectivity to Navy/Joint systems and ready availability of command and control systems and technology laboratories.

Navy Intelligence Development, Integration And Test Facility (unique to DoD)

Provides a land-based development/test site of an Ocean Surveillance Information System Evolutionary Development system. Supports the development, integration and interoperability testing of major intelligence and advanced applications such as collection requirements management. It also provides on-line communications to ships and selected intelligence shore activities worldwide to support the gathering of requirements and to define user system needs.

Unique to DoD: This facility is unique to DoD due to its communications connectivity to Navy/Joint systems and ready availability of command and control systems and technology laboratories.

Ocean Surveillance Information System (OSIS) Evolutionary Development (OED) Laboratory (unique to DoD)

Provides a land-based test site of an OSIS Evolutionary Development (OED) facility to support development, integration and interoperability testing. It also provides on-line communications to ships and selected intelligence shore activities worldwide to support the gathering of requirements and to define user system needs.

Unique to DoD: This facility is unique to DoD due to its communications connectivity to Navy/Joint systems and ready availability of command and control systems and technology laboratories.

Surveillance Systems Offices and Labs

These facilities are general offices and labs that support the C4I Systems - Afloat surveillance systems work.

Distributed Command/Control (DC2) Laboratory

The Distributed Command/Control (DC2) Laboratory is responsible for the development, demonstration, and transition of distributed technologies for combat systems and command and control systems for the Navy so that they may meet the application requirements of today and tomorrow. The evolution of these systems is being done through the use of software engineering and use of base technologies such as networks and standard computer communication protocols. These are enhanced through the incorporation of distributed real-time system, distributed operating system, distributed database management system, and distributed security technologies as they are developed. Most importantly, they are being integrated into a distributed computing environment that will support current and future Navy, joint, dual-use and non-Department of Defense applications.

Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Laboratory (unique to DoD)

The Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Laboratory provides a simulation combat environment for commands and their staffs to practice and sharpen decision making skills and to assist in the command and control aspects of tactical field exercises.

Unique to DoD: MTWS is the only command control and communications training facility in development for use by the Marine Corps.

Distributed Simulation Internet (DSI) Advanced Simulation Laboratory (DASL)/ Secure DSI Integration Simulation Laboratory (SISL)

The DASL/SISL facility provides hardware, software, simulations and gateways to other simulations.

The facility is not unique, but there are very limited secure laboratories with DSI access.

Command Center of the Future (unique to DoD)

The Command Center of the Future is a command briefing center and advanced technology demonstration theater for evaluating the use of new technology.

Unique to DoD. The Command Center of the Future is a unique facility in that it takes advantage of demonstrating advanced technology to many high level visitors and thus gaining insight to potentially successful future system developments.

Processing and Data Exploitation Center (unique to DoD)

An in-house SCIF laboratory facility for conducting data fusion and information processing research for the exploitation of national systems products for National, Unified and Special Command, and Joint service and tactical applications. Unique to the DoD because of its utilization and processing of multi-service classified intelligence information.

Space and Electronic Warfare Simulator (SEWSIM) (unique to U.S.)

SEWSIM is unique at all three levels (DoD, Federal Gov., and US) since it is the only high resolution simulation in the world specifically dedicated to analyzing Space and Electronic Warfare (SEW) systems across the entire spectrum of Army, Navy, Air Force and Marines. In addition, it is capable of simulating SEW assets of all major foreign countries.

Special Signals Equipment Space Simulator (SWIFT) (unique to U.S.)

SWIFT is unique at all three levels since it is the only facility in the world which replicates an entire Special Signals Equipment Space (SEES) found on major U.S. Naval combatants.

Microwave and Millimeter-wave Antenna Range Complex (unique to Fed Govt)

The antenna range is used in the design, development, test and evaluation of antenna systems being developed at NCCOSC RDTE DIV SAN DIEGO CA. It is also used for the evaluation, calibration and servicing of antennas sent to NCCOSC RDTE DIV SAN DIEGO CA for that purpose. The location across the natural deep canyons on the Point Loma peninsula provide reflection-free operation, electromagnetic isolation, access to testing with ships at sea and an over water link to San Clemente Island. The antenna range consists of 8 outdoor signal paths situated across canyons on the Point Loma Naval Reserve, and three anechoic chambers. It is bounded on the east by San Diego Bay and on the west by the Pacific Ocean.

The antenna range is equipped with 3-channel receivers, 1-channel receivers, pattern recorders and pedestals. The pedestals have weight capacity from a few hundred pounds

to 30,000 pounds. Signal generators and synthesizers, coupled with solid state and TWT amplifiers, provide for transmission over the frequency range from 0.045 GHz to 110 GHz, although the ranges are usually not used below 0.4 GHz. In-house developed software and hardware allows for digital recording of antenna pattern data on one of the signal paths and in one of the chambers. Amplitude measurements have been made to tenths of a dB and angle data recorded to tenths of a degree. Boresight measurements on NESP (Navy MILSTAR) antennas are to 0.03 degrees (RSS).

Uniqueness: Location over natural canyons, access to Naval ships at sea and in the bay, over-water links capable to San Clemente Island, Camp Pendleton and North Island Naval Air Station are some of the unique features of this facility. The unique contours of the canyons and the natural vegetation provide for almost reflection-free and electromagnetic interference-free operation, which would be difficult to duplicate. Mild climate conditions allow for nearly year-round range operation, with typically 2000 hours of range availability. This availability can be extended greatly, since many of the signal paths and all of the three chambers can be operated independently. At one time during FY94 three of the signal paths and all three chambers were in operation simultaneously.

Radar Signal Processing Laboratory (unique to U.S.)

The Radar Signal Processing Laboratory is equipped to provide support in analyzing and processing Imagery, Radar and Signal data. In addition, there are many resources available to assist in developing general engineering software. The RSPL consists of a 3-bay laboratory and is open and manned during normal business hours and can be manned on a 24-hour basis when required by project needs.

The RSPL is a stand alone ADP processing and storage facility with no outside connectivity (local area networks, modems, dedicated lines, etc.). The RSPL is certified for open storage of SECRET material and is accredited for ADP processing of data at the SECRET level.

Uniqueness: The Radar Signal Processing Laboratory is unique because it is co-located with the NCCOSC Ship and Aircraft Radar Signature test area located just west of Pt. Loma, Ca. This co-location allows for 24 hour real-time processing of radar signature data in support of naval ship and aircraft measurement efforts. The largest data base of US combatant ship and aircraft Radar Cross Section resides within the Radar Signal Processing Laboratory. In house developed software is used for processing of radar signature data into ISAR Image and RCS data products.

Secure Facilities, Vaults And Underground Bunkers (unique to DoD)

NCCOSC RDTE DIV SAN DIEGO CA has the largest set of Navy Sensitive Compartmented Information (SCI) facilities (SCIFs) outside Washington D.C., used for developing, testing, and operating communication systems that use highly classified data

and major programs combining the surveillance, command and control, and communications efforts into major military systems. Two Special Intelligence Communications (SPINTCOMM) facilities exist in the Center's intelligence structure. The SPINTCOMMs operate and maintain a variety of crypto, modem, router, facsimile and computer equipment for secure communications and related support for extremely highly classified work throughout the Center.

SCIF standards must be met to provide laboratory and other working space for the wide variety of intelligence-related command and control and surveillance programs at the Center. Lack of adequate accredited SCIF spaces and SCI communications support (SPINTCOMM facilities must be in SCIFs) would cause severe and in most cases complete degradation in the ability to perform major claimant assigned tasking.

No known comparable support facility(s) currently exist on the West Coast which could duplicate this Centers's SCI and other compartmented support assets. Major on-going SCI communications/computer programs support US and Fleet Commanders including JCS, USCINCPAC, CINCPACFLT, CINCUSACOM, CINCLANTFLT, CINCENT, COMNAVENTCOM, CINCSPACECOM, CINCNORAD, CINCSOCOM, and COMNAVSPECWARCOM plus agencies including CIA, NSA, and DIA. Additionally, the NCCOSC RDTE DIV SAN DIEGO CA SPINTCOMM facilities have served in the role of alternate intelligence command center for communications purposes for major fleet commanders and as direct SCI communications support for other high level officials.

Indoor Robotics Development/Test Facility (unique to DoD)

The Indoor Robotics Development/Test Facility is used for the development, test, and evaluation of indoor automated systems, including robotics software and hardware architectures.

Unique to DoD: This is the only remaining DoD indoor robotics development and test facility. Additionally, this facility is unique in both hardware and personnel. The lab personnel have a combined robotics experience of over 85 years, and have access to numerous robotics test platforms and equipment from which to conduct development and testing efforts.

Communications Support System Simulation Facility

Provides an environment for evaluating software components being developed for communication control systems. Analysis includes fleet protocol definition, operator interfaces, and system engineering.

Systems Integration Facility (SIF) (unique to DoD) (40% used by this CSF)

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Unique to DoD: Provides Links 11/4A/22/CSS certification facility for Navy data terminal sets.

High Performance Computing Processing Facility (unique to DoD) (50% used by this CSF)

The High Performance Computer Processing Facility provides: triple graphics pipeline (Reality Engine Twos), four processor Silicon Graphics ONYX system with Sinius Video Option (30 frames/sec digitization of video in and out). A 10' x 10' surround-screen "cave" environment allows multiple operators, mockups, etc. to be immersed in and interact with stereoscopic imagery in a 270 degree field of view. The VIPER Lab is located in a secure vault providing one of the few classified virtual environments available in the country. The visualization capability of the ONYX complements the computing power of the Intel Paragon. The Paragon provides state-of -the-art, massively parallel processing to support classified RDT&E efforts of all components of the DoD. In addition to remote access, the Paragon facility is configured to provide unique hands-on access for specialized, real-time I/O requirements and contains numerous workstations and visualization stations for development, operation, and data analysis.

The facility is unique to the DoD in that it provides support for hands-on access to

massively parallel processing equipment for development of embedded HPC applications.

Research Evaluation and Systems Analysis (RESA) Facility (unique to DoD) (50% used by this CSF)

The purpose of the RESA facility is to provide Command Control and Communications (C3) simulation in support of RDT&E and Joint Training Requirements.

Unique to DoD: Only Navy multi-warfare command control and communications (C3) analysis facility.

Display Systems Development Laboratory (unique to DoD) (50% used by this CSF)

The laboratory supports Advanced Combat Direction System (ACDS) hardware engineering support tasks involving documentation and engineering change proposals (ECP's) testing and verification. Facility is also used to support advanced system design and testing for new systems such as Map Server and Digital Radar Video Data Distribution System (DRVDDS) programs.

Unique to DoD: In order to provide the hardware support testing, the facility must include hardware such as the OJ-535/OL-318 and OJ-451(V)9 display consoles, the OL-191(V)1 Radar Azimuth Converter/Radar Data Switchboard/Radar Video Switchboard/Central Data Buffer/Power Supply and the AN/UK-7 3-bay NTDS computers.

Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS) (unique to DoD) (50% used by this CSF)

The primary purpose of the OTH-T RLBTS is to provide world wide connectivity to OTH-T systems and laboratories for all Services and Allied countries in support of OTH-T C4I configuration validation studies; validation of C4I system requirements and architecture; management of ADP telecommunications standards by the Commander, Naval Computer Telecommunications Command (NAVCOMTELCOM); OTH-T interoperability testing; Fleet OTH-T systems engineering; Fleet exercise/ Command Center support, for overall responsibility for the end-to-end effectiveness of the Navy's C4I systems in the Fleet; and Battle Group Network analysis and feedback to PACFLT and LANTFLT Command Centers.

Unique to DoD. Provides a certification environment for the U.S. Navy's OTH-T systems.

CSF 8. C4I Systems - Afloat

Ship Antenna Model Range and Simulation Facility (unique to U.S.)

The Center has a capability in simulation and Modeling of ship communications systems unsurpassed in the world. This facility consists of a flat ground plane for rotating modeled ships, tracks and towers for equipment movement, control systems for the test equipment, data collection systems, data reduction computers, plotters, and analysis software and components. The facility includes a modeling machine shop in which a scaled model of every ship in the fleet has been built for evaluations. It is a major installation developed over the past 40 years. This facility, along with the simulation facility, provides a basis for analysis and measurement of shipboard antennas.

The Ship Antenna Simulation Facility operates in conjunction with the Antenna Model Range. It provides software modeling and simulation of systems, confirmation of models, and extensions beyond the test capability of the Model Range. Evaluates electromagnetic propagation effects, electromagnetic engineering systems and structural resonant responses.

The Ship Antenna Model Range and Simulation Facility is unique to US. No other facility exists like it. There is no requirement for this effort in commercial facilities, and no other service has combat ships needing this complex interaction.

VLF/LF Integrated Test Facility (unique to U.S.)

Includes simulated terminals, submarine radio room RF equipment, control devices, software evaluation, test equipment, analysis tools.

The VLF/LF Integrated Test Facility is unique to US. No other activity has submarines to model and test. ELF/VLF/LF is almost exclusively used for submarine communications.

EHF Satellite Communications Terminal Test Facility

This facility provides a basis for ship, submarine, and shore site terminal development and follow-on support in MILSTAR EHF systems.

Radar Test Range (unique to U.S.)

Six in-house developed radars and standard product radars are used to support several programs. The frequency bands used are: HF, UHF, S, C, X Ku, and millimeter wave. The radar range has communication links (both voice and data) with the various test targets, and can provide links to other facilities for coordinated testing. The radar range is capable of using several different waveforms, such as stepped frequency, chirp, fixed,

instantaneous wideband, and frequency hopping signals. One radar is capable of stepped frequency while changing signal polarization.

The Radar Test Range is unique to the U.S. because of its waveform and frequency capabilities.

Surveillance Systems Offices and Labs

These facilities are general offices and labs that support the C4I Systems - Fixed Ground Based surveillance systems work.

Deployable Surveillance Integration Facility (unique to DoD)

This facility was constructed in 1984 as a special facility for the fabrication and handling of fiber optic cabled systems. The building is divided into three areas. One area is a fiber-optic laboratory which contains state-of-the-art instrumentation that automatically measure the characteristics of optical fibers and allows for special undersea cable tests such as oxygen absorption in optical fibers. Another bay of the building is designed to allow the winding of cables into packs and the handling of large amounts of cable and telemetry hardware. The remaining section of the building allows for the assembly of telemetry/test systems and components. The facility also has a pressure test capability for testing small system components. The building has supported most of the projects involving fiber optic cables since its completion. It is also sited such that cabled systems installed off Pt. Loma during the summer of 1994 in the Southern California Shallow Water Test Bed will be terminated in the building. It is a unique facility due to its location and equipment. It is capable of receiving and handling the large amounts of cable, vans and other equipment associated with undersea cabled systems.

Certain functions of this facility would be extremely difficult to replicate or relocate at another site, namely, those associated with the Southern California Shallow Water Test Bed. Cables come ashore here from offshore locations where undersea surveillance experiments are conducted. This is the only site where over-the-shore cables will be permitted after implementation of the environmentally protected zone on Pt. Loma. Cost replacement would be difficult to estimate since, although the equipment is portable, the site cannot be duplicated. A rough estimate of replacement cost would be approximately $2.75M.

Bayside Acoustic Systems Computational Capability (unique to DoD)

The Bayside Acoustic Systems Computing Capability (BASCC) laboratory is a unique facility which provides a wide range of state-of-the-art simulation and assessment models for acoustic and non-acoustic (magnetic and electro-magnetic) sensors in fully range-dependent ocean/geophysical environments. In addition to this robust performance prediction and area assessment capability, which is not available as a unified toolset

anywhere else, there are a wide range of acoustic and non-acoustic performance assessment and data analysis tools developed by NCCOSC RDTE DIV for LFA/SURTASS, ADS and ONT Block programs which are not available outside BASCC. This lab will soon be incorporated with the lab supporting the Multistatic Active Surveillance ONR Block program. Other processing will include algorithm development, data analysis, and verification of system capability. Combined assets, including numerous SUN Sparcstations, other hardware and software would require in excess of $4M to replicate.

Combat Direction System (CDS) Development and Evaluation Site (CDES) (unique to DoD)

The Combat Direction System Development and Evaluation Site (CDES) is a dedicated multi-configurable development center designed to support the Navy's effort in the design, development, test and evaluation of new concepts, equipment and software associated with a family of highly complex, automated Advanced Combat Direction Systems (ACDS), Command and Control Processor (C2P), Range NTDS Upgrade System (RNUS), Data Links (Link-11, Link 4A, Link 16) and Advanced Display System (ADS) planned for deployment on current and future surface combatants. The CDES is a separate entity from the critical path of shipbuilding programs and is capable of life cycle support throughout the development and certification of new systems. It also provides a means of training those shipboard personnel scheduled for involvement in initial system Operational Evaluation (OPEVAL).

Unique to DoD: Lab comprises shipboard and militarized electronics (computers, tape units, displays, disks, etc.). There is no use for the system external to the Navy.

Navy Tactical Command System Afloat (NTCS-A) Testbed And Integration Facility (unique to DoD)

The NTCS-A testbed and integration facility provides a land-based test site for an aircraft carrier command and control system to support development, integration and interoperability testing, new software duplication and release to all afloat platforms. Also provides a mockup of an aircraft carrier command and control system installation to support development, integration and interoperability testing. On-line communications to ships and shore activities worldwide provide a means to help diagnose and fix problems remotely. The NTCS-A testbed and integration facility work is done in two laboratories, one at the Secret level and one at the Sensitive Compartmented Information (SCI) level.

Unique to DoD: This facility is unique to DoD due to its communications connectivity to Navy/Joint systems and ready availability of command and control systems and technology laboratories.

The Simulated Ships Motion Test Facility (unique to U.S.)

This facility occupies 4,000 sq. ft. and houses three ship motion simulators (Scorsby), including the world's largest precision ship motion simulator (Benton Model 1592) installed in FY93. The simulators are fully automated to permit pre-programming of complex ship's motion in all three axes (roll, pitch, and heading). The motions can be programmed to accurately simulate various mission scenarios, either individually or simultaneously, with varying amplitude and period (see Table below). Each simulator is instrumented to permit precise dynamic readout and recording of all navigation output parameters.

Simulator	Weight Capacity	Motion Angle/Period	Accuracy Static/Dynamic
Benton Model 1592 (one of-a-kind)	3000 lbs.	Roll+/-40 deg/7sec Pitch+/-35 deg/6 sec Yaw+/- 10 deg/11 sec	1 arc sec/2 arc sec
Contraves/Goertz Model 53SM	1000 lbs.	Same as above	2 arc sec/4 arc sec
Navy design(1950's)	2500 lbs.	Same as above	5 arc sec/10 arc sec

The weight of the simulators range from 8 to 15 tons each. They are required for developing and testing ship and submarine gyrocompasses and inertial navigation systems and are therefore designed to handle test articles of up to 3000 lbs. Each simulator is mounted in a concrete well 20 ft. deep, a total of 230 tons of concrete was used to install the three simulators. Each well is attached to bedrock to provide the necessary reference stability and to minimize the effects of vibration on system performance evaluation. One of the simulators is housed in an environmental chamber (temperature/humidity) approximately 27 ft. long, 30 ft. wide and 14 ft. high to allow testing to be performed under varying conditions of temperature (32 to 125 deg F) and humidity (0-95%).

The facility is located adjacent to a loading dock and provides for easy forklift access to each of the simulator test stations. A high ceiling (>13 ft) and monorail/hoist (4000 lb. capacity) facilitates the installation and removal of test articles. Direct sighting of the North Star is possible through an optical tube which penetrates the outer building wall and provides a precise heading reference (<1 arc sec) for the facility.

The Facility is used to evaluate the navigation performance of the Navy's marine gyrocompasses and inertial navigators. More specifically, the Facility is used to:

-- Establish a performance database for each gyrocompass/inertial navigation system under test.

-- Evaluate and characterize system error models

-- Characterize systems dynamic outputs to users (e.g. Missile Alignment Systems, Combat Systems, etc.)

-- Evaluate new system designs and improvements; provide quantitative measurement of improvement

-- Duplicate, investigate and resolve fleet reported problems; isolate problem to user system, inertial navigation system or component (gyro, accelerometer).

The Simulated Ships Motion Test Facility located at NCCOSC RDTE DIV, Warminster Det. is unique to the U.S. It is the only Government or private sector facility capable of dynamically measuring marine inertial system attitude performance to current Navy specifications. The motion simulators have been designed for the development and test of very high accuracy ring laser, fiber optic and super conducting gyro technology navigation systems. The newest of these simulators has the capability (i.e. load capacity, accuracy) to test a full ships navigation suite (dual navigation system) and meets all known future Navy requirements for system performance evaluation.

Oceanographic Systems Program (OSP) Laboratory (unique to U.S.)

A 6000 sq ft laboratory containing state-of-the-art navigation, bathymetric sonar and survey data refinement systems. It supports the Ocean Survey Program by duplicating the existing and future mission survey equipment suites aboard four OSP vessels. Simulates complete mission survey operations as conducted aboard ship for development of precise navigation, bathymetric and other geophysical systems.

It is used to: design, develop, and integrate advanced navigation, sonar, and survey data refinement systems; develop advanced algorithms for high resolution wide swath sonar signal processing and survey data refinement; conduct ocean surveillance and emerging ASW technology developments; develop and assess new survey navigation concepts; and assess and improve survey system design and performance.

It is the only facility in the country that has a complete mission survey suite to support development and upgrades of deep ocean and hydrographic survey missions. Facility supports both the United States and United Kingdom survey ship programs.

Survivable Adaptable Fiber-Optic Embedded Network Development Site

Used to develop hardware, software and firmware for ship interior communication, addressing interface to combat systems and combat damage survivability issues. It also provides a base to address hull, machinery and electrical systems effects.

Inertial Navigation Facility (INFAC) (unique to U.S.) (50% used by this CSF).

INFAC supports the Navy air and marine surface and subsurface navigation RDT&E in evaluating the performance related capabilities of inertial components (gyroscopes and accelerometers) in an environment that is free of external influences. Since these components are the prime drivers of inertial navigator performance, determining their performance characteristics is crucial to understanding and improving inertial navigation in the fleet.

The INFAC is recognized as the most seismically stable inertial navigation facility in the United States. It was designed and built specifically to evaluate precision inertial sensors (gyroscopes and accelerometers). It is unique partly because of the benefits it derives from location. The concept behind INFAC's design was to locate the facility to minimize seismic and other noise disturbances to the inertial sensors being tested and then to construct the facility so as to minimize local man-made disturbances. INFAC's location is remote from vehicular traffic as a site that is seismically quiet and where the bedrock is near ground level. The building is circular in shape to minimize wind effects and constructed slightly below grade to permit the attachment of short, squat piers directly to bedrock. To reduce the introduction of shock and vibration, required support machinery is shock and vibration isolated and housed in a separate building. Noise from local foot traffic is minimized by suspending the floor out to the vibration damped footings of INFAC.

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Navy, navies of allied countries, the U.S. Coast Guard and the U. S. Customs Service.

Unique to DoD: Provides Links 11/4A/22/CSS certification facility for Navy data terminal sets.

GPS laboratory (unique to U.S.) (29% used by this CSF).

Since 1980, NCCOSC RDTE DIV SAN DIEGO CA's GPS laboratory has been DoD's lead laboratory for developing GPS receivers and GPS receiver test tools. The lab reproduces a complete host vehicle environment through a coordinated, real-time simulation of both the GPS satellite signals and host vehicle communications. In this unique development, integration, and test and evaluation environment, GPS receiver hardware and software can be exercised dynamically, under precise and repeatable laboratory conditions. The common support function Air Vehicles Fixed Avionics is 59% of the usage, C4I Afloat is 29% and Weapons Cruise Missiles 12%.

The following major equipment suites comprise the GPS Laboratory: Satellite Signal Generator - Generation of GPS satellite constellations with effects of user dynamics under scenario control; Cryptographic Satellite Signal Simulator - same as above including effects of Military denial of accuracy (Selective Availability) and Anti-Spoofing; Monitor Station Receiver Element - GPS control station receiver used primarily for calibration of the lab's GPS simulators; Cesium Beam Frequency Standard (3) - lab frequency synthesis, clocking and synchronization; Commercial GPS Survey Receiver Pair - Centimeter level range calibration of lab simulators, differential references (test controls); Military 3A GPS Receiver (2) - test controls; Military 3S GPS Receiver (2) - test controls; Military MAGR GPS Receiver (2) - test controls; Jammer Rack - Configured to represent RF threats or GPS interference; Screen room (RF shielding) - T&E area immune to stray RF for evaluation of antennae and antennae electronics; Host Vehicle Interface Emulators - reproduction of electrical protocols found on platforms which integrate or will integrate GPS, including: TLAM MK-82; 1397; Synchro; ARINC (various); 1553; PTTI; Supporting Computer Systems - host platform and sensor modeling software, implement real-time controls and support data reduction and analysis, including: VAX Alpha Computers (4); VAX Computers (4); IBM Compatible Computers (Various).

The depth of NCCOSC RDTE DIV SAN DIEGO CA's GPS/navigation expertise and experience is unique within the Government, with the most versatile and comprehensive GPS test and evaluation facilities in the United States. The laboratory's Satellite Signal Simulator (SSS) is a system of processors and transmitters that calculates trajectory data and generates realistic RF signals that a GPS receiver would encounter in a live satellite vehicle (SV) environment. To achieve the testing accuracy required for GPS, cesium clocks allow precise time-coordinated RF and host-platform simulation. NCCOSC RDTE DIV SAN DIEGO CA has also developed very precise calibration techniques for its simulators, using the monitor station receiver element (MSRE), which is the same

receiver the GPS control segment uses for monitoring the satellites. Flexibility in simulation is accomplished by downloading almanac data into the SSS, enabling simulation of a mix of healthy and unhealthy SV'S. NCCOSC RDTE DIV SAN DIEGO CA's GPS engineers also readily provide related technological skills and any modifications (or adaptations) the facility requires.

High Performance Computing Processing Facility (unique to DoD) (50% used by this CSF)

The High Performance Computer Processing Facility provides: triple graphics pipeline (Reality Engine Twos), four processor Silicon Graphics ONYX system with Sinius Video Option (30 frames/sec digitization of video in and out). A 10' x 10' surround-screen "cave" environment allows multiple operators, mockups, etc. to be immersed in and interact with stereoscopic imagery in a 270 degree field of view. The VIPER Lab is located in a secure vault providing one of the few classified virtual environments available in the country. The visualization capability of the ONYX complements the computing power of the Intel Paragon. The Paragon provides state-of -the-art, massively parallel processing to support classified RDT&E efforts of all components of the DoD. In addition to remote access, the Paragon facility is configured to provide unique hands-on access for specialized, real-time I/O requirements and contains numerous workstations and visualization stations for development, operation, and data analysis.

The facility is unique to the DoD in that it provides support for hands-on access to massively parallel processing equipment for development of embedded HPC applications.

Research Evaluation and Systems Analysis (RESA) Facility (unique to DoD) (50% used by this CSF)

The purpose of the RESA facility is to provide Command Control and Communications (C3) simulation in support of RDT&E and Joint Training Requirements.

Unique to DoD: Only Navy multi-warfare command control and communications (C3) analysis facility.

Display Systems Development Laboratory (unique to DoD) (50% used by this CSF)

The laboratory supports Advanced Combat Direction System (ACDS) hardware engineering support tasks involving documentation and engineering change proposals (ECP's) testing and verification. Facility is also used to support advanced system design and testing for new systems such as Map Server and Digital Radar Video Data Distribution System (DRVDDS) programs.

Unique to DoD: In order to provide the hardware support testing, the facility must

include hardware such as the OJ-535/OL-318 and OJ-451(V)9 display consoles, the OL-191(V)1 Radar Azimuth Converter/Radar Data Switchboard/Radar Video Switchboard/Central Data Buffer/Power Supply and the AN/UK-7 3-bay NTDS computers.

Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS) (unique to DoD) (50% used by this CSF)

The primary purpose of the OTH-T RLBTS is to provide world wide connectivity to OTH-T systems and laboratories for all Services and Allied countries in support of OTH-T C4I configuration validation studies; validation of C4I system requirements and architecture; management of ADP telecommunications standards by the Commander, Naval Computer Telecommunications Command (NAVCOMTELCOM); OTH-T interoperability testing; Fleet OTH-T systems engineering; Fleet exercise/ Command Center support, for overall responsibility for the end-to-end effectiveness of the Navy's C4I systems in the Fleet; and Battle Group Network analysis and feedback to PACFLT and LANTFLT Command Centers.

Unique to DoD. Provides a certification environment for the U.S. Navy's OTH-T systems.

CSF 9. C4I Systems - Ground Mobile

None

CSF 10. Electronic Devices

Microelectronic Computer Aided Design (CAD) Facility

The Microelectronics Computer Aided Design (CAD) Facility is used for integrated circuit design to support research, design, test and evaluation for Space and naval Warfare Systems Command (SPAWAR) and Trident program activities. Tasks include full custom, semi-custom and digital system and sub-system development.

Radiometric Measurements Facility

The purpose of the Radiometric Measurements Facility is the characterization of high-sensitivity photon detectors. The facility requires controlled temperature and humidity and a special room with no light leaks, low reflectivity surfaces, non-fluorescent lighting, high-voltage and signal bulkhead feedthroughs.

Optoelectronic Device Characterization Facility

The purpose of the Optoelectronic Device Characterization Facility is to characterize photonic components to frequencies of 50 GHz.

Infrared Focal Plane Array Test Facility (unique to U.S.)

The purpose of the Infrared Focal Plane Array Test Facility is to test and evaluate infrared focal plane components in clear and simulated radiation environments.

Unique to US: Complete medium to long wavelength (2 - 40 micron) measurement capability exists in this one facility for infrared focal plane arrays in both benign and radiation environments. The capability provides measurements in an environment which simulates low thermal background radiation, i.e., lower than the temperature of liquid helium. This capability is unique to the United States.

Long Wavelength Infrared (LWIR) Filters and materials Evaluation Laboratory (unique to U.S.)

The purpose of the Long Wavelength Infrared Filters and Materials Evaluation Laboratory is to test and evaluate LWIR filters and materials.

Unique to US: The Long Wavelength Infrared Filters and Materials Evaluation Laboratory has been developed over the last thirty years in order to address fundamental radiometric issues associated with LWIR applications for both DoD and civilian projects. This facility's pre-eminent standing in the United States infrared technology and research communities has been achieved through development of unique test apparatuses, test methodology and personnel expertise over this time frame. Critical technical issues involving emissive, transmissive and reflective properties of optical components are identified and investigated using spectrophotometric equipment specifically designed to test the state-of-the-art in precision controlled cryogenic environments. No other facility in the United States, government owned or private, has the test hardware or the expertise to provide this support for the myriad military surveillance, meteorological and astronomical programs which consistently fund this laboratory.

Electronic Packaging Facility

The purpose of the Electronic Packaging Facility is the packaging of electronic devices and testing these devices to military specifications. Packaging includes die separation, die bonding, wire bonding, and sealing devices in a hermetic enclosure. Testing includes device burn-in, leak testing, temperature cycling, and particle impact noise detection. The facility has 18 Mega ohm deionized water, appropriate plumbing for gasses, house vacuum for backing pumps, and fume hoods for chemical work.

Micro-electronics Laboratory

The purpose of the Microelectronics Lab is to provide expertise in the research and exploratory development of microelectronics in support of the C3I, Navy fleet systems, and Ocean Surveillance missions. A partial list of the laboratory equipment follows: Gemini II Epitaxial Reactor, Eaton Ion Implanter, GCA XLS I-Line Stepper, Perkin Elmer Aligner, Bruce Furnaces - Four Banks, Varian Metalization System, Drytek Metal Etcher, Poly Etcher 5000, 1513 Oxide Etcher, Electron Microscope, Credence VLSI Tester, and Sentry VII Tester. The Microelectronics Lab requires Class 10 and Class 100 Clean Room conditions with monitoring capabilities, vibration free building foundation, cryogenic storage and handling equipment, temperature and humidity control. The vibration free building is required to support the photolithographic, quality control, diagnostic and test equipment. Laminar flow ceilings and work stations with HEPA filters are required for particulate control. Environmental control requirement for the Microelectronics Lab include temperature control at 20 degrees C +/- 2 degrees; humidity control at 45% +/- 5%; and five air scrubbers are required for the gas handling, wet chemical etching, dry plasma etching and deposition systems.

Electronic Materials Science Facility

The Electronic Materials Science Facility is used for semiconductor materials development, and electronic and optoelectronic device development. The facility includes the Electronic Materials Lab and Class 1000 Clean Room. Environmental control requirements for the Electronic Materials Science Facility include temperature and humidity control for the clean room facility, toxic gas monitoring, and 12,000 cfm vent system with 100% makeup.

Inertial Navigation Facility (INFAC) (unique to U.S.) (50% used by this CSF).

INFAC supports the Navy air and marine surface and subsurface navigation RDT&E in evaluating the performance related capabilities of inertial components (gyroscopes and accelerometers) in an environment that is free of external influences. Since these components are the prime drivers of inertial navigator performance, determining their performance characteristics is crucial to understanding and improving inertial navigation in the fleet.

The INFAC is recognized as the most seismically stable inertial navigation facility in the United States. It was designed and built specifically to evaluate precision inertial sensors (gyroscopes and accelerometers). It is unique partly because of the benefits it derives from location. The concept behind INFAC's design was to locate the facility to minimize seismic and other noise disturbances to the inertial sensors being tested and then to construct the facility so as to minimize local man-made disturbances. INFAC's location is remote from vehicular traffic as a site that is seismically quiet and where the bedrock is near ground level. The building is circular in shape to minimize wind effects

and constructed slightly below grade to permit the attachment of short, squat piers directly to bedrock. To reduce the introduction of shock and vibration, required support machinery is shock and vibration isolated and housed in a separate building. Noise from local foot traffic is minimized by suspending the floor out to the vibration damped footings of INFAC.

CSF 11. Environmental Sciences

Environmental Sciences Facility (Unique to U.S.)

The Environmental Sciences Facility supports the Marine Environmental Quality Program. San Diego Bay, less than 100 yards from the Ocean Sciences Laboratory, is a marine embayment which supports the San Diego Naval Complex and several Cities surrounding the Bay. The bay is used constantly by the Environmental Sciences Division as a resource and test bed for environmental quality RDT&E. Specifically, the Bay is necessary and used for the following purposes:

1) San Diego Bay is the source of pumped sea water into the Ocean Sciences Laboratory and the Portable Environmental Test Facility for marine biological and chemistry studies to evaluate Navy environmental issues.

2) San Diego Bay is used as an effective test bed for environmental instrumentation, sensors and ecological risk assessment methods developed by Environmental Sciences Division.

This facility is unique to the U.S. due to the close proximity of the San Diego Navy "Megaport" including Navy Fleet assets, shore facilities and environmental issues such as aquatic hazardous waste sites that are needed for both effective technology demonstration and transfer. The proximity of full spectrum of Navy ships is important for on-going project to evaluate the impacts of shipboard effluents and hull coatings. The Navy Environmental Leadership Program site for the West Coast is North Island Naval, Air Station, with many Bay issues that will be addressed.

Propagation Test Facility (unique to U.S.)

The primary purpose of the Propagation Test Facility is to simulate typical radio, radar, and electro-optic shipboard environments from which both propagation measurements and system performance assessment studies can be made. The most important aspects of this facility are an unobstructed view of the ocean's horizon at typical shipboard heights (50 to 100 feet above sea level); the rise of Point Loma peninsula to an altitude of approximately 400 feet behind the facility, providing reduction of nearby electromagnetic transmissions from the greater San Diego metropolitan area; the concave coastline and offshore islands of Southern California that provide many options for propagation paths; the Mediterranean climate that produces frequent ducting

that is typical of other militarily important areas like the eastern Mediterranean, the Arabian Gulf, and the northern Arabian Sea; the prevailing westerly wind which produces propagation conditions that are predominately representative of the open-ocean and coastal regions. The nearby Naval Station San Diego makes the fleet and the offshore exercise areas readily accessible for shipboard tests and evaluations.

Unique to US: The Propagation Test Facility is unique to the U.S. because of its physical sitting, geographic configuration, climatic regime, and its proximity to both the fleet and offshore fleet operating areas. This facility can not be replicated anywhere in the world.

CSF 12. Environmental Quality

Ocean Sciences Laboratory (unique to Fed Govt)

The Ocean Sciences Laboratory provides more than 11,500 square feet of specialized spaces to support basic and applied research for Navy requirements. A flow-through seawater system delivers San Diego Bay water into about half of these labs for experimental uses. Unique and specialized instrumentation for environmental analyses include atomic absorption spectrophotometry, ICP atomic emission spectrophotometry, gas chromatography, high performance liquid chromatography (HPLC), gas chromatography/mass spectrometry (GC/MS), ultraviolet-visible spectrometry, scanning spectro-fluorometry, xray fluorescence, electrochemical instrumentation, electrophoresis instrumentation, scanning electron microscopy and cell culture instrumentation. All lab spaces are equipped with the most current analytical instrumentation. Nearby pier space is available for environmental survey and support craft. Several mobile assessment and monitoring capabilities are also located adjacent to this facility.

Unique to Federal Government: The Ocean Sciences Laboratory houses a fully-equipped chemistry, biology and sensor instrumentation development facility with state-of-the-science capabilities for marine environmental quality and ocean science research applications. Proximity and access to a broad range of naval ship and shore facilities in the immediate San Diego area serves to provide a unique environment for applied science and technology research efforts. This capability is unique to the Federal Government.

Marine Environmental Survey Capability (MESC) (unique to Fed Govt)

The Marine Environmental Survey Capability (MESC) is housed on the 40 foot custom built research vessel R/V ECOS in San Diego Bay and provides the Navy with a capability to measure multiple environmental parameters in real-time incorporating a data processing/ management system which allows near-real time mapping of significant environmental parameters.

Unique to Federal Government: The Marine Environmental Survey Capability

(MESC) provides for the rapid continuous measurement and mapping of environmental chemical, physical and biological parameters in marine environments such as navy harbors. MESC is a fully integrated system which incorporates navigation, data logging, and a number of NCCOSC RDTE DIV SAN DIEGO CA developed sensors which provides a unique capability to assess and map information about the marine environment. This capability is unique to the Federal Government.

Site Characterization and Analysis Penetrometer System (SCAPS)

The Site Characterization and Analysis Penetrometer System (SCAPS) provides the Navy with a capability to detect and measure petroleum, oil and lubricant (POL) contaminants in the soil at hazardous waste sites with a mobile, real-time, in-situ laser/fiber optic/computer-based system. Plume definition and mapping before remediation and verification of cleanup after remediation are accomplished. State-of-the-art optical, data processing and computer equipment is installed on board a 20-ton all wheel drive cone penetrometer vehicle.

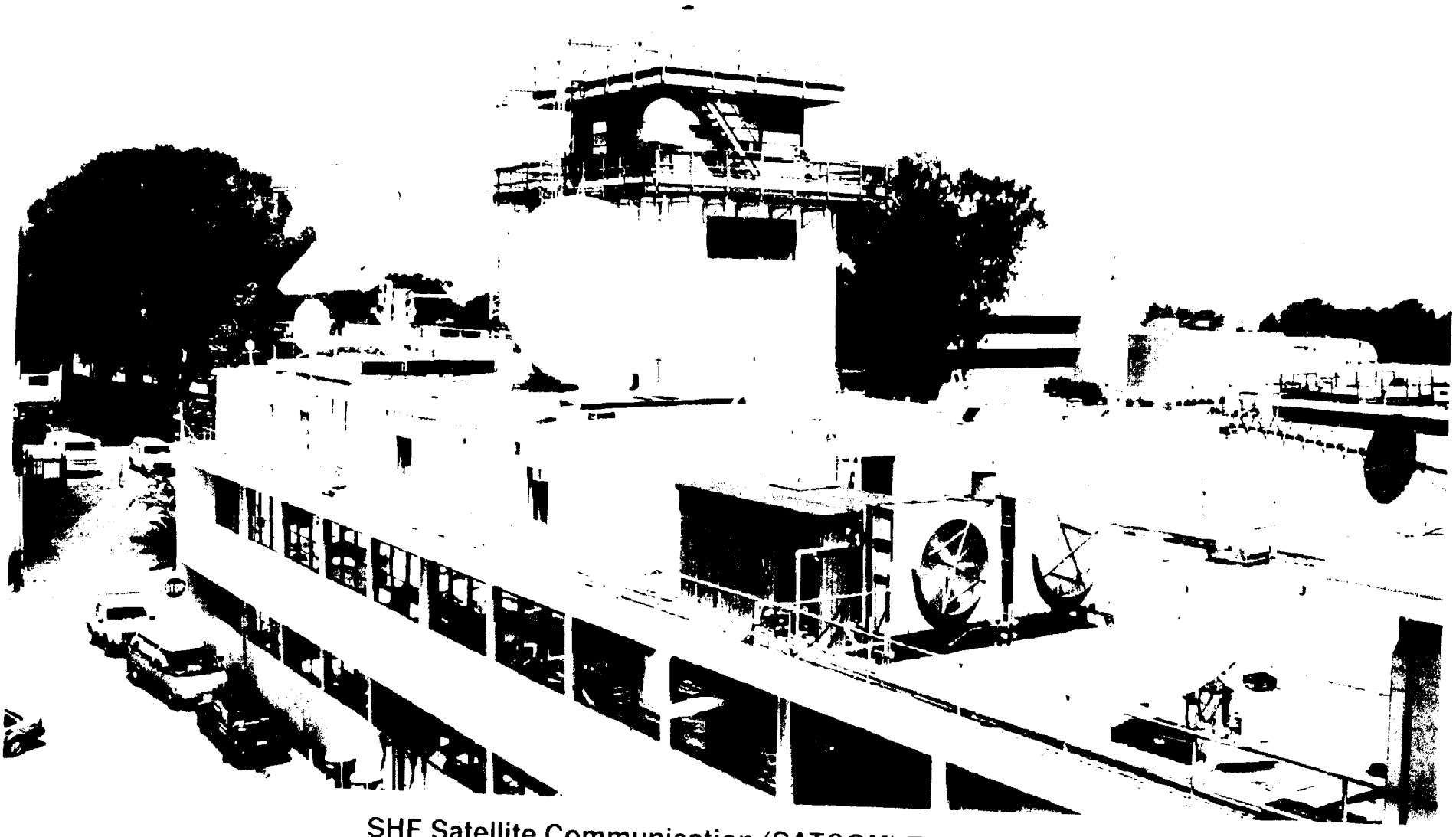
CSF 13. Advanced Materials

Materials Research Laboratory

The facility is used to conduct research and development in the electronic and magnetic properties of synthetic materials such as ceramics, polymers, and organic solids, as well as in electrochemistry and high-energy-density batteries. Materials are prepared and tested in the laboratory, characterized electrically, magnetically and structurally, and evaluated as suitable devices and components for future Navy systems.

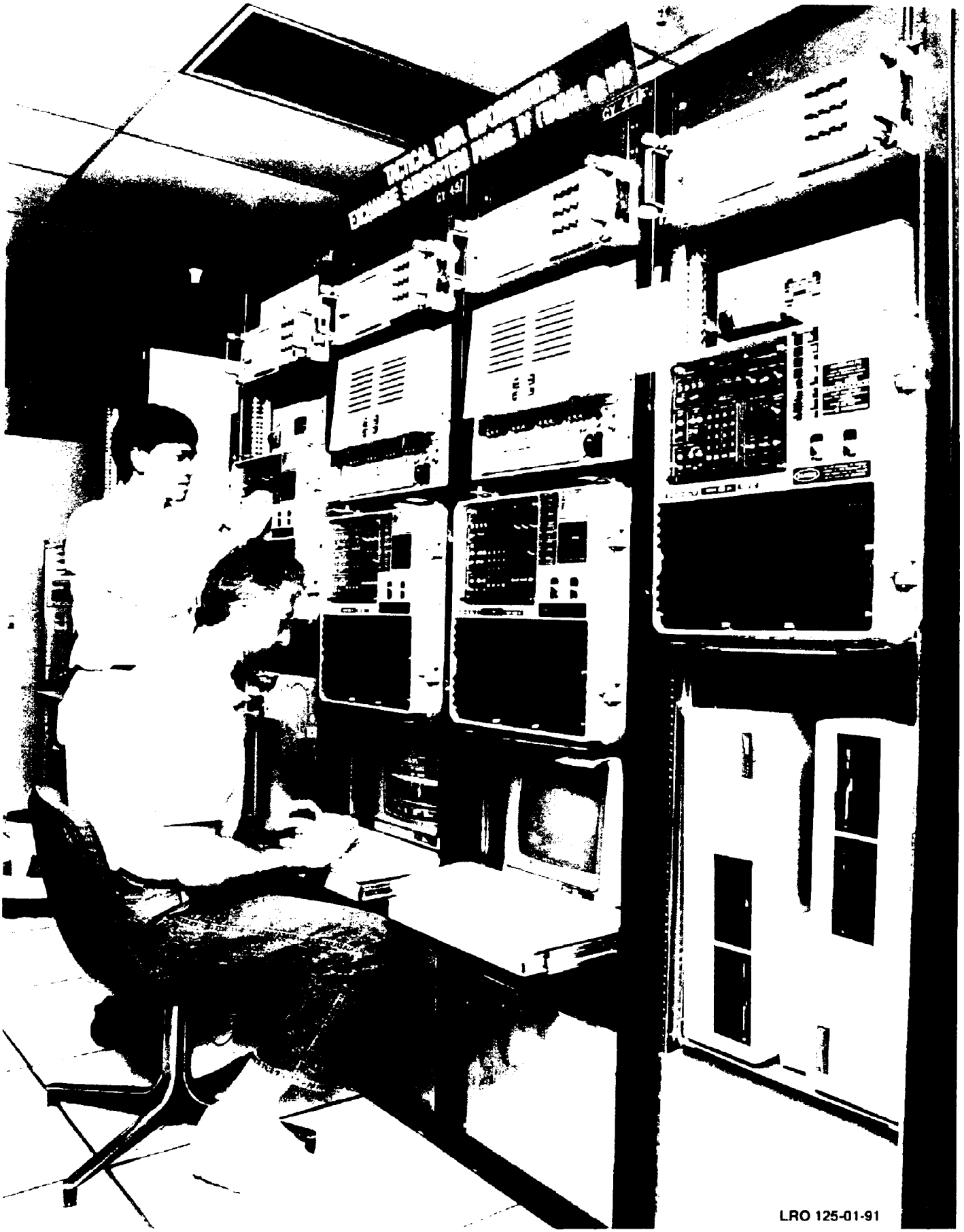
NCCOSC RDTE DIV N66001

Aircraft Motion Simulator. UIC N66001 Photo 2



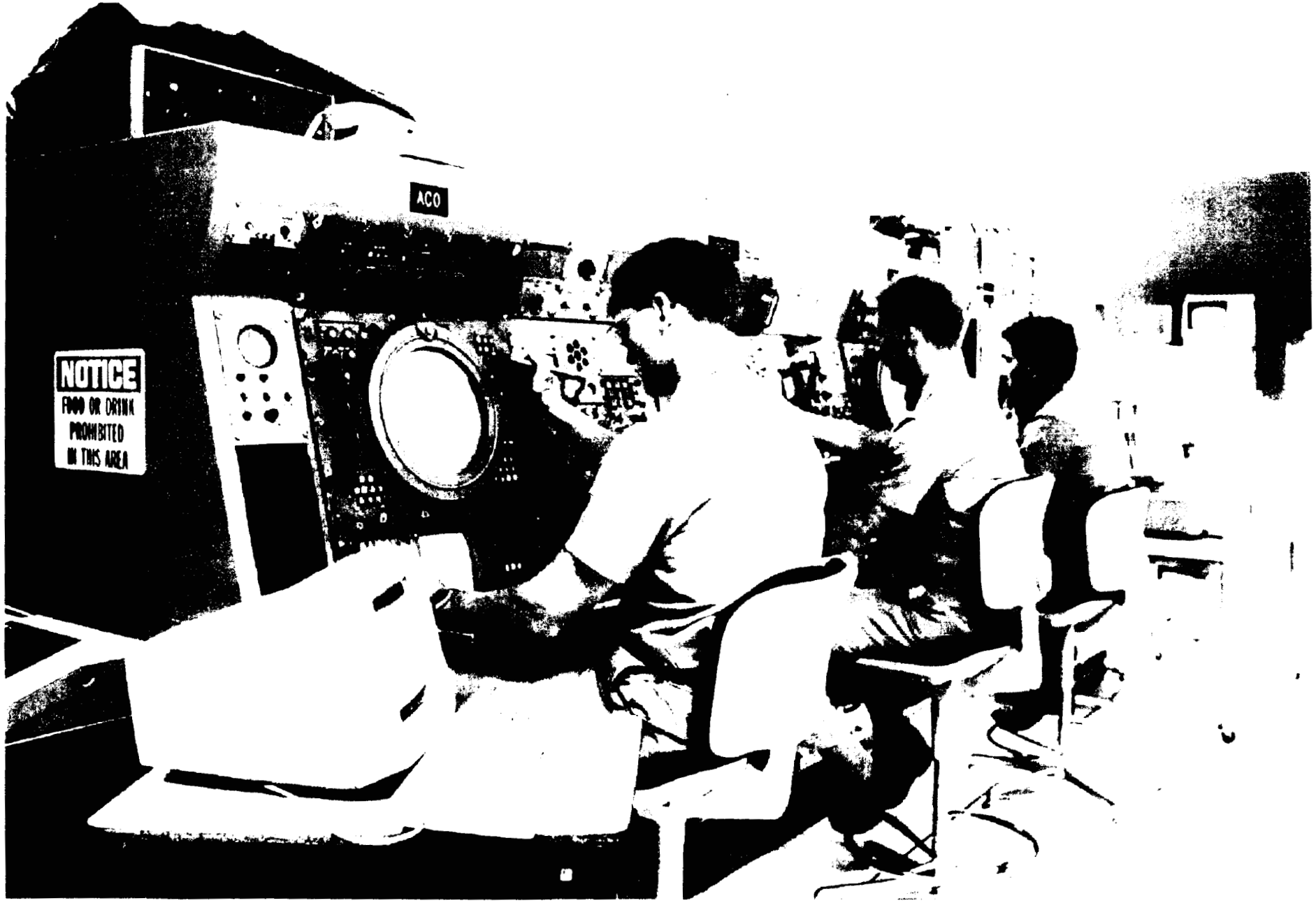
SHF Satellite Communication (SATCOM) Test Facility.

UIC N66001 Photo 3



Navy UHF Satellite Communications Test Facility (NUSTF) 121A

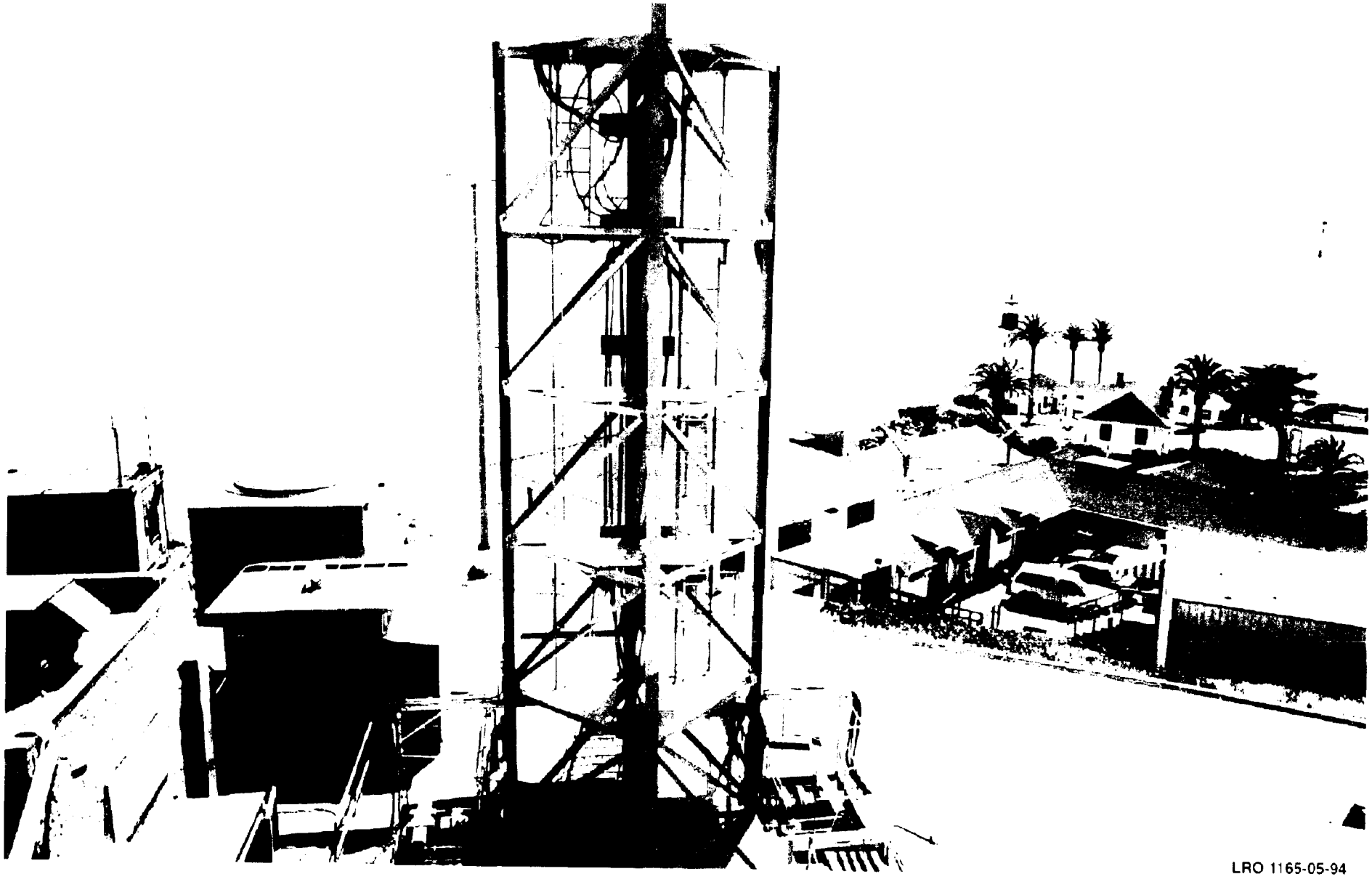
UIC N66001 Photo 4



E2-C Airborne Tactical Data Systems (ATDS) Integration Laboratory. UIC N66001 Photo 5

Ship Antenna Model Range and Simulation Facility.

UIC N66001 Photo 6



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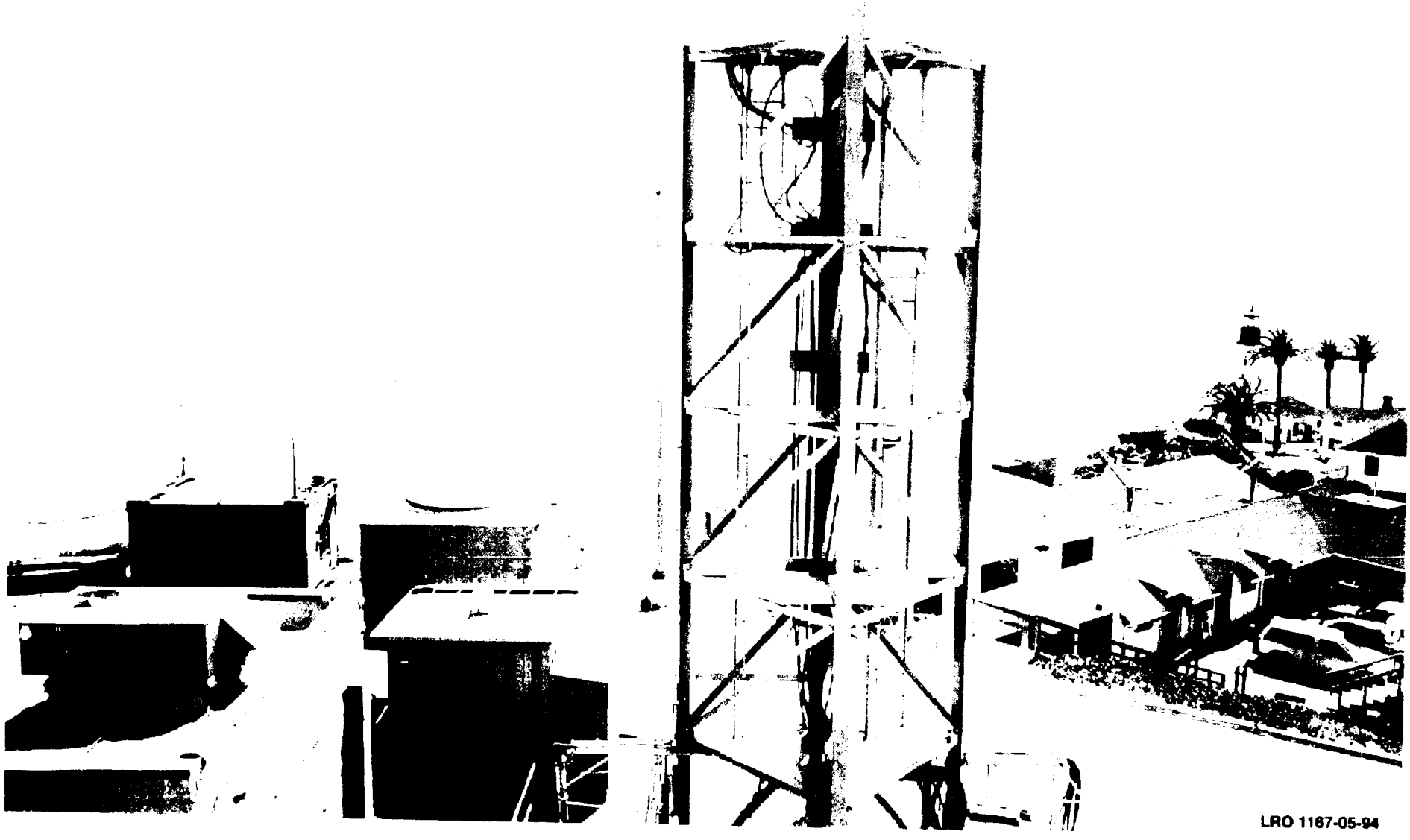
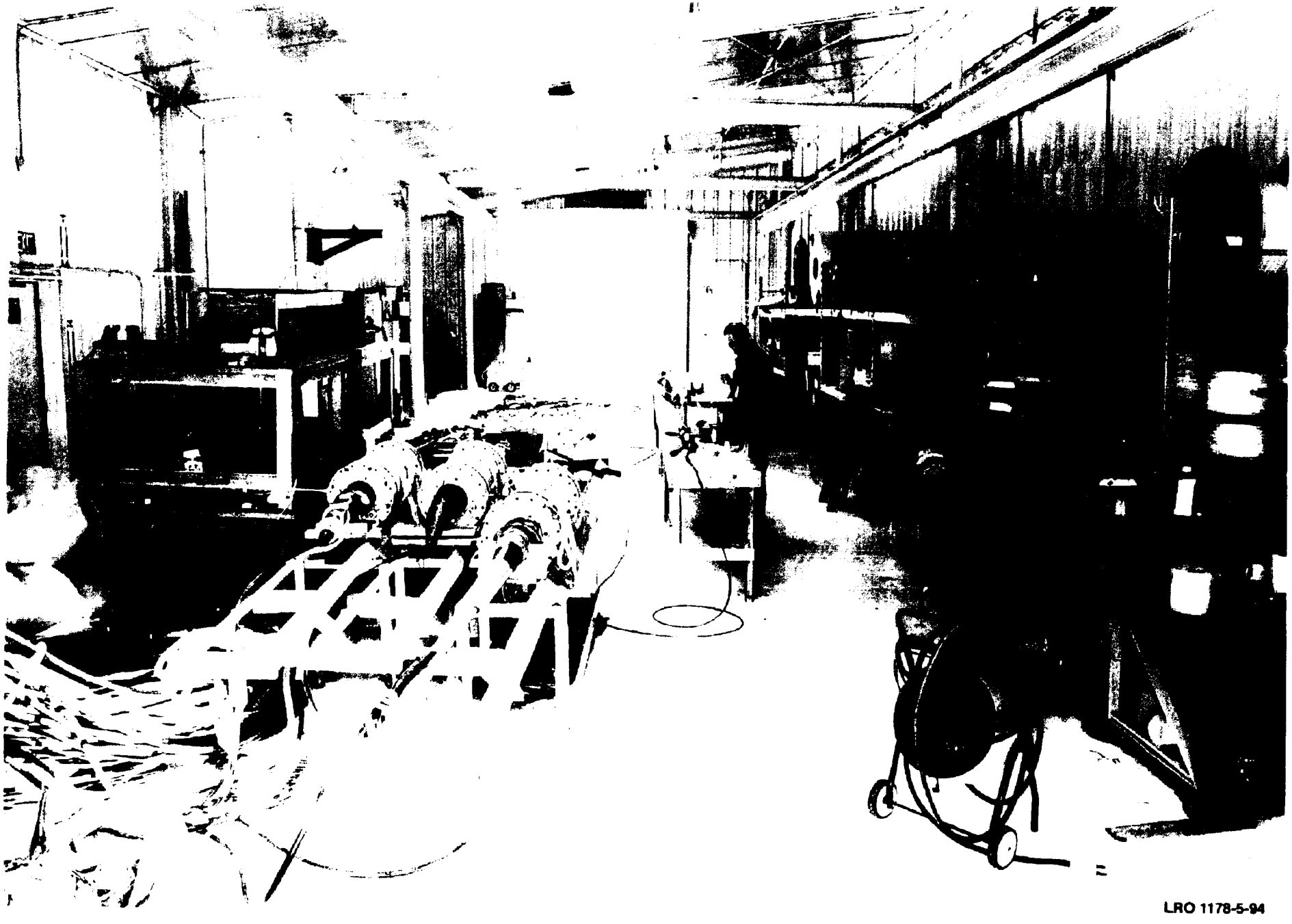
VLF/LF Integrated Test Facility.

UIC N66001 Photo 7



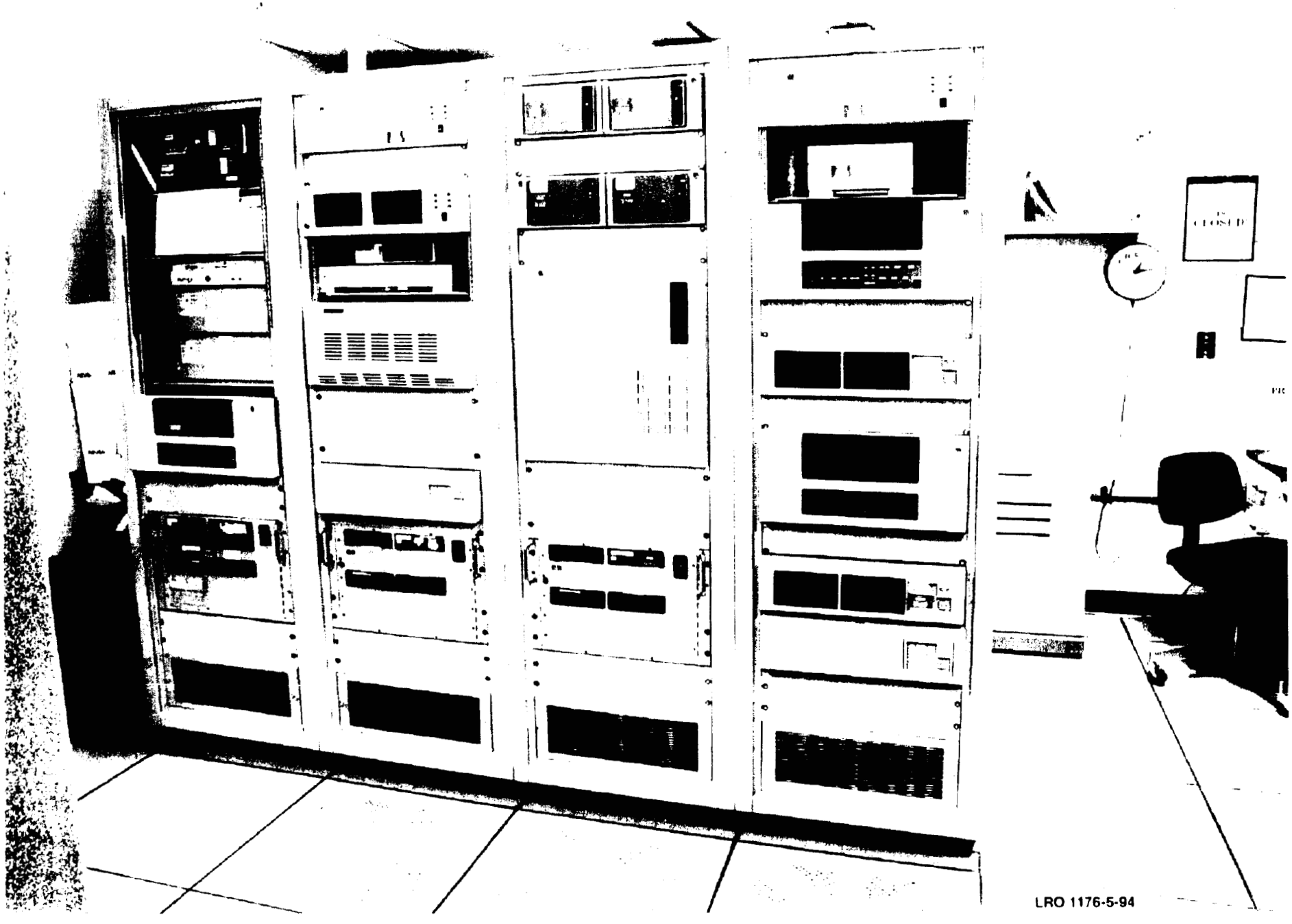
EHF Satellite Communications Terminal Test Facility.

UIC N66001 Photo 8



Deployable Surveillance Integration Facility

UIC N66001 Photo 9



Bayside Acoustic Systems Computational Center (BASCC) UIC N66001 Photo 10

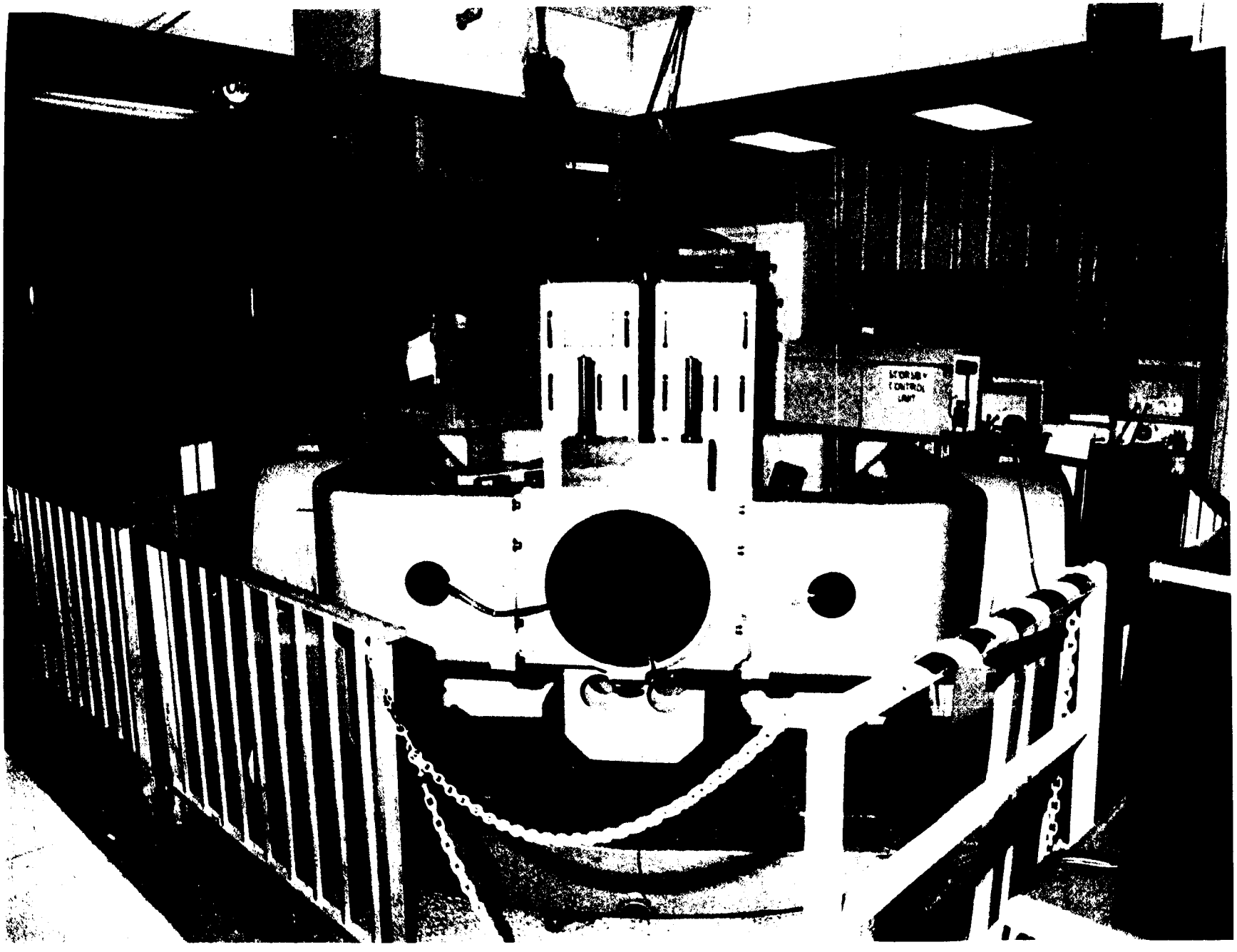
Combat Direction System (CDS) Development and Evaluation Site (CDES).

Navy Tactical Command System Afloat (NTCS-A) Testbed and Integration Facility.

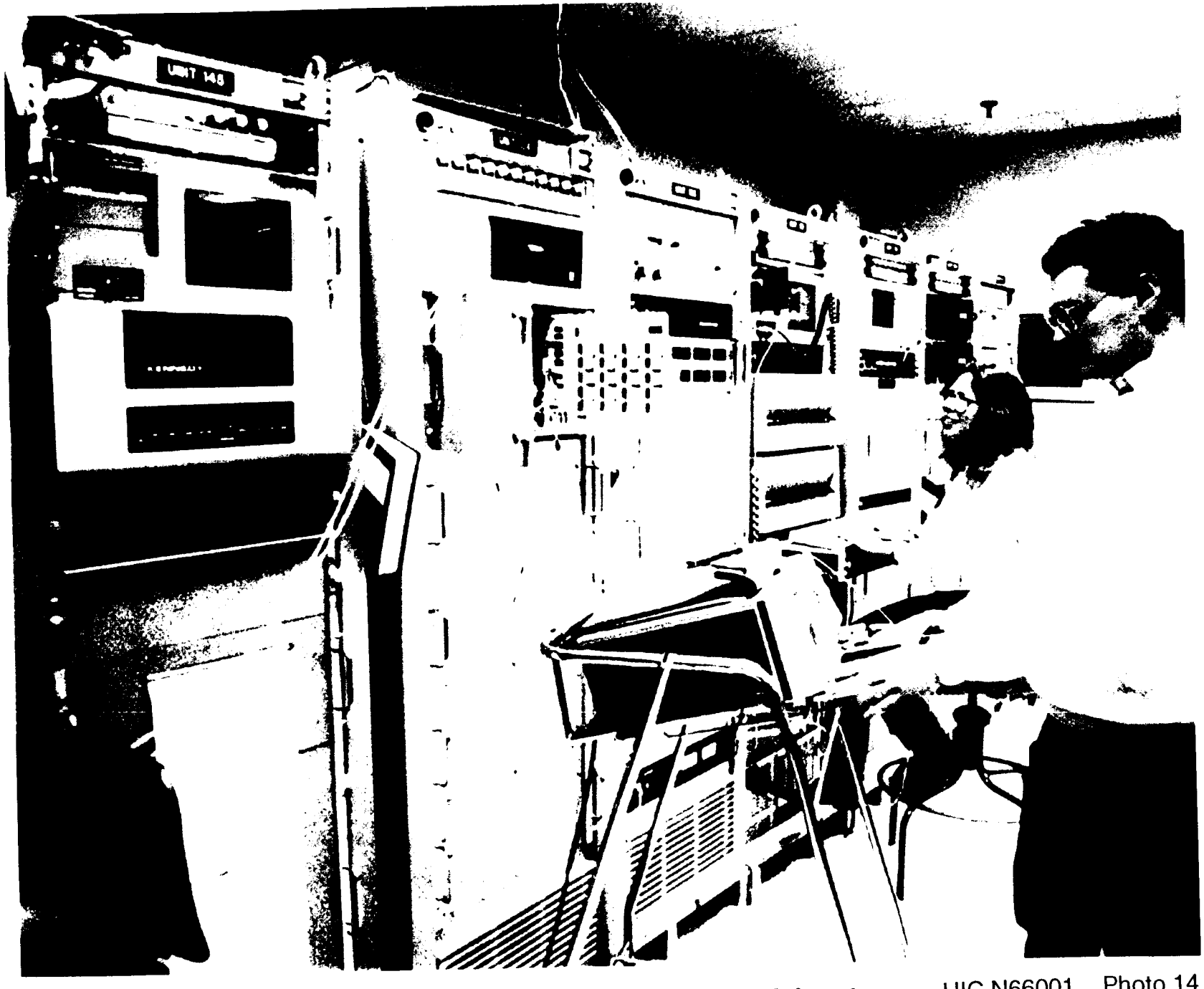
UIC N66001 Photo 12

Surveillance Test and Integration Center (STIC).

UIC N66001 Photo 17



Simulated Ships Motion Test Facility. UIC N66001 Photo 13



Ocean survey systems integration laboratory. UIC N66001 Photo 14

Survivable Adaptable Fiber-Optic Embedded Network (SAFENET) Development Site.

Information Transfer Management Structure (ITMS). UIC N66001 Photo 16

Tactical Engineering Analysis Laboratory (TEAL). UIC N66001 Photo 18

Tactical Systems Laboratory (TSL).

UIC N66001 Photo 19

High Performance Computing and Theater Level Planning Laboratory. UIC N66001 Photo 20

Navy Command and Control System Ashore (NCCS-A) Integration and Test Facility

UIC N66001 Photo 21

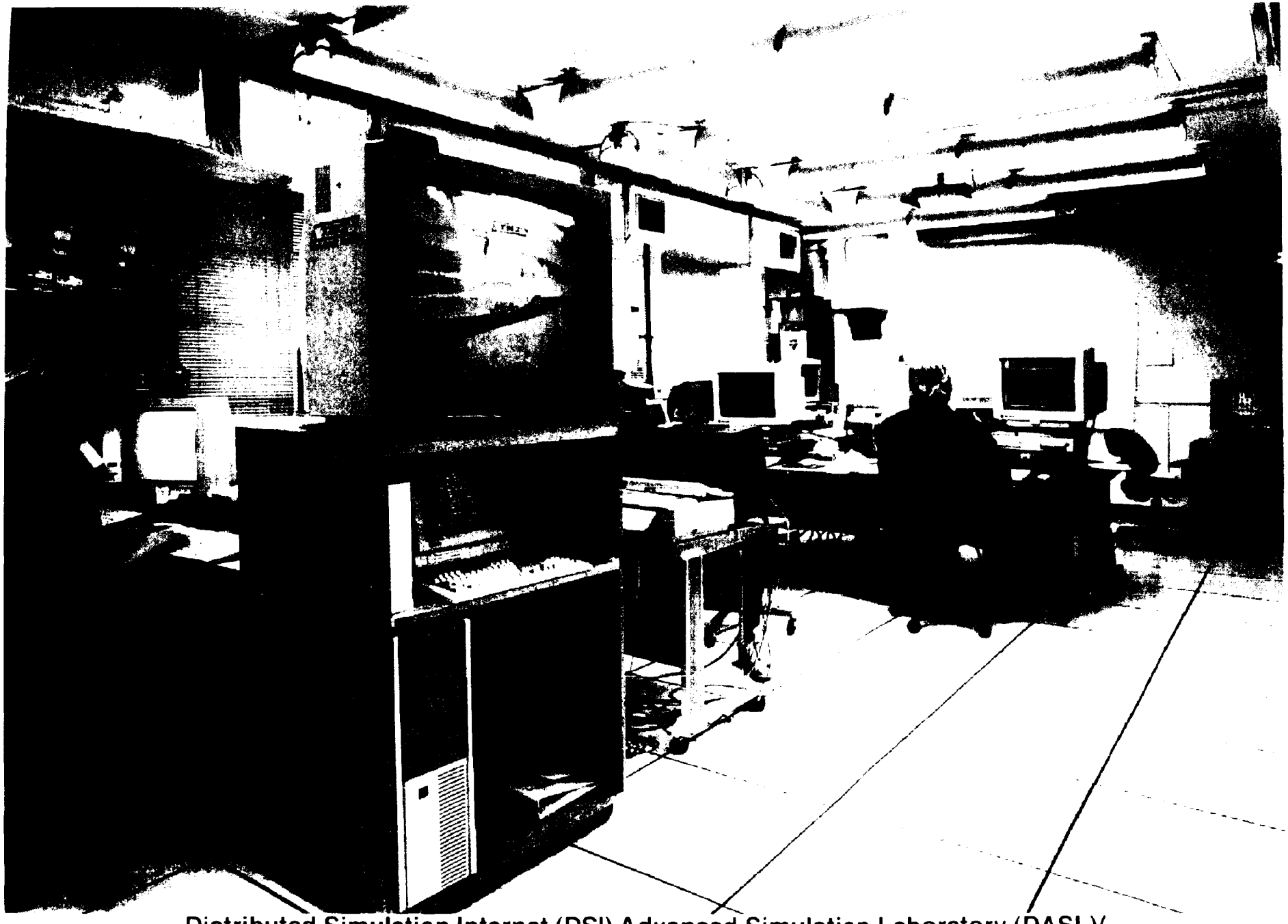
Navy Intelligence Development, Integration and Test Facility. UIC N66001 Photo 22

Ocean Surveilance Information System (OSIS) Evolutionary Development (OED) Laboratory.

Distributed Command and Control (C2) Laboratory.

UIC N66001 Photo 24

Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Laboratory



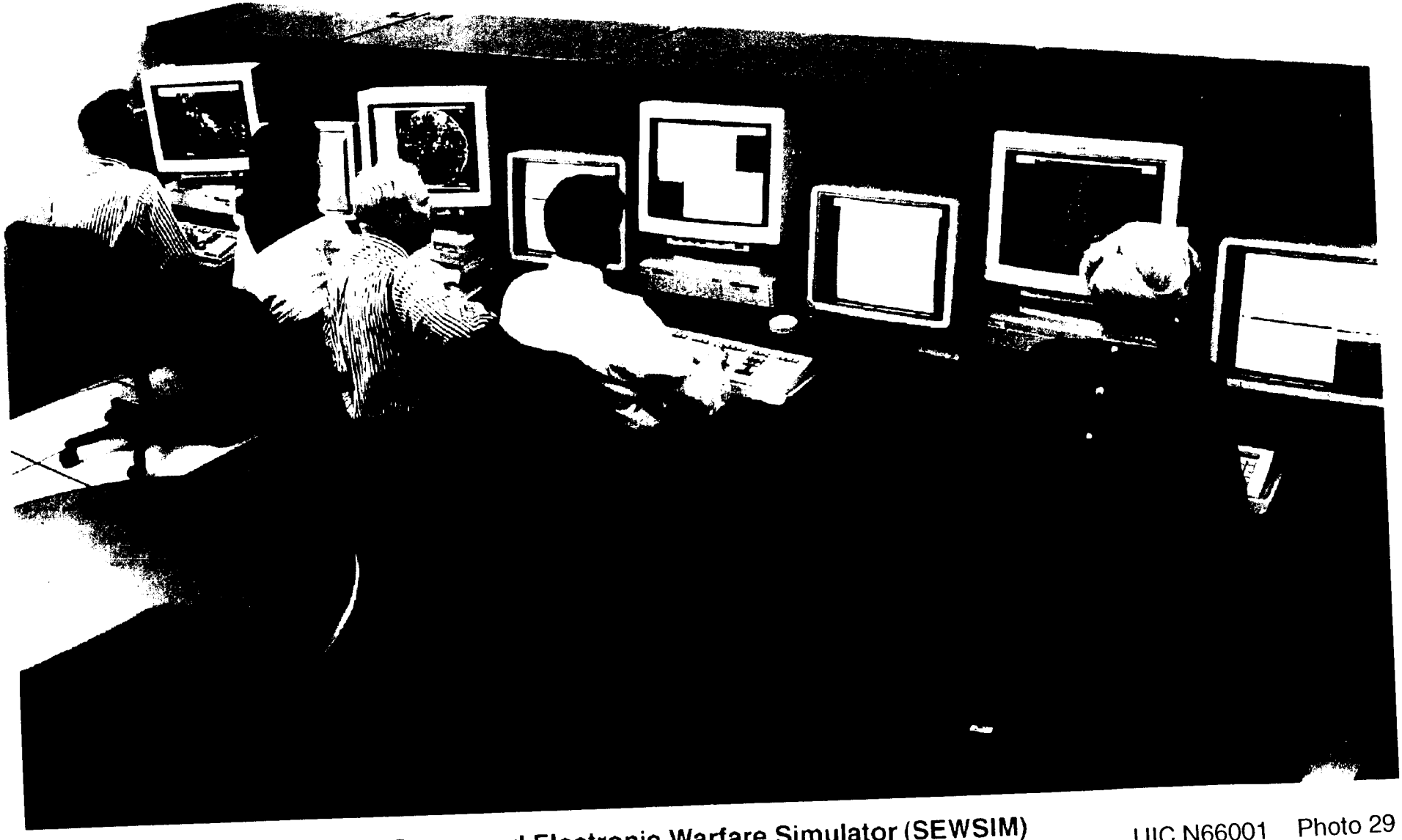
Distributed Simulation Internet (DSI) Advanced Simulation Laboratory (DASL)/
Secure DSI Integration Simulation Laboratory (SISL).

UIC N66001 Photo 26

Command Center of the Future

UIC N66001 Photo 27

Processing and Data Exploitation Center (PDEC) UIC N66001 Photo 28



Space and Electronic Warfare Simulator (SEWSIM)

UIC N66001 Photo 29

Signals Warfare Integrated Facilities Testbed (SWIFT).

87a

UIC N66001 Photo 30

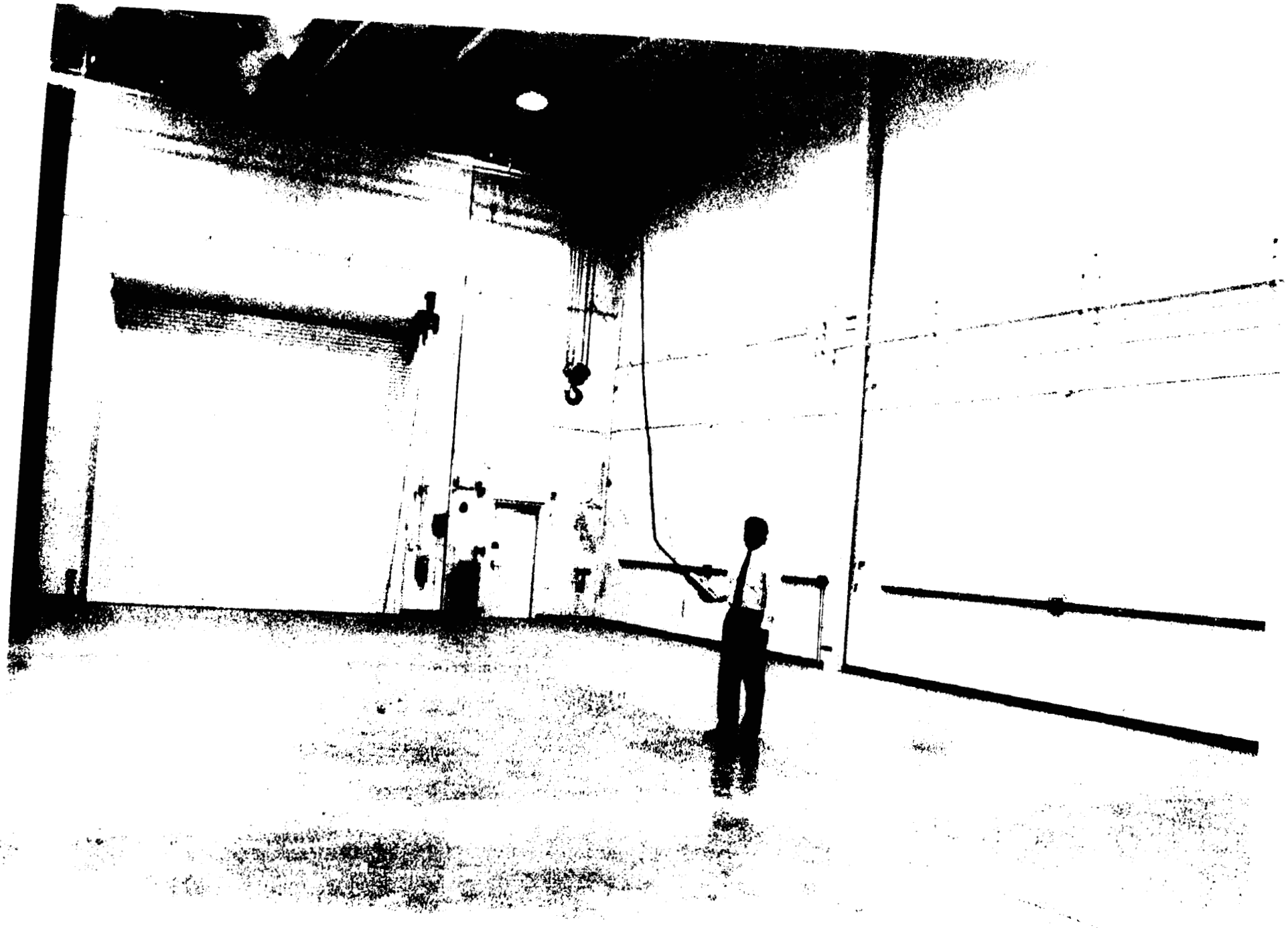
RF Microelectronics Laboratory

UIC N66001 Photo 1

NRaD Antenna Range

UIC N66001 Photo 31

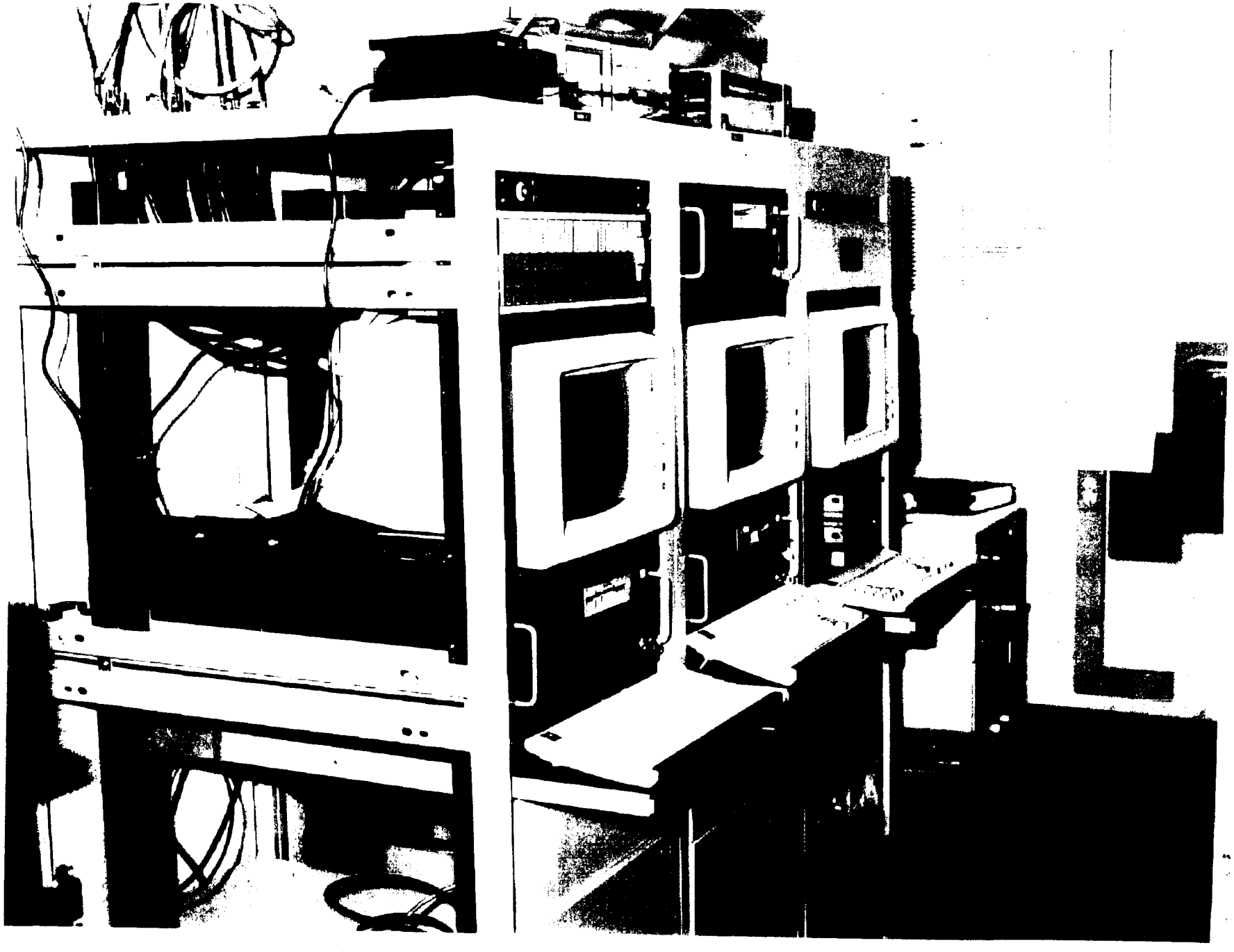
Radar Signal Processing Laboratory (RSPL) UIC N66001 Photo 32



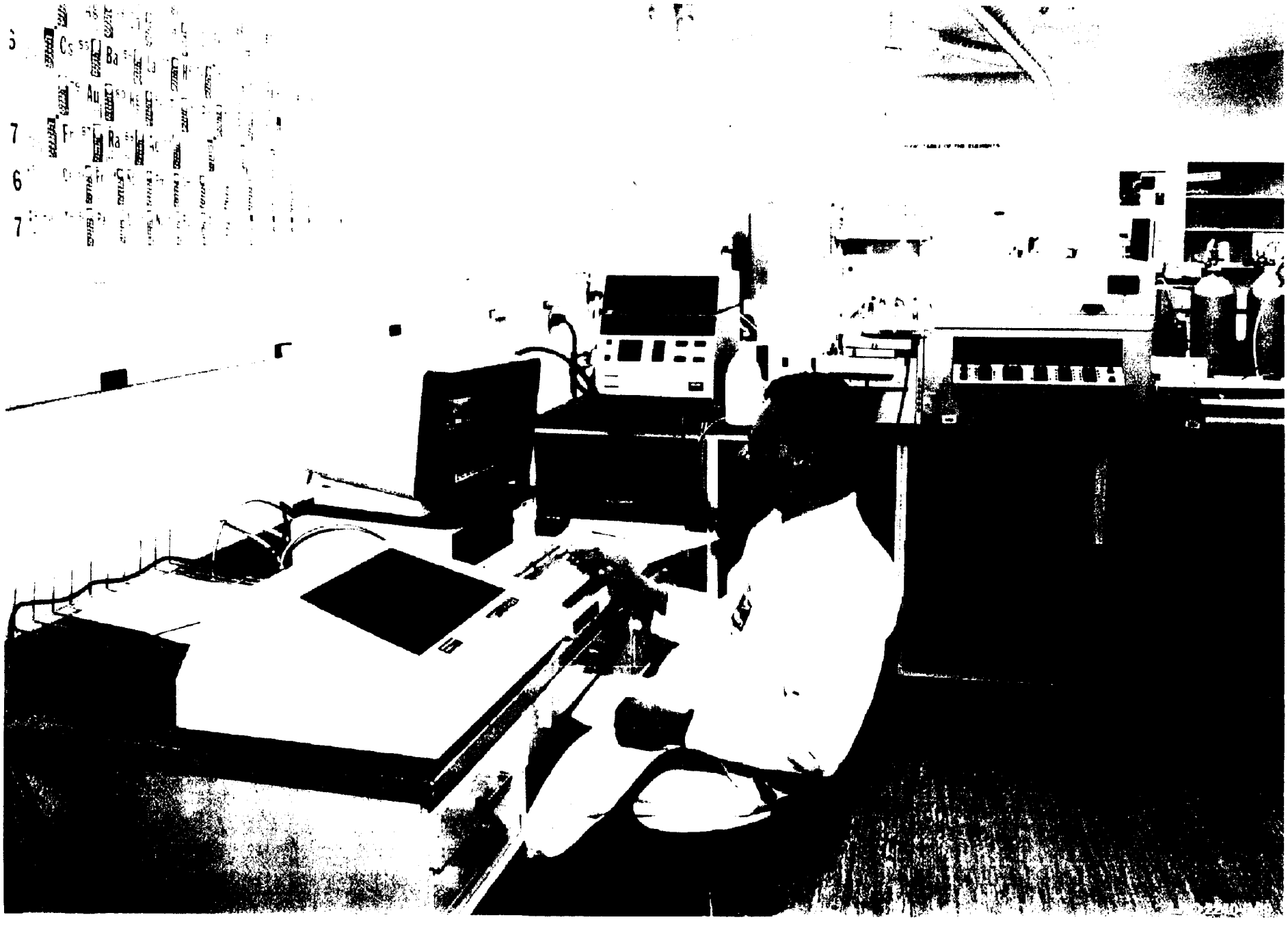
Secure Facilities, Vaults and Underground Bunkers.

UIC N66001 Photo 33

Indoor Robotics Development/Test Facility UIC N66001 Photo 34



Communications Support System Simulation Facility. UIC N66001 Photo 35

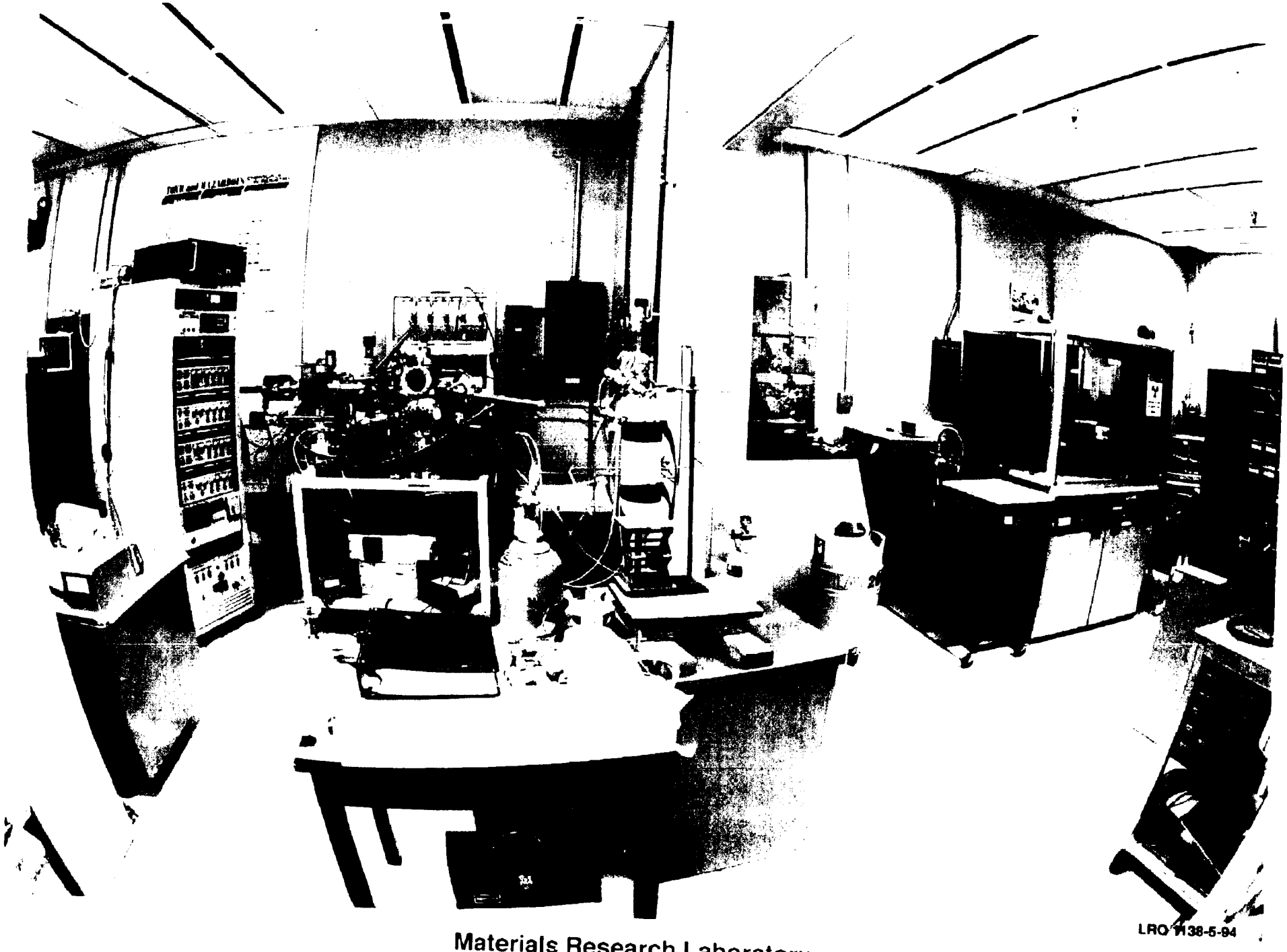


Ocean Sciences Laboratory

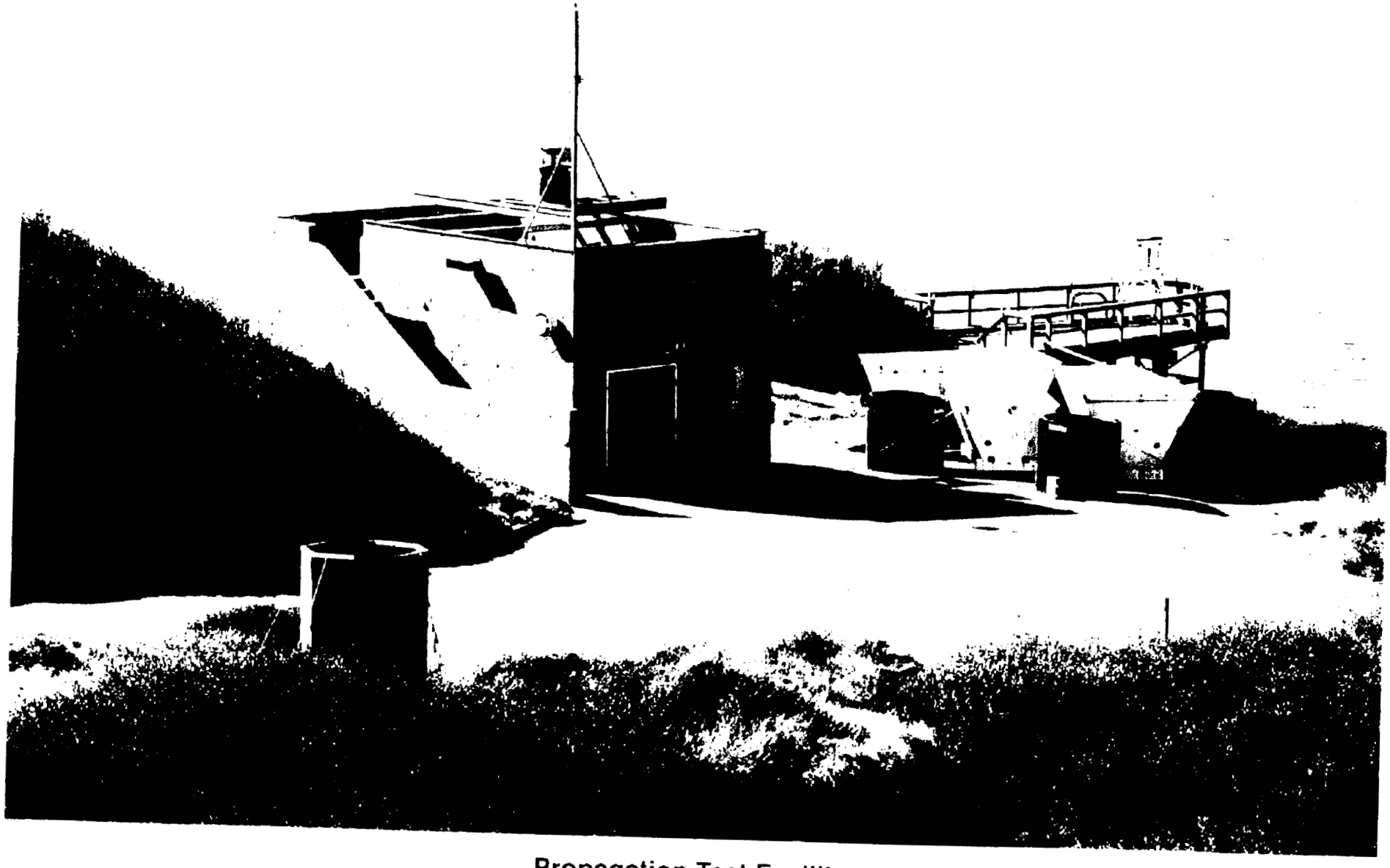
UIC N66001 Photo 36

Marine Environmental Survey Capability (MESC) UIC N66001 Photo 37

Site Characterization and Analysis Penetrometer System (SCAPS) UIC N66001 Photo 38



Materials Research Laboratory

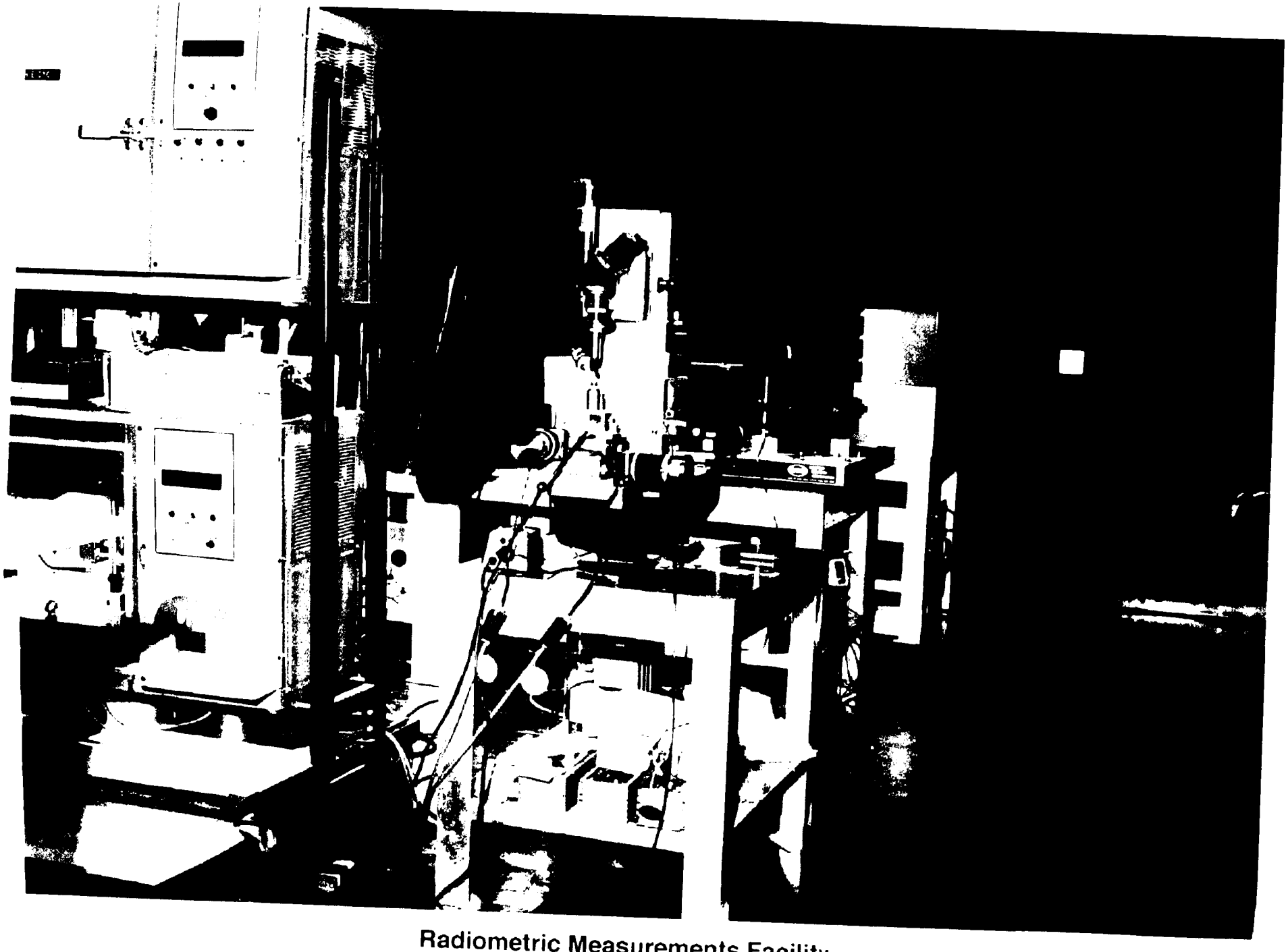


Propagation Test Facility

UIC N66001 Photo 40

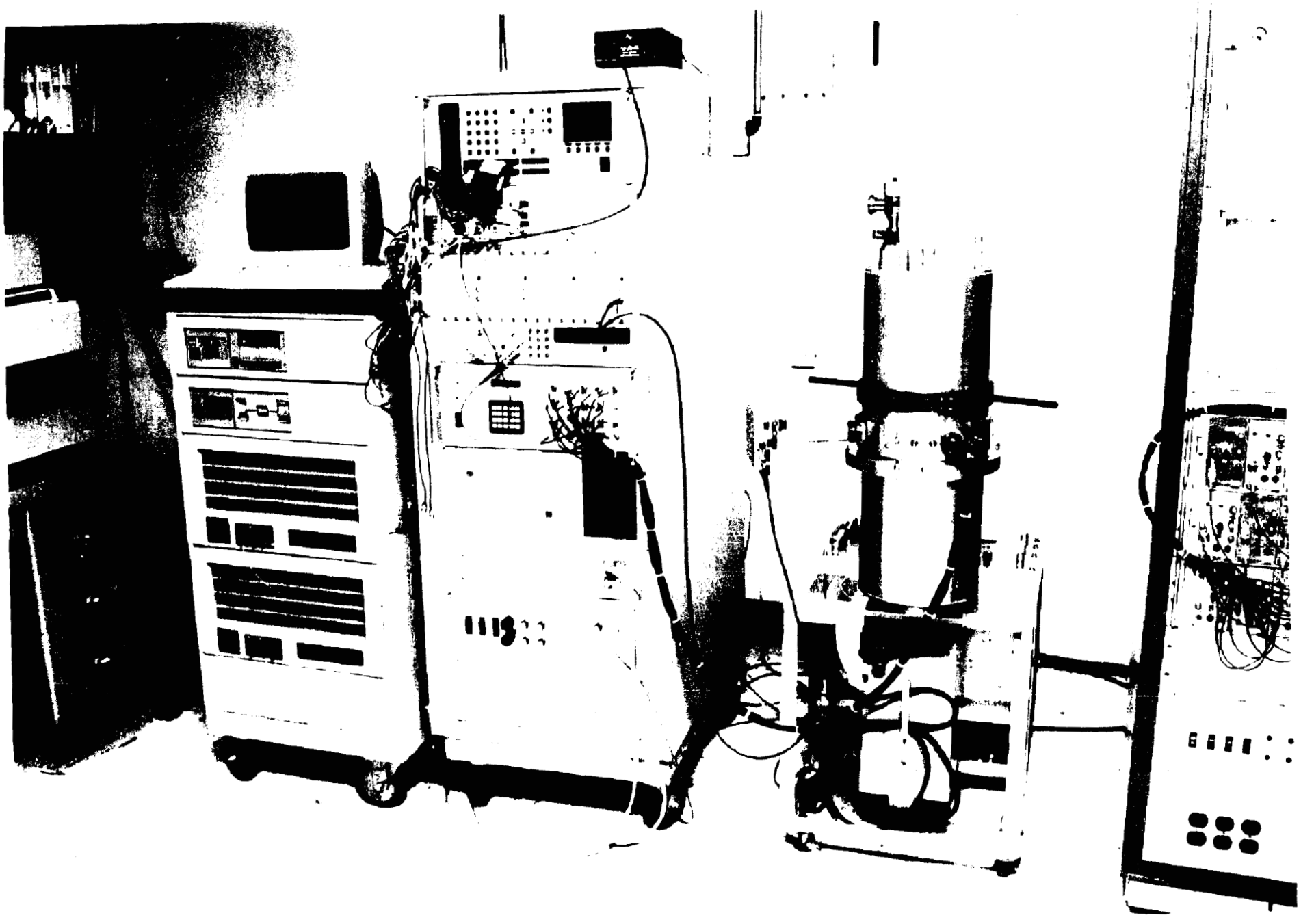
Microelectronics Computer Aided Design (CAD) Facility

UIC N66001 Photo 41



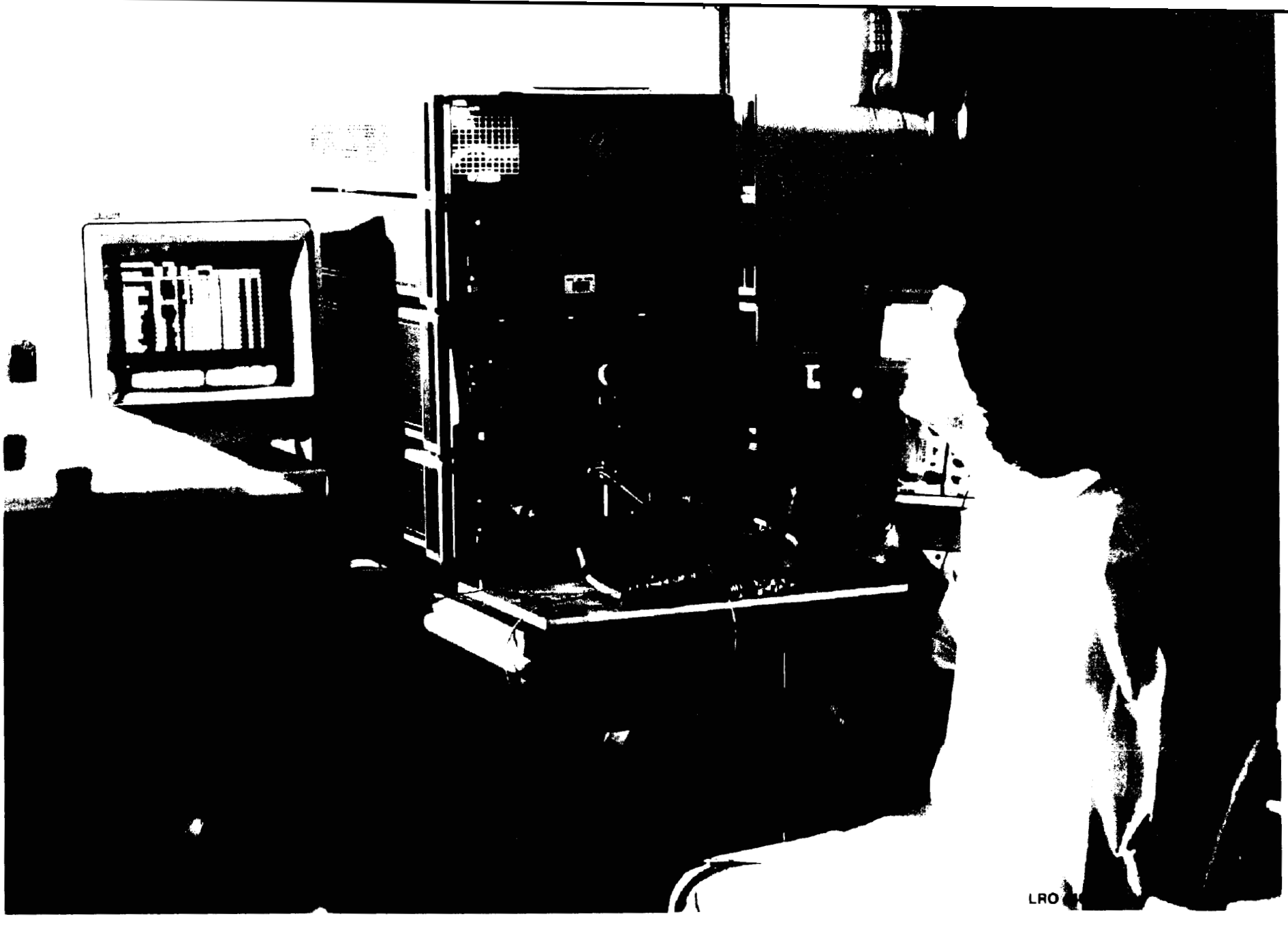
Radiometric Measurements Facility

UIC N66001 Photo 42

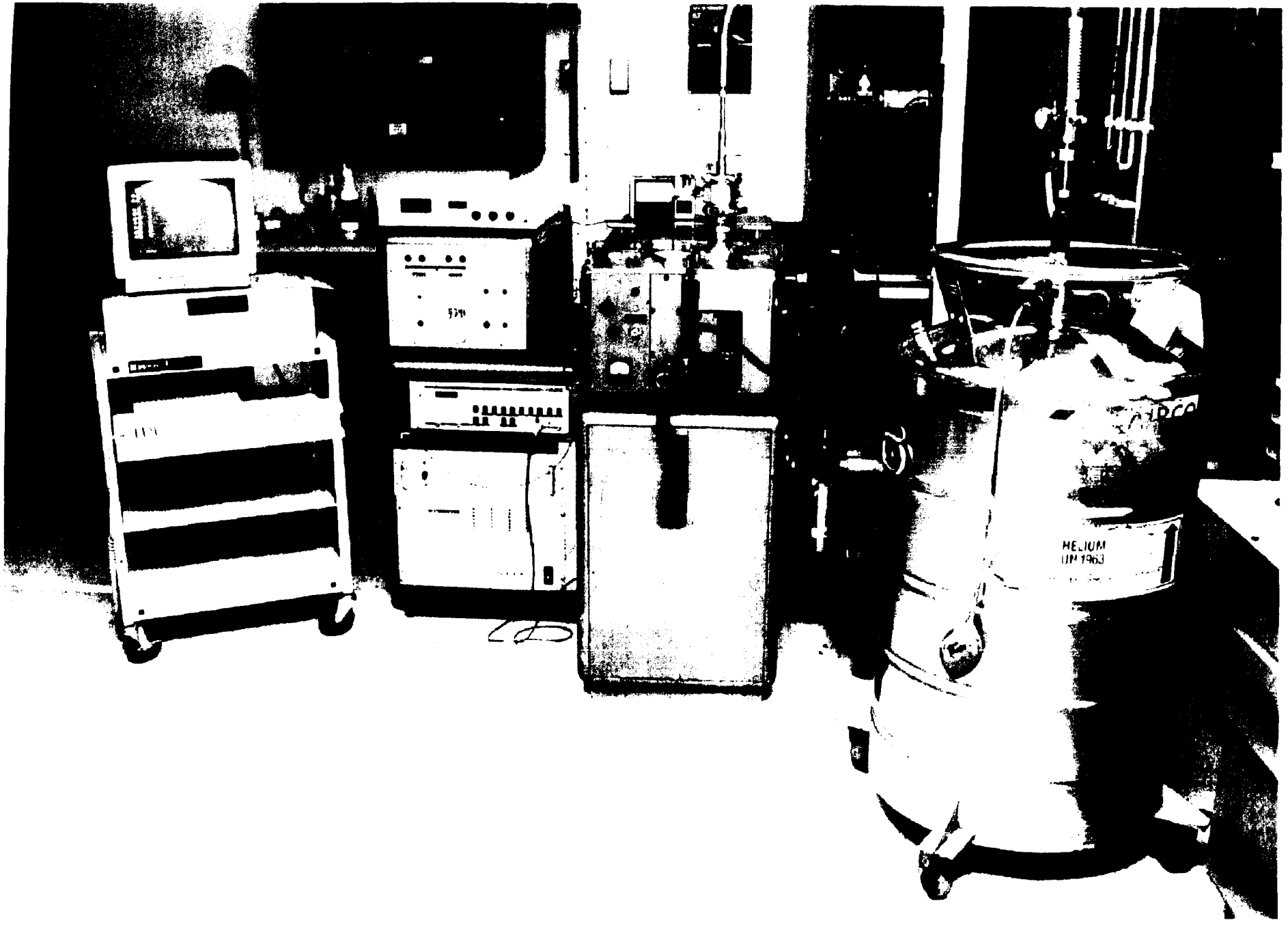


Infrared Focal Plane Array Test Facility

UIC N66001 Photo 44



Optoelectronic Device Characterization Facility UIC N66001 Photo 43



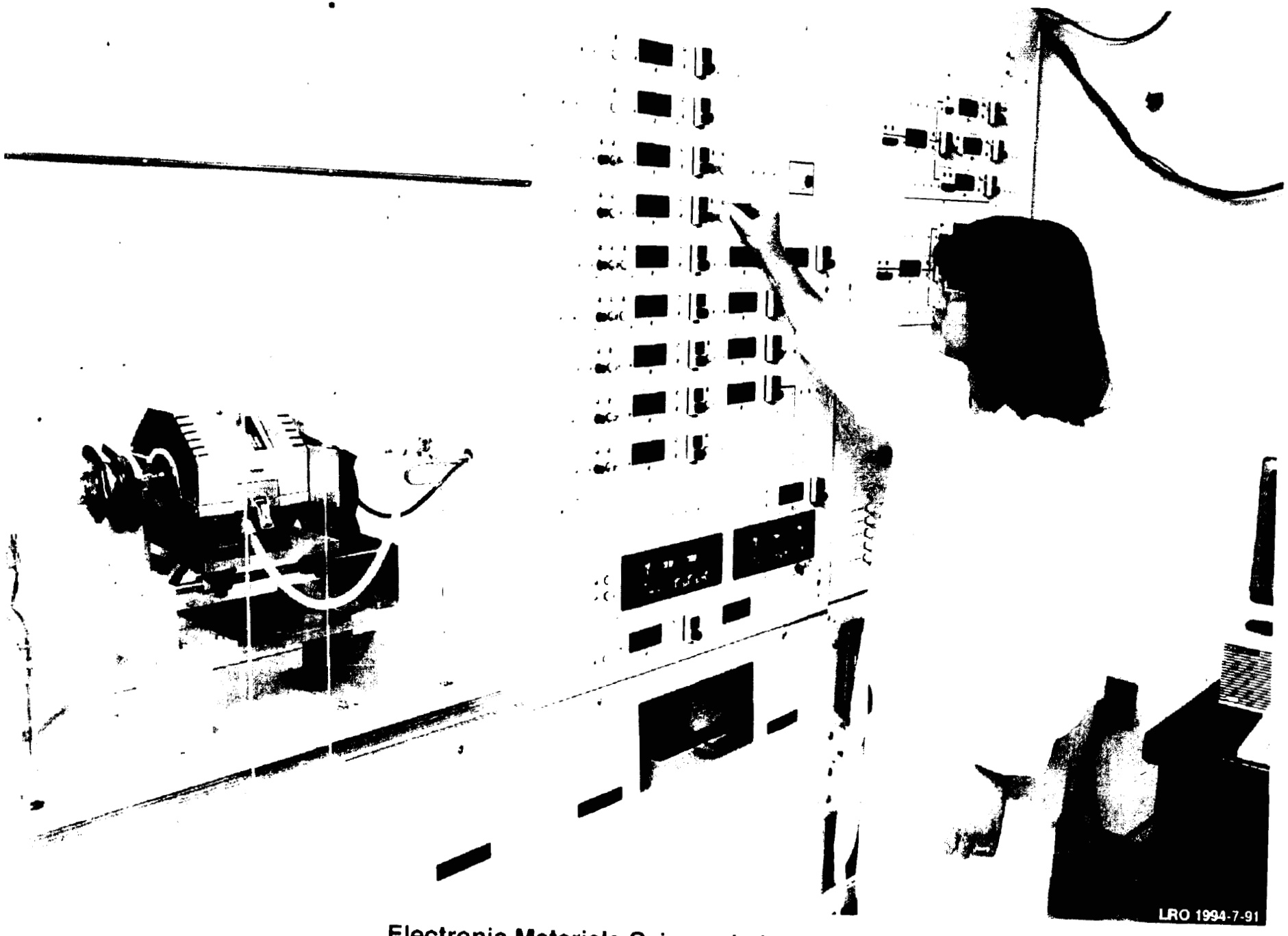
Long Wavelength Infrared Filters and Materials Evaluation Lab UIC N66001 Photo 45

Electronic Packaging Facility

UIC N66001 Photo 46

Microelectronics Laboratory

UIC N66001 Photo 47

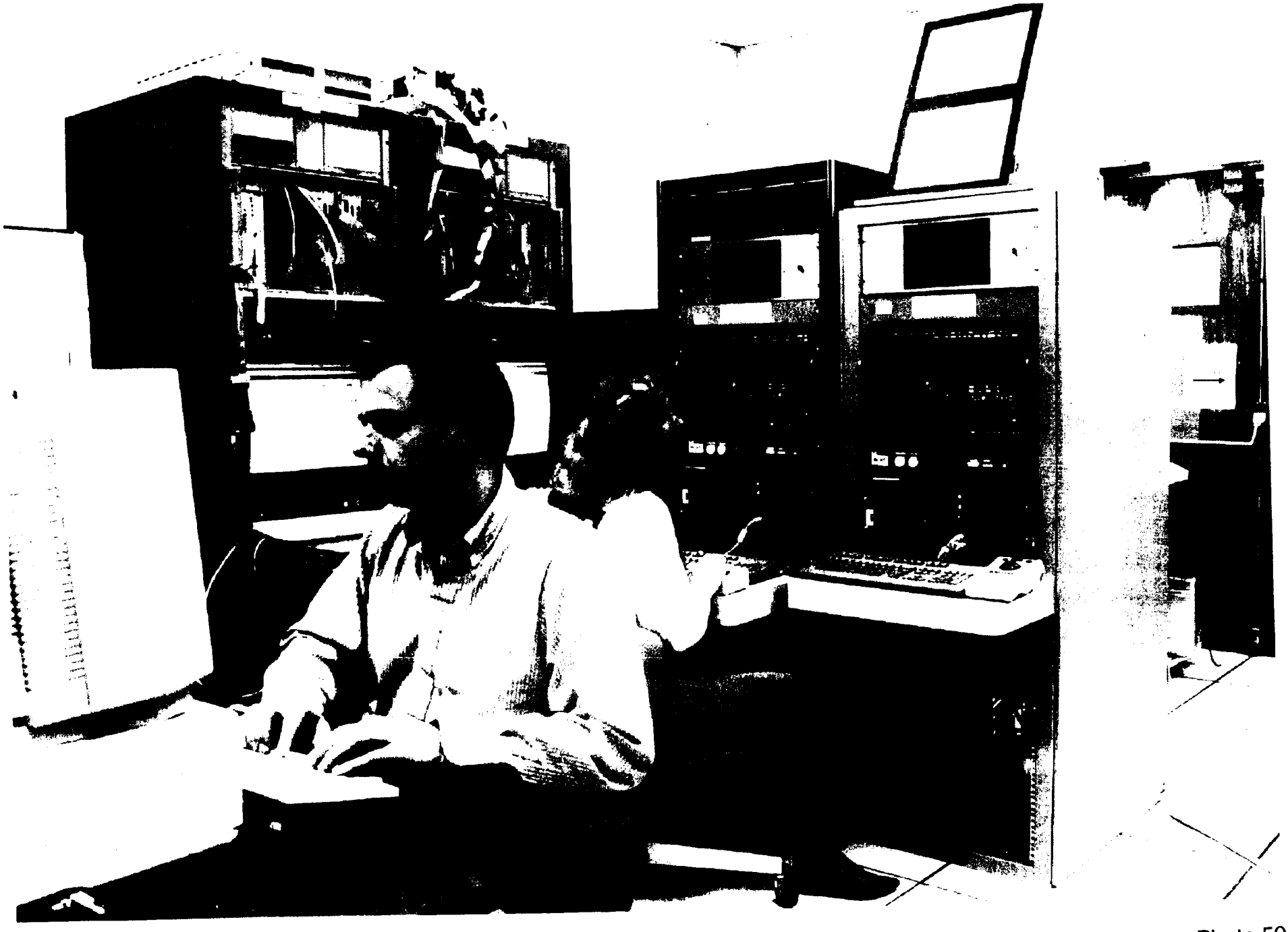


Electronic Materials Science Laboratory

UIC N66001 Photo 48

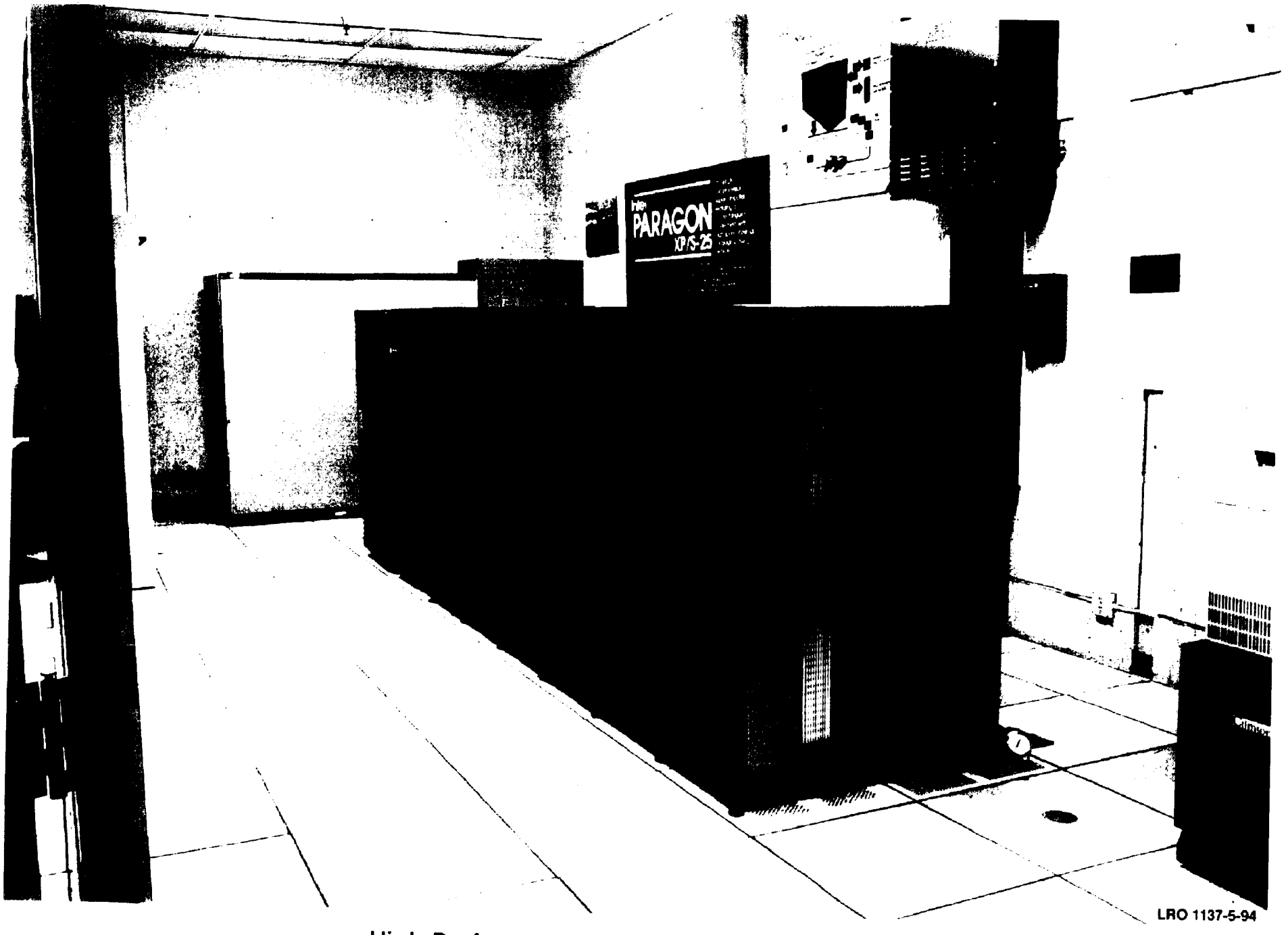
Systems Integration Facility (SIF).

UIC N66001 Photo 49



Multi-Link Laboratory

UIC N66001 Photo 50



High-Performance Computer Support Facility.

UIC N66001 Photo 51

Research, Evaluation & Systems Analysis (RESA) Facility. UIC N66001 Photo 52

Over The Horizon-Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS).

Inertial component test facility. UIC N66001 Photo 55

Global Positioning System (GPS) Laboratory. UIC N66001 Photo 56

3.5 Expansion Potential

3.5.1 Laboratory Facilities: Use facilities records as of fourth-quarter FY93 in answering the following (in sq ft) for each CSF: (BRAC Criteria II)

Common Support Function	Facility or Equipment Description	Space Capacity (KSF)			
		Type of Space*	Current	Used	Excess
CSF 1. Air Vehicles - Fixed Propulsion	None				
CSF 2. Air Vehicles Fixed Avionics	RF/Micro-electronics Laboratory	Technical	2.0	2.0	0
	HC/KC-130 System Integration Lab (SIL)	Technical	0.45	0.45	0
	CARCO Flight Motion Simulator (CFMS)	Technical	1.0	1.0	0
CSF 2. Air Vehicles Avionics 59%, C4I Afloat 29%, Weapons Cruise Missiles 12%	GPS Lab	Technical	13.0	13.0	0
CSF 3. Air Vehicles Rotary Avionics	CH-46 System Integration Lab (SIL)	Technical	0.28	0.28	0
CSF 4. Weapons Cruise Missiles 12%, Air Vehicles Avionics 59%, C4I Afloat 29%	GPS Lab	Technical	13.0	13.0	0
CSF 5. Space Systems - Satellite	SHF Satellite Communications Test Facility	Technical	3.7	3.7	0
	Navy UHF Satcom Test Facility	Technical	2.0	2.0	0

CSF 6. C4I Systems - Airborne	JTIDS Network Design Lab	Technical	11.0	11.0	0
	E-2C Airborne Tactical Data Systems (ATDS) Integration Laboratory	Technical	5.0	5.0	0
CSF 6. C4I Airborne 20%, C4I Afloat 40%, C4I Fixed Ground-Based 40%	Systems Integration Facility (SIF)	Technical	3.5	3.5	0
	Multi-Link Laboratory	Technical	3.2	3.2	0
CSF 7. C4I Systems - Fixed Ground-Based	Information Transfer Management Structure	Technical	0.14	0.14	0
	Surveillance Test and Integration Center	Technical	24.0	24.0	0
	Tactical Engineering Analysis Lab	Technical	2.6	2.6	0
	Tactical Systems Lab	Technical	16.0	16.0	0
CSF 7. C4I Systems - Fixed Ground-Based (cont).	High Performance Computing And Theater Level Planning Laboratory	Technical	2.3	2.1	0.2
	Navy Command and Control System Ashore Integration Test Facility	Technical	4.9	4.4	0.5
	Navy Intelligence Development, Integration And Test Facility	Technical	6.6	6.0	0.6
	Ocean Surveillance Information System (OSIS) Evolutionary Development (OED) Laboratory	Technical	1.3	1.1	0.2
	Surveillance Systems Offices and Labs	Admin	4.5	3.9	0.6
		Technical	109.6	105.6	4.0
		Storage	3.9	3.0	0.9
		Utility	20.1	17.9	2.2

CSF 7. C4I Systems - Fixed Ground-Based (cont).	Distributed Command/Control (DC2) Laboratory	Technical	5.0	5.0	0
	Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Laboratory	Technical	2.2	2.2	0
	Distributed Simulation Internet (DSI) Advanced Simulation Laboratory (DASL)/Secure DSI Integration Simulation Laboratory (SISL)	Technical	2.7	2.7	0
	Command Center of the Future	Technical	0.8	0.8	0
	Processing and Data Exploitation Center	Technical	15.5	15.5	0
	Space and Electronic Warfare Simulator (SEWSIM)	Technical	37.5	37.5	0
	Special Signals Equip. Space Simulator (SWIFT)	Technical	241.7	241.7	0
	Microwave and Millimeter-wave Antenna Range Complex	Technical	35.8	35.8	0
	Radar Signal Processing Laboratory	Technical	17.0	17.0	0
	Secure Facilities, Vaults And Underground Bunkers	Technical	55.0	55.0	0
	Indoor Robotics Development/Test Facility	Admin	0.5	0.4	0.1
		Technical	2.0	2.0	0
		Storage	0.1	0.1	0
		Utility	0.3	0.3	0

CSF 7. C4I Systems - Fixed Ground-Based (cont).	Communications Support System Simulation Facility	Technical	0.3	0.3	0
CSF 7. C4I Fixed Ground-Based 40%, C4I Afloat 40%, C4I Airborne 20%	Systems Integration Facility (SIF)	Technical	3.5	3.5	0
	Multi-Link Laboratory	Technical	3.2	3.2	0
CSF 7. C4I Fixed Ground Based 50%, C4I Afloat 50%	High Performance Computing Processing Facility	Technical	10.0	10.0	0
	Research Evaluation and Systems Analysis (RESA) Facility	Technical	4.0	4.0	0
	Display Systems Development Laboratory	Technical	0.2	0.2	0
	Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS)	Technical	1.5	1.5	0
CSF 8. C4I Systems - Afloat	Ship Antenna Model Range and Simulation Facility	Technical	2.5 acres	2.0 acres	0.5 acres
	VLF/LF Integrated Test Facility	Technical	80.0	75.0	5.0
	EHF Satellite Communications Terminal Test Facility	Technical	2.0 acres	1.5 acres	0.5 acres
	Radar Test Range	Technical	N/A	N/A	N/A

CSF 8. C4I Systems - Afloat (cont.)	Surveillance Systems Offices and Labs	Admin	3.4	3.1	0.3
		Technical	70.2	64.7	5.5
		Storage	10.2	10.0	0.2
		Utility	8.8	7.3	1.5
	Deployable Surveillance Integration Facility	Technical	23.0	23.0	0
	Bayside Acoustic Systems Computational Facility	Technical	33.0	33.0	0
	Combat Direction System (CDS) Development and Evaluation Site (CDES)	Technical	11.7	11.2	0.5
	Navy Tactical Command System Afloat (NTCS-A) Testbed And Integration Facility	Technical	4.8	4.3	0.5
	Simulated Ships Motion Test Facility	Technical	4.0	4.0	0
	Oceanographic Systems Program (OSP) Lab	Technical	6.0	6.0	0
	Survivable Adaptable Fiber-Optic Embedded Network Development Site	Technical	0.8	0.6	0.2
CSF 8. C4I Afloat 50%, Electronic Devices 50%,	Inertial Navigation Facility (INFAC)	Technical	10.0	7.0	3.0
		Utility	4.5	3.6	0.9
CSF 8. C4I Afloat 40%, C4I Airborne 20%, C4I Fixed Ground-Based 40%	Systems Integration Facility (SIF)	Technical	3.5	3.5	0
	Multi-Link Laboratory	Technical	3.2	3.2	0

CSF 8. C4I Afloat 29%, Weapons Cruise Missiles 12%, Air Vehicles Avionics 59%	GPS Lab	Technical	13.0	13.0	0
CSF 8. C4I Afloat 50%, C4I Fixed Ground Based 50%	High Performance Computing Processing Facility	Technical	10.0	10.0	0
	Research Evaluation and Systems Analysis (RESA) Facility	Technical	4.0	4.0	0
	Display Systems Development Laboratory	Technical	0.2	0.2	0
	Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS)	Technical	1.5	1.5	0
CSF 9. C4I Systems - Ground Mobile	None				
CSF 10. Electronic Devices	Microelectronic Computer Aided Design (CAD) Facility	Technical	4.58	2.29	2.29
	Radiometric Measurements Facility	Technical	0.4	0.45	0
		Storage	0.08	0.08	0
		Utility	0.23	0.23	0
	Optoelectronic Device Characterization Facility	Technical	3.75	3.75	0
	Infrared Focal Plane Array Test Facility	Technical	2.1	1.6	0.5
		Storage	0.6	0.36	0.24
		Utility	0.3	0.24	0.06
	Long Wavelength Infrared (LWIR) Filters and Materials Evaluation Facility	Technical	1.25	1.25	0
	Electronic Packaging Facility	Technical	2.4	2.4	0

CSF 10. Electronic Devices (cont.)	Microelectronics Laboratory	Technical	9.4	9.4	0
	Electronic Materials Science Facility	Technical	8.7	7.6	1.1
		Storage	2.3	2.3	0
		Utility	0.5	0.5	0
CSF 10. Electronic Devices 50%, C4I Afloat 50%	Inertial Navigation Facility (INFAC)	Technical	10.0	7.0	3.0
		Utility	4.5	3.6	0.9
CSF 11. Environmental Sciences	Environmental Sciences Facilities	Admin	0.3	0.3	0
		Technical	8.26	7.97	0.29
		Storage	2.84	2.82	0.02
		Utility	0.5	0.5	0
	Propagation Test Facility	Technical	1.16	0.87	0.29
		Storage	0.04	0.02	0.02
CSF 12. Environmental Quality	Ocean Sciences Laboratory	Technical	10.9	8.8	2.1
		Storage	0.3	0.2	0.1
		Utility	0.3	0.3	0
	Marine Environmental Survey Capability (MESC)	Technical	0.4	0.4	0
	Site Characterization and Analysis Penetrometer System	Technical	0.85	0.85	0
CSF 13. Advanced Materials	Materials Research Laboratory	Technical	1.75	1.75	0

* Administrative, Technical, Storage, Utility

3.5.1.1 Describe the capacity of your activity to absorb additional similar workyears categorized in the same common support function with minor facility modification. If major modification is required, describe to what extent the facilities would have to be modified. (Use FY97 workyears as your requirement) (BRAC Criteria III)

CSF 1. AIR VEHICLES - FIXED PROPULSION

No facilities are specifically designated for this CSF.

CSF 2. AIR VEHICLES - FIXED AVIONICS

RF/Microelectronics Lab: Additional tasking could be absorbed in the facility without modification.

SIL Lab: The HC/KC-130 SIL currently has the capacity to absorb additional similar workyears categorized in the same common support function with only minor facility modifications. The SIL could be used to simulate various types of aircraft platforms with minor modifications (e.g. addition of specific aircraft avionics, sensors, additional wiring, etc.) The SIL could also be used as a training facility on the operation of the newly integrated system.

Carco Flight Motion Simulator: The CFMS has spare capacity to absorb additional workyears. Minor modifications such as cabling to the system under test needs to be designed and built. Also depending on the system under test data acquisition software will require minor changes.

GPS Lab (59%) : Has some limited capacity to absorb additional workyears of effort if additional space can be made available either by construction or reorganization of existing spaces. Additional equipments (2 GPS simulators) would also be required.

CSF 3. AIR VEHICLES - ROTARY AVIONICS

CH-46 SIL: This lab currently has the capacity to absorb additional similar workyears categorized in the same common support function with only minor facility modifications. The SIL could be used to simulate various types of similar helicopter platforms with minor modifications such as addition of a sensor, additional wiring, etc.

CSF 4. WEAPONS - CRUISE MISSILES

GPS Lab (12%) : Has some limited capacity to absorb additional workyears of effort if additional space can be made available either by construction or reorganization of existing spaces. Additional equipments (2 GPS simulators) would

also be required.

CSF 5. SPACE SYSTEMS - SATELLITES

The SHF Satellite Communication Test Facility could be increased by 4000SF through the reassignment of other programs currently using the adjacent spaces at a cost of $0.5M.

The Navy UHF Satcom Test Facility could easily absorb 5 workyears, but any requirement above that would require the relocation of the secure facilities' wall at a cost of $0.4M.

CSF 6. C4I SYSTEMS - AIRBORNE

JTIDS Network Design Lab: As this facility is dedicated to the JTIDS Network Design Function, it offers significant potential for expansion to accommodate additional similar workyears. Existing buildings within the Warminster site are also available for expansion, making access to additional lab space to support Joint operations a trivial effort (i.e. NRaD Warminster can provide additional capacity without need for MILCON). It is anticipated that approximately 2000 sq ft of additional lab space would be required to absorb 20 additional workyears of effort required by the Joint Development Activity. This is well within existing building capacity expected to be available in the FY97 time frame at the Warminster site.

The E-2C Airborne Tactical Data Systems (ATDS) Integration Laboratory has the capacity to absorb additional similar workyears with only minor facility modifications.

The Systems Integration Facility (SIF) (20%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Multi-Link Laboratory (20%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

CSF 7. C4I SYSTEMS - FIXED GROUND-BASED

Expansion of the Information Transfer Management Structure could be achieved by converting adjacent lab spaces at a minor cost of $0.1M for an additional 5 workyear capability.

The Surveillance Test and Integration Center is currently fully utilized and does not have further capacity to absorb additional workyears.

The Tactical Engineering Analysis Lab is currently fully utilized and cannot absorb additional workyears.

The Tactical Systems Lab is currently fully utilized and cannot absorb additional workyears.

The High Performance Computing and Theater Level Planning Laboratory has the capacity to absorb additional similar workyears with minor facility modifications.

The Navy Command and Control System Ashore Integration Test Facility has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Navy Intelligence Development, Integration And Test Facility has the capacity to absorb additional similar workyears with minor facility modifications.

The Ocean Surveillance Information System (OSIS) Evolutionary Development (OED) Laboratory has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Surveillance Systems' C4I Fixed Ground Based offices and labs can absorb additional similar workyears by increasing office occupancy density and by converting storage space to office space.

The Distributed Command/Control (DC2) Laboratory has the capacity to absorb additional similar workyears with minor facility modifications.

The Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Laboratory does not have the capacity to absorb additional similar workyears.

The Distributed Simulation Internet (DSI) Advanced Simulation Laboratory (DASL)/Secure DSI Integration Simulation Laboratory (SISL) does not have the capacity to absorb additional similar workyears.

The Command Center of the Future does not have the capacity to absorb additional similar workyears.

The Processing and Data Exploitation Center is currently fully utilized and cannot absorb additional workyears.

The Space and Electronic Warfare Simulator (SEWSIM) is currently fully utilized and cannot absorb additional workyears.

The Special Signals Equipment Space Simulator (SWIFT) is currently fully utilized and cannot absorb additional workyears.

The Microwave and Millimeter-wave Antenna Range Complex is currently fully utilized and cannot absorb additional workyears.

The Radar Signal Processing Laboratory is currently fully utilized and cannot absorb additional workyears.

Secure Facilities, Vaults, and Underground Bunkers: The SCI and other compartmented facilities consist of over 55,000 square feet of operating space in 26 separated facilities within the Center. An additional 1500 square foot space is presently proposed for becoming a SCIF, and at least 12 additional spaces (12,000 square feet) meet DIAM 50-3 requirements and could be accredited as SCIFs. The Center also oversees three (3) contractor SCIFs with 1181 square feet of space; four (4) other contractor SCIFs with 8093 square feet can rapidly be re-accredited. These additional SCIF spaces could be accredited with only minor or no additional facility modifications.

The Indoor Robotics Development/Test Facility has additional buildings that could be used to absorb additional robotics work. The use of the robotics test facility can be time-shared to provide for additional requirements.

The Communications Support System Simulation Facility could easily accommodate an additional 10 workyears.

The Systems Integration Facility (SIF) (40%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Multi-Link Laboratory (40%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The High Performance Computing Processing Facility (50%) is currently fully utilized and does not have further capacity to absorb additional workyears.

The Research Evaluation and Systems Analysis (RESA) Facility (50%) does not have the capacity to absorb additional similar workyears.

The Display Systems Development Laboratory (50%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS) (50%) does not have the capacity to absorb additional similar workyears.

CSF 8. C4I SYSTEMS - AFLOAT

Based on the analysis provided in FY95 BRAC Data Call #4 Section 3, additional work space is available to support an additional 618.6 workyears capability in support of C4I afloat without major facility modifications.

The Ship Antenna Model Range and Simulation Facility could absorb workyears without modification; additional office and working spaces would be required at other nearby buildings.

The VLF/LF Integrated Test Facility could absorb an additional 3 to 5 workyears, and expansion capacity beyond this is limited.

The EHF Satellite Communications Terminal Test Facility could absorb another 4 workyears and additional space could be made available for $0.5M.

The Radar Test Range is currently fully utilized and cannot absorb additional workyears.

The Surveillance Systems' C4I Afloat office and labs can absorb additional similar workyears by increasing office occupancy density and by converting storage space to office space.

The Deployable Surveillance Integration Facility is currently fully utilized and cannot absorb additional workyears.

The Bayside Acoustic Systems Computational Facility is currently fully utilized and cannot absorb additional workyears.

The Combat Direction System (CDS) Development and Evaluation Site (CDES) has the capacity to absorb additional similar workyears categorized in the same common support function with only minor facility modifications.

The Navy Tactical Command System Afloat (NTCS-A) testbed and integration facility has the capacity to absorb additional similar workyears with only minor facility modifications.

Simulated Ships Motion Test Facility: The Simulated Ships Motion Test Facility is used on the average 16 hrs per day to conduct inertial navigation system testing. Little or no facility modification would be required to increase the facility workload capacity. Simultaneous testing of two inertial systems, vice a single system, can be

conducted on the same motion simulator and the normal test day can be extended (e.g. 24 hrs per day).

OSP Integration Lab: Minor modifications to upgrade lab for Secret ADP applications.

The Survivable Adaptable Fiber-Optic Embedded Network Development Site could absorb an additional 5 workyears through reassignment of nearby office spaces at a cost of $0.1M.

Inertial Navigation Facility (INFAC) (50%): The Inertial Component Test Laboratory (ICTL) at INFAC contains 12 test piers, isolated from local foot traffic, and the required electronics to support equipment on those piers. The test piers contain developmental test stations incorporating triple, dual and single axis rate and position tables, precision dividing heads, environmental stations and seismic monitors in the most seismically stable inertial sensor facility in the United States. Currently, 7 of the 12 piers are being utilized 8 hours/day, 5 days/week and 1 pier is devoted to long term testing, 24 hours/day, 7 days/week. The remaining 4 piers are available for expansion/growth. Currently, 6 workyears of labor is being expended in the laboratory.

The Systems Integration Facility (SIF) (40%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Multi-Link Laboratory (40%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

GPS Lab (29%) : Has some limited capacity to absorb additional workyears of effort if additional space can be made available either by construction or reorganization of existing spaces. Additional equipments (2 GPS simulators) would also be required.

The High Performance Computing Processing Facility (50%) does not have the capacity to currently not have further capacity to absorb additional workyears.

The Research Evaluation and Systems Analysis (RESA) Facility (50%) does not have the capacity to absorb additional similar workyears.

The Display Systems Development Laboratory (50%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS) (50%) does not have the capacity to absorb additional similar workyears.

CSF 9. C4I SYSTEMS - GROUND MOBILE

No facilities are specifically designated for this CSF.

CSF 10. ELECTRONIC DEVICES

The Microelectronics CAD Facility can absorb additional workyears with minor facility modifications. This is in accordance with the initial plan for CAD expansion.

The Radiometric Measurements Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Optoelectronic Device Characterization Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Infrared Focal Plane Array Test Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Long Wavelength Infrared (LWIR) Filter and Materials Evaluation Laboratory consists of multiple test apparatus which can be used in a coordinated fashion in support of multiple workyears. The ultimate limiter of the number of workyears supportable is the space required to place experimental hardware in and around the rather large spectrophotometers and the space required for personnel access to the equipment. Minor modifications could be made to acquire adjoining space in order to expand this facility.

The Electronic Packaging Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Microelectronics Laboratory requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Electronic Materials Science Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

Inertial Navigation Facility (INFAC) (50%): The Inertial Component Test Laboratory (ICTL) at INFAC contains 12 test piers, isolated from local foot traffic, and the required electronics to support equipment on those piers. The test piers contain developmental test stations incorporating triple, dual and single axis rate and position tables, precision dividing heads, environmental stations and seismic monitors in the most seismically stable inertial sensor facility in the United States. Currently, 7 of the 12 piers are being utilized 8 hours/day, 5 days/week and 1 pier is devoted to long term testing, 24 hours/day, 7 days/week. The remaining 4 piers are available for expansion/growth. Currently, 6 workyears of labor is being expended in the laboratory.

CSF 11. ENVIRONMENTAL SCIENCES

The Environmental Sciences facility can absorb additional similar workyears by increasing office occupancy density and by converting storage space to office space.

The Propagation Test Facility's current use and anticipated future use is running at about 75% capacity. In the previous two years, the facility ran at approximately 100% capacity.

CSF 12. ENVIRONMENTAL QUALITY

The Ocean Sciences Laboratory is a fully-equipped chemistry, biology and sensor instrumentation development facility with state-of-the-science capabilities for marine environmental quality and ocean science research applications. With the use of nearby buildings to provide office space, the facility could be shared to support significant additional workyears.

The Marine Environmental Survey Capability (MESC) facility is currently fully utilized and cannot absorb additional workyears.

The Site Characterization and Analysis Penetrometer System facility is currently fully utilized and cannot absorb additional workyears.

CSF 13. ADVANCED MATERIALS

The Materials Research Laboratory personnel are fully utilized, but the 12 major instruments and workstations can not be fully utilized by the current laboratory personnel all at the same time (more equipment and stations than people). There is capacity to increase the productivity of the laboratory with only minor modifications.3.5.1.2 If there is capacity to absorb additional workyears, how many additional workyears can be supported? (BRAC Criteria III)

CSF 1. AIR VEHICLES - FIXED PROPULSION

No facilities are specifically designated for this CSF.

CSF 2. AIR VEHICLES - FIXED AVIONICS

RF/Microelectronics Lab: 1 to 3 workyears.

HC/KC-130 SIL: The capacity to absorb additional workyears, beginning in FY96 through FY97 would be 1.4 workyears.

Carco Flight Motion Simulator: The CFMS estimated work load is 30% for FY97 and can absorb 1.6 workyears.

GPS Lab: could absorb 59% of 1 additional workyear.

CSF 3. AIR VEHICLES - ROTARY AVIONICS

CH-46 SIL: The capacity to absorb additional workyears would be 1.4 workyears.

CSF 4. WEAPONS - CRUISE MISSILES

GPS Lab: could absorb 12% of 1 additional workyear.

CSF 5. SPACE SYSTEMS - SATELLITES

The SHF Satellite Communication Test Facility could absorb an additional 7 workyears.

The Navy UHF Satcom Test Facility could easily absorb 5 workyears.

CSF 6. C4I SYSTEMS - AIRBORNE

JTIDS: 20 additional workyears.

The E-2C Airborne Tactical Data Systems (ATDS) Integration Laboratory could absorb 20 additional workyears.

The Systems Integration Facility (SIF) can absorb 20% of 18 workyears.

The Multi-Link Laboratory can absorb 20% of 15 workyears.

CSF 7. C4I SYSTEMS - FIXED GROUND-BASED

Expansion of the Information Transfer Management Structure could absorb an additional 5 workyears.

The High Performance Computing And Theater Level Planning Laboratory could absorb 50% of 3 workyears assuming 8 hrs/day utilization, 50% of 10 workyears assuming 24 hrs/day utilization.

The Navy Command and Control System Ashore Integration Test Facility could absorb 5 additional workyears assuming 8 hr/day utilization, of 20 additional workyears assuming 24 hrs/day lab utilization.

The Navy Intelligence Development, Integration And Test Facility could absorb 5 workyears assuming 8 hr/day lab utilization, 20 workyears assuming 24 hr/day lab utilization.

The Ocean Surveillance Information System (OSIS) Evolutionary Development (OED) Laboratory could absorb 2 workyears assuming 8 hr/day lab utilization, 10 workyears assuming 24 hr/day utilization.

The Surveillance Systems' C4I Fixed Ground Based offices and labs could absorb approximately 40 additional workyears.

The Distributed Command/Control (DC2) Laboratory has the capacity to absorb 60 workyears by time sharing of equipment and extension of the work shift.

Secure Facilities, Vaults And Underground Bunkers: Although there is an obvious capacity to absorb additional workyears in these facilities, there exists no direct correlation between square footage and capacity for work-years. Utilization of available space is dependent upon the particular projects being supported; i.e., they may be equipment intensive or people intensive, or include stringent physical security requirements.

The Indoor Robotics Development/Test Facility could absorb 8 workyears of additional robotics work.

The Communications Support System Simulation Facility could easily accommodate an additional 10 workyears.

The Systems Integration Facility (SIF) could absorb 40% of 18 workyears.

The Multi-Link Laboratory could absorb 40% of 15 workyears.

The Display Systems Development Laboratory could absorb 50% of 3 workyears.

CSF 8. C4I SYSTEMS - AFLOAT

Based on the analysis provided in FY95 BRAC Data Call #4 Section 3, additional work space is available to support an additional 618.6 workyears capability in support of C4I afloat without major facility modifications.

The Ship Antenna Model Range and Simulation Facility could absorb 5 workyears.

The VLF/LF Integrated Test Facility could absorb an additional 3 to 5 workyears.

The EHF Satellite Communications Terminal Test Facility could absorb another 4 workyears.

The Surveillance Systems' C4I Afloat offices and labs could absorb approximately 30 additional workyears.

The Combat Direction System (CDS) Development and Evaluation Site (CDES) could absorb 200 additional assuming lab utilization of 24 hrs/day, seven days a week.

The Navy Tactical Command System Afloat (NTCS-A) testbed and integration facility could absorb 5 additional workyears assuming 8 hour/day lab utilization; 20 additional workyears assuming 24 hour/day lab utilization.

Simulated Ships Motion Test Facility: Approximately 5-6 additional workyears could be supported by the test facility with little or no modification.

OSP: 30 additional workyears. Basic lab can support development of survey systems for non-DOD application, i.e., Dept of Commerce, Dept of Transportation.

The Survivable Adaptable Fiber-Optic Embedded Network Development Site could absorb an additional 5 workyears.

The INFAC/ICTL has the capacity to absorb 50% of 8 workyears.

The System Integration Facility (SIF) could absorb 40% of 18 workyears.

The Multi-Link Laboratory can absorb 40% of 15 workyears.

The GPS Lab could absorb 29% of 1 additional workyear.

The Display Systems Development Laboratory could absorb 50% of 3 additional workyears.

CSF 9. C4I SYSTEMS - GROUND MOBILE

No facilities are specifically designated for this CSF.

CSF 10. ELECTRONIC DEVICES

The following facilities supporting the electronic devices CSF could absorb an additional 36 workyears without significant modification. The breakdown by facility follows:

Additional workyears	Facility
8	Microelectronic CAD Facility
3	Radiometric Measurements Facility
4	Optoelectronic Device Characterization Facility
2	Infrared Focal Plane Array test Facility
1	Long Wavelength Infrared (LWIR) Filter and Materials Evaluation Laboratory
6	Electronic Packaging Facility
6	Microelectronics Laboratory
6	Electronic Materials Science Facility

INFAC/ICTL has the capacity to absorb additional work, categorized in the common support group, with little or no facility modifications, by utilizing the 4 available piers and by extending the work week to 24 hours/day, 5-7 days/week. Assuming that additional workyears scale linearly with additional pier utilization, up to 50% of 26 additional workyears could be accommodated. Approximately 50% of 8 workyears could be absorbed at ICTL with little or no modification.

CSF 11. ENVIRONMENTAL SCIENCES

The Environmental Sciences facility could absorb approximately 5 additional workyears.

The Propagation Test Facility can support an additional 3 workyears without significant modification to the facility.

CSF 12. ENVIRONMENTAL QUALITY

The Ocean Sciences Laboratory could absorb 30 workyears of additional work with the use of nearby buildings for the additional office space required.

CSF 13. ADVANCED MATERIALS

The Materials Research Laboratory could absorb 5 workyears of additional work.
3.5.1.3 For 3.5.1.1 and 3.5.1.2 (above) describe the impact of military construction programs or other alteration projects programmed in the FY95 PBS. (BRAC Criteria II)

None.

3.5.2 Land Use: Provide number of buildable acres for additional laboratory/administrative support construction at your installation. (BRAC Criteria II)

NCCOSC RDTE DIV SAN DIEGO CA is being asked to provide buildable acres by each Common Support Function as though there were unique acreage requirements. However, this is nearly impossible since our Common Support Functions do not have unique or separable acreage requirements. Any attempt to separate buildable acreage by Common Support Functions would be a gross estimate at best. Therefore, the following numbers of buildable acres applies equally to all Common Support Functions supported by NCCOSC RDTE DIV SAN DIEGO CA, and no separation is even attempted (i.e. Air Vehicles Fixed Propulsion, Air Vehicles Fixed Avionics, Air Vehicles Rotary Avionics, Weapons Cruise Missiles, Space Systems Satellites, C4I Systems Airborne, C4I Systems Fixed Ground Based, C4I Systems Afloat, C4I Systems Ground Mobile, Electronic Devices, Environmental Sciences, Environmental Quality, and Advanced Materials).

NCCOSC RDTE DIV SAN DIEGO CA has 78 buildable acres for additional laboratory/administrative support construction. Using a model sampling of our existing developed areas it was calculated that within the 78 acres of buildable area approximately 1.3 Million square feet of additional building could be developed. This includes provisions for parking, utilities, and other amenities found within our model.

NCCOSC RDT&E DIV DET, Warminster will have a footprint of 55 acres (of which 111,000 sq. feet is laboratory space) that could be available for construction.

3.5.3 **Utilities:** Provide an estimate of your installation's capability to expand or procure additional utility services (electric, gas, water). Estimates should be provided in appropriate units -- e.g. KWH of electricity. (BRAC Criteria II)

NCCOSC RDTE DIV SAN DIEGO CA is being asked to provide estimates of our installation's capability to expand or procure additional utility services by each Common Support Function as though there are unique utility requirements. However, this is nearly impossible since our supported Common Support Functions do not require unique or separable utility services. Therefore, the following estimates of our installation's capability to expand or procure additional utility services applies equally to all Common Support Functions supported by NCCOSC RDTE DIV SAN DIEGO CA, and no separation is even attempted (i.e. Air Vehicles Fixed Propulsion, Air Vehicles Fixed Avionics, Air Vehicles Rotary Avionics, Weapons Cruise Missiles, Space Systems Satellites, C4I Systems Airborne, C4I Systems Fixed Ground-Based, C4I Systems Afloat, C4I Systems Ground Mobile, Electronic Devices, Environmental Sciences, Environmental Quality, and Advanced Materials).

San Diego Main Facilities	On Base Capacity	Off base long term contract	Normal Steady State Load	Peak Demand
Electrical Supply (KVA)	83,138*	none**	23,902	30,138
Natural Gas (CFH)	84,000 CFH	none**	12,000 CFH	39,960 CFH
Sewage (GPD)	1.2 Million	none**	156,000	202,000
Potable Water (GPD)	11 Million	none**	350,000	455,000
Steam (PSI & lbm/Hr)	none	none	none	none
Long Term Parking	none	none		
Short Term Parking	3,516	none	3,050	3,200

Warminster Detachment	On Base Capacity	Off base long term contract	Normal Steady State Load	Peak Demand
Electrical Supply (KVA)	10,000	N/A	1,200	4,500
Natural Gas (CFH)	15,000	N/A	10,000	15,000
Sewage (GPD)	20,000	N/A	15,000	20,000
Potable Water (GPD)	576,000	N/A	15,000	20,000
Steam (PSI & lbm/Hr)	15 and 10,000	N/A	8,000	10,000
Parking	620	N/A	400	620

*** The on base capacity is calculated for the Point Loma Naval Complex. The on**

base capacity is not broken out by PWC, but response to fluctuating requirements of each activity located within the Point Loma Naval Complex..

**** NCCOSC RDTE DIV SAN DIEGO CA has no off base long term contracts directly with the suppliers. PWC San Diego provides these services to NCCOSC RDTE DIV SAN DIEGO CA.**

SECTION IV: APPENDICES

Note: Appendices A, B and C contain no data and are not included in this submission.

APPENDIX D: CSF RELATED DISCLOSURE AND PATENT TITLES

CSF 1. AIR VEHICLES - FIXED PROPULSION

Patents Awarded

None

Patents Pending

None

CSF 2. AIR VEHICLES - FIXED AVIONICS

Patents Awarded

Blown Wing VTOL Aircraft

Patents Pending

None

CSF 3. AIR VEHICLES - ROTARY AVIONICS

Patents Awarded

None

Patents Pending

None

CSF 4. WEAPONS - CRUISE MISSILES

Patents Awarded

None

Patents Pending

None

CSF 5. SPACE SYSTEMS - SATELLITES

Patents Awarded

None

Patents Pending

None

CSF 6. C4I SYSTEMS - AIRBORNE

Patents Awarded

Large, Air Deployable, Volumetric Hydrophone Array

Josephson Junction Gyroscope

Multi-Channel Acoustic Simulator

Doppler Velocity Profiler

Multiplatform Sonar System And Method For Underwater Surveillance

Patents Pending

Inter-Processor Data Communications System

Fault Tolerant Lcd Display With Gray-Scale Programmability

CSF 7. C4I SYSTEMS - FIXED GROUND-BASED

Patents Awarded

Improved HF Fix-Tracking System

Monopole Inductively Loaded Antenna Tuning System

Computer Hardware Executive

Constrained Bubble Transducer Low Cost Resonant Source

Test Message Injector For System Evaluation

Meteor Burst Communication System

Adjustable Frequency Diversity Acoustic Telemetry System

Visual Aid For VLF Msk Signals

High Definition Video-Rate Laser-Addressed Liquid-Crystal Light-Valve

Grid Free, Modular, Large Screen Liquid Crystal Displays (LS-LCD)W/Color

Very Low Frequency (VLF) And Low Frequency (LF) Transmitting Antenna

Preprocessor And Adaptive Beamformer For Linear-Frequency Modulation

Patents Pending

Rotating Disk Three-Dimensional Display

A Constrained-Set Generalization Technique For Automated Message Correction

Submerged Sensing System Using Line Array Segments

A Parallelization Tool For Parallel Architecture Computer

Quality Indicator For FVLF On-The-Air Broadcast

Instantaneous Bit-Error-Rate Meter

Self-Adapting Filter

Adaptive Processor Integrator

Demand Assigned Multiple Access (DAMA) Device Controller Interface

Navy Tactical Data System Interface Adapter

Adaptive Partitioning In An Iterated Transform Image Compression Algorithm

Variable Length Filter

Mini-Pang (Pseudo-Atmospheric Noise Generator)

Laser Based 3d Volumetric Display System

NCCOSC RDTE DIV N66001

Conforming Tuning Coupler For Flextensional Transducers

Scene-Adaptive Light Attenuation

Adaptive Processor Integrator

Test System, Fiber Optic Multiplexer/Demultiplexer

Broadband Adaptive Amplitude Filter

A Method For Adding Abstraction To Complex Software...

Laser Based 3d Volumetric Display System

Temporal Sensor Data Fusion Scheme For Intelligent Security Assessment

Adaptive Processor Integrator

Multi-Base Band Receiver

Weak Signal Revealer

Single-Sideband Modulator With Ultra-Low Spurious Levels

Pre-Beamformer Interference Canceller

Time Domain Beamformer Interference Canceller

3d Spacial Plan Position Indicator (SPPI) Display

Low VSWR 2-30 Mhz HF Twin Whip Antenna For Shipboard And Land-Based Use

Improved VLF/LF Communication System

Adaptive Parameter Kernel ALOD Processor

Multi-Mode Acoustic Source

Technique For Distributed Quantization Noise Transmission Zeros

Sigma-Delta Modulator With Tunable Signal Pass-Band

Wide Band TEM Phased Array Reflector Antenna

NCCOSC RDTE DIV N66001

Method Of Encoding A Digital Image Using Iterated Image Transformations To Form An Eventually Contractive Map

CSF 8. C4I SYSTEMS - AFLOAT

Patents Awarded

None

Patents Pending

None

CSF 9. C4I SYSTEMS - GROUND MOBILE

Patents Awarded

Mobile Magnetometry Processing Scheme

Patents Pending

Sensor To Cable Molding Process

Fiber Optic Cable Payout System

Rosette Top-Loaded Monopole Antenna

Dual Feed Dual Antenna For Mono-Directional Pattern

Underwater Cable Junction For Electro-Optical Mechanical Cables

Adjustable Top-Loaded Monopole Antenna

Power Filter

A Super Wideband Omni-Directional Radiating Disk (SWORD) Antenna

Split Rosette Top-Loaded Monopole Antenna

Lightweight, Low Power, Slack-Line, Deployable Acoustic Surveillance Array System

CSF 10. ELECTRONIC DEVICES

Patents Awarded

Interferometric Optical Fiber Data Link

Color Sonar For Submarine Underice Collision Avoidance

Variable Printed Circuit EHF Filter

Direct Voltage Source Power Converter

Electrical Characterization Of Interface Between Thin Film Silicon

Ohmic Contacts For Semiconducting Diamond

Variable Length Word Compression Decoder

Magnetic Stabilization Of Spooled Fiber Optic Data Links

Method Of Making Integrated Circuit To Package Connections

Intensity Dependent Beam Deflector

Remote Fiber Optic Angular Orientation Sensor Using Four Channel In Sum.

Resistive Element Using Depletion-Mode MOSFETS

High Speed Serial Optical Crossbar Switch

Main And Auxiliary Rectifier System For Minimizing Line Harmonics

Instantaneous DC UPS With Hysteresis

Optically Powered High Voltage Electron Gun

Insulator Assisted Self-Aligned Gate Junction Field Effect Transistor

Cmos Analog Four-Quadrant Multiplier

Flexducer Preamplifier Power Controller

Energy Storage Circuit For Short Term Power Interruption

NCCOSC RDTE DIV N66001

Real-Time Optical Motion Detector

Hybrid Navigational Control System

Wide Bandwidth Differential Amplifier

Dual-Frequency Receiving Array Using Randomized Element Positions

A Bridge Type Optoelectronic Sample And Hold Circuit

Intelligent Data Fusion Scheme For Fixed And Mobile Security Sensors

Edge-Emitting Diode-To-Optical-Fiber Coupling Technique

Method For Measuring The Resistive Transition And Critical Current

Method For Producing Polarization Independent Narrow Channel Wavelength

Laser Texturing

Optically Powered Photomultiplier Tube

A Structure For Providing High Resolution Modulation Of Voltage

Compensation Circuitry For Analog Multiplier

Microelectronic Photomultiplier Device

Laser Energized High Voltage Direct Current Power Supply

An Apparatus And Method For Non-Contact Surface Voltage Probing

Method For Fabricating Complementary Enhancement & Depletion Mode Field

Conformal Waveguide For Optical And Electronic Integration

Laser Formation Of Graded Junction Devices

Multilayer Microelectronic Photomultiplier Device

Magnetic Amplifier Switch For Automatic Tuning Of VLF Transmitting Antenna

Integrated Circuit Transformer

NCCOSC RDTE DIV N66001

Hybrid Pneumatic/ Hydraulic Actuator

Reconfigurable Video Line Digitizer

Intelligent Battery Charging System

Adaptive Filter For The Suppression Of Wideband Or Offset Narrowband Interference

Patents Pending

Method Of Rapid Sample Handling For Laser Processing

A Structure For Providing High Resolution Modulation Of Voltage

Oxide-Voltage-Limit In Circuit For Floating-Gate Devices

Method Of Fabricating A Microelectronic Photomultiplier Device

Method Of Laser Processing Ferroelectric Materials

Monolithic Low Voltage To High Voltage Converter

Optical Imager On Transparent Substrates

Fiber Optic Microcable Coating Module

Optimized Minority Carrier Lifetime By Wafer Bonding To SOS

Light-Powered Synthetic Muscle

Method Of Forming A High Voltage Silicon-On-Sapphire Photocell Array

Method Of Forming Thin Films

High Energy Density Linearly Variable Inductor

Microdynamic Devices Fabricated On Silicon-On-Insulator Substrates

Silicon To Sapphire Bond

Ultra-High Resolution Liquid Crystal Display On Silicon-On-Sapphire

NCCOSC RDTE DIV N66001

Hybrid High Power Amplifier

Laser Textured Surface Absorber And Emitter

Method Of Locking Laser Wavelength To An Atomic Transition

An Ion-Implanted Diamond Metal-Insulator-Semiconductor Transistor

Ultra High Vacuum Chemical Vapor Deposition Of Epitaxial Silicon Sapphire

High Voltage Power Supplies For Microdynamic Structures

Diamond Multilayer Multichip Module Substrate

Fiber Optic Self-Multiplexing Amplified Ring Transducer

Electrically Addressable Silicon-On-Sapphire Light Valve

Diamond Electronic Package

Method For Manufacture Of Liquid Crystal Cavity Using Wafer Bonding

Ring Oscillator Thermometry

Complementary Vertical Bipolar Junction Transistors Fabricated

Variable Fiber Optic Time Delay Line

Method For Fabricating Vertical Bipolar Junction Transistors In Bonded...

Method For Fabricating An Operational Amplifier Using Bipolar Junction...

Bipolar Analog Memory In Double-Polysilicon Mos Canceller

Wavelength Shifting Optical Fibers

Submersible Magnetic Sensor And Indicator

Method For Manufacture Of Fiber Optic Filter

Electroluminescent Devices In Porous Silicon On Sapphire

Integration Of Semiconductor Circuits And Devices With Superconducting

NCCOSC RDTE DIV N66001

Complementary Vertical Bipolar Junction Transistors Fabricated In Silicon

Photonic Silicon On A Transparent Substrate

Fiber Optic Microcable Produced With Fiber Reinforced Ultraviolet Light

Ultra-High Resolution Dielectrically Isolated Display On Silicon-On-Sapp

Pulsed Laser Diode System Using Electrical Resonant Driving

Triple Base Bipolar Phototransistor

Method Of Controlling Photoemission From Porous Silicon Using Ion Implant

Electrical Resonant Circuit For Driving Laser Diodes

An Automatic Repeater Station For Signal Transmissions

Multichannel, Multifunction Relay Radio Architecture

CSF 11. ENVIRONMENTAL SCIENCES

Patents Awarded

Hybrid Ray Optics And Parabolic Equation Method For Radiowave Propagation

Patents Pending

Radio Wave Refractivity Profiles Deduced From Lidar Measurements

CSF 12. ENVIRONMENTAL QUALITY

Patents Awarded

Portable Flow Control And Diluter System For Bioassay Testing

Patents Pending

Organotin Biocide With Unsaturated Carbon Chains

Storm Water Runoff First Flush Sampler

Indicator Reagent Delivery System For Direct In Situ Spectroscopic Deter

Copolymers Containing Mixed Saturated/Unsaturated Organotin Compounds

Organotin Biocides Containing Mixed Saturated/Unsaturated Carbon Chains

Photon Controlled Decomposition Of Nonhydrolyzable Ambients

Chlorinated Hydrocarbon Sensor For Cone Penetrometer

Method For Quantitative Calibration Of In Situ Optical Chemical Measure

Reducing Polluted Air Device

A Fullerene Based Solid State Neutron Detector

Feedback-Controlled Oxygen Regulation System

Benthic Flux Sampling Device

Autonomous Hydrostatic Water Sampling System

NCCOSC RDTE DIV N66001

Optical Solid-State Thermal Neutron Detector

Coincidence Detection Of Thermal Neutrons Through Correlation Of Optical

Detection Of Subsurface Fissionable Nuclear Contamination

The Differential Mode Band Limited Detector (DMBLD)

A Neural Network Based Method For Qualitative And Quantitative Identific

Non-Chloride, Seawater-Based Referenced Electrode

A Microwave Based Gamma Detector

CSF 13. ADVANCED MATERIALS

Patents Awarded

Chromium Doped Laser Transmitter Of Extended Wavelength Capability

Thermistor Controlled Current Source Versatile Temperature Sensor

Disclosures

Electrode And Method For Preparation Of Electrodes For Electrochemical...

Compact Substrate Heater For Use In An Oxidizing Atmosphere

Method Of Determining The Granular Nature Of Superconductors Using...

Superconducting Ceramic Magnet

Superconducting Transformer With Enhanced Excitation

Nonlinear Dynamic Signal Processor Suitable For Detecting Very Low...

Nonlinear Dynamic Signal Processor, Based On Enhancement Of Stochastic...

Id Ammonia Synthesis Of Doped Fullerenes

Liquid Ammonia Synthesis Of Doped Fullerenes

APPENDIX E: CSF RELATED LITERATURE TITLES

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CSF 3. AIR VEHICLE —ROTARY AVIONICS

CSF 4. WEAPONS—CRUISE MISSILES

CSF 5. SPACE SYSTEMS—SATELLITES

CSF 6. C^4I SYSTEMS—AIRBORNE

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Comments on Methodology of Excess Tritium Determination.

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Cooperative Stochastic Processes in "Physiological" Neuron Models.

The Role of Noise in Sensory Information Transfer.

Stochastic Resonance in a Bistable Squid Loop.

Cooperative Stochastic Effects in Globally Coupled Interacting Neurons; Stochastic Resonance.

Nonlinear Resonance: Noise-Assisted Information.

Coupled Neural-Dendritic Processes: Cooperative Stochastic Effects and the Analysis of Spike Trains.

NCCOSC RDTE DIV N66001

The Single Effective Neuron.

Single Effect Neuron: Macroscopic Potential and Noise-Induced Bifurcations.

Observation of a Strange Nonchaotic Attractor in a Multistable Potential.

Stochastic Resonance in a Single Neuron Model: Theory and Analog Simulation.

Time-Interval Sequences in Bistable Systems and the Noise-Induced Transmission of Information by Sensor Neurons.

Cooperative Stochastic Processes in Reduced Neuron Models.

Single Neuron Model; Response to Weak Modulation in the Presence of Noise.

Triplet States and Optical Absorptions in Finite Polyenes and Conjugated Polymers.

Photoinduced Charge Separation in Q1D Heterojunction Materials: Evidence for Electron-Hole Pair Separation in Mixed-Halide MX Solids.

Electron-Phonon Driven Spin Frustration in Multi-Band Hubbard Models: MX Chains and Oxide Superconductors.

Infinite volume extrapolations of finite cluster calculations - How correct are these?

The mechanism of pairing in Hubbard molecules.

Extracting Infinite System Properties From Finite Size Clusters: Phase Randomization/Boundary Condition Averaging.

Femtosecond Dynamics, Photoexcitation and ESR Spectra of MX Chain Solids.

Dynamics and Photoexcitation in MX and MXX' Chain Solids.

Mean-Field Matrix Inversion Method for Electron Correlations as Applied to the Hubbard Model.

Phase Diagrams for the Strongly Correlated Three-Band Model of CuO(2) Planes.

Properties of Bi2Sr2CaCu2O8 Thick Films Melt-Processed at 895 degrees C.

Reversibility between the Bi2Sr2CaCu2O8 and Bi2Sr2Ca2Cu3O10 Superconducting

Phases.

Properties of Bi2Sr2CaCu2O8 Thick Films Melt-Processed at Temperatures up to 950 degree C.

Anodized Aluminum Coatings: Thermal Conductors or Barriers?

Spin-Peierls Ground States and Frustration in a Multi-band Peierls-Hubbard Model.

Magnetic Order in Three Rare-Earth Elpasolit Compounds Cs2NaRCl6.

Magnetic Order in the Nd, Gd, Er, and Yb Triflouromethane Sulfonates.

Polaronic Charge Separation in Mixed-halide MX Solids.

Photoinduced Electron-hole Charge Separation, Intrinsic Self-doping and Novel Device Applications of Q1D Heterojunction Materials: Mixed-halide MX Solids.

Single Effective Neuron.

Looking at Fokker-Planck Dynamics With a Noisy Instrument.

Electrochemical Charging of PD RODS.

On The Behavior of Pd Deposited In The Presence of Evolving Deuterium.

Ce5Ni6In11:An Intermediate Heavy-Fermion System.

Specific Contact Resistance Measurements of Ohmic Contacts To Diamond.

Electrical Activation Of Boron Implanted Into Diamond.

Reliability of Ohmic Contacts to Diamond.

Electrical Characterization of Boron-Implanted Diamond.

Fabrication of an Insulated Gate Diamond Fet for High Temperature Applications.

Issues on Diamond Device Fabrication.

An Ion-Implanted Diamond Metal-Insulator-Semiconductor Field Effect Transistor.

NCCOSC RDTE DIV N66001

High Temperature Reliability of Refractory Metal OHMIC Contacts to Diamond.

Fabrication of an Insulated Gate Diamond Field Effect Transistor.

Diamond-Based Microelectronics.

Carrier Activation and Mobility as a Function of Ion Implantation Conditions in Insulating Diamond.

Effect of Surface Condition on Strength and Fatigue Behavior of Alumina Ceramic.

Structural Performance of Cylindrical Pressure Housing Under External Pressure Loading, Part 6 Summary and Conclusions.

Long Distance Repeaterless Duplex FiberOptic Demonstration System.

A Review of High Temperature Superconductivity and the Effect of Chemical Modification on Bi2Sr2CaCu2O8 and Bi2Sr2Ca2Cu3O10.

Modelling the Density of a Distribution Containing A Jump Nonstationarity.

Prototype Superconducting Planar Transformers using High Thin and Thick Films.

Li/SOCI2 Battery Technology: Problems and Solutions.

L/F Noise In Indium Phosphide Transistors/Independent Exploratory Development Project ZF04.

Adhesive Bonded Joint with Improved Cyclic Fatigue Life for Alumina Ceramic Cylinders and Hemispheres Fourth Generation Housings.

Evaluation of NonDestructive Inspection Techniques for Quality Control of Alumina Ceramic Housing Components.

Initial Design of the TADMUS Study.

A Simple Computational Model of Center Surround Receptive Fields in the Retina.

Machine Visual Targeting Modeled on Biological Reflexes.

Algorithm for Simple and Complex Feature Detection: From Retina to Primary Visual Cortex.

NCCOSC RDTE DIV N66001

BRAC-95 CERTIFICATION

Certified Data: BRAC 95 Data Call Number Twelve - NCCOSC RDTE DIV SAN DIEGO CA

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

NEXT ECHELON LEVEL (if applicable)

J. J. DONEGAN
NAME (Please type or print)

Signature

Commander
Title

6/28/94
Date

Naval Command, Control and Ocean Surveillance Center
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief, with exceptions as noted in the attached statement.

MAJOR CLAIMANT LEVEL

W. H. CANTRELL
NAME (Please type or print)

W. H. Cantrell
Signature

Commander
Title

1 July 94
Date

Space and Naval Warfare Systems Command
Activity

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief. (noting that CSFs do not capture important work performed at these activities; e.g. marine mammals, IUSS, etc.)

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

J. B. GREENE, JR.
NAME (Please type or print)

Signature

ACTING
Title

13 JUL 1994
Date

Activity

BRAC-95 CERTIFICATION

Certified Data: BRAC 95 Data Call Number Twelve - NCCOSC RDTE DIV SAN DIEGO CA

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

NEXT ECHELON LEVEL (if applicable)

J. J. DONEGAN
NAME (Please type or print)

Commander
Title

26 July 94
Date

Naval Command, Control and Ocean Surveillance Center
Activity

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

MAJOR CLAIMANT LEVEL

W. H. CANTRELL
NAME (Please type or print)

W. H. Cantrell
Signature

Commander
Title

27 Jul 94
Date

Space and Naval Warfare Systems Command
Activity

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

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

Signature

Title

8/9/94
Date

Activity

BRAC-95 CERTIFICATION

Reference: SECNAVNOTE 11000 of 08 December 1993

In accordance with policy set forth by the Secretary of the Navy, personnel of the Department of the Navy, uniformed and civilian, who provide information for use in the BRAC-95 process are required to provide a signed certification that states "I certify that the information contained herein is accurate and complete to the best of my knowledge and belief."

The signing of this certification constitutes 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.

Each individual in your activity generating information for the BRAC-95 process must certify that information. Enclosure (1) is provided for individual certifications and may be duplicated as necessary. You are directed to maintain those certifications at your activity for audit purposes. For purposes of this certification sheet, the commander of the activity will begin the certification process and each reporting senior in the Chain of Command reviewing the information will also sign this certification sheet. This sheet must remain attached to this package and be forwarded up the Chain of Command. Copies must be retained by each level in the Chain of Command for audit purposes.

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

ACTIVITY COMMANDER

KIRK E. EVANS, CAPT., USN
NAME (Please type or print)

Signature

COMMANDING OFFICER
Title

7/26/94
Date

NCCOSC RDTE DIV
Activity

JOINT CROSS-SERVICE LABORATORIES DATA CALL # 12

NCCOSC RDTE DIV

Re-certified Pages:

4	9	14	19	20D	60	72A
5	10	15	20	21	60A	72B
6	11	16	20A	22	64	72C
7	12	17	20B	23	66	72D
8	13	18	20C	23A	72	

Revised pages dated 14 & 15 September 94

BRAC-95 Data Call 12
Joint Cross-Service Laboratories Data Call Certification

Reference: SECNAVNOTE 11000 of 08 December 1993

In accordance with policy set forth by the Secretary of the Navy, personnel of the Department of the Navy, uniformed and civilian, who provide information for use in the BRAC-95 process are required to provide a signed certification that states "I certify that the information contained herein is accurate and complete to the best of my knowledge and belief."

The signing of this certification constitutes 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.

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I certify that the information contained herein is accurate and complete to the best of my knowledge and belief WITH THE FOLLOWING EXCEPTION:

I have included the Common Support Function of Afloat C4I in addition to Airborne C4I, Fixed Ground-Based C4I, and Ground Mobile C4I Common Support Functions (CSFs). These functions are, by design and direction, increasingly common. The same C4I systems are used for airborne, fixed, and ground based platforms. In fact, the integration of C4I across platforms and services is the single overarching thrust in modern command and control. I believe C4I as a whole is in and of itself an inseparable common support function. We have answered the questions as requested. The breakout of data between Afloat C4I, Airborne C4I, Fixed Ground-Based C4I, and Ground Mobile C4I is based on parametric estimates. The estimates are themselves reasonable, however their meaning in terms of separation of actual work, in reality, is largely hypothetical. It is an accounting exercise. No decision should be based on the break-out within C4I common support functions.

Re-certification of Data Call #12 per BSAT clarification request:

Question 3.2.4.2. Papers published in peer reviewed journals.

Question 3.3.1.2. Engineering Development by ACAT

ACTIVITY COMMANDER

KIRK E. EVANS, CAPT., USN
NAME (Please type or print)

Signature

COMMANDING OFFICER
Title

15 SEPT 94
Date

NCCOSC RDTE DIV
Activity

Revised pages dated 14 & 15 September 94

BRAC-95 CERTIFICATION

Certified Data: BRAC 95 Data Call Number Twelve - NCCOSC RDTE DIV SAN DIEGO CA

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

NEXT ECHELON LEVEL (if applicable)

G. A. KLEIN III
NAME (Please type or print)

SIGNATURE

Acting Commander
Title

16 September 1994
Date

Naval Command, Control and Ocean Surveillance Center
Activity

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

MAJOR CLAIMANT LEVEL

W. H. CANTRELL
NAME (Please type or print)

W. H. Cantrell
Signature

Commander
Title

9/20/94
Date

Space and Naval Warfare Systems Command
Activity

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

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

W. A. EARNER
NAME (Please type or print)

Signature

Title

9/21/94
Date

Activity

Question 3.2.4.2 and Question 3.3.1.2

219

BRAC-95

DATA CALL NUMBER TWELVE
AMENDMENT 1

Data for

Naval Command, Control and Ocean
Surveillance Center, RDT&E Division
San Diego, CA

Certified Data: BRAC 95 Data Call Number Twelve - NCCOSC RDTE DIV SAN DIEGO CA
(Amendment Number 1)

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

DEPUTY CHIEF OF NAVAL OPERATIONS (LOGISTICS)
DEPUTY CHIEF OF STAFF (INSTALLATIONS & LOGISTICS)

D. W. DRENNON
NAME (Please type or print)

Signature

Acting
Title

10-24-94
Date

Activity

BRAC-95 CERTIFICATION

Certified Data: BRAC 95 Data Call Number Twelve - NCCOSC RDTE DIV SAN DIEGO CA
(Amendment Number 1)

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

NEXT ECHELON LEVEL (if applicable)

G. A. KLEIN III
NAME (Please type or print)

Signature

Acting Commander
Title

20 Oct 94
Date

Naval Command, Control and Ocean Surveillance Center
Activity

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

The information contained herein is prepared primarily from data submitted in previous data calls. Breakdown of square footage for other than Lab space is based on best estimate available given the timeframe allotted and personnel available.

Total workyears for organizational elements are provided but personnel necessary to breakdown total WYS into type of WYS were not available in the timeframe allotted.

MAJOR CLAIMANT LEVEL

W. H. CANTRELL
NAME (Please type or print)

W. H. Cantrell
Signature

Commander
Title

10/20/94
Date

Space and Naval Warfare Systems Command
Activity

BRAC-95 Data Call 12 AMMENDMENT NO. 1
Joint Cross-Service Laboratories Data Call Certification

Reference A: SECNAVNOTE 11000 of 08 December 1993
Reference B: SECNAV MEMO MM-0084-F2, BSAT/JT, 7 October 1994

In accordance with policy set forth by the Secretary of the Navy, personnel of the Department of the Navy, uniformed and civilian, who provide information for use in the BRAC-95 process are required to provide a signed certification that states "I certify that the information contained herein is accurate and complete to the best of my knowledge and belief."

The signing of this certification constitutes 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.

Each individual in your activity generating information for the BRAC-95 process must certify that information. Enclosure (1) is provided for individual certifications and may be duplicated as necessary. You are directed to maintain those certifications at your activity for audit purposes. For purposes of this certification sheet, the commander of the activity will begin the certification process and each reporting senior in the Chain of Command reviewing the information will also sign this certification sheet. This sheet must remain attached to this package and be forwarded up the Chain of Command. Copies must be retained by each level in the Chain of Command for audit purposes.

I certify that the information contained herein is accurate and complete to the best of my knowledge and belief WITH THE FOLLOWING EXCEPTION:

I have included the Common Support Function of Afloat C4I in addition to Airborne C4I, Fixed Ground-Based C4I, and Ground Mobile C4I Common Support Functions (CSFs). These functions are, by design and direction, increasingly common. The same C4I systems are used for airborne, fixed, and ground based platforms. In fact, the integration of C4I across platforms and services is the single overarching thrust in modern command and control. I believe C4I as a whole is in and of itself an inseparable common support function. We have answered the questions as requested. The breakout of data between Afloat C4I, Airborne C4I, Fixed Ground-Based C4I, and Ground Mobile C4I is based on parametric estimates. The estimates are themselves reasonable, however their meaning in terms of separation of actual work, in reality, is largely hypothetical. It is an accounting exercise. No decision should be based on the break-out within C4I common support functions.

Re-certification of Data Call #12 per reference (B) :

Organization Chart
NRaD Department Workyear and Space Breakdown
Map of Installation
Capacity Absorption Estimate
BRAC 91 and BRAC 93 Impact
Military Plans Impact
Collocated C4I Organizations
Tenant and Other Activities Mission and Workyears

BRAC-95 Data Call 12 AMMENDMENT NO. 1
Joint Cross-Service Laboratories Data Call Certification

ACTIVITY COMMANDER

KIRK E. EVANS, CAPT., USN
NAME (Please type or print)

Signature

COMMANDING OFFICER
Title

20 OCTOBER 1994
Date

NCCOSC RDTE DIV
Activity

1. Organization Chart (as of 30 Sep 94):

a. Show organization elements (those which report directly to the activity commander or report to a PEO.)

Organizational Chart Attached.

b. Describe the organizational relationships especially between support organizations and PEO/PMs.

NRaD reports to Commander, NCCOSC, who reports to COMSPAWARSYSCOM. For those PMs reporting to COMSPAWAR, there is therefore an organizational relationship in addition to the funding/technical relationship. For PEOs and PMs in other systems commands, there is only the funding/technical relationship.

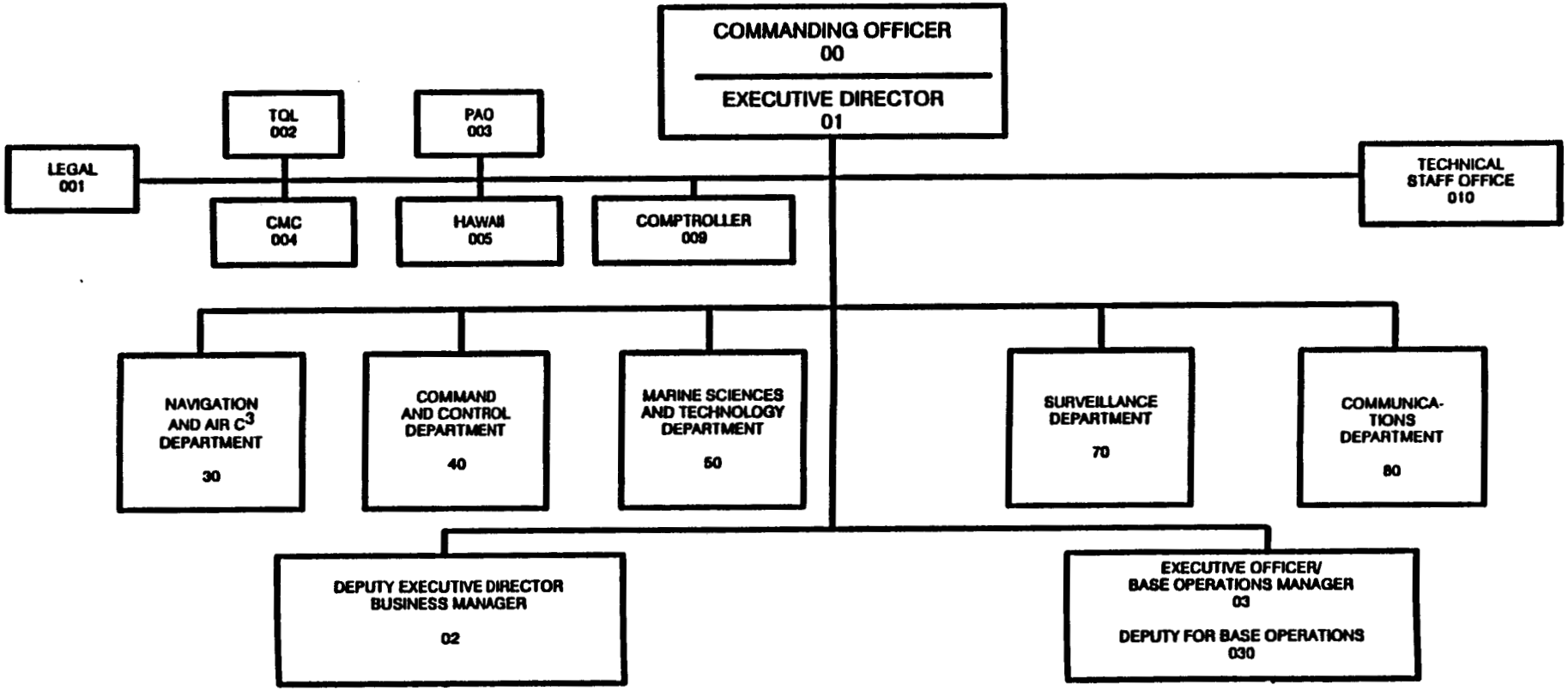
The funding and technical relationship between NRaD and the PMs and PEOs varies significantly from program to program. At one end of the spectrum, NRaD is provided funding to accomplish tasking that is developed by the PM/PEO. Other programs have more NRaD involvement and cooperation with the PM/PEO in the development of the tasking prior to the funding/tasking being formally provided to NRaD. In some programs, NRaD has full program management responsibility, and develops and executes tasking in support of the program.

c. Summarize the Command's C4I acquisition / non-C4I acquisition level of effort.

The 1,615 WYs of C4I acquisition management identified represents 66% of the total technical effort of the command. The Marine Science and Technology Department and most of the Surveillance Department do not perform C4I acquisition management.

The Command's remaining 1,191 WYs consist of functions such as admin, supply, legal, personnel, contracting, logistics, public works, etc. and support the functions listed above in about the same ratio.

NCCOSC RDT&E DIVISION ORGANIZATION



2. For each organizational element:

a: Breakout five types of FY93 workyears (government, FFRDC on-site, FFRDC off-site, contract support on-site and contract support off-site) by the following seven job categories: engineering, logistics, contracting, financial, legal, management, and administrative & other.

Organizational Element: CODE 30 NAVIGATION & AIR DEPARTMENT

FY-93 WORKYEARS (C4I ACQUISITION MANAGEMENT ONLY)						
	GOVT		FFRDC		CONTRACT SUPPORT	
	MIL	CIV	ON-SITE	OFF-SITE	ON-SITE	OFF-SITE
TOTAL*		251				

*Personnel necessary to break down total workyears into types of workyears were not available in the time allotted.

2.b. Number of square feet of space occupied broken out by: general office space, laboratory specific space, and other space (describe). Note if government owned or leased.

SPACE OCCUPIED (C4I ACQUISITION MANAGEMENT ONLY)			
	SF	OWNED	LEASED
GENERAL OFFICE SPACE**	12,800	X	
LABORATORY SPECIFIC SPACE**	94,400	X	
OTHER SPACE** (storage and training)	5,500	X	

**Best estimates given the timeframe allotted and personnel available.

UIC: N66001

2.d. Support office, list main programs.

SUPPORT OFFICE: **CODE 30 NAVIGATION & AIR DEPARTMENT**

MAIN PROGRAMS -

* GPS
* V-22
* ICNIA
* JOINT STAND-OFF WEAPON SYSTEM
* GLOBAL POSITIONING SYSTEM INTERFACE UNIT
* TACTICAL RELAY SURVEILLANCE SYSTEM
* CH-46 SYSTEM INTEGRATION LAB
* CRUISE MISSILE GPS
* JTIDS

TOTAL FY 93 PROGRAM FUNDS $50.5 M

UIC: N66001

2. For each organizational element:

a: Breakout five types of FY93 workyears (government, FFRDC on-site, FFRDC off-site, contract support on-site and contract support off-site) by the following seven job categories: engineering, logistics, contracting, financial, legal, management, and administrative & other.

Organizational Element: CODE 40 COMMAND & CONTROL DEPARTMENT

FY-93 WORKYEARS (C4I ACQUISITION MANAGEMENT ONLY)						
	GOVT		**FFRDC**		**CONTRACT SUPPORT**	
	MIL	**CIV**	**ON-SITE**	**OFF-SITE**	**ON-SITE**	**OFF-SITE**
TOTAL*	27	882				

*Personnel necessary to break down total workyears into types of workyears were not available in the time allotted.

2.b. Number of square feet of space occupied broken out by: general office space, laboratory specific space, and other space (describe). Note if government owned or leased.

SPACE OCCUPIED (C4I ACQUISITION MANAGEMENT ONLY)			
	SF	**OWNED**	**LEASED**
GENERAL OFFICE SPACE**	132,300	X	
LABORATORY SPECIFIC SPACE**	403,400	X	
OTHER SPACE (DESCRIBE)**			

**Best estimates given the timeframe allotted and personnel available.

UIC: N66001

2.d. Support office, list main programs.

SUPPORT OFFICE: CODE 40 COMMAND & CONTROL DEPARTMENT

MAIN PROGRAMS -

* JTIDS CLASS 2 TERMINAL
* E-2C WEAPON SYSTEM
* OPERATION SUPPORT SYSTEM
* NAVY TACTICAL COMMAND SYSTEM AFLOAT
* ADVANCED COMBAT DIRECTION SYSTEM BLOCK 0
* ADVANCED COMBAT DIRECTION SYSTEM BLOCK 1
* COMMAND & CONTROL PROCESSOR C2P
* C3 SIMULATION

TOTAL FY 93 PROGRAM FUNDS $180.5 M

UIC: N66001

2. For each organizational element:

a: Breakout five types of FY93 workyears (government, FFRDC on-site, FFRDC off-site, contract support on-site and contract support off-site) by the following seven job categories: engineering, logistics, contracting, financial, legal, management, and administrative & other.

Organizational Element: CODE 70 SURVEILLANCE DEPARTMENT

FY-93 WORKYEARS (C4I ACQUISITION MANAGEMENT ONLY)						
	GOVT		**FFRDC**		**CONTRACT SUPPORT**	
	MIL	**CIV**	**ON-SITE**	**OFF-SITE**	**ON-SITE**	**OFF-SITE**
TOTAL*		102				

*Personnel necessary to break down total workyears into types of workyears were not available in the time allotted.

2.b. Number of square feet of space occupied broken out by: general office space, laboratory specific space, and other space (describe). Note if government owned or leased.

SPACE OCCUPIED (C4I ACQUISITION MANAGEMENT ONLY)			
	SF	**OWNED**	**LEASED**
GENERAL OFFICE SPACE**	22,440	X	
LABORATORY SPECIFIC SPACE**			
OTHER SPACE (DESCRIBE)**			

**Best estimates given the timeframe allotted and personnel available.

UIC: N66001

2.d. Support office, list main programs.

SUPPORT OFFICE: CODE 70 SURVEILLANCE DEPARTMENT

MAIN PROGRAMS -

* HULTEC - TEC SUPPORT
* RADIANT OUTLAW
* PARALLEL IMAGE PROCESSING
* ELECTRO-MAG THEORY
* GUSTY DAIRY
* PROGRAM MANAGEMENT SUPPORT
* GUSTY DAIRY TASK 9
* TACTICAL DATA ACQUISITION & CORRELATION ATD
* RASSP COORDINATION
* THAW
* IUSS COMMUNICATIONS ENGINEERING
* SITE 7800 SYSTEM ENGINEERING AND TESTING

TOTAL FY 93 PROGRAM FUNDS $13.3M

UIC: N66001

2. For each organizational element:

a: Breakout five types of FY93 workyears (government, FFRDC on-site, FFRDC off-site, contract support on-site and contract support off-site) by the following seven job categories: engineering, logistics, contracting, financial, legal, management, and administrative & other.

Organizational Element: CODE 80 COMMUNICATIONS DEPARTMENT

FY-93 WORKYEARS (C4I ACQUISITION MANAGEMENT ONLY)						
	GOVT		**FFRDC**		**CONTRACT SUPPORT**	
	MIL	**CIV**	**ON-SITE**	**OFF-SITE**	**ON-SITE**	**OFF-SITE**
TOTAL*	9	380				

*Personnel necessary to break down total workyears into types of workyears were not available in the time allotted.

2.b. Number of square feet of space occupied broken out by: general office space, laboratory specific space, and other space (describe). Note if government owned or leased.

SPACE OCCUPIED (C4I ACQUISITION MANAGEMENT ONLY)			
	SF	**OWNED**	**LEASED**
GENERAL OFFICE SPACE**	57,000	X	
LABORATORY SPECIFIC SPACE**	387,500	365,800	21,700
OTHER SPACE (DESCRIBE)**			

**Best estimates given the timeframe allotted and personnel available.

UIC: N66001

2.d. Support office, list main programs.

SUPPORT OFFICE: CODE 80 COMMUNICATIONS DEPARTMENT

MAIN PROGRAMS -

* NAVY EHF SATELLITE
* DEMAND ASSIGNED MULTIPLE ACCESS SYSTEM
* UHF SATCOM
* MINI-DAMA
* WSC-3 SATELLITE TRANSCEIVER UPGRADE
* DEFENSE DISSEMINATION PROGRAM
* SHF SATCOM
* TACTICAL RECEIVE EQUIPMENT
* VERDIN
* EVS
* ISABPS
* IRR
* SLVR
* TMPS
* MMPS
* NECC
* SMB
* CPIP

UIC: N66001

* FVLF ENGINEERING

* BASEBAND SWITCH

* CIRCUIT MAYFLOWER

* CLARINET MERLIN

TOTAL FY 93 PROGRAM FUNDS $205 M

3. Map of the installation to include elements listed in 2:
a. annotate buildings to show location of each organizational element.

Locations shown are for C4I acquisition management functions only.

Maps of installation are provided as attachments A-H for San Diego and G & H for Warminster Pa. Buildings are color coded to identify occupants as follows:

Code 30 - Yellow
Code 40 - Pink
Code 70 - Green
Code 80 - Blue

b. Show location of available space in FY97.

Space in FY97 is the same except for Warminster. On Map H, buildings 1&2 will be vacated; building 70 and a new building to be constructed near Bldg 125 will be occupied.

c. Show buildings with equipment/facilities which would be difficult to move or replicate. list such equipment with initial cost.

Data provided is for C4I acquisition management only. Maps A-H are attached. Labs are identified by bldg # in parenthesis with map letter after dash (-). Data has been condensed from information provided in Data Call #5.

SCIF. There are 33ksf of SCIF operating space for C4I acquisition management. Replication cost is $5M.
(600, 605)-B
(587, 557)-A
(A33)-D

Combat Direction System (CDS) Development and Evaluation Site (CDES). Cost of equipment is $75M and relocation would be difficult. The facility is a 11,776 sf TEMPEST building.
(600)-B

Over the Horizon -Targeting (OTH-T) Reconfigurable Land Based Test Site(RLBTS) Replacement cost is $5M and relocation would be difficult.
(600)-B

Systems Integration Facility (SIF). Equipment cost is $23.7M and relocation would be difficult.

difficult.
(600)-B

E-2C Airborne Tactical Data Systems (ATDS) Integration Laboratory. Replacement cost is $15.6M and relocation would be difficult.
(60)-D

Multilink Laboratory. Replacement cost is $4M and relocation would be difficult.
(600)-B

Propagation Test Facility (PTF). The replacement value is $500K and relocation would be difficult. Further, the site (with unobstructed view of the ocean) is difficult to replicate.
(599)-B

Signals Warfare Integrated Facilities Testbed (SWIFT). The replacement cost of equipment is $28M and the facility would be difficult to relocate.
(605)-B

Space and Electronic Warfare Simulator (SEWSIM). Equipment replacement cost is $4M and relocation would be difficult.
(605)-B

Tactical Systems Laboratory (TSL). The replacement cost of the facility is $1.5M and relocation would be difficult.
(33)-D

Processing and Data Exploitation Center (PDEC). The replacement cost of the facility is $1.5M and relocation would be difficult.
(33)-D

Southern California Communications Networking Test Facility. The equipment is movable but the new site would require line of sight over the ocean testing area.
(Geographic area)

Ship Antenna Model Range and Simulation Facility. Replacement cost is $30M and relocation is not feasible.
(382, 415)-E

VLF/LF Integrated Test facility. Replacement cost is $97M and relocation is not feasible.
(33)-D

Optical and Radiometric Calibration Facility. The replacement cost is $750K and relocation is not feasible.
(76)-D

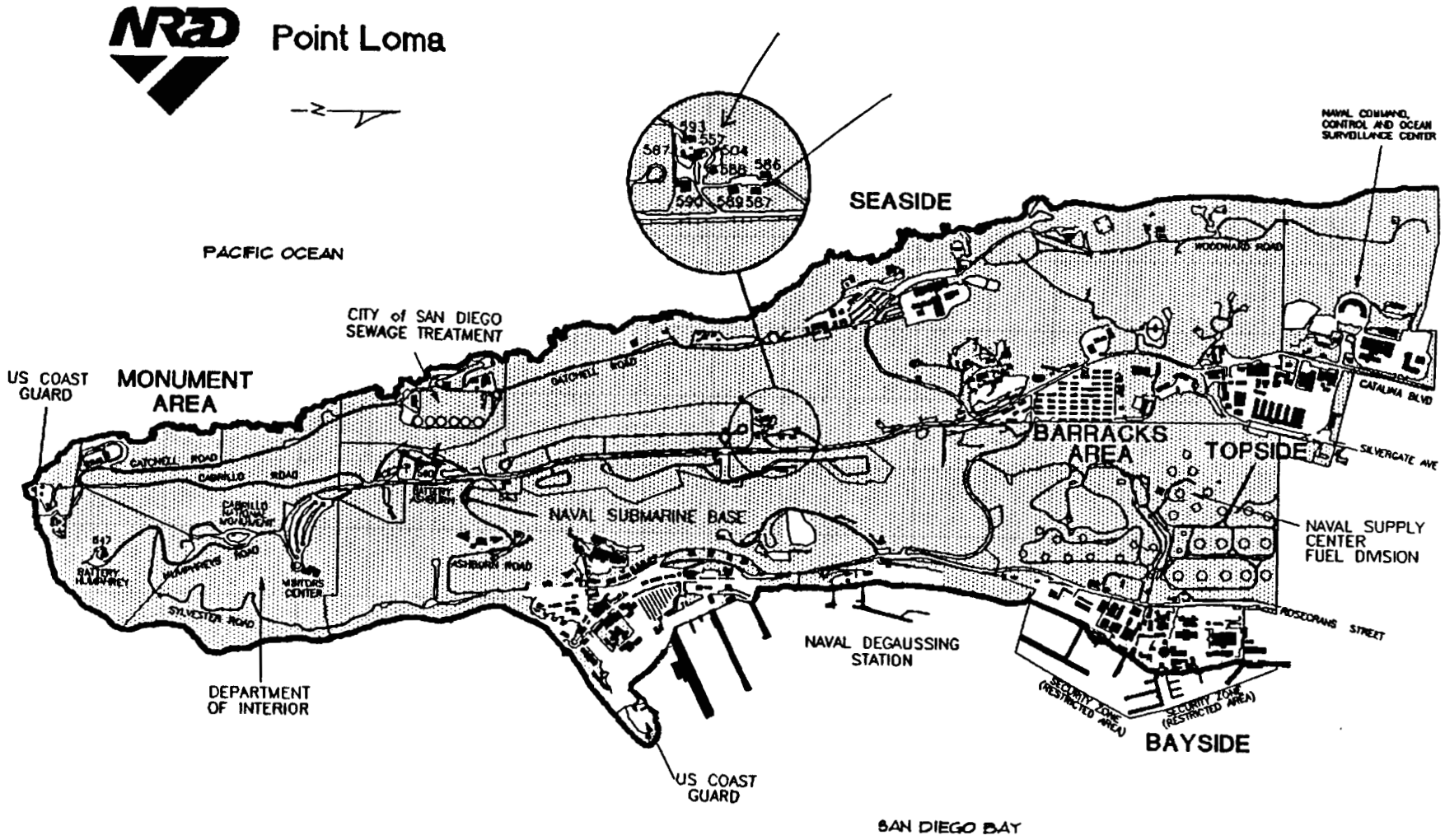
Environmental Test Laboratory. Relocation of this facility is estimated to cost $600K.
(40)-D

Inertial Components Test Lab. The equipment could be relocated but the required facility would be expensive to replicate. Major features of the existing building are equipment piers anchored to bedrock with the surrounding floor isolated from the piers to reduce the effects of foot traffic. The building is circular to reduce wind effects and the outer wall and center hub have vibration isolation material between upper and lower footings to attenuate building generated vibrational disturbances. Building replacement cost is $25M.
(108)-H

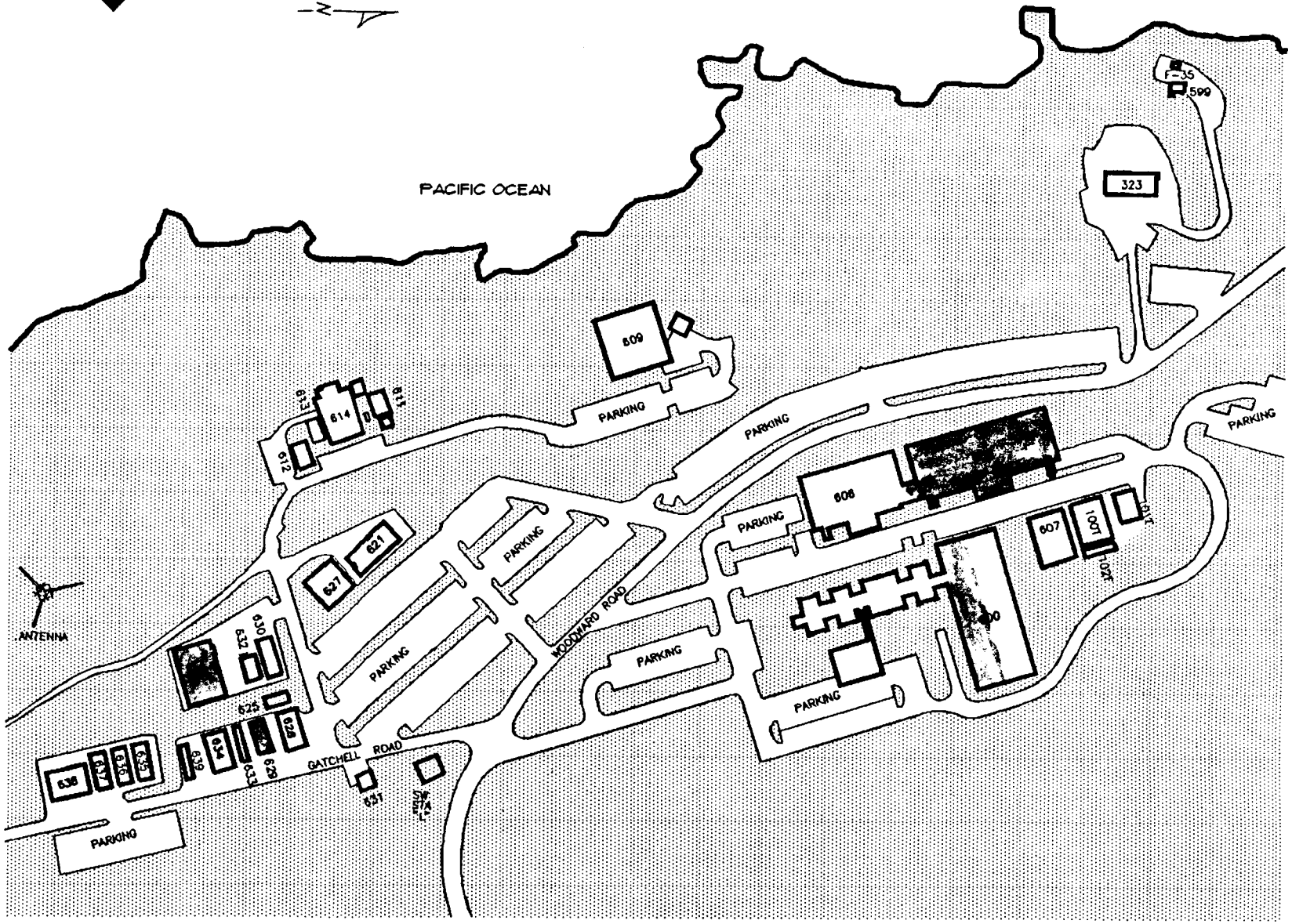
Carco Flight Motion Simulator. The replacement cost is $600K including installation. Relocation would be difficult.
(108)-H

d. Describe potential space for consolidation in close proximity to the activity available in FY97, state distance to the activity and extenuating circumstances.

With the acquisition of Air Force Plant 19 there exists the potential of accommodating an additional 1,200 - 1,500 man years with labs and support facilities if Martin Marrietta vacates the premises which are within several miles of NRAD. Limited to admin, labs, and support facilities, the modifications would require approximately $15 - $20M in funding.


NRaD
Point Loma
PACIFIC OCEAN
SEASIDE
NAVAL COMMAND, CONTROL AND OCEAN SURVEILLANCE CENTER
CITY of SAN DIEGO SEWAGE TREATMENT
US COAST GUARD
MONUMENT AREA
CATAVOLL ROAD
CABRILLO ROAD
CABRILLO NATIONAL MONUMENT
BATTERY HUMPHREYS
HUMPHREYS ROAD
SILVESTER ROAD
VISITORS CENTER
DEPARTMENT OF INTERIOR
NAVAL SUBMARINE BASE
ASHBURN ROAD
NAVAL DEGAUSSING STATION
US COAST GUARD
BARRACKS AREA
TOPSIDE
WOODWARD ROAD
CATALINA BLVD
SILVERGATE AVE
NAVAL SUPPLY CENTER FUEL DIVISION
ROSECRANS STREET
SECURITY ZONE (RESTRICTED AREA)
BAYSIDE
SAN DIEGO BAY

Seaside


PACIFIC OCEAN
323
599
609
611
613
614
612
PARKING
PARKING
PARKING
PARKING
PARKING
PARKING
PARKING
PARKING
PARKING
606
607
1001
1002
1003
621
627
630
632
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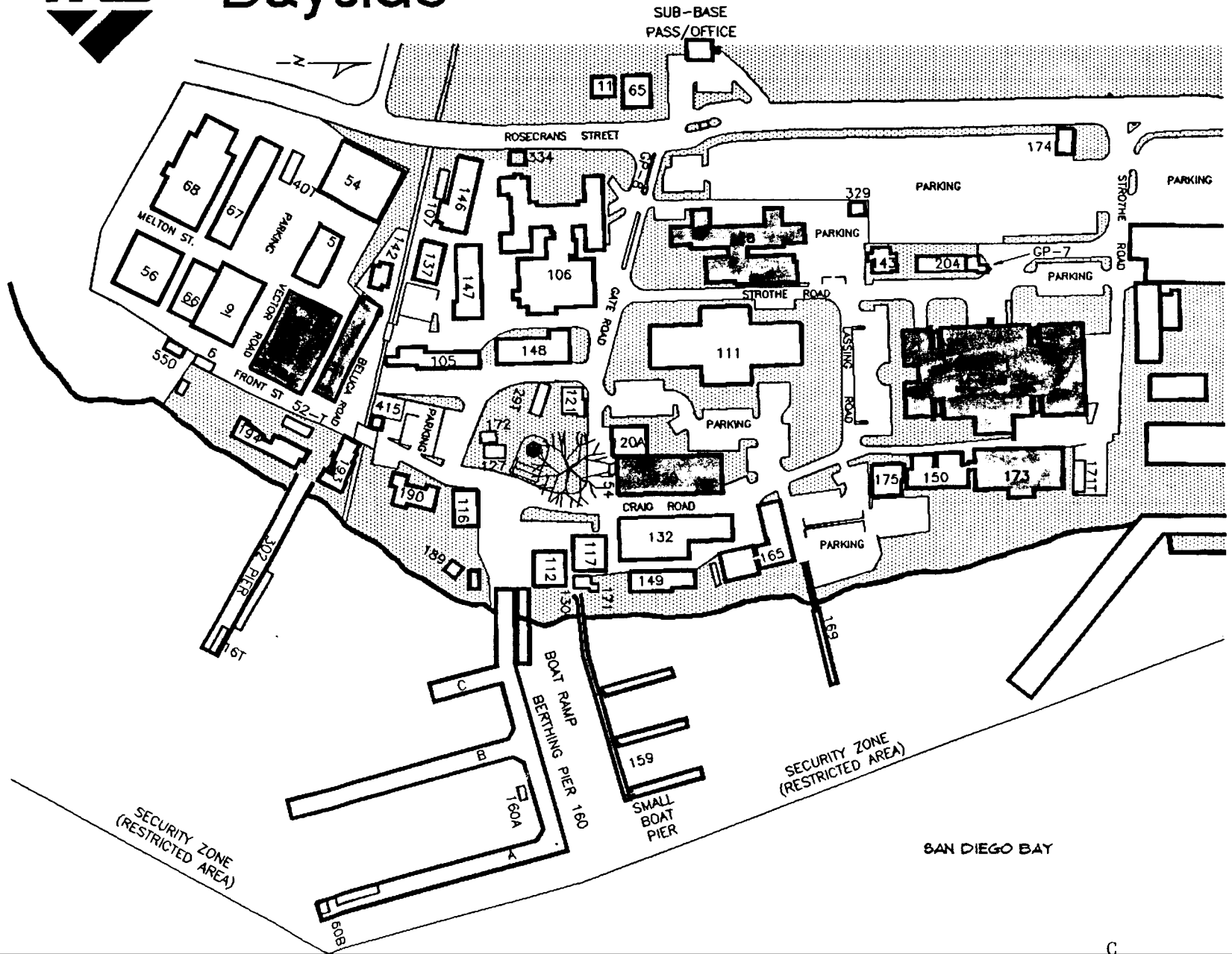
629
631
638
637
WOODWARD ROAD
GATCHELL ROAD
ANTENNA

Bayside


SUB-BASE
PASS/OFFICE
ROSECRANS STREET
MELTON ST.
FRONT ST
VISITOR ROAD
BELUGA ROAD
PARKING
STROTHE ROAD
GATE ROAD
LASSING ROAD
CRAIG ROAD
BOAT RAMP
BERTHING PIER 160
SMALL BOAT PIER
SECURITY ZONE (RESTRICTED AREA)
SAN DIEGO BAY
GP-7
68
67
56
66
61
54
5
40T
550
6
52-T
194
193
415
190
116
681
302 PIER
19T
11
65
334
146
107
142
137
147
106
148
105
292
121
172
127
20A
54
111
112
117
130
132
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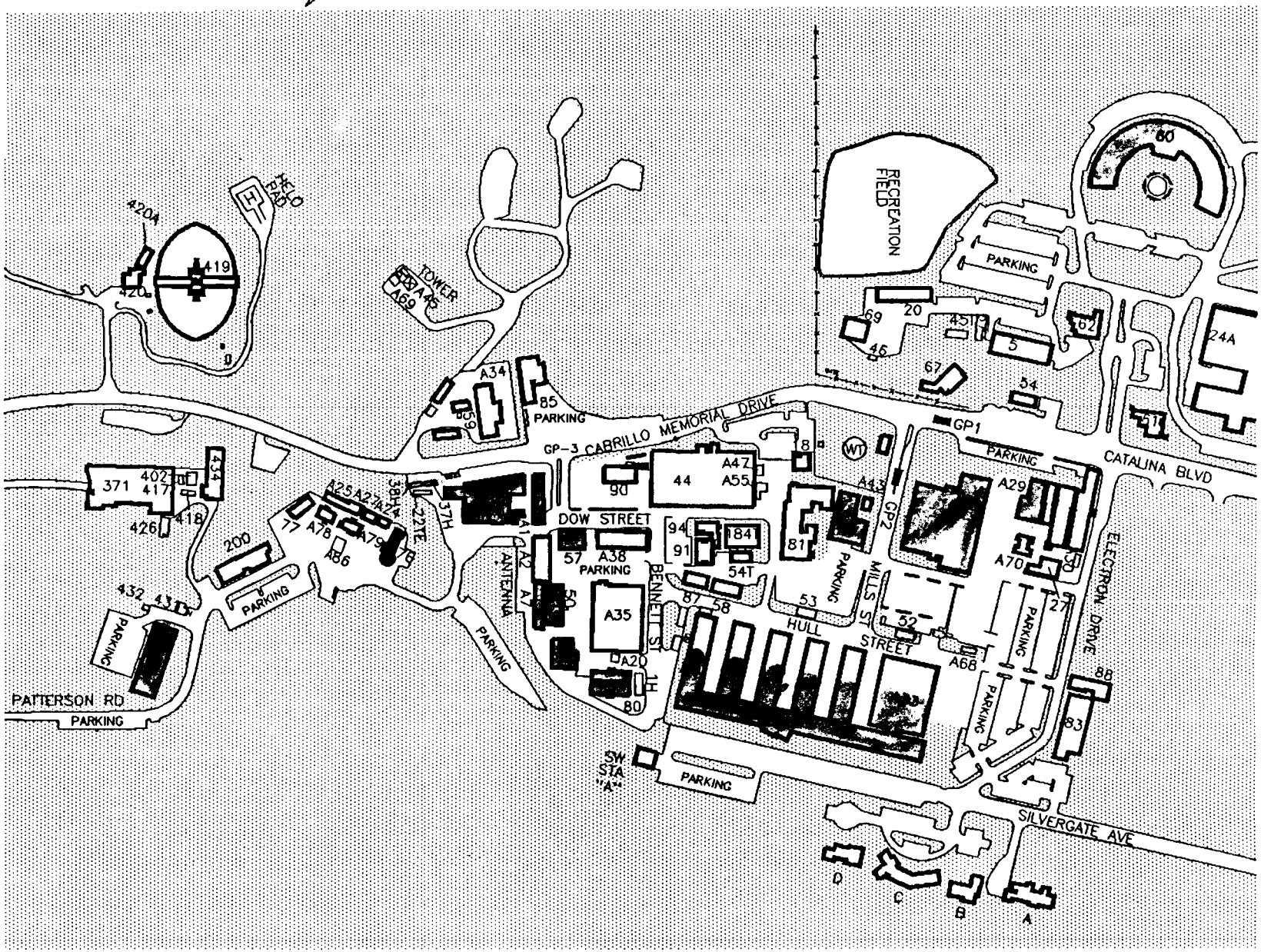
169
171
175
150
173
174
329
145
204
159
160A
160B
A
B
C

Topside


RECREATION FIELD
PARKING
CABRILLO MEMORIAL DRIVE
GP-3
GP1
GP2
CATALINA BLVD
DOW STREET
BENNETT ST
MILLS ST
HULL STREET
ELECTRON DRIVE
SILVERGATE AVE
PATTERSON RD
ANTENNA
TOWER
SW STA "A"
A34
A47
A55
A43
A29
A70
A68
A38
A35
A20
A69
A78
A79
A86
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69
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45T
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24A
60
88
83
27
80
1H
37H
38H
22TE
371
402
417
418
426
434
420A
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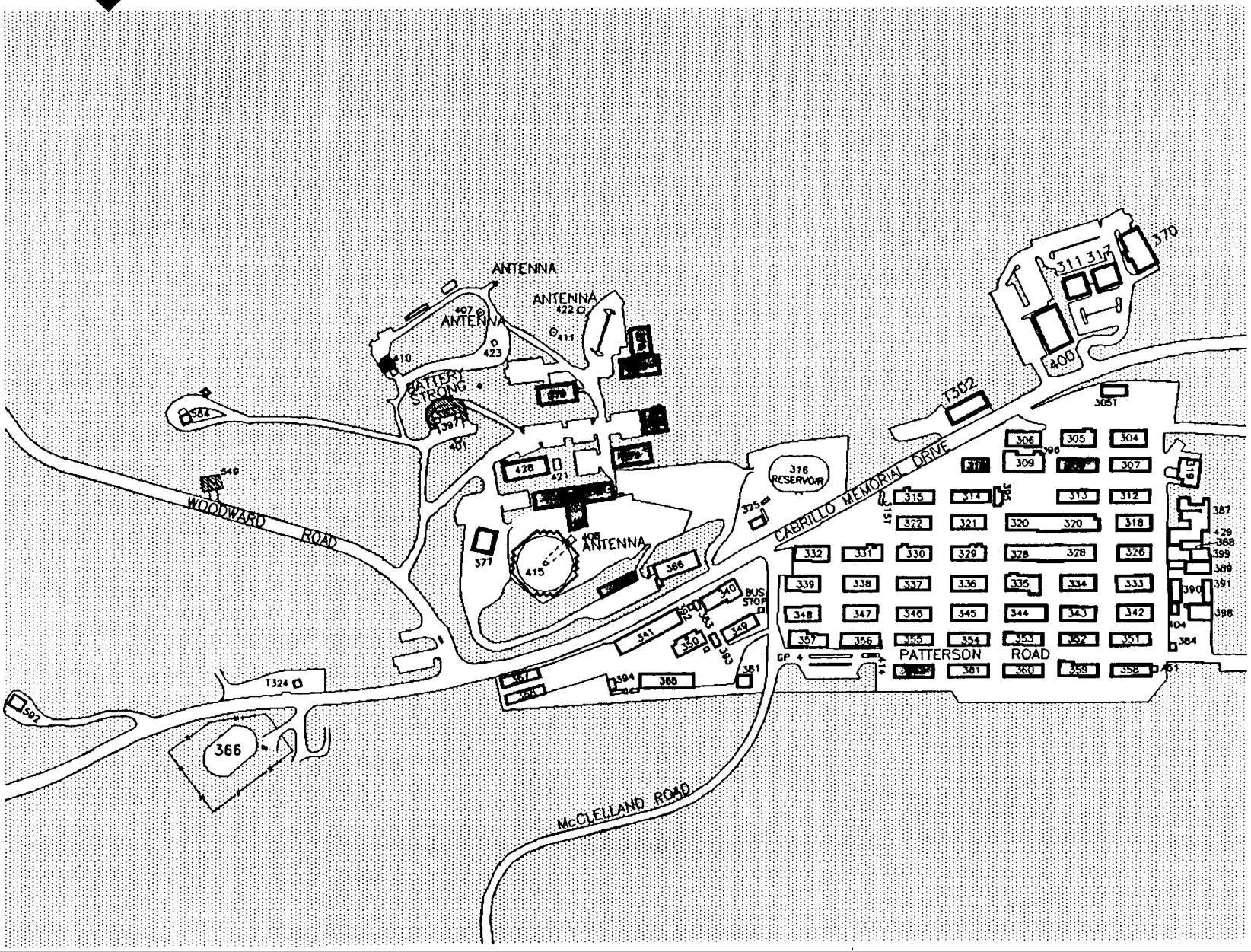
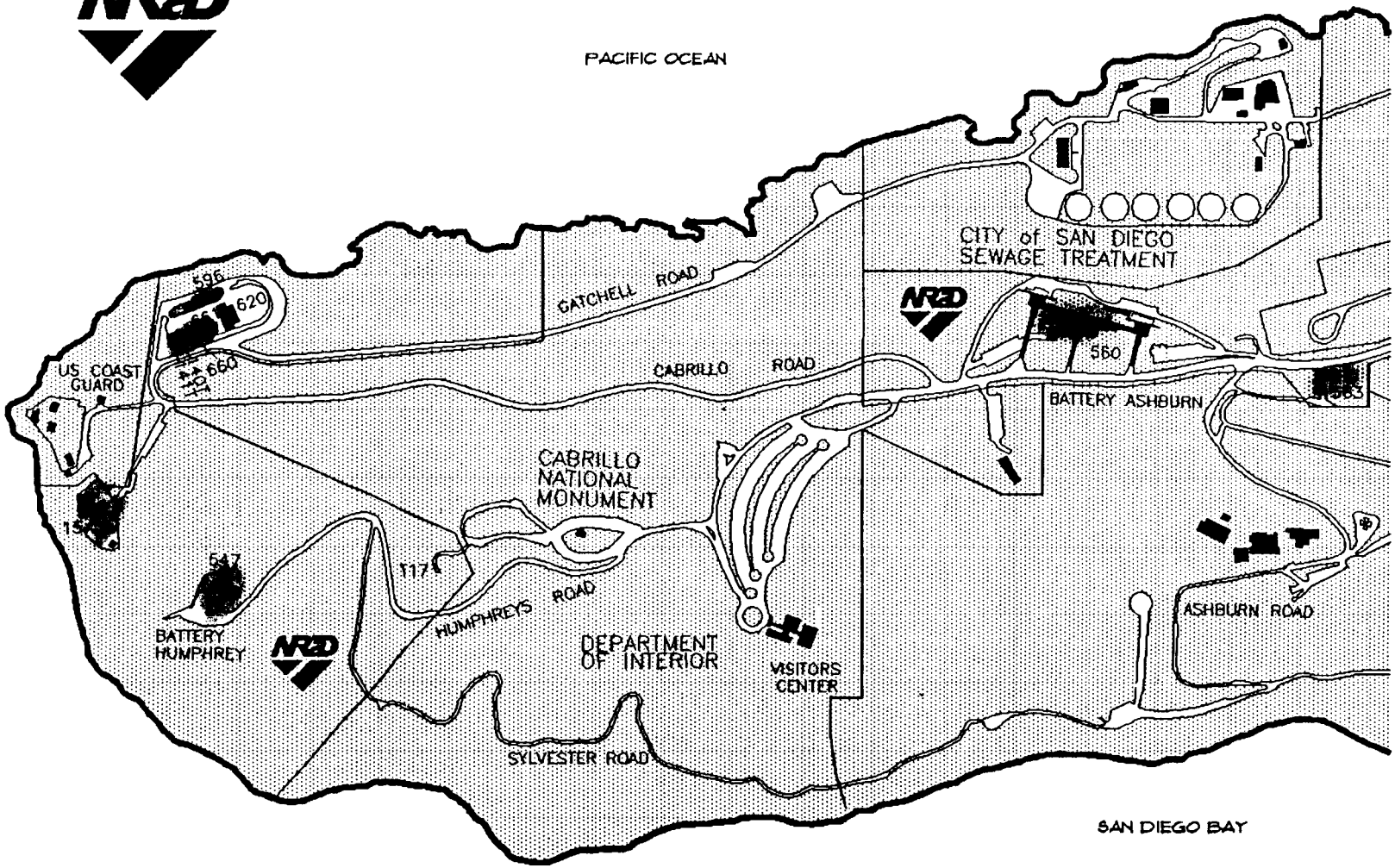
432
43D
200
77
425
427
A2
A7
50
D
C
B
A

Barracks/ Model Range

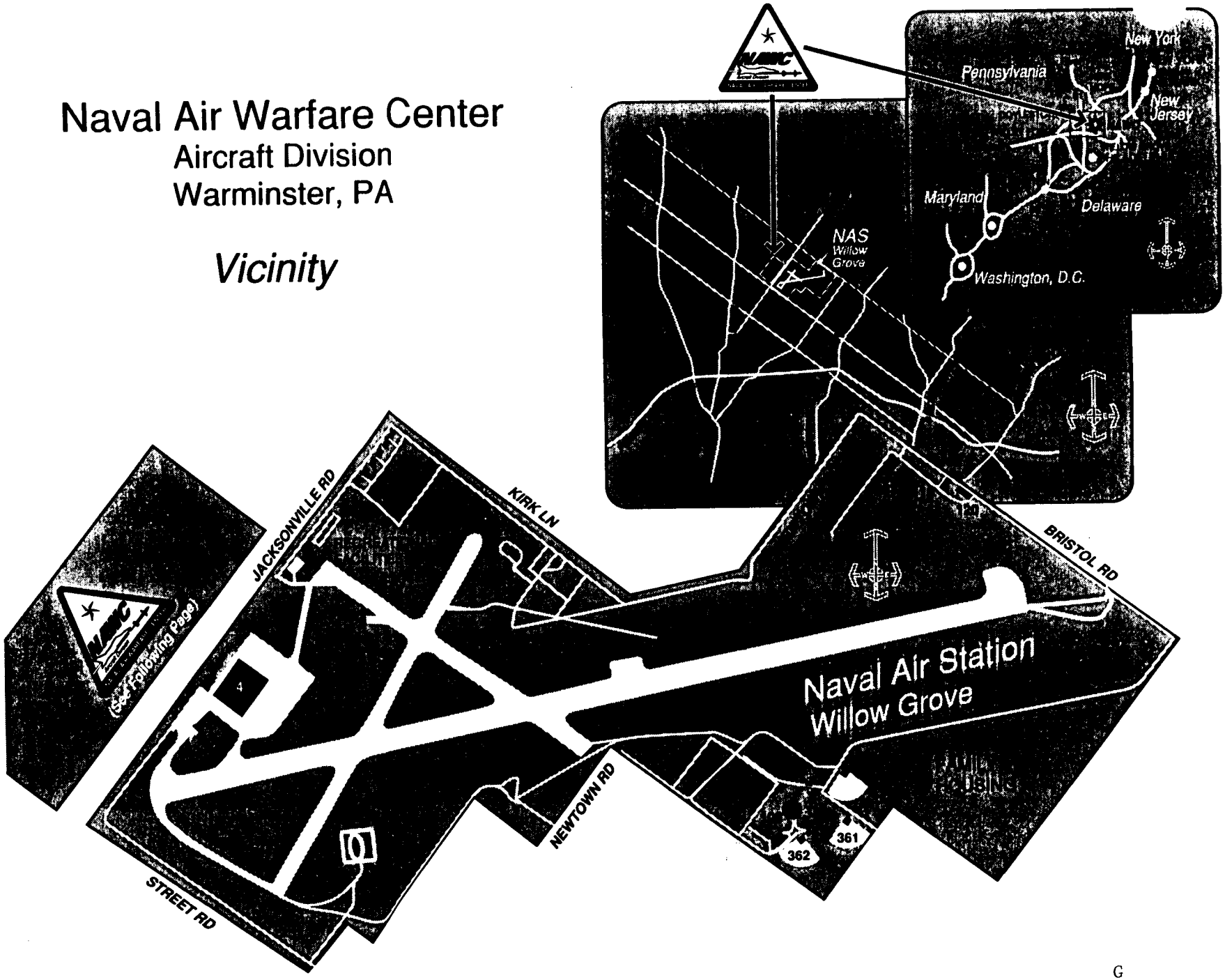


Monument Area

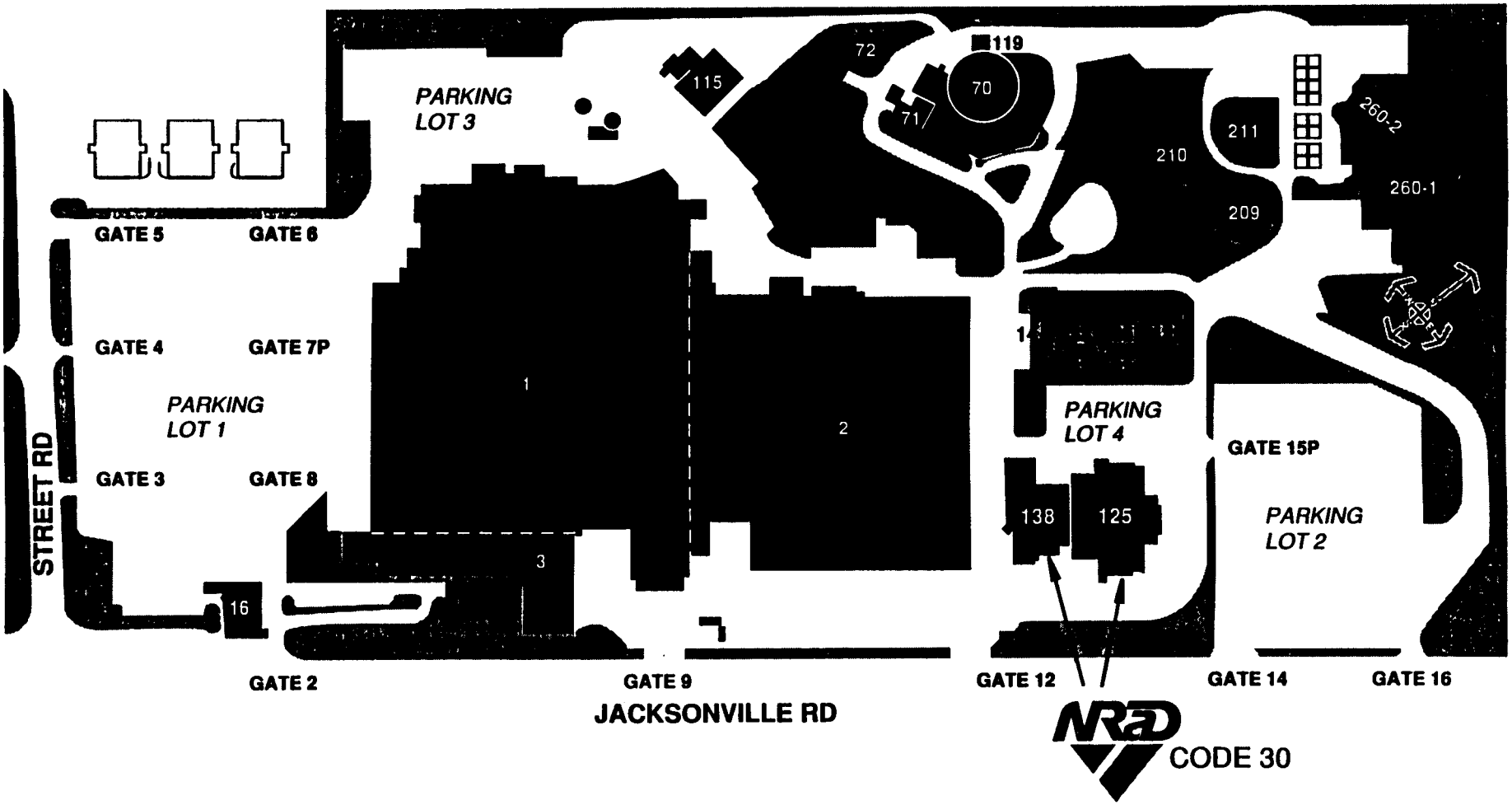


Naval Air Warfare Center
Aircraft Division
Warminster, PA

Vicinity



Naval Air Warfare Center
Warminster, PA



H

4. Estimate the capacity of the activity and installation (separately) to absorb similar workyears with little or no modification of facilities. Estimate the capacity of the activity and installation (separately) to absorb similar workyears with major modifications and describe the nature of those modifications and estimated cost. Use FY97 as the baseline for such estimates.

CSF 1. AIR VEHICLES - FIXED PROPULSION

No facilities are specifically designated for this CSF.

CSF 2. AIR VEHICLES - FIXED AVIONICS

RF/Microelectronics Lab: Additional tasking could be absorbed in the facility without modification.

SIL Lab: The HC/KC-130 SIL currently has the capacity to absorb additional similar workyears categorized in the same common support function with only minor facility modifications. The SIL could be used to simulate various types of aircraft platforms with minor modifications (e.g. addition of specific aircraft avionics, sensors, additional wiring, etc.) The SIL could also be used as a training facility on the operation of the newly integrated system.

Cargo Flight Motion Simulator: The CFMS has spare capacity to absorb additional workyears. Minor modifications such as cabling to the system under test needs to be designed and built. Also depending on the system under test data acquisition software will require minor changes.

GPS Lab (59%) : Has some limited capacity to absorb additional workyears of effort if additional space can be made available either by construction or reorganization of existing spaces. Additional equipments (2 GPS simulators) would also be required.

CSF 3. AIR VEHICLES - ROTARY AVIONICS

CH-46 SIL: This lab currently has the capacity to absorb additional similar workyears categorized in the same common support function with only minor facility modifications. The SIL could be used to simulate various types of similar helicopter platforms with minor modifications such as addition of a sensor, additional wiring, etc.

CSF 4. WEAPONS - CRUISE MISSILES

GPS Lab (12%) : Has some limited capacity to absorb additional workyears of effort if additional space can be made available either by construction or reorganization of existing spaces. Additional equipments (2 GPS simulators) would also be required.

CSF 5. SPACE SYSTEMS - SATELLITES

The SHF Satellite Communication Test Facility could be increased by 4000 SF through the reassignment of other programs currently using the adjacent spaces at a cost of $0.5M.

The Navy UHF Satcom Test Facility could easily absorb 5 workyears, but any requirement above that would require the relocation of the secure facilities' wall at a cost of $0.4M.

CSF 6. C4I SYSTEMS - AIRBORNE

JTIDS Network Design Lab: As this facility is dedicated to the JTIDS Network Design Function, it offers significant potential for expansion to accommodate additional similar workyears. Existing buildings within the Warminster site are also available for expansion, making access to additional lab space to support Joint operations a trivial effort (i.e. NRaD Warminster can provide additional capacity without need for MILCON). It is anticipated that approximately 2000 sq ft of additional lab space would be required to absorb 20 additional workyears of effort required by the Joint Development Activity. This is well within existing building capacity expected to be available in the FY97 time frame at the Warminster site.

The E-2C Airborne Tactical Data Systems (ATDS) Integration Laboratory has the capacity to absorb additional similar workyears with only minor facility modifications.

The Systems Integration Facility (SIF) (20%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Multi-Link Laboratory (20%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

CSF 7. C4I SYSTEMS - FIXED GROUND-BASED

Expansion of the Information Transfer Management Structure could be achieved by converting adjacent lab spaces at a minor cost of $0.1M for an additional 5 workyear capability.

The Surveillance Test and Integration Center is currently fully utilized and does not have further capacity to absorb additional workyears.

The Tactical Engineering Analysis Lab is currently fully utilized and cannot absorb additional workyears.

The Tactical Systems Lab is currently fully utilized and cannot absorb additional workyears.

The High Performance Computing and Theater Level Planning Laboratory has the capacity to absorb additional similar workyears with minor facility modifications.

The Navy Command and Control System Ashore Integration Test Facility has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Navy Intelligence Development, Integration And Test Facility has the capacity to absorb additional similar workyears with minor facility modifications.

The Ocean Surveillance Information System (OSIS) Evolutionary Development (OED) Laboratory has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Surveillance Systems' C4I Fixed Ground Based offices and labs can absorb additional similar workyears by increasing office occupancy density and by converting storage space to office space.

The Distributed Command/Control (DC2) Laboratory has the capacity to absorb additional similar workyears with minor facility modifications.

The Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Laboratory does not have the capacity to absorb additional similar workyears.

The Distributed Simulation Internet (DSI) Advanced Simulation Laboratory (DASL)/Secure DSI Integration Simulation Laboratory (SISL) does not have the capacity to absorb additional similar workyears.

The Command Center of the Future does not have the capacity to absorb additional similar workyears.

The Processing and Data Exploitation Center is currently fully utilized and cannot absorb additional workyears.

The Space and Electronic Warfare Simulator (SEWSIM) is currently fully utilized and cannot absorb additional workyears.

The Special Signals Equipment Space Simulator (SWIFT) is currently fully utilized and cannot absorb additional workyears.

The Microwave and Millimeter-wave Antenna Range Complex is currently fully utilized and cannot absorb additional workyears.

The Radar Signal Processing Laboratory is currently fully utilized and cannot absorb additional workyears.

Secure Facilities, Vaults, and Underground Bunkers: The SCI and other compartmented facilities consist of over 55,000 square feet of operating space in 26 separated facilities within the Center. An additional 1500 square foot space is presently proposed for becoming a SCIF, and at least 12 additional spaces (12,000 square feet) meet DIAM 50-3 requirements and could be accredited as SCIFs. The Center also oversees three (3) contractor SCIFs with 1181 square feet of space; four (4) other contractor SCIFs with 8093 square feet can rapidly be re-accredited. These additional SCIF spaces could be accredited with only minor or no additional facility modifications.

The Indoor Robotics Development/Test Facility has additional buildings that could be used to absorb additional robotics work. The use of the robotics test facility can be time-shared to provide for additional requirements.

The Communications Support System Simulation Facility could easily accommodate an additional 10 workyears.

The Systems Integration Facility (SIF) (40%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Multi-Link Laboratory (40%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The High Performance Computing Processing Facility (50%) is currently fully utilized and does not have further capacity to absorb additional workyears.

The Research Evaluation and Systems Analysis (RESA) Facility (50%) does not have the capacity to absorb additional similar workyears.

The Display Systems Development Laboratory (50%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS) (50%) does not have the capacity to absorb additional similar workyears.

CSF 8. C4I SYSTEMS - AFLOAT

Based on the analysis provided in FY95 BRAC Data Call #4 Section 3, additional work space is available to support an additional 618.6 workyears capability in support of C4I afloat without major facility modifications.

The Ship Antenna Model Range and Simulation Facility could absorb workyears without modification; additional office and working spaces would be required at other nearby buildings.

The VLF/LF Integrated Test Facility could absorb an additional 3 to 5 workyears, and expansion capacity beyond this is limited.

The EHF Satellite Communications Terminal Test Facility could absorb another 4 workyears and additional space could be made available for $0.5M.

The Radar Test Range is currently fully utilized and cannot absorb additional workyears.

The Surveillance Systems' C4I Afloat office and labs can absorb additional similar workyears by increasing office occupancy density and by converting storage space to office space.

The Deployable Surveillance Integration Facility is currently fully utilized and cannot absorb additional workyears.

The Bayside Acoustic Systems Computational Facility is currently fully utilized and cannot absorb additional workyears.

The Combat Direction System (CDS) Development and Evaluation Site (CDES) has the capacity to absorb additional similar workyears categorized in the same common support function with only minor facility modifications.

The Navy Tactical Command System Afloat (NTCS-A) testbed and integration facility has the capacity to absorb additional similar workyears with only minor facility modifications.

Simulated Ships Motion Test Facility: The Simulated Ships Motion Test Facility is used on the average 16 hrs per day to conduct inertial navigation system testing. Little or no facility modification would be required to increase the facility workload capacity. Simultaneous testing of two inertial systems, vice a single system, can be conducted on the same motion simulator and the normal test day can be extended (e.g. 24 hrs per day).

OSP Integration Lab: Minor modifications to upgrade lab for Secret ADP applications.

The Survivable Adaptable Fiber-Optic Embedded Network Development Site could absorb an additional 5 workyears through reassignment of nearby office spaces at a cost of $0.1M.

Inertial Navigation Facility (INFAC) (50%): The Inertial Component Test Laboratory (ICTL) at INFAC contains 12 test piers, isolated from local foot traffic, and the required electronics to support equipment on those piers. The test piers contain developmental test stations incorporating triple, dual and single axis rate and position tables, precision dividing heads, environmental stations and seismic monitors in the most seismically stable inertial sensor facility in the United States. Currently, 7 of the 12 piers are being utilized 8 hours/day, 5 days/week and 1 pier is devoted to long term testing, 24 hours/day, 7 days/week. The remaining 4 piers are available for expansion/growth. Currently, 6 workyears of labor is being expended in the laboratory.

The Systems Integration Facility (SIF) (40%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Multi-Link Laboratory (40%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

GPS Lab (29%) : Has some limited capacity to absorb additional workyears of effort if additional space can be made available either by construction or reorganization of existing spaces. Additional equipments (2 GPS simulators) would also be required.

The High Performance Computing Processing Facility (50%) does not have the capacity to currently not have further capacity to absorb additional workyears.

The Research Evaluation and Systems Analysis (RESA) Facility (50%) does not have the capacity to absorb additional similar workyears.

The Display Systems Development Laboratory (50%) has the capacity to absorb additional similar workyears categorized in the same common support function with minor facility modifications.

The Over the Horizon Targeting (OTH-T) Reconfigurable Land Based Test Site (RLBTS) (50%) does not have the capacity to absorb additional similar workyears.

CSF 9. C4I SYSTEMS - GROUND MOBILE

No facilities are specifically designated for this CSF.

CSF 10. ELECTRONIC DEVICES

The Microelectronics CAD Facility can absorb additional workyears with minor facility modifications. This is in accordance with the initial plan for CAD expansion.

The Radiometric Measurements Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Optoelectronic Device Characterization Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Infrared Focal Plane Array Test Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Long Wavelength Infrared (LWIR) Filter and Materials Evaluation Laboratory consists of multiple test apparatus which can be used in a coordinated fashion in support of multiple workyears. The ultimate limiter of the number of workyears supportable is the space required to place experimental hardware in and around the rather large spectrophotometers and the space required for personnel access to the equipment. Minor modifications could be made to acquire adjoining space in order to expand this facility.

The Electronic Packaging Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Microelectronics Laboratory requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

The Electronic Materials Science Facility requires minor or no modification to support additional workyears. Not all of the facility equipment is operated at full capacity.

Inertial Navigation Facility (INFAC) (50%): The Inertial Component Test Laboratory (ICTL) at INFAC contains 12 test piers, isolated from local foot traffic, and the required electronics to support equipment on those piers. The test piers contain developmental test stations incorporating triple, dual and single axis rate and position tables, precision dividing heads, environmental stations and seismic monitors in the most seismically stable inertial sensor facility in the United States. Currently, 7 of the

12 piers are being utilized 8 hours/day, 5 days/week and 1 pier is devoted to long term testing, 24 hours/day, 7 days/week. The remaining 4 piers are available for expansion/growth. Currently, 6 workyears of labor is being expended in the laboratory.

CSF 11. ENVIRONMENTAL SCIENCES

The Environmental Sciences facility can absorb additional similar workyears by increasing office occupancy density and by converting storage space to office space.

The Propagation Test Facility's current use and anticipated future use is running at about 75% capacity. In the previous two years, the facility ran at approximately 100% capacity.

CSF 12. ENVIRONMENTAL QUALITY

The Ocean Sciences Laboratory is a fully-equipped chemistry, biology and sensor instrumentation development facility with state-of-the-science capabilities for marine environmental quality and ocean science research applications. With the use of nearby buildings to provide office space, the facility could be shared to support significant additional workyears.

The Marine Environmental Survey Capability (MESC) facility is currently fully utilized and cannot absorb additional workyears.

The Site Characterization and Analysis Penetrometer System facility is currently fully utilized and cannot absorb additional workyears.

CSF 13. ADVANCED MATERIALS

The Materials Research Laboratory personnel are fully utilized, but the 12 major instruments and workstations can not be fully utilized by the current laboratory personnel all at the same time (more equipment and stations than people). There is capacity to increase the productivity of the laboratory with only minor modifications.

5. Describe the impact of BRAC 91 and BRAC 93 decisions on the activity and installation.

On 12 April 1991, SECNAV approved a plan to consolidate Navy RDT&E, Engineering and Fleet Support Activities. Part of that plan was the establishment of the Naval Command Control and Ocean Surveillance Center (NCCOSC), located on Point Loma in San Diego, CA as one of the Navy's full spectrum warfare centers. Concurrently, the Naval Ocean Systems Center (NOSC) was disestablished as a separate reporting activity.

As part of the NCCOSC establishment, the Research, Development, Test and Evaluation (RDTE) Division was established as a subordinate command collocated with NCCOSC at San Diego, CA. BRAC-91 approved this plan and it was effective 1 January 1992.

When BRAC-91 approved the SECNAV 12 April 1991 consolidation plan, the following were also approved:

WARMINSTER DETACHMENT
When the Naval Air Development Center (NADC) in Warminster, PA was disestablished, some of the former NADC functions, personnel, and facilities at Warminster, PA became the Naval Command, Control And Ocean Surveillance Center RDT&E Division Detachment at Warminster.

PHILADELPHIA DETACHMENT
BRAC-91 closed Naval Station Philadelphia, PA and transferred tenants to other bases. OPNAV modified the name of one of those tenant commands, the Naval Electronic Systems Engineering Activity Detachment, Philadelphia, PA to the NCCOSC RDT&E Division Detachment Philadelphia, which will relocate in 1995 to property currently held by NAWC-AD at Warminster, PA.

FCDSSA
The Fleet Combat Direction Systems Support Activity (FCDSSA) located in San Diego, CA had it's functions, personnel, and other resources transferred to the Naval Command, Control And Ocean Surveillance Center Research, Development, Test, and Evaluation Division in San Diego and effective 5 April 1992 FCDSSA was disestablished.

HAWAII DETACHMENT
The functions, personnel, and other resources of the NCCOSC RDTE DIV, Detachment, Kailua, Hawaii were transferred to our activities in San Diego, CA and Pearl Harbor, HI and this detachment was disestablished effective 30 September 1993.

NSSA LOS ANGELES
Effective 1 October 1992, OPNAV disestablished the Navy Space Systems Activity (NAVSPASYSACT) in Los angeles after transferring its functions, personnel, facilities, and other resources to the Naval Command, Control And Ocean Surveillance Center Research, Development, Test, and Evaluation Division in San Diego.

6. Describe military department approved and programmed plans which will impact or have impacted the activity and organization.

None other than BRAC impacts described above.

7. Collocated C4I organizations.

None.

8. Remaining tenants and other activities on the installation: name of organization, mission, total workyears.

Tenants residing on main complex (shore commands)

Tenant Command Name (mission)	UIC	Officer	Enlisted	Civilian
Naval Base San Diego (Fire Dept)	N00242	0	0	15
Port Hueneme Division Naval Surface Warfare Center	N63394	3	7	62
Naval Military Personnel Command Support Activity Det	N41341	1	18	0
Defense Printing Service Branch Office, Pt Loma	N43639	0	0	13
Naval Surface Warfare Center Dahlgren Division DET White Oak	N60921	0	0	7
Naval Health Research Center	N63116	11	14	59
Navy Public Works Center	N63387	0	0	185

Tenant Command Name (mission)	UIC	Officer	Enlisted	Civilian
Naval Base San Diego (Fire Dept)	N00242	0	0	15
Navy Personnel Research And Development Center	N68221	4	11	220
Personnel Support Activity Det Pt Loma	N68554	1	33	13
Naval Undersea Warfare Center Keyport Detachment Arctic Submarine Lab	N68951	0	0	7
Defense Technical Information Center (DTIC)	D000UA	0	0	12
Defense Finance And Accounting Service DAO-CL San Diego, Pt Loma Detachment	HQ0112	0	0	39
*Scheduled Airline Traffic Office	SATO	0	0	0
*La Petite Academy, Inc	LPA	0	0	0
*Data Disposal, Inc	DDI	0	0	0

Tenant Command Name (mission)	UIC	Officer	Enlisted	Civilian
Naval Base San Diego (Fire Dept)	N00242	0	0	15
*Point Loma Federal Credit Union	PLFCU	0	0	0
*Evergreen Concessions Co	ECC	0	0	0
*Marine Physical Laboratory	MPL	0	0	0
TOTALS		**20**	**83**	**632**

*Notes:

SATO: Six SATO contractors provide airline scheduling services for NCCOSC and this command's travelers.

LPA: Seventeen La Petite Academy, Inc contractors provide daycare services for 80 children of this command's military and civilian employees.

DDI: Five Data Disposal, Inc contractors perform pick-up, shredding, and disposal of approximately 5 tons of paper products per week for this command and NCCOSC.

PLFCU: Fourteen Point Loma Federal Credit Union contractors provide full service banking at two locations for various military and civilian customers.

ECC: Fifteen contractors provide cafeteria services at three locations at this command for various military and civilian customers.

MPL: Twenty five contractors work in this scientific activity that provides support for Scripps Institute of Oceanography, whose principal business area is oceanography.

Tenants residing in Special Areas (Special Areas are defined as real estate owned by host command not contiguous with main complex; e.g. outlying fields).

Tenant Command Name	UIC	Location	Officer	Enlisted	Civilian
*University Of California	UC	LaPosta, CA	0	0	0
*U.C. Customs	USC	LaPosta, CA	0	0	0

* These are tenants at our La Posta Astrophysical Observatory, which is rarely used. Neither tenant has permanent full-time personnel on site.