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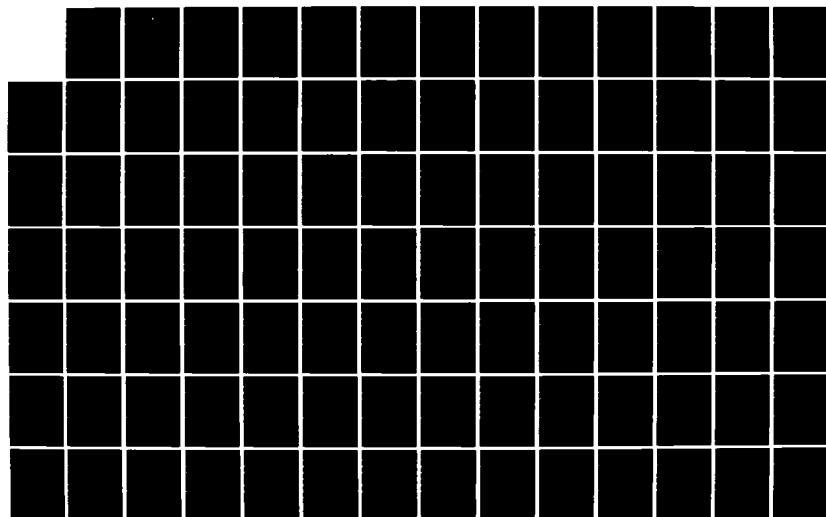
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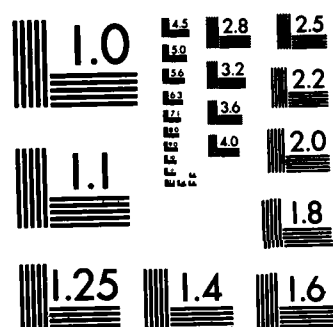
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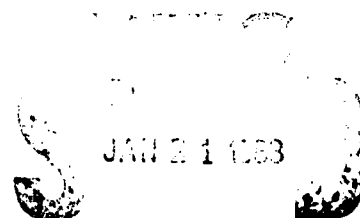
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15 SEPTEMBER 1982

PHASE REPORT

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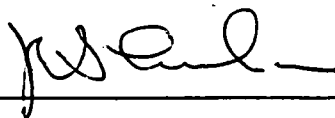
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The Naval Air Development Center has evolved from a war-time privately-owned aircraft production plant into a complex RDT&E Naval Laboratory. This report is the result of a preliminary investigation of sources for a more detailed history of NADC. The report consists of two parts: a summary history of NADC, focusing on organizational changes; and, a guide to available sources, including organizational files, formal historical reports, in-house newspapers, bibliographies, taped interviews, records held by the Federal Records Center, and technical reports.		

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A

INTRODUCTION

This report results from a preliminary investigation of sources for a projected history of the Naval Air Development Center (NADC) in Warminster, Pennsylvania. This investigation is part of the Navy's effort to improve its internal history program—especially that of the Navy laboratories—and to provide guides for researchers wishing to explore issues relating to the Navy's history. Mr. Joseph Cody, Public Affairs Officer at NADC, and Dr. David Allison, Historian of the Navy Laboratories, initiated the project by contacting the Department of History and Sociology of Science at the University of Pennsylvania, which provided the principal investigators. The aim of this report is to provide an introduction to the history of NADC and a guide to the historical sources available at the Center and the Federal Records Centers storing NADC records.

The project consisted of three major tasks. The first task was to locate and survey records containing information of permanent value to the Navy. The results are presented in the guide to sources and in the tabular survey of records. The second task consisted of conducting tape-recorded interviews with nine people who have important perspectives on the history of NADC. The result of this work is described in the guide to sources below. The third task was the preparation of a final report summarizing the work conducted for this project and including a summary history of the Center.

This report consists of two parts. The summary history of NADC focuses on the organizational history of the Center from its origin as a privately-owned aircraft factory in World War II to 1980. The history attempts to identify the major events in the Center's history and the reasons for its various reorganizations. The second part of this report is a guide to sources, which identifies and describes available sources for researchers interested in NADC's history. Many of these sources are in various Federal Records Centers and are listed in tabular form in the appendices. Other sources are to be found in the NADC History Project files held by the Public Affairs Office of NADC.

HISTORY OF NADC, 1941-1980

INTRODUCTION

The following historical narrative summarizes nearly forty years of the activities of a large and complex research and development facility. We have emphasized long-run trends and general patterns at the expense of close analysis of individual events. To provide the reader with a short introduction to the history of NADC, we have developed several specific themes. Our major theme is the relationship between the Center's technical effort and its organization. A second, and related, theme is the changing relationship of the Center and its technical projects to the sponsors and patrons in the Navy. Throughout NADC's history, the Center's laboratories have tended to develop an independence, which some NADC personnel have perceived as hindering the Center's technical efficiency. This survey describes the organizational responses to the development of the "autonomous laboratory," to changes in the Navy, and to the emergence of the "systems" approach. More extensive treatment is given to the early years of the Center than to its most recent past for two reasons. First, the history of NADC began when the Navy took over a privately-owned aircraft factory, an event surrounded by controversy. Second, there is little information on the early period, including the 1950's, that is commonly available or common knowledge. The survey is based on material available at NADC, and therefore is limited to the perspective of NADC personnel.

BREWSTER AERONAUTICAL CORPORATION, 1941-1945

The residents of Johnsville, Pennsylvania, enthusiastically greeted the announcement on January 23, 1941, of plans for the local construction of a multi-million-dollar aircraft factory. The Brewster Aeronautical Corporation had already purchased 400 acres of farmland at a cost of \$2 million, and quickly began a crash program to complete construction of the new facility by July. Little existed near the site except the Friends' Meeting House on Street Road, and so the plan promised to bring "the largest industrial boom in the history of Bucks County." (1)

Brewster designed the new Johnsville plant to complement and extend the capabilities of its two other factories, and it shipped plane parts produced at its plants in Long Island City, N.Y., and Newark, N.J., to Johnsville for final assembly. The newly-created Defense Plant Corporation subsidized the \$8 million cost of the new facility and leased the factory to Brewster for \$1 per year. With contracts approaching \$110 million from the U.S. Navy, Great Britain, and the Netherlands, Brewster's future looked bright.

A carriage manufacturer of long standing, Brewster began expanding rapidly in the late 1930's by moving into aircraft engineering and production just as war-time demands took off. Employing only 40 people in 1932, Brewster expanded its payroll to 20,000 by 1943. In the 1930's Brewster made parts for Grumman Aircraft Engineering, but built no planes of its own until 1938 when it developed two planes for the Navy: the F1A-1, a carrier-based fighter, and the SBA-1, a two-seat dive bomber. An improved version of the fighter, the F2A-2, was sold to England, and nicknamed the "Buffalo" by the R.A.F. (2)

The plane's nickname described it well. A small number of Buffalos were first sent to Britain in the summer of 1940 during the Battle of Britain, but the British soon discovered to their dismay that with armor and ammunition the Buffalo could manage only 270 mph at 6,000 feet. This performance sharply contrasted with the projected figure of 313 mph at 13,000 feet. When the British Admiral Cunningham was offered Buffalos in early 1941 for Mediterranean service, he chose instead

to use World-War-I-vintage Gladiator biplanes. Nor did the Buffalos serve the American Navy well. In the Battle of Midway the Buffalos were slaughtered: during the initial American attack thirteen of the twenty Brewster planes were shot down, and only two of the planes ever flew again. (3)

In early 1942 Brewster ran into difficulty. Shortly after Pearl Harbor, Brewster had announced the "Buccaneer," a new dive bomber to be built wholly at Johnsville. The first Buccaneers were to roll off the assembly line by mid-February 1942, but production difficulties plagued the firm. When Brewster failed to deliver a single new dive bomber, President Roosevelt directed the Secretary of the Navy, Frank Knox, to take immediate control of the firm. Captain George C. Westervelt assumed command of the Brewster complex on April 21 and reported that "dissatisfaction with management" had caused the takeover. (4)

Explanations for the production failures varied greatly. Senator Harry F. Byrd asserted that the Long Island City plant was operating at 40 percent of capacity, and he charged that labor slowdowns had caused Brewster's ills. R. J. Thomas, a member of the War Labor Board and President of the United Automobile Workers (UAW), alleged that "aliens" were managing the firm, and requested an F.B.I. investigation. The plant officials at Johnsville blamed their delays on subcontractors who failed to deliver critical parts and on the Navy's many design changes. The *Hatboro Spirit* editorialized: "For months people of the community . . . have been asking each other the question—'What's the matter with Brewster; why are they not producing?'" (5)

The events soon took an unexpected turn when the *Philadelphia Record* exposed a complicated profit-skimming scheme that it asserted had crippled Brewster. The "mysterious Miranda brothers," Alfred and Ignateo, along with their associate F. William Zelcher, had set up three shadow corporations that controlled not only the sale of parts to Brewster, but also the firm's lucrative exports. From November 1939 to June 1941 the three men had siphoned off an alleged \$5.5 million from the firm. During the same period stockholders had received only \$290,000 in dividends and had filed a suit against Brewster's board chairman, James Work, for redress. Most damning to the firm was that the Mirandas had spent twelve months of the twenty-month period either in Federal jail or on parole for smuggling arms to Bolivia in 1939, in violation of the Neutrality Act. (6)

The Navy reinstated private management to Brewster one month after the Navy takeover. The company's officials had resigned, and the Navy installed a new board of directors, headed by veteran aircraft engineer C. A. Van Dusen. In early 1943, a three-man panel headed by Van Dusen took control of the Brewster stock held by Work, Zelcher, and the Mirandas (amounting to 27 percent of the total stock). Still failing to produce planes on schedule, on May 17, 1943, Brewster again received a new set of directors, headed by Henry J. Kaiser, "the West coast shipbuilding genius." Ex-Westinghouse executive Frederick Riebel, who had been acting as production trouble-shooter for the Navy at Brewster, was elevated to president. Although Kaiser immediately launched a campaign to improve the firm's performance, Brewster remained behind its production schedule. (7)

In addition to suffering under ineffectual management, Brewster was mired in labor difficulties. The War Labor Board reported in late 1942 that a work "slowdown" was impeding Brewster's production. On August 24, 1943 a four-day strike began after a month of controversy over the classification of employees assigned to guard the plant. The guards, members of both the UAW and the Coast Guard Reserve, had conflicting loyalties; when four guards were arrested for disregarding Coast Guard orders the rest of the employees walked out. After a total of 39 people were arrested, the UAW demanded withdrawal of the 200 regular Coast Guardsmen that had been moved in. The striking workers, and particularly the local's contentious head, Thomas de Lorenzo, drew public wrath for betraying the war effort. A letter to the editor of the *Doylestown Intelligencer*

exhorted: "Citizens! Awake! dare to demand that these strikers choose between the United States flag and their gangster leaders. Demand that our government clamp down on these saboteurs and traitors . . ." The War Labor Board demanded the workers return to work "unconditionally," and production soon began again. (8)

Shortage of materials also ailed Brewster. Hangars were built with wooden beams due to war-time shortages of steel. Senator Harry S. Truman investigated the firm in September 1943 and found conditions "extremely bad." Two hundred mechanics had petitioned to be released to find work elsewhere, but had been refused; 24 plane motors had sat unused for a month because the necessary mounting bolts were not available. To compound matters, an allegation of sabotage surfaced in October when it became known that seven employees had been fired at the Navy's behest in the spring of 1942 on charges of subversive activity. (9)

In November 1943 the questionable past of the testy union leader Lorenzo was uncovered during his testimony before a Congressional committee. He had employed a half dozen aliases, "when they came in handy," and had falsified several official documents, including his 1940 tax return. Reelected for his fourth term as president of Local 365 in February 1944, Lorenzo nevertheless faced serious problems. In March he was indicted by a Federal Grand Jury for doctoring his application to the War Labor Board, and in August he was fined \$500 and sentenced to 30 days in Federal jail. (10)

By early 1944 Brewster's prospects were grim. The Doylestown Intelligencer reported that Kaiser's reforms had boosted production by 350 percent, cut man hours per plane from 32,000 to 13,000, and decreased the payroll by one-third. (11) Nevertheless, on May 19, four days after Kaiser left Brewster, the Navy cancelled the remaining half of Brewster's contract for the manufacture of Vought Corsairs — virtually the firm's entire business. Navy officials announced three reasons for the decision, and admitted that the firm was bearing the brunt of a \$180 million cutback in the purchase of fighters. With 12,000 employees, Brewster held the smallest of the three major Corsair contracts. The two largest contractors, United Aircraft and Goodyear Aircraft, retained their orders. Second, Brewster had no other Navy contracts, and "no other work of importance to the war effort." Finally, Brewster's unit production costs exceeded those of United and Goodyear, despite Kaiser's improvements. (11)

To protest the Navy's decision, the Johnsville workers began a "stay in" on May 31 that lasted two days. The workers continued plane assembly and set a production record of eight planes in one day. Upset over the loss of jobs, and what was feared to be a prelude to the national chaos that would occur with demobilization, the union called for the establishment of an Office of War Demobilization and Post-War Adjustment. (12)

While Brewster moved into the manufacture of pots, pans, and suitcases, the Navy took full control of the Johnsville plant. Initially, Captain S. J. Zeigler coordinated the conversion of the factory into an aircraft engineering and modification center under the direction of the Philadelphia Navy Yard's Naval Air Material Center.

NAVAL AIR MODIFICATION UNIT, 1943-1945

The establishment in 1943 of the Naval Air Modification Unit (NAMU) at the Philadelphia Naval Yard reflected a decision by the War Department to separate aircraft production from modification. To speed delivery to the armed services, planes were mass produced and then, at a separate facility, design modifications were added to produce the "latest" model for war duty. (14) The Modification Branch of the Naval Aircraft Factory (NAF), Philadelphia, modified the Factory's

assembled planes, but the two functions of production and modification turned out to fit poorly in the same organization. Hence when the NAF was expanded into the Naval Air Material Center (NAMC) on July 20, 1943, the Modification Branch was reconstituted separately as the Naval Air Modification Unit. (15)

During its first year of operation NAMU moved between different buildings in the NAMC complex while its personnel wrestled with an influx of projects. The availability of the million square foot Brewster plant, twenty miles north of Philadelphia, promised relief from crowded facilities, and shortly after it took possession of the Johnsville facility in July 1944, the Navy transferred NAMU there under the command of Captain Ralph S. Barnaby.

The move to Johnsville coincided with an expanded mission for NAMU. Its new tasks were to develop special weapons, to do prototype modifications for aircraft, and to perform quantity conversion of war planes. NAMU became a leader in adapting radar to Navy planes, including the TBF/TBN, PV, PB4Y, F4U, PB4Y, and SB2C. Some modification work concerned the installation of improved armaments and communications equipment, (16) or involved prototyping, but most resulted from requests by the Bureau of Aeronautics to make changes based on Fleet performance. Since many of NAMU's employees had little experience with prototyping work, having been production workers at Brewster, a retraining program was conducted by the Training Division of NAMC. In the fourteen months between its move to Johnsville and the surrender of Japan, NAMU modified, repaired or experimented with over 1,370 service aircraft. Under a tight veil of secrecy, NAMU also conducted special weapons work, with such colorful project names as Pelican, Little Joe, Gargoyle, Glomb, and Glimp. NAMU engineers coordinated their activities with the National Defense Research Committee and the Special Weapons Experimental Tactical Test Unit, and combined many elements of modern war technology to develop new guided missiles and drone targets. Experimental glider work was also important, due to Captain Barnaby's experience and interest in the field of gliders. (17)

NAVAL AIR DEVELOPMENT CENTER, 1947-1959

Between the end of the war and the beginning of the 1950's, the Naval Air Modification Unit underwent a series of changes that fragmented its technical effort. The loosely-structured but integrated NAMU was replaced by an autonomous grouping of R&D laboratories, in which control passed from the commanding officer to the laboratories and related sections of the Bureau of Aeronautics. After the war NAMU concentrated on research and development and no longer performed aircraft "modification." Therefore the Bureau of Aeronautics changed the name from NAMU to the Naval Air Development Station (NADS), under the command of the Fourth Naval District Commandant and the managerial control of the Bureau of Aeronautics. Then, on August 1, 1949, NADS was redesignated the Naval Air Development Center (NADC).

The fragmenting of the technical effort of NADS began in December 1947, when the Bureau of Aeronautics designated distinct missions for the Station's three laboratories: Aviation Armament Laboratory, Aeronautical Electronic and Electrical Laboratory, and Pilotless Aircraft Development Laboratory. When the Station's Central Planning Office was disbanded in February 1948, its functions were transferred to the various laboratories and departments. Contributing to the fragmentation was the piecemeal growth of NADS, as the Bureau of Aeronautics moved several Navy R&D laboratories located along the East coast to Johnsville. In June 1948 the Naval Air Material Laboratory in Philadelphia was disbanded and its functions were reassigned to Johnsville. In August the Aeronautical Electrical Section was transferred from the Naval Research Laboratory (NRL) to Johnsville, and in the spring of 1949 the NRL Field Station, Boston, under Dr. Harry Krutter, moved to NADS, as did the Special Project Unit CAST. The mission of NADS was also expanded to include the newly-formed Aviation Medical Acceleration Laboratory. (18)

The personnel profile changed significantly in the 1940's and 1950's. The change from modification to R&D required the retraining of many workers. On August 1, 1947, the full-time professional staff stood at 902, but one year later slipped to 532. Due to an extensive recruiting effort and the transfer of laboratories to NADC, the Center's staff grew to 1002 by June 1949. (19) Johnsville's professional staff increased since a different mix of talents were required for R&D. The 1950's saw a slow, steady growth in personnel, and by 1958 the civilian complement was 1670 and the military complement was 470.

The physical resources of the Center grew rapidly in the early 1950's. Several new facilities were constructed at costs not approached again until the 1960's. (20) The extent of these expenses are evident in the table below.

NADC Facility	Fiscal Year	Amount (thousands of dollars)
Human Centrifuge	1949	2,381
Development and Test Facilities for AEEL, AAL, EDL	1951	2,600
Runway Extension for Jet Operations	1952	1,667
	1956	28
Computer Room Construction	1953	232

During the 1950's, NADC operated not as a unified Center, but as a collection of independent laboratories. Many of the laboratories had their own support services, including technical writing staffs and libraries. Relatively independent of Center control, the laboratories or parts thereof developed direct connections with the related technical sections of the Bureau of Aeronautics, or, in the case of the Aviation Medical Acceleration Laboratory, of the Bureau of Medicine. The Bureau-Center relationship was a "parent-child" one, and what follows is an account of these children. (21)

Aeronautical Computer Laboratory (ACL)

Computer work began in 1947-1948 when the Center purchased two new Reeves Instrument analog computers. These "REAC" units were the outcome of the Navy's "winds" program, which began in 1946 to develop a series of computers. The Reeves' project "Cyclone" employed available technology to construct a computer as soon as possible, while R.C.A. carried out Project "Typhoon" at its Laboratories in Princeton, N.J., to develop the ultimate computer using state-of-the-art technology.

After designing and building the Typhoon computer, R.C.A. reconsidered its connection to the Navy and decided to rid itself of Typhoon. In August 1950, Harold Tremblay, an NADC electrical engineer who had worked with the Reeves firm on REAC, and George Caffrey began training on the Typhoon in preparation for its move to NADC. A hybrid analog-digital machine, Typhoon consisted of an F-shaped complex of some 50,000 tubes that occupied floor space of nearly 10,000 square feet. (22) It was not until the spring of 1952 that the transfer of Typhoon to NADC was completed.

NADC organized a Computer Unit in July 1950 and soon reorganized it as the Analytical and Computer Department (ACD). The civilian supervisor of the ACD was Professor William H. Boghosian, from the Moore School of Electrical Engineering at the University of Pennsylvania. The ACD's two divisions provided a large-scale analog computer facility for Department of Defense use. The ACD's Systems Engineering Division conducted long-range research studies of the effectiveness of air weapons systems and the vulnerability of aircraft. In June 1955, the Division was removed from the ACD and became the core of the Air Warfare Research Department (AWRD), which developed many advanced weapons concepts, and carried out studies of the Fleet Ballistic Missile, the CORVUS missile, and the EAGLE missile, an early version of the Phoenix. The Computer Division carried out theoretical studies and simulations of aircraft and guided missile designs. With the departure of the Systems Division, the Computer Division became the Aeronautical Computer Laboratory. In the late 1950's the Typhoon was broken down into components called "Gales," and finally, in 1968, the Typhoon was completely dismantled. Five analogue computers replaced Typhoon and provided twice its capacity. (23)

Engineering Development and Services Department (EDSD)

The Pilotless Aircraft Development Laboratory (PADL) was the pioneer activity at the time of the establishment of NADS; its responsibilities included the design and development of aircraft and target drones. In 1950 its mission was expanded, and PADL was renamed the Engineering Development and Services Department. When its shop facilities were transferred in 1958, the EDSD became the Engineering Development Department, with a diverse mission. Through the 1950's with a staff of 400, the EDSD—known as Everybody Does Something Different—worked on ground and airborne instrumentation and control systems and other aircraft development projects.

Aeronautical Electronics and Electrical Laboratory (AEEL)

The AEEL was the second original laboratory that comprised NADS. A shortage of technical personnel due to the demands of the Korean War and a recognition that too many organizational barriers existed within AEEL prompted an organizational streamlining of the AEEL under Technical Director Dr. Harry Krutter in 1950. To centralize control of the Laboratory's 400 personnel and six divisions—undersea warfare, control and guidance, radar, electrical, radio, and technical services—the Program Officer's power and responsibilities were increased. Moving personnel to match project demands continued to be a difficulty that was addressed by organizational changes, as can be seen in the reorganization of the Control and Guidance Division in 1954. In January its Analysis Branch was split into the Physics and Systems Analysis Branches, but in July the two Branches were again recombined as the Analysis Branch.

Antisubmarine warfare work was a major part of the AEEL. To promote undersea warfare work, AEEL created in April 1958 two new divisions, Sonar and Special Methods. These two divisions formed the core of the Antisubmarine Warfare Laboratory organized in the fall of 1958.

Aircraft Armament Laboratory (AAL)

AAL was formed at Johnsville when NAMU was reorganized in 1947 as NADS. With approximately 270 members it was slightly smaller than PADL and AEEL. During the Korean War AAL expanded to 340 members, and provided support for U.S. warplanes. From 1954 onward, the members of AAL conducted analytical studies of aircraft vulnerability, and mounted an effort to persuade manufacturers to be "vulnerability conscious" during the design stages of aircraft development. In 1958 the AAL was disbanded, and its divisions transferred to AWRD and the newly-formed ASWL.

Aviation Medical Acceleration Laboratory (AMAL)

Planning of a medical acceleration laboratory began in 1944. The centerpiece of the group that became AMAL was a new high-performance Human Centrifuge with a 50-foot radius. Work on the new facility at Johnsville began in June 1947, with the McKiernan-Terry Corporation of Harrison, N.J., constructing the centrifuge building under the direction of the Special Devices Center of the Office of Naval Research. On November 2, 1951, Captain J. R. Poppin, the director of AMAL, became the first human subject tested on the centrifuge. The facility's ties to the University of Pennsylvania were reinforced in July 1954, when Dr. James D. Hardy, Professor of Physiology in the School of Medicine, became Research Director of AMAL.

The centrifuge's capabilities were demonstrated through a series of experiments. In 1956 a joint Navy-Air Force study revealed that chimpanzees were able to sustain 40 G's for 60 seconds. Two years later R. Flanagan Gray of NADC set the world's record of 31.25 G's, which he sustained for five seconds in the "iron maiden," a water-filled protective apparatus, attached forty feet out the arm of the centrifuge. The combination of the human centrifuge and the Center's computer facilities, the first step in the development of dynamic flight simulation, was first used in 1957 for the X-15. Perhaps the most celebrated program of AMAL was the flight simulation training for Project Mercury astronauts. In the early 1960's, the centrifuge received its own analog computer, which is still in use. (24)

Aeronautical Instruments Laboratory (AIL) and Aeronautical Photographic Experimental Laboratory (APEL)

The AIL and APEL were transferred to Johnsville in December 1953 from NAMC, in Philadelphia, to provide more space for them. AIL grew from 92 people in 1953 to 134 in 1958, as three new branches were added: Simulation, Inertial Navigation, and Systems and Computers.

APEL provided contract monitoring and technical assistance to the Navy. One important project involving antarctic exploration, OPERATION DEEPFREEZE, required a large winterization program for over 200 cameras.

NADC REORGANIZATION AND ESTABLISHMENT OF ANTI-SUBMARINE WARFARE LABORATORY, 1957

The growth of the NADC during the early and mid-1950's was due in large measure to the transfer of outside laboratories to the Center, as well as the rearrangement of existing labs. In January 1954, the Aeronautical Instruments Laboratory and the Aeronautical Photographic Equipment Laboratory were transferred to the Center from the NAMC, Philadelphia. The Analytical and Computer Group was established in 1950, and given departmental status a year later. In July 1955 the group's analytical and computer components were divided to form the Air Warfare Research Department and the Aeronautical Computer Laboratory.

The Center's labs developed a high degree of autonomy during the 1950's. The 1957 NADC Appraisal Committee, chaired by CDR H. L. Anderton (AEEL), wrote: "Presently, the primary mode of operation appears to be that each laboratory, acting in autonomous fashion, goes out and gets its own work and does its utmost to avoid Center-wide operation." (25) One result of the autonomous growth of NADC Laboratories was that many areas of "overlap and conflict" developed. The Committee identified four areas in which this was a problem: study and research, in which AWRD and the Armaments Systems Division overlapped; aviation systems, in which both

EDSD and AAL worked on separate programs for target drones and towed targets; sub-systems and components, in which airborne computer work was prosecuted by AIL and AEEL without coordination; and anti-submarine warfare work (ASW) which was carried out by many laboratories.

An examination of the NADC personnel similarly revealed an unorganized R&D effort. Of the 454 professionals at NADC, 10 percent were involved in study and research activities, 40 percent with R&D, and 10 percent with "design, approval, test," a category of unclear meaning. The remaining 40 percent performed "routine" tasks, described by the Committee as "type test, or design work significantly lacking in engineering challenge." Organizing the number of professionals by laboratory affiliations indicated that the Target Drone division of the EDSD was the largest Center activity with 33. But the R&D work area that was actually the largest activity on Center was ASW, which had 56 professionals scattered across AEEL, AAL, AWRD, and ACL, but with no laboratory to focus the effort.

The Appraisal Committee concluded that an organizational change would benefit the Center's effectiveness, and it made a two-part proposal. First, to provide a means by which the Commanding Officer could plan and integrate Center-wide technical effort, a "technical alter ego" for the C.O. was necessary to be filled by either an officer or civilian. A line position directly under the C.O., with the title of Director of Development, was suggested. In response to the perception that more systems work should be performed by the Center (revealed by the Committee's interviews), the Director of Development would have the assistance of Ad Hoc Systems Managers to coordinate large complex programs.

The second recommendation of the Committee concerned utilization of technical personnel: "The Center does at present suffer from an inability to handle Centerwide projects without jurisdictional battles and wounded feelings and morale." Most of the troublesome projects concerned aircraft systems development, and a possible solution would have been to set up another administrative entity to coordinate this area of work. Since the number of entities reporting to the Commander was already unmanageable, the Committee favored a comprehensive reorganization of the Center's into five new laboratories: Study, Aeromechanics, Electronics, Medical, and Services Department. This suggestion was not followed.

An NADC Ad Hoc Committee was, however, appointed by Command Officer Emerson E. Fawkes on May 5, 1958, to study the need for the coordination of the Center's ASW efforts. The Committee, chaired by F. M. Gloeckler, concluded that the Center faced a real need for a comprehensive ASW laboratory, and several of its recommendations were soon enacted. The AAL and AEEL had substantial ASW activities that were merged into the new Anti-Submarine Warfare Laboratory (ASWL). The remaining non-ASW activities in AAL and AEEL were mainly avionics, and the Committee recommended to merge these into a new Avionic Laboratory, never officially created. The AAL was disbanded on September 1, 1958, and its personnel combined with the ASW staff of the AEEL. The resulting ASWL had six divisions (Administration, Programs, Special Methods, Sonar, Attack Systems and Development Support), and, at the time of its establishment, had 63 projects.

1963 AD HOC NADC APPRAISAL COMMITTEE REPORT

Many of the problems identified by the 1957 Ad Hoc Appraisal Committee continued to plague NADC in the 1960's. A new Ad Hoc Committee studied the NADC's activities in 1963 and produced a report which stated that the Center lacked clear goals and that the various laboratories* often acted independently of the Center. (27) The Committee feared that parochial laboratory objectives had replaced any meaningful Center objectives, and it noted that the Center's mission did not provide "any effective guidelines for senior people in the present, largely autonomous operation of the separate laboratories." The Center also did not have clearly delineated objectives. In response to a survey, a majority of senior professionals expressed "a complete lack of knowledge of any expressed or implied Center objectives." The Center's management did not define objectives of performance for the Center or long-range goals. One NADC employee told the Ad Hoc Committee: "NADC doesn't have the foggiest idea where it's going."

The Center's various laboratories were autonomous entities, and even the divisions within the laboratories were often independent. Self-sufficiency and autonomy persisted within the organizational structure of the laboratories. Some central control remained in dealing with such administrative details as travel, fiscal affairs, material ordering, and general support, but if the laboratory segments found such administrative functions important, they set up unofficial mechanisms to supply the need.

The lack of Center coordination resulted in part from the relationship between NADC's laboratories and the Bureau of Aeronautics. The laboratories, or even subsections of the laboratories, were closely related to specific parts of the Bureau. Following product lines, the major flow of work, communication, and trust was between these divisions and the related areas in the Bureau of Aeronautics. For all practical purposes, the Center's commitments of resources therefore were made at the divisional level, which limited the size of the development effort on which the Center could work and prevented the handling of large projects. The laboratories' tight connection to their sponsors made impractical central control over the operations of the laboratories.

The attitudes of the Bureau of Aeronautics towards NADC were ambivalent. The Ad Hoc Appraisal Committee reported that when the Bureau viewed NADC as a large number of separate contributors, it did not seem dissatisfied. However, Bureau personnel had also complained that NADC lacked initiative, consistently took the small view, and followed too slavishly the Bureau's often inadequately planned directives. Many at the Bureau also complained that assessing NADC was almost impossible since it had produced no major products. Nevertheless, the Bureau mentioned favorably several new NADC programs, specifically A-NEW and the Captured Air Bubble Foundational Research Project. (28)

EXTERNAL PRESSURES FOR CHANGE

The Navy's system for research, development, testing and evaluation (RDT&E) faced significant personnel and management problems in the early 1960's. There were no clear goals or long-range plans for the system. An attempt to create "lead laboratories" had confused lines of

*In 1963 there were eight laboratories: the Aeronautical Computer Laboratory, the Aero Electronic and Electrical Laboratory, the Aeronautical Instrument Laboratory, the Aviation Medical Acceleration Laboratory, the Aeronautical Photographic Experimental Laboratory, the Anti-submarine Warfare Laboratory, the Air Warfare Research Department, and the Engineering Development Department.

responsibility and work assignments, and there was overlapping and duplication of work done at the various Navy laboratories. Another problem was that some laboratories were trying to develop special competencies, while others acted as "job shops." This confusing situation was compounded by the Navy's top-heavy managerial structure: an inverted pyramid with laboratories at the bottom. (29)

The trend in the Department of Defense in the early 1960's toward centralization and consolidation of functions, together with the Navy's desire to improve the quality and status of its laboratories, led to changes in the Navy's administration of its laboratories. In December 1965, the Navy created the position of Director of Navy Laboratories, and in April 1966 transferred 15 major RDT&E centers from the material bureaus to the Chief of Naval Material. The laboratories in this new "federation" were ordered to develop similar management, organization, and research program structures. Another change came in the laboratory budgeting procedure. Prior to 1966, the bureaus had controlled and determined laboratory budgets in a "parent/child" relationship. After 1966, the laboratories under the Chief of Naval Material developed a new "producer/consumer" relationship with the newly-constituted Systems Commands, which succeeded the material bureaus. The new relationship was formalized in 1969 with the implementation of the Navy Industrial Fund cost accounting procedures. Under this accounting system, sponsors of research could shop around for RDT&E services, and Navy laboratories actively had to seek customers for their services and had to stay attuned to customer needs. (30)

The changes in the Navy's RDT&E system removed one of the causes of divisional autonomy at NADC, but continued the earlier pattern of uncoordinated growth. The "producer/consumer" relationship with the new Naval Air Systems Command ended the close connection divisions had had with the Bureau of Aeronautics. This change could have strengthened the Center's control of its divisions, but at the same time the Navy began moving various laboratories to NADC in an attempt to consolidate the RDT&E system. The Navy wanted its RDT&E centers to carry out complete systems development in a broad systems approach to Naval warfare. To promote this new approach, the Navy consolidated activities engaged in similar types of work. To make NADC the Navy's center for aeronautical systems, three departments from the Naval Air Engineering Center (NAEC) in Philadelphia were transferred in July 1967 to NADC. The three—the Aerospace Crew Equipment Department (ACED), the Aero Structures Department (ASD), and the Aero Materials Department (AMD)—remained initially at the Philadelphia Naval Yard. In a sense they were being reunited with NADC, since the forerunner of NAEC was the Naval Air Material Center, which had earlier controlled NAMU. (31)

NADC faced the problem of integrating the three departments into the Center. Early in 1969, NADC formed an Ad Hoc Committee to investigate the problems associated with the move from the Naval Yard to Johnsville. In its report, the Committee declared that it was financially feasible to move the departments, but, because major improvements at NADC were required for ACED, recommended that only AMD and ASD be moved at that time. Project High Mountain and a Project Team, made up of representatives from all departments, developed detailed plans and recommendations to accomplish the relocation. AMD and ASD moved first, with ACED eventually being integrated into the Crews Systems Department at NADC in 1971. A further integration of the new departments occurred in 1972, when the AMD and the ASD were combined with the Aero Mechanical Department (originally the Pilotless Aircraft Development Laboratory) to form the Air Vehicle Technology Department. This new department was designed to realign and consolidate related technologies to permit maximum concentration on design concepts for air vehicle and aerospace systems. (32)

A further addition to NADC came in 1974, when, in accordance with the Shore Establishment Realignment Program, the Naval Strategic Systems Navigation Facility (NSSNF) in Brooklyn was relocated at NADC. The Center formed the Ships Navigation Department to combine the functions of the NSSNF with various navigation technology tasks formerly assigned to the Aero Vehicle Technology and Aero Electronic Technology departments. The new department was responsible for research, development, testing and evaluation of ship navigation systems and related fields of science and engineering. (33)

Reorganization of the Navy's RDT&E structure effected the NADC in two ways. The Navy added new laboratories to NADC which then had to be integrated. The Navy also removed the Center from its "parent/child" relationship with the bureaus — a relationship that had contributed to the fragmentation of the Center due to the direct ties between the laboratories and corresponding sections of the Bureau of Aeronautics. The establishment of the Navy's Industrial Fund cost accounting procedures led to a new "customer/producer" relationship that forced the Center actively to sell itself. These changes reinforced the internal pressures for reorganizing the Center, which were exacerbated by the development in the late 1950's and early 1960's of several large "systems" projects.

INTERNAL PRESSURES FOR CHANGE

The development of the systems approach in the 1960's had an important impact on NADC. The problems caused by the autonomous laboratory and by the development of "systems engineering" can best be seen in the development of the ASWL and one of its most important projects, A-NEW.

The term "systems" had several different meanings. For some it was a technological need, whereas for others it represented a managerial goal. The A-NEW project grew out of the need to integrate a technical system. Airborne antisubmarine warfare developed during the 1950's according to the "additive approach," whereby each new sensor or capability added a new box that the airplane crew had to monitor. A-NEW began as an attempt to integrate a dozen or more sensors into one airborne antisubmarine system. In this project, NADC's ASWL began engineering an entire airplane using a Univac 901 computer as the heart of the new system. The first airborne, integrated ASW avionic system (A-NEW MOD 1) was given its first flight test on October 28, 1963, some four years after the project was initiated. (34) The A-NEW project heavily emphasized in-house analysis and hardware development. Although there were other systems projects in the early 1960's, the A-NEW project was the first and the only one in which the in-house effort played the leading role. (35) While the A-NEW project emphasized the technical need to integrate sensors into one system, the Ad Hoc Appraisal Committee in 1963 emphasized a managerial view of systems. To the Committee the systems approach meant more than simply a "higher level of engineering development activity"; instead, it emphasized "planning, concept synthesis, analysis, experimentation and observation, technical supervision or review of development, feedback, and documentation of all these activities for management decision."

The enlarged technical and managerial needs of A-NEW and other "systems" projects taxed NADC resources in the 1960's. Systems engineering required the use of many senior people and demanded inter-disciplinary and inter-laboratory cooperation which the Center's organization did not readily allow. The 1963 Appraisal Committee feared that the four systems projects then handled by the Center, including A-NEW and the Phoenix missile system, would create a significant problem by absorbing the Center's technical manpower. (36) Indeed this is what happened, with the ASW Laboratory leading the raiding of other parts of the Center for manpower. Since the Center had fixed personnel ceilings, the only way to expand a project's manpower was to take it from other parts of the Center. (37)

The very success of the ASWL and the A-NEW project exacerbated the problems identified in the late 1950's and early 1960's, and led to a reorganization of the Center in 1965. ASWL was an example of an autonomous laboratory directing the Center. The ASWL engineers who promoted the systems approach had to force the Center to accept their ideas, and in the process they attracted a large amount of money and developed direct ties to high-level Naval officers, who helped them promote the systems approach. By the early 1960's the ASWL had become a powerful force in its own right. (38)

NADC was able to use a request of the Bureau of Naval Weapons, which had succeeded the Bureau of Aeronautics, to reorganize the ASWL and the systems projects. Increasing its emphasis on major weapons projects, the Bureau requested in 1964 that the Center reorganize itself to strengthen these capabilities. The Center disbanded the ASW Laboratory and reorganized the eight Center laboratories into four technical departments and one systems project department.* The new organization was designed to use more efficiently the Center's limited technical manpower and to facilitate the management of weapon-system development. The Systems Projects Department had two major subdivisions: Aero Space Systems Projects and Antisubmarine Warfare Systems Projects, which included the A-NEW program. (39) A remnant of the ASWL, the Sonar Division, moved to the Aero Electronic Technology Department. (40) A second reorganization in 1967, designed to increase the manageability of the Center, merged the Air Warfare Research Department and the Systems Projects Department into the Systems Analysis and Engineering Department.

The organizational changes in the 1960's did not solve the Center's management problems. Writing in July 1970, D. W. MacKiernan, Technical Director of the Aero Electronics Technology Department, identified many of the same problems as had the Ad Hoc Appraisal Committee of 1963. MacKiernan stated that the Center was plagued by almost autonomous laboratories and departments, which were able to shift workloads and manpower to meet their own changing needs. Their ability prevented the "radical internal reorganization" of NADC. The problem was that the Center had never found the mechanism for shifting manpower between departments. Neither the Center Commander nor the Technical Director had the detailed information necessary for this purpose. The Center's Technical Director, MacKiernan noted, had opposed forming a sizable Center staff, because it might dilute management and leadership at the operating level. (41) These problems continued to plague the Center during the 1970's.

The initial step toward introducing the current matrix system was taken by the Systems Analysis and Engineering Department in its 1974 reorganization. The matrix system allowed project heads to bid for the use of manpower according to the needs of the projects. A control group regulated the relations between the various divisions of the department. The reorganization eased the pressures within the department and provided experience for the reorganization of the Center in 1977. At that time the Systems Analysis and Engineering Department was split into three parts: the Systems Directorate, the Software & Computer Directorate, and the Command Projects Directorate. The other three directorates were the Communication Navigation Technology Directorate, the Sensors & Avionics Technology Directorate, and the Aircraft & Crew Systems Technology Directorate. A control group, Planning Assessment Resources (PAR), was created to act as a staff to the Technical Director. This reorganization solved many of the problems that had plagued the Center in the 1960's and early 1970's. The directorates could call on expertise throughout the Center, and therefore did not need to try to move personnel permanently into their area. More importantly, the Center could more easily coordinate its RDT&E effort.

*The technology departments were: Air Warfare Research Department, Aero Electronic Technology Department, Aero Mechanics Department and the Aerospace Medical Research Department.

CONCLUSION

From the standpoint of its management, NADC has been plagued throughout its history by autonomous laboratories that prevented the Center from coordinating its resources to meet the demands of its sponsors. The accretion of personnel and laboratories from other centers in the Navy's effort to organize its RDT&E activities was one cause of constant Center reorganizations. Another cause was the development of systems projects in the late 1950's and 1960's which exacerbated managerial problems because the systems projects absorbed personnel from other sections of NADC. Those interested in promoting a coordination of Center activities were able to broaden the "systems" concept into a managerial concept and take advantage of Navy reorganizations to break up ASWL in 1965 and bring about further reorganizations of the Center thereafter. It is not clear that these reorganizations benefited the Center's technical effort or whether the "autonomous" laboratory benefited this effort. Whether the Bureau of Aeronautics found the effort adequate or not, for instance, is not clear from the sources available at NADC. A full history of NADC would require an investigation of its technical effort and its relation to the Bureau of Aeronautics, the Naval Air Systems Command, the Naval Material Command, the Navy, and industry.

FOOTNOTES

- (1) Doylestown Intelligencer, 23 January 1941. Hereafter cited as D.I.. Newspaper articles cited below are bound together in an untitled volume available in the NADC library (#5800285-1).
- (2) D.I., 28 January 1941, 20 August 1943.
- (3) Brian Johnson, Fly Navy: The History of Naval Aviation (New York: William Morrow, 1981), pp. 178-179, 196-197, 200-201, 264-268.
- (4) D.I., 19 December 1941, 22 April 1942.
- (5) Hatboro Spirit, 24 April 1942.
- (6) Philadelphia Record, 24 April 1942; D.I., 28 November 1942.
- (7) D.I., 26 December 1942, 18 March 1943.
- (8) D.I., 26 December 1942, 24-27 August 1943.
- (9) D.I., 22 September 1942, 29 October 1943; Philadelphia Inquirer, October 1943.
- (10) D.I., 5 November 1943, 10 February 1944, 11 August 1944; Associated Press, 31 March 1944.
- (11) D.I., 29 February, 9 March, 18 May, 22 May 1944.
- (12) D.I., 31 May, 1 June 1944.
- (13) D.I., 6 June, 22 June, 31 July 1944; I.N.S., 23 June 1944.
- (14) Alan S. Milward, War, Economy & Society: 1939-1945 (Berkeley: University of California Press, 1979), p. 192.
- (15) The following information on NAMU is drawn from Navy Department, "U.S. Naval Administration in World War II, 250 Vols. (Washington, D.C.: Naval History Division) Unpublished manuscript Vol. 111e; "The War History of the Fourth Naval District," pp. I-16 to I-18, III-15 to III-17.
- (16) Interview with Charles E. Keener, NADC, conducted 28 June 1982. Taped interviews cited are in the NADC History Project files.
- (17) Interview with Harold Tremblay, 6 July 1982.
- (18) NADC, "Historical Report, 14 July 1957 to 31 December 1949." Unpublished manuscript. In the NADC Library.
- (19) Ibid.
- (20) "Compilation of Data on Navy R&D Activities, NADC, 1 December 1966," in file "Naval Air Development Center, 1949-1957," NADC History Project file.

- (21) See David K. Allison, "Evolution of Missions and Functions of CNM-Commanded Laboratories and Centers," report to NAVMAT Headquarters, November 1981.
- (22) Interview with Harold Tremblay, 6 July 1982.
- (23) The following discussion is based primarily on NADC, "Historical Reports," 1950 to 1958. In the NADC Library.
- (24) Interview with Richard Crosbie, 2 July 1982.
- (25) The following discussion is drawn from the "Report of the Ad Hoc NADEVCON Appraisal Committee, 17 June 1957, to Commanding Officer, NADEVCON." Available in the NADC History Project files.
- (26) NADC, "ASW Lab Ad Hoc Committee Report," 18 June 1958. Available in the NADC History Project files.
- (27) "Preliminary Report of the 1963 Ad Hoc NADC Appraisal Committee," 1 May 1963. NADC History Project Files.
- (28) Ibid.
- (29) Booz, Allen and Hamilton, Inc., Review of Navy R&D Management, 1946-1973 (Washington, D.C.: Department of the Navy, 1976), pp. 127-128, 142.
- (30) Ibid, pp. 150-158; David K. Allison, "Evolution of Missions and Functions of CNM-Commanded Laboratories and Centers," November 1981.
- (31) Reflector, June 1967; Commanding Officer, NAEC to All Employees, 9 January 1967, memorandum in NADC History Project Files.
- (32) Reflector, January 1970, April 1970; NADC, "Command History," 1972.
- (33) NADC, "Command History," 1973.
- (34) Interview with Jim Howard, 9 June 1983; Interview with Tom Willey, 15 July 1982.
- (35) "Preliminary Report of the 1963 Ad Hoc NADC Appraisal Committee."
- (36) Ibid.
- (37) Interview with Tom Willey.
- (38) Ibid. Willey suggested this interpretation of the reasons for the reorganization of 1965. See Howard Cole to James H. Wakelin, Jr., 16 July 1963, NADC History Project Files, for a direct approach to the Assistant Secretary of the Navy for R&D for increased ASW support.
- (39) Reflector, 21 May 1965.
- (40) Commanding Officer NADC to Special Distribution List, 1 June 1965, NAVAIRDEVCON 5400. In NADC History Project Files.

- (41) D. W. MacKiernan to Capt. E. J. Kingsbury, 22 July 1970. In NADC History Project Files.
- (42) Interview with Tom Willey; NADC, "Command History," 1977.

GUIDE TO SOURCES

INTRODUCTION

This guide to sources is designed to facilitate further investigations of the history of NADC. The guide presents the historical sources currently available, assesses their value, and suggests the areas in which further work will be needed. This guide is divided into eight sections: organizational files in the NADC History Project files; formal historical reports compiled by the Center; collections of in-house newspapers; bibliographies of reports, articles, and books of use to historical investigations of NADC; interviews conducted with Center personnel for this project; NADC records held by Federal Records Centers; technical reports written for Center projects; and a collection of miscellaneous sources. The appendices to this report are also described in the relevant sections of the guide.

ORGANIZATIONAL FILES

The NADC History Project files located in the Public Affairs Office contains past organizational files from the office of the commanding officer. This material consists of approximately one metal file drawer of miscellaneous reports, correspondence, promotional brochures, organizational charts, and photographs. The material is organized according to two criteria. First, material that pertains to the Center as a whole is filed according to chronological periods. Second, material is filed under the name of individual departments or laboratories. This collection also includes a file containing material describing NADC's past technical directors.

FORMAL HISTORICAL REPORTS

Formal historical reports compiled by the Center can be found in the NADC library. These reports were generally produced annually. Individual departments were responsible for their respective sections of these reports, so the quality varies. These reports overwhelm the reader with their detail and are a valuable source of specific information. For example, the personnel of individual laboratories are listed, as are individual projects on which the Center worked. If analyzed systematically this data could be revealing, but, as written, they convey no sense of historical patterns or trends. These reports have two names corresponding with two slightly different formats. Reports from the late 1940's and 1950's are titled "Historical Report." Beginning in the late 1950's, a better integrated version was compiled, named "Command History." The library's collection is incomplete. Although the reports began in 1947 and were presumably compiled continuously until the present, no reports from 1964 to 1971 are in the library, and their present location is unclear. Supplementing the historical reports in the 1950's is a document titled "Accomplishment Summary." The library has the editions from 1950 and 1954-1957.

IN-HOUSE NEWSPAPERS

A nearly-complete run of issues of the Center's various newspapers is located in the NADC History Project files. The articles vary greatly in quality, and are difficult to use since they lack an index. The Brewster Builder (1943-1944) was published twice per month, and covered all three of the Brewster Corporation's factories. It is unreliable. A complete series exists of the monthly NADC News, published from 1949 to 1952, and from 1955 to 1957. The Reflector began monthly publication in 1958, and a complete series through the present is available.

BIBLIOGRAPHIES

Bibliographies listing reports, articles, and books pertaining to the history of NADC are in the NADC History Project files. A selected bibliography is included in this report as Appendix A.

INTERVIEWS OF CENTER PERSONNEL

Tapes and files for nine interviews conducted with Center personnel for this project are with the NADC History Project files. The tape-recorded proceedings range in length from one to three hours, and average approximately one and one-half hours. The finding guides listing topics discussed on each tape are included in this report as Appendix B. A file for each interview contains a copy of the finding guide, miscellaneous biographical information, notes from the interview, and consent forms.

RECORDS HELD BY FEDERAL RECORDS CENTERS

NADC records held by various Federal Records Centers provide a rich historical source that merits further investigation. These records include documentation of many of the Center's most significant projects, central correspondence files, and technical reports.

Finding and retrieving some of these records may be difficult. In the 1950's records were sent to the Navy records facility in Mechanicsburg, Pennsylvania, and thereafter to the Federal Records Center (FRC) in Philadelphia. Almost no accession numbers for the material in Mechanicsburg are available. Some early NADC records were transferred from Mechanicsburg to Philadelphia, but were destroyed in 1974. Records have also been sent to federal records facilities in Washington; Garden City, NY; Alexandria, VA; and St. Louis, MO. With rare exceptions no accession numbers are available for these records.

Records at the Philadelphia FRC are retrievable. A preliminary survey of all known NADC records in federal facilities is presented in tabular form in Appendix C. The NADC Records Office files contain descriptions of material sent to Federal Records Centers, but accession numbers are often not available for shipments in the 1950's. *Appendix C thus represents a correlation of information from the NADC Records Office files through 1977 and the computer printout which shows NADC material stored at the Philadelphia FRC.* Where accession numbers were not available an "UNK" (unknown) appears in the column for accession numbers. Appendix C shows accession numbers, subject descriptions, period in years, location and quantity in boxes or cubic feet. Since this is a working document, some correlations are tentative and some of the material may have been destroyed.

TECHNICAL REPORTS

There are two ways of locating NADC technical reports: through the Defense Technical Information Center (DTIC) which publishes bi-weekly indexes and maintains an on-line data base; and through the Center's library. DTIC's bibliography is indexed by author, report number, DTIC accession number, corporate author, subject, contract number, and title. This agency is limited to indexing reports it receives. Since it is the responsibility of the individual author and/or contractor to submit reports to DTIC, gaps in the collection are created.

Within NADC library are several finding aids. One is the card catalogue, which is organized by laboratory and within this division by year. It too contains only those reports received by the library and has gaps. A second listing is an inventory of early reports that were in the library and have been sent to the Philadelphia Federal Records Center for storage. A third tool is the NADC Report Log which lists reports by NADC report number followed by author, title, contract number, DTIC number, and library holdings. If a report was written for a particular contract, it can be located by contract number in a separate card file which starts with the year 1967.

Locating specific reports may be difficult, particularly those from early years. DTIC sometimes receives reports not sent to the library and vice versa. Finding aids have varied in coverage over the years. As a result of these problems, all finding aids must be used to ensure locating the desired reports.

MISCELLANEOUS HISTORICAL SOURCES

Several miscellaneous sources may also be of help. The NADC Records Office has a collection of old organization manuals and telephone books. An ex-NADC staff member, Russell Mason, is preparing a history of sonobuoy and anti-submarine warfare work under a contract with the Naval Air Systems Command. Mason's projected book will deal not only with development at NADC, but also with sonobuoy work elsewhere in the United States, Canada, and the United Kingdom.

CONCLUSION

A history of NADC could be of great value both to the Navy and to historians of science and technology. For example, several NADC staff members we interviewed had not considered why their projects had been successes. A thorough investigation of several NADC development projects would provide valuable insight into the factors that promote the success of development projects. This information would be of value to NADC and to the Navy. Historians of science and technology are interested in technological change and the factors affecting it. NADC could provide a useful focus for investigating the complex relationships between the Navy, industry, fleet needs, RDT&E programs, Washington politics, Center reorganizations, and technological change. For example, the "systems approach" surfaced and became an important issue at NADC starting with A-NEW in the late 1950's, and in the 1960's the approach swept the Department of Defense under the direction of Secretary McNamara. The relations between these two events deserves further study. NADC also could provide a useful focus for investigating the relationship between the organization of the Center and the Navy and the technical effort of the Center. Many questions of mutual interest to Navy RDT&E management and to historians may be asked about NADC.

There are two main sources for writing a history of NADC: interviews and printed material. The Center traces its history back to World War II and many of the participants in this history are still available for interviewing. This is an opportunity that should be pursued forthwith: the passage of time will weaken memories, scatter people, and diminish this resource. Some individuals are at the Center, including those who came in the late 1940's and early 1950's; others have moved into consulting work or retirement, but still may be available. Those interviewed for this project have expressed a willingness to supply additional names of strategic persons. The interested researcher can also identify many important people by consulting the recent Center document, "Twenty-Five Years of Accomplishments," which lists contacts for many important NADC projects. Two specific people should be contacted. Mr. Jim Howard, who is on Center, is collecting information on the development of sonobuoy work at NADC and is interested in assisting a larger historical effort. Mr. Russell Mason, a former Technical Director of the ASWL in the early 1960's, is preparing a history of sonobuoys since World War II. Both men should be contacted concerning sonobuoy and ASW history and to develop a list of further interviews.

The interviews for this project have demonstrated a significant difference between those Center personnel who have remained primarily involved in technical work and those who have moved into management. The scientists and engineers were most helpful in describing technical details of development efforts, whereas those who moved into management provided useful insight into the problems of organizing the Center's technical efforts. Each supplement the other and both should be included in future interviews.

A second source for writing a history of NADC is the material found in NADC records, most of which is stored at the Federal Records Center in Philadelphia. In the course of this project, we have correlated NADC records of shipments sent to the various Federal Records Centers with the computer printout showing material now stored at the FRC Philadelphia. This was a difficult task that should be pursued further in order to establish the existence and location of material described in Appendix C. We could not locate accession numbers for many shipments; hence, if these documents still exist it will be difficult to locate and retrieve them. In one case, a large (312 cu. ft.) collection of records from the period from 1938 to 1952 was destroyed because it contained only copies of originals. But it is unclear if the originals are available, and now there is no easy way to gather material on the Center's early history. Another problem lies with the unknown quality of the material that is retrievable. The next step in assessing the value of written sources should be to go to the Philadelphia FRC and examine the stored NADC records.

In addition, we were not able this summer (1982) to obtain a computer printout of records held in a second location at the Philadelphia FRC, the archive, which may have NADC holdings.

A further source to be explored vigorously is historical material presently stored informally around NADC. Several of the people whom we interviewed intimated that "bottom drawer" collections were full of valuable sources. Although we collected, copied, and filed material on several NADC projects, this remains a largely untapped resource. Some of this material only becomes available when the person holding the material retires. A concerted effort to locate, survey, and store this material will preserve a valuable historical source.

A thorough study of NADC history will take several years, even with a concerted effort. This project focused on NADC records and organizational history, and a great deal of records work, interviewing, and collecting of on-Center material is still needed. In section 2 we described the frequent reorganizations of NADC, some caused by the addition of laboratories and others by the perceived threat of autonomous laboratories to the Center. The documents used for the survey history in section 2 were generated by those who wanted reorganizations. Little is known about those who might have opposed the reorganizations, or about the positive or negative impact of the reorganizations on NADC's technical achievements. Nor is much known about NADC's relations to its sponsors, especially from the perspective of those sponsors. A full evaluation of NADC and its technical achievement requires a broader perspective, which can be attained by evaluating NADC's relations with its sponsors. This requires locating sources on NADC from the Bureau of Aeronautics, the Navy Materials Command, the Navy Air Systems Command, and the Secretary of the Navy.

APPENDIX A
BIBLIOGRAPHY

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APPENDIX B
FINDING GUIDES TO INTERVIEWS

Tape 1 Jim Howard Interview conducted on June 9, 1982,

by Tom Misa and Ed Todd

Side A:

Aircraft used by NADC in ASW

R-4D, B-17, P-2V (main ASW airplane in Navy for many years, arrived in 1955-58 [?])

P-3A arrived in early 1960s, was first of the P-3 series, led into systems concept

Prototyping of S-3 aircraft, contract turned over to Lockheed

Systems Approach and Sonobuoy Development 1952 to present

Listening sonobuoys were norm when Howard arrived at NADC in 1952

Diesel submarines difficult to hear when operating on batteries, quite loud when operating on engines

Plotting of sub positions done by hand at first

Development of display plotters, not yet tied to sonobuoys directly

Development of active sonobuoy that used small explosive charge

Displays that used circle projector on plotting board, developed by Canadians

Additive approach to ASW equipment: 13-15 boxes in one aircraft

Tactical Navigator: TACO

Canadians and British concept

Resistance from pilots in Navy that wanted to retain control of aircraft

Concept came around early 1960s [?]

Display for S-2G designed completely by NADC

ASN-30: completely automated display system, light projected onto translucent screen — sensors were now tied together

DIFAR: passive sonobuoys that provided bearings

Active sonobuoys with audible note

P-3C System: engineer entire aircraft

Heart was 901 Univac computer

ANEW approach

Information flowed into computer; computer drove displays for TACO

Magnetic Anomaly Detector

ANEW Approach to developing equipment

"LOFAR" and "DIFAR" explained

Side B:

Present goals: design common systems

Dynamic of "unique" versus "common" systems from 1960 to 1980s

Advanced Signal Processor to be installed in many aircraft throughout the Navy developed by NADC

Very High Speed Integrated Circuitry; flexible processing

EMSP follow-on to ASP, extension of commonality concept

Standardization of software: ADA, SPL-1 [Signal Processing Language]

Large expense in computer systems no longer hardware, but software

Changes in sonobuoy work

Hardware to software

Personnel requirements changes from circuit designers to programmers

Jim Howard
Tape 1, Side B (Continued):

List of Sonobuoys over NADC history
Werner Gleiter was Howard's boss
SS-Q2 to SS-Q90

Tactical Support Center
ASW Module and pre- and post-flight analysis of data

JULIE Sonobuoy
Start of systems approach by tying sensors together
JULIE dropped human ear, utilized machine analysis

P-3C system

Service Life Improvement Program
Use old weapons platform and do incremental improvements

Tape 2 Dr. Harry Krutter Interview conducted on June 28, 1982,

by Tom Misa and Ed Todd

Side A:

Academic background

MIT, Purdue, professor at Penn State
MIT Radiation Lab during WW II

NRL Field Station

Worked for BuAer on Early Warning System
Transferred to NADC July 1949

Penn State days

Petroleum Engineering
Fencing coach

BuAer consolidation of facilities at Johnsville

Philadelphia Navy Yard labs
Radome work
Early NADC environment described
Difficulties with Government regulations
Captain Akers coordinated move on BuAer's part

NRL Field Station became Radar Division of A.E.E.L.

Development of Airborne Early Warning Radar
Airborne Height Finder: AN/APS-45
Used Height Finder in the Constellation aircraft
Search radar separate from Height Finder radar
Director of A.E.E.L. in 1952 [?]

Projects of Center in early 1950s

ASW
Countermeasures
Fire Control
PADL work in rockets, missiles, and drones
AIL, APEL moved in from Philadelphia; AMAL created under ONR auspices
Personnel hiring difficulties due to money

Side B:

ASW Laboratory formed in 1958

Formed from A.E.E.L.
Need for separate department to focus work

A.W.R.D. Department formed in 1955

Studies and analyses
Feasibility of Nuclear Aircraft
Early studies of Phoenix missile system
Helpful to planners, i.e. CNO
Headed by Fred Gloeckler, later joined BuAer

Dr. Harry Krutter

Tape 2, Side B (Continued):

BuAer relationship to NADC

Parent/child

Great control over NADC projects

Comparison to present funding system

Chief Scientist of NADC 1956

Predecessors: Dr. K.C. Black, Ivan Driggs

Autonomy of component laboratories

Difficulties in transferring personnel

Competition among labs caused hard feelings

Center Reorganizations

Commanding Officers' desires to attract attention in Washington to advance their careers

ASW lab created for technical need

ASWL disestablished in 1965 due to its excessive independence

Systems Approach

Reputation as "anti-systems" before retirement

Airborne Early Warning System on board the Constellation

Systems as the managerial complex in charge of the technical system

Systems work as a quick way to receive promotions on managerial level

Acute conflict beginning in mid-1960s between technology/managers

McNamara's reforms in DoD spread throughout the military

Lag between reforms and effects of six years

Tape 3 Dr. Harry Krutter (Continued) Interview conducted on June 28, 1982,

by Tom Misa and Ed Todd

Side 1:

Systems Approach continued

Navy Laboratories reorganization 1965-1968

BuAer became Naval Air Systems Command

New relationship to Chief of Naval Material of NADC

Support from NASC important for Commanding Officer

Change in Nature of NADC's work

Movement toward managerial controls

More outside contracting due to managerial imperatives, pressure from Administration

Effectiveness of industrial contractors

Bendix Eagle missile system review found 200+ systems managers—too many

Hughes Phoenix missile work well organized

General Electric Valley Forge recruiting from NADC; differing styles of conducting projects in early 1960s

Contacts with G.E.'s Hilary Page to stop raiding of NADC employees

Names of History Project's interviewees

Effects of DoD Reorganizations over the years

NADC affected with time lag of four or five years

Eagle Project had axe come down on it from Washington; reappeared as Phoenix missile a year later

Bureau to Systems Command reorganization complicated Commanding Officer's duties

Personnel reflections on career as Technical Director

Krutter paid little attention to Washington

Retired in 1972 due to increasing emphasis on the politics in Washington in the TD's responsibilities

Present duties as Technical Consultant to NADC

Doctorate under John Slater at M.I.T.; was his first graduate student

Patents in 1952, 1955 were spinoffs of Radiation Lab work during World War II

Hal Tremblay and early days of Project TYPHOON

Congressional testimony on military R&D in 1954 (Krutter had its proceedings)

Dr. K.C. Black's testimony on NADC

85 to 90% of Black's criticisms were true, although he spent his time travelling to professional meetings

Bruce G. Eaton, formerly of PADL, gave testimony

Hearing on NADC closing (ca. 1975) perhaps on Navy Department level

Tape 4 Charles E. Keener Interview conducted on June 28, 1982,
by Tom Misa and Ed Todd

Side 1:

Comments on "Twenty-five Years of Accomplishments" of NADC

Arrival at NADC in 1945

Previously stationed with CNO office in Washington
Came to Johnsville to be near home in Philadelphia
Decline in NAMU after the war
Stationed in Philadelphia Navy Yard, to Electronics Lab; then retransferred to Johnsville-A.E.E.L.
Study group set up at Johnsville under Raber: A.W.R.D., initially approximately 50 people
NAMU involved with modification: armament, communications equipment
During war served as radar aide to staff of admiral at Norfolk, VA

Educational background

M.S. in electrical engineering from University of Pennsylvania before the war
B.S. in electrical engineering from Drexel

Use of radar in World War II

Norfolk radars came from England

NADC career

A.E.E.L.
A.W.R.D. until retirement attempt at age 60, denied
Organized Technical Intelligence Department (1970-1975)
Designated director

A.W.R.D.

Free wheeling choice of study topics
Military infrared studies
Problem of communicating with atomic submarines while they are underwater: rise of TACAMO concept of low frequency communication via airborne antennas in early 1960s
Support of airborne VLF antennas from Raber, Admiral in charge of communications of atomic submarines
Long antenna from aircraft presented to committee on Polaris submarine problems; convinced committee by recalling feasibility of long lines used to tow targets
Study of nuclear plane
Frustration of studies not being used in the contracting process

Reflections on period from 1945 to early 1950s

Functions of NAMU not needed after war
Some radar work concerning modification
Reoriented to do development work
Early departments included the E.D.S.D. ("Everybody Does Something Different")
Few amenities: drafting desks put in hanger space
Lab transfers to NADC included NRL Field station (remembered as the M.I.T. Rad Lab)

Charles E. Keener
Tape 4, Side 1 (Continued)

Reflections on 1945 to early 1950s (continued)

Continuous flow of military personnel helped labs grow

Military-civilian relationship: status as Reserve Officer improved his communication with the Fleet

Rise of contract monitoring functions of NADC

Inspector of Naval Material assigned to factory

INM concept now extended to R&D

Potentially cheaper to retain work in-house: no need for industry profits

Contractors for side-looking radar exaggerated capabilities

A.W.R.D.'s work continued in S.A.E.D.

Reorganization had little effect on Keener

Systems analysis emphasized

Reorganizations healthy; need occasional changes

NADC connections to Wright Field R&D group

Large liaison staff

Reputation for excessive reorganization confirmed when workman removed table in middle of conference, "Sorry we're reorganizing. . . ."

Classification of work

Personal difficulties because of not being able to tell friends what you do

Center reorganizations

Empire building

Healthy changes

Movement of personnel

Side 2:

Center reorganizations (continued)

Security restrictions impede communications between labs

Technical Intelligence Department

Admiral in Washington pushed dissemination of technical information gathered by intelligence units to laboratories

Countermeasures to Soviet airborne radar

Security clearances for NADC personnel

Support on project from H.B. McCaulley

Systems Approach

Systems a dirty word during certain times

Technical advantages

Systems Project Department initiated greater systems work

Tape 5 Richard Crosbie Interview conducted on July 2, 1982,

by Tom Misa and Ed Todd

Side 1:

Centrifuge under Cam Control

- Control of gondola by inner and outer gimbles
- Length of run limited to 30 seconds
- Cam design required 3 days
- Complex simulations were difficult to do with cams
- Use of computer to design cams led to direct computer control of the centrifuge

X-15 was first project under computer control

- Astronauts were original X-15 subjects
- Other limitations of centrifuge: gondola difficult to mount fixtures into

Adoption of interchangeable gondola capsule

- Spherical gondola replaced the oblate spheroidal gondola
- Surface profile of gondola
- Need for larger gondola, better access to inside: 10-foot sphere
- Complete vacuum capability; rotary joints enabled evacuation
- Hydraulic fluid supply to gondola: superimpose "vibrational Gs" onto the "sustained Gs"

Boeing 707 simulation

- Instrument testing
- Clear air turbulence simulation
- Very popular, used by many commercial airlines

Computer Links

- Telephone lines linked centrifuge to central computer

Space Program Simulation

- Limited control by astronauts
- Mercury, Gemini, Dyna-Soar, Apollo
- Total of 1165 runs over 11 major space programs

Johnson Space Center at Houston, Texas

- Beginning with LBJ's presidency
- Decision in Washington to move all space capabilities to Houston
- Duplication of centrifuge: slightly larger with 12-foot gondola
- Performance of Houston's centrifuge impaired

NADC centrifuge:

- Connected to solid bedrock by concrete
- Electric motor was the largest verticle-mounted motor yet built
- G.E. motor rated at 4000 h.p.; peak capability [for 2 minutes] of 16,000 h.p.
- Maximum rate of acceleration of 10 G per second
- Maximum acceleration of 40 G
- Separate generators for the drive motor
- Low moment of inertia key to performance

Richard Crosbie
Tape 5 (Continued):

Houston centrifuge has less h.p., higher moment of inertia
Capability of about 2 G per second; but sufficient for space work

Development of In-house Computer [continued]
Computer installed in 1963, still operating today
Computer and centrifuge as one system
Increase in efficiency with shift from Center to centrifuge computer

Tape 6 Richard Crosbie (Continued) Interview conducted on July 2, 1982,

by Tom Misa and Ed Todd

Side 1:

Dynamic Flight Simulation

- Presently being tied into Center's central computer
- Centrifuge computer was completely analogue
- Typhoon was broken into a number of smaller units "Gales"

Early difficulties in connecting centrifuge to central computer
Ordinary telephone line 1/4 mile long

Relationship to University of Pennsylvania in early 1950s

- James Hardy — from Cornell originally
- AMAL was looking for a civilian director of research
- Hardy had three hats: Medical School professor at Penn, NADC
AMAL Research Director, and Rear Admiral in Navy Reserve
- Little interaction with the Center
- Hardy emphasized publication

A.M.A.L. projects

- Heat studies led into protective clothing
- Captain Jack R. Poppin
 - First Director of AMAL
 - First man on the centrifuge [1950 or 52 ?]
- Captain Ray, also an early director
- Relationship between military and civilian personnel worked quite well

Advisory Board from the University of Pennsylvania

- Program Reviews
- School of Medicine

"Iron Maiden" Ride

- Done by Flanagan Grey in 1958
- 31 1/4 G in water immersion
- Suited mounted on 40-foot platform, taken to full speed
- World Record

Difficulties in Integrating Cockpit into rest of Plane

- Supine position best for high G

Centrifuge Projects

- Loss of Consciousness studies by Dr. Tom Duwayne [?]
 - Was himself in the gondola monitoring the subject
- Staff volunteered routinely to be subjects
- Bureau of Medicine and Surgery provided centrifuge funding until mid-1960s
- Scientists tend to explore their interests, applications wane
 - Blood vessel modeling

Richard Crosbie
Tape 6, Side 1 (Continued):

- Isolation of Centrifuge
 - Physical isolation
 - Medical personnel vs. engineers
 - Department divisions needed to be broken down

Side 2:

- Directorate Program
 - Importance of sponsors
 - Separation along interests still occurs under the present organization
 - Pilot as an integral part of the aircraft

- Systems Approach
 - DFS program required systems analysis
 - If not overdone, systems approach beneficial
 - Software now a major cost
 - Systems approach "against the grain" of the Center's inclination in the 1960s,
 - difficulty in getting personnel to cooperate
 - Role of PAR to keep departments from being isolated

- Historical Reports generated by Centrifuge

Tape 7 Harold Tremblay Interview conducted on July 6, 1982,

by Tom Misa and Ed Todd

Side 1:

Personal Background

- Bachelors in electrical engineering from Tufts University in 1943
- Worked for General Electric
- During the war in Navy, assigned to Johnsville
- Special Weapons Evaluation Group worked on control systems
- Went through Navy, M.I.T. radar schools

Early Center work [N.A.M.U.]

- Only government establishment that made missiles
- Studied V-2 missiles
- 1945-1947 period had continuous projects
- Projects ran from Cape May: "zinged" missiles out to sea
- First four years: "very interesting"
- Drone projects: configured the S-6F for the Bikini test
- Gliders on center due to Barnaby's expertise
- Towing of downed planes
- Glider work cut down by fatal crash at national glider meet
- Gliders as troop carriers in World War II
- Early Television projects: Block One and Two
- Airborne video cameras
- German-captured missiles — controlled by wires
- No lack of projects — 1945-1947 was not a wind-down period
- Gliders sent to hangers after Barnaby's departure
- Bureau of Aeronautics fed projects to the center, feeling that missiles, targets were to be the future of the Navy
- Personnel situation 1945-1952? 1945-47 fairly stable

Project Typhoon

- Interested in the mathematical aspects of his education
- Member of A.I.E.E. and I.R.E. [professional societies]
- Navy initiated "winds" program in 1946: Typhoon, Cyclone, Hurricane, [Whirlwind]
- Cyclone: Reeves program using available techniques to build computer
- Typhoon: R.C.A. to design the ultimate computer
- Hurricane: Raytheon project for telemetry
- Whirlwind: taken over by the Air Force
- Bureau of Aeronautics arranged with Ed Reeves in New York to have simulation work done on missile control systems; Tremblay thus spent time away from NADC in N.Y.
- BuAer bought the next generation of Cyclone in 1947-1948
 - Two Cyclones brought to the Center: one put under Tremblay; one under A.E.T.D. with Dr. Krutter
- Shifted work away from autopilots to analysis, simulation
- Tremblay spent time with R.C.A. in Princeton 1950+
- R.C.A. did not want the military project at Princeton; possible move to Camden, but eventually moved to Johnsville

Harold Tremblay
Tape 7, Side 1 (Continued):

- Programs given by BuAer, Tremblay's group eventually took over Typhoon
- Typhoon equipment description: "F"-shaped complex of 50,000 tubes
- Combination of digital and analog capabilities
- Comparison of "analog" and "digital" problem solving

Applications for Typhoon

- Sparrow missile control system simulation
- Navy interceptor aircraft program at Bell Laboratories

Side 2:

- Typhoon move to NADC led by R.C.A.'s desires:
 - To move out of military work
 - Rise of television and solid state electronics

Typhoon Equipment

- 60 feet by 120 feet, not including power supply
- Homopole generator (high current) used to power tubes
- Vacuum tube difficulties; used R.C.A. long-life "Red" tubes
- Failure rate of tubes corresponded to "bathtub curve"
- Still ran the REAC computers, which had been on Center since 1947-48

Tape 8 Werner Gleiter Interview conducted on July 8, 1982,

by Tom Misa and Ed Todd

Side 1:

Personal Background

Came to the Naval Air Development Station in 1948; had been active in the Navy Reserve, on duty during WW II
Jim Howard recruited to NADC by Gleiter
Majored in physics, graduated in 1939 from Wisconsin State University: River Falls
Interested in electronics
After graduation taught school for 2 1/2 years
After Pearl Harbor [1941] taught as a civilian at the Army radio school at Scott Field, Illinois
Took Navy commission in 1942, went to radar school at M.I.T. and Harvard, and to sea duty
After the war was on active duty at Patuxent River
Visited NADS in 1948, liked the countryside, had friends on Center, and wanted to get into ASW work

Came to NADS as a Civilian

Remained in Reserves
1948: "It was a challenge." "It was like a frontier town [for R&D]."
Early difficulties in procuring materials for R&D effort
Communication to Washington was difficult; tie line through Philadelphia
Supply system only smoothed out by mid-1950s
[turned off tape on request]
Need for state-of-the-art components for development effort
Connections to electronics industry, e.g. International Resistor, N.J.
Importance of industrial connections: "Most of our development . . . has been done by industry."

Sonobuoy Effort

First SSQ-15 [sonobuoy] built by Herb West of NADC, unable to get a transducer commercially, turned to Jack Wallace and the Ceramics Laboratory (the "Mud Shop") invented a hydrophone for the project circa 1949. Wallace had experience at the Columbia University acoustics group during the war
Cooperative effort between government and industry the key
Sonobuoy conferences in Gleiter's living room
Korean War marked the start of large industrial role
Meetings every six months between Navy and industry got companies to work together
Technical difficulties with early sonobuoys
Impact of hitting water from air drops caused units to leak, sink
Self-opening blades
Other government labs:
Underwater Sound Laboratory, New London [CT]
Standards and Calibration Laboratory, Orlando [FL]

Werner Gleiter

Tape 8, Side 1 (Continued):

Industry's interest: "The Korean War forced the issue."

[See Russell Mason's book on the history of ASW]

Columbia University Field Laboratory had ASW & sonobuoy program, developed CRT-1 and -4

Staff involved: Henry Suttor and R. Mason

Mrs. Mason and Mrs. Suttor sewed the parachutes—a make-do wartime effort

During closing days of the war the CRT's were used with some effectiveness

Post-war Rise of Air-ASW

Characteristics of submarines

Capability of listening devices tied to aircraft

Ship's problem of hearing submarines above its own self-noise

Sonobuoys can be made to be very sensitive to underwater sounds

Signal processing techniques

Aircraft is soundless in water and invulnerable to submarine

Resistance of destroyer enthusiasts to air-ASW

Side 2:

Relationship of NADC to Bureau of Aeronautics

Close connections of working engineers, branch and division heads at NADC to Washington staff

Military-civilian relationship at NADC

Junior officers often chose Johnsville as a desirable location

Notable contributions made by military officers to ASW

Navy officers brought a sensitivity to tactics to NADC, e.g.

Grover M. Yowell [Commander Circa 1974]

Gleiter's position in Naval Reserves contributed to his work

Relationship of NADC to Local Universities

Krutter pushed connections to University of Pennsylvania as soon as he became Chief Scientist

Programs in early 1950s, to give graduate instruction to engineers on Center by Temple, Penn, and Drexel

Gleiter found university people of great help in his work, e.g. in radioactive isotope project

Academics involved in all aspects of NADC work; university professors as summer employees

Tape 9 Jerry Polin Interview conducted on July 13, 1982,

by Tom Misa and Ed Todd

Side A:

Human Factors Engineering

Accounting for the human being in a hardware system
Design of cockpit, control, noise level, environment

Personal Background

Princeton aeronautical engineering program for three years
Transferred to New York University to psychology, graduated 1960
Combination of technical training and psychology
Entrance level examination to get into government
Job offer doing human factors work for Martin-Marietta, Baltimore
Three weeks at Defense Logistics Agency on Tabor Road, then to M-M

Work at Martin Marietta [1960-1962]

Study program for Apollo contract
Titan II program, worked on ground support equipment
Apollo: survivability in space, sensory deprivation
Met Carl Clark, of NADC, when Clark came aboard Martin: first contact with NADC.
Trip with Clark to NADC to observe centrifuge studies: met future boss
(Flanagan Gray) and Randall Chambers

Worked for State of Pennsylvania doing statistical highway modeling

Worked for Philco-Ford as financial analyst

Stayed 10 months, unhappy
Left October 1963

Went to supply agency at Philadelphia Navy Yard

Stayed until April 1966
Naval Facilities Engineering Command, new reorganization
GS-7 management analyst
Boss was too suspicious, sneaky

Returned to Defense Logistics Agency on Tabor Road

Management Analyst
Used contacts with F. Gray to be hired at NADC
Started June 1967 as an engineering psychologist, Weapons System Support
Branch of A.M.R.D.

Centrifuge Department [AMRD]

Separate from rest of Center, "more like a college campus. . . ."
Ties to University of Pennsylvania were contracted by mid-1960s
Dr. Squires: Head of Physiology at NADC, held professorship at Penn
Dr. David Polis: internationally known biochemist, lots of clout in BuMed in Washington

NADC's outside appearance

From Philadelphia Navy Yard it looked like a "country club"

Jerry Polin
Tape 9 (Continued):

Side B:

Air Crew Equipment Department, Aero Structures Lab, and Aero Materials Lab
moved to NADC

Interview in Philadelphia with John Lazo, who urged Polin to move up to NADC
Later, when Lazo moved to NADC, he became Polin's boss

Human Factors Engineering work at NADC

LAHV helicopter project, predecessor to LAMPS

Light Airborne ASW Vehicle

Destroyer-based ASW helicopter

Sonobuoy shot from gun of ship

Porpoises

ANew Project

Modifications to P-3

Sonobuoy signal processing

"Was not satisfying work": were supposed to develop tasks for the operator, did
not understand this work

Won NADC fellowship for graduate work, went to Temple University

Returned to NADC Human Factors
Animal studies on Center

Project Assignments

F-14 project

Liked project arrangement

Comparison of 'project' to 'functional' organization of work; promotions of
employees suffers when they are distant from their home department

Human Factors Personnel

Psychologists do not communicate well with engineers, tend to isolate themselves
from the Center's projects

Flanagan Gray had money and did research; but money for research dried up in
early 1970s and many people left the Center

Randall Chambers left NADC in 1968 and was replaced by a military man as
division head

Military leadership harmed human factors program

Different reward structure

Medical Service Corps [Navy psychologists]

Morale suffered — impossible to advance beyond one's military superior

Limited number of positions for Medical Service Corps psychologists, moved
around and treated in preference to civilians

Tape 10 Tom Willey Interview conducted on July 15, 1982

by Tom Misa and Ed Todd

Side A:

Personal Background

Came to NADC in 1951

B.S. in Physics; M.S., A.B.D. taken from night school

First in A.A.L.

Systems Engineering

Different levels of conceptualizing "system"

Systems engineering as a philosophy: pieces are designed to interface

First NADC system was Airborne Early Warning System of Constellation

Viewed by Navy as an ad hoc system

Wired together by J-boxes, luck-factor

Command and control system: NTDS for coordination of carriers

Systems engineering developing as a profession/art

Roots of ANEW program

Coordination of ASW sensors on an aircraft

Difficulties of selling the new idea

Hal Cody [sp?], Izzy Aslo (promoters of systems work in ASW)

Airborne Computer Development and Systems in early 1960s

E-2 aircraft equipped with first digital computer

Digital computer as "rallying point" for integrating ASW sensors

Interest of NAVAIR people and computer people pushed systems approach
and provided seed money until the concept could be proved

Computer's integration of data replaced operator's integration of same

1967-1968: Lockheed given P-3 contract for system avionics

Systems engineering as a philosophy of engineering

Importance of integrating with operator

Brighter, more widely focused engineers came naturally to systems approach
to engineering problems

Case for opposing systems approach

PROTEUS system for signal processing: to go into all airplanes

IBM has production contract, and the units are now going into the fleet

Side B:

Need to make PROTEUS compatible with all applications, but cannot design
for all possible applications: "stand alone system"

Interface couplers have replaced J-boxes

Three components to rise of systems: NADC engineers in ASW, NAVAIR sponsors,
engineering profession

Impact of Systems Approach on NADC

Managers of systems had to force Center to adopt the new approach

Engineers as tradition bound problem solvers

Success of airborne-ASW created on elite at NADC, led to ASWL disbanding

Large amount of money

Direct access to three-star admirals

Conflicts between systems and components people

Tom Willey
Tape 10, Side B (Continued):

- Introduction of Polaris-class submarines pushed ASW on national scale
- Over autonomy of ASW systems programs forced reorganization
- Cosmetic change of ASWL into Systems Project Department
- 1967 reorganization designed to increase manageability of NADC; merger of AWRD and SPD pushed systems managers out of power
- Spread of systems approach to rest of NADC
 - Diffusion of systems with increased managerial emphasis
 - ILAS and IHAS [systems]
- Difference of requirements for out-house contractors
 - ASW people believed in large in-house capability
 - Others [?] believed in increased contractors to do systems designing
 - Led to major philosophy dispute, polarization
 - Caused series of reorganizations of systems department in early 1970s

Tape 11 Tom Willey [Continued] Interview conducted on July 15, 1982,
by Tom Misa and Ed Todd

Side A:

Reorganizations of NADC in early 1970s

- Systems Department underwent continuous fine tuning
- Difficulty for management in balancing zeal of engineers with high morale versus organization that is obedient, but lifeless
- Resource stealing with the Center a management problem
- Dedicated projects compared with Matrix organization [extended discussion]
- Technology areas

Aggressiveness of Systems People in mid-1960s

- Dominant portion of NADC in money, prestige
- People stealing from other departments
- 1974 reorganization eased pressure within systems department
 - Matrix organization within the department
- 1977 reorganization applied lessons learned from 1974 systems reorganization
 - Eased pressures within the Center regarding people stealing
 - (1) Control Group: PAR group
 - (2) Matrix organization
 - PAR as staff to technical director
 - Software Department split off as separate technology area
 - Old systems group now in three parts:
 - Software, Systems, and Command Projects
 - Recent review of 1977 reorganization mainly for "head shed's" benefit

Relation of PAR to other Directorates

- Staff to T.D. and C.O.
 - Address resources disputes
 - Control through T.D. and C.O.'s authority
 - IMPASS procedure to solve inter-directorate disputes: mediation and fact-finding

Miscellaneous staff programs

- Fleet liaison program
- Science advisor program
- Field Station; scheduling of NADC Testing and Evaluation
- Assures compliance, quality of program reviews

Side B:

- Audits of selected programs, 6-12 per year
- Annual review of all divisions
- Technology transfer program

Tape 12 Jerry Polin Interview conducted on July 15, 1982,

by Tom Misa and Ed Todd

Side A:

Navy Scientists Training Exchange Program [NSTEP]
NAVMAT program under DNL set up circa 1978
Exchange between Washington and field activities
Description of program
Polin's NAVMAT job: laboratories management area
SHORESTAMPS — manpower needs for shore activities
Supervisor: Howard Law
Experience in Congress

Relationship between NAVMAT and NADC

Ranking of Navy laboratories
NADC: responsive to NAVMAT requests
China Lake considered premier technical lab
Has many "alumni" in Washington; very active liaison office
NSWC ranked second; NADC *et al.* follow
Overlap on labs' efforts
NOSC and NSWC; NADC and China Lake

Returned to NADC (PAR) in February 1981 after 18 months in Washington

Tape 13 Richard James Interview conducted on July 19, 1982,
by Tom Misa and Ed Todd

Side 1:

Organizational Factors

LAMPS [Light Airborne Multi-Purpose System] done under project organization
One boss, vertical organization
LAMPS now under matrix organization
Chain of command, evaluation, promotion
Project organization worked well for ANEW, LAMPS projects

History of LAMPS

1968 Development Concept Evaluation
Need for long-range ship detection
Initial focus on ship-to-ship warfare, not ASW which came later

Personal Background

Bureau of Weapons prior to NADC
SOSUS and Sonar operator in Navy for four years

History of LAMPS

Need to develop data link: 1969+
Exchange of sensor data had not been widely done before
Precursor: DASH - Drone ASW Helicopter

1970: Data linking MAD and ESM back to ship
Rise of ASW in the LAMPS program

Four parallel efforts:

- Installation on aircraft [H/2 helicopter] of sonar equipment
- Effort to get something to fleet as soon as possible - LAMPS Mk I
- Analog equipment used in system
- Digital equipment used in system

1971: LAMPS Mk I in fleet and development work on early phases completed
Analog equipment would not fit into the small helicopters

H/2-SR Program 1972-1975

Put both ASW and ASMD capability [anti-ship missile defense]
Built helicopter and ship computer system
Personnel had grown from 40 to 80 engineers, able to recruit and hire the necessary people then, not sure if same would be possible today
Success of "dedicated" project

LAMPS was both Air and Ship project

James coordinated ship aspects; Tom Janaco coordinated air aspects
Contacts on West coast through NTDS experts
Difficulty of integrating LAMPS software into destroyer software
LAMPS probably will have separate computer on the destroyer

Richard James

Tape 13, Side 1 (Continued):

Importance of Documentation of LAMPS

Software documented

Large amount of testing assured success; learned lessons from ANEW problems

Many shore tests of digital data link before bringing it to ship

Reasons for Success

Project organization

Looked at both analog and digital systems

Extensive background work

Testing approach

Investment in the integration of software

"Configuration Management"

Side 2:

History of LAMPS [continued]

Connections to Washington were good

LAMPS had high credibility with NAVAIR sponsors

Software Development and Documentation

Documentation, network-network logic modeling

"TERD" - test and evaluation requirements document

Documentation allows systematic control of project

Connections to Industry

Development of LAMPS appropriate for NADC

Manufacturing too large a job for NADC: turned over project to IBM

IBM observed LAMPS project from 1974 onward; became prime mover in 1976

NADC now preparing to do Life Cycle Support of LAMPS

Loss of visibility in Washington, difficult on morale

LCS will not be on-line until 1990

IBM-Sikorsky Rivalry

Both desire as large a share of the money as possible

Life Cycle Support

Fixes problems that arise while system is in operation

LAMPS project has no direct ties to Sikorsky, NADC as whole does have ties

Initial Operating Capability scheduled for 1984

First squadron deployed in fleet

1977: NADC Reorganization and Impact on LAMPS

IBM was already off to a good start, LAMPS shifted to LSC

Long-range focus allowed an accommodation to the reorganization of NADC

Project cut by 50% in 1975; contract monitoring to IBM

NADC still has small advisory role to NAVAIR

Doubts about Center's present capabilities

Life Cycle Support might be done by industry

Tape 14 Harold Tremblay Interview conducted on July 20, 1982,

by Tom Misa and Ed Todd

Side A:

Connections of NADC to University of Pennsylvania

Boghosian taught graduate course on Center circa 1948 [Professor W.H. Boghosian, of Moore School of Electrical Engineering]

Tremblay took servomechanisms course and interested Boghosian in NADC's work

Formalization of Center-University ties in 1950

Tremblay favored the university tie

Boghosian had semi-official position with NADC

NADC sponsored computer work at Penn

Other professors: Knoblouch, who eventually came to NADC

Bill Walkter [sp?]

Nicholson [sp?]

Broad spectrum of work on theory

Shielding of nuclear reactor in an aircraft

Checking solutions to computer

Numerical Analysis Branch set up in 1953

Cross-checking of digital and analog solutions

Digital problems: round-off error

Old numerical solutions unearthed from archives to solve the problems

Many courses in numerical methods, on Center, at Penn, across country

ENIAC at Penn worked on gun trajectories for Dahlgren and Army

Boghosian's relationship to NADC

Lasted until about 1956

Reorganization of computer work in 1955-1956

Commander Keene formed the Computer Group [Walter]

Previous work had been on projects

Keene had been to Princeton; knew many famous mathematicians (Von Neumann, Weiner, et al.)

Failed to get Princeton math faculty involved in the Center's work

Became interested in systems engineering

Brought aeronautical engineers in to do systems work on weapons systems

Ambiguity of "systems" concept

Electrical engineers used systems approach for electrical systems

Rings on aircraft guns attributed to systems engineering

Establishment of Aeronautical Computer Lab

Systems people loosely connected to computer people, then split off

Keene had taught "systems" to the aero engineers

Connections of Computer to Centrifuge

Dr. Hardy [of centrifuge] and Tremblay talked about ties in 1956

Telephone lines connected the two facilities

Centrifuge as a large servomechanism

Harold Tremblay
Tape 14, Side A (Continued):

- Fink Fischer involved
- Centrifuge people shocked when Tremblay et al. turned the arm backward
- X-15 simulation on computer
- Six degrees of freedom on computer; only three on centrifuge
- Fears of pilot-induced oscillation with X-15
- Mercury, Gemini simulation
- Difficulties with lines overstated
- Medical people had different perspective on centrifuge
- Oscillation of arm done on the sly
- Computer people suggested turning gondola around to make G forces more real to subject
- Centrifuge people wanted to cut the telephone lines
- Installed their own analog computer

Side B:

Connections of Computer to Centrifuge [continued]
Centrifuge broke away from computer in early 1960s

Computer Work in the 1960s

- Solving missile, aircraft problems
- Static simulations: mock cockpits
- Battle simulations with varied characteristics of aircraft
- Simulations very costly
- Analysis of weapons systems
- F-111 analysis done by NADC for top Navy brass in disputes with McNamara
 - Set of different series of runs every week; results sped to Admiral Zumwalt, Secretary of Navy, then McNamara
 - "Omnipotent" computer solutions often in error

Relations of Computer Department to Software [at present]

- Engineering and support work for Software and other Directorates
- Automatic Data Processing official on Center

APPENDIX C
GUIDE TO NADC RECORDS

Location Codes:

Philadelphia	PR
Mechanicsburg	MC
Garden City	GC
Arlington	AR
St. Louis, MO	SLF
St. Louis, Mil. Personnel Records Center	SLM
Alexandria	ALX
Washington National Records Center, GSA	WNRC

TABLE I. FROM RECORDS DISPOSAL FILE 1950-1955

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Correspondence Files relating to aircraft; mail logs NAS Johnsville	MC	1943-1950	2 cu. ft. 1 box
UNK	Files relating to pay authorizations, deductions and adjustments for individual civilian employees who have been transferred or separated, except income tax withholding exemption certificates. (S&A 205 and 206) Civilian payrolls (rough payrolls)	MC	1944-1948	11 cu. ft.
UNK	Metal templates for miscellaneous model aircraft-NAS-NADC	MC	pre 1951	300 cu. ft. 38 wooden boxes
UNK	Folders on all planes accepted by the station for operational and experimental purposes containing correspondence, memoranda, incoming and outgoing inventories, and other data relating to the plane while in station custody	UNK	pre 1951	1 1/2 cu. ft.
UNK	Contract and purchase order files: containing correspondence and documents governing the issuance of purchase orders, award and administration of material and subsequent payments, and including annual purchase requisitions, transactions of over \$1,000, receipt control records	MC	1948	24 cu. ft. 15 boxes
UNK	Beneficial suggestion case files	MC	1947-1950	1/2 cu. ft.

TABLE I. FROM RECORDS DISPOSAL FILE 1950-1955 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Contract and purchase order files containing correspondence and documents governing the issuance of purchase orders, award and administration of contracts, receipt and inspection of material, and subsequent payments, and including annual purchase requisitions relating to transactions more than \$1,000. (Confidential)	MC	1948-1949	3 cu. ft.
UNK	Contract and purchase order files containing correspondence and documents governing the issuance of purchase orders, award and administration of contracts, receipt and inspection of material, and subsequent payments, and including annual purchase requisitions. Relating to transactions of more than \$1,000.00	MC	1945-1947	3 cu. ft.
UNK	Aircraft accident and crash reports relating to injury or damage to private persons or private property. Folders on all planes accepted by the station NAS	MC	1949-1950	1/4 cu. ft.
UNK	Files relating to pay authorizations, deductions, adjustments for civilian employees who have been transferred	MC	1944-1951	36 1/2 boxes
UNK	Original plans made in laboratory development work (tool drawings)	MC	1944-1950	6 cu. ft.

TABLE I. FROM RECORDS DISPOSAL FILE 1950-1955 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Files relating to pay authorizations, deductions and adjustments for individual civilian employees who have been transferred or separated, except income tax withholding exemption certificates (S&A 205 and 206); civilian payrolls (rough payrolls)	MC	1949	4 cu. ft.
UNK	Correspondence files relating to the operation and administration of the Naval Research Laboratory Field Station, Boston, Massachusetts	MC	1949	3 cu. ft. 2 boxes
UNK	Correspondence Files relating to aircraft in the custody of this command	MC	1948-1951	1/2 cu. ft. 1 box
UNK	X-ray log (1 book) Sick call log (1 book)	MC	1948-1953	1/14 cu. ft.
UNK	Retired medical records	GC	1944-1949	6.4 cu. ft.
UNK	Supply and Fiscal Department record material relating to pay authorizations, deductions	MC	1950	12 boxes 33 1/2 boxes
UNK	NAS Johnsville: Old medical records	GC	UNK	35.5 cu. ft.
UNK	Correspondence relating to quality control, exhibit projects, ASO test and component tests	MC	1949-1954	21 cu. ft. 14 boxes

TABLE I. FROM RECORDS DISPOSAL FILE 1950-1955 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Rough payrolls (subject to audit) - note on site audit was made up to 30 June 1953	MC	1950-1953	4 cu. ft.
UNK	Industrial Relations Dept.: Inactive personnel folders	SLF	UNK	1 cu. ft.
UNK	NAS: Master flight log	AR	1949-1953	2 cu. ft.
UNK	20 inactive personnel folders	SLF	pre 1954	0.6 cu. ft.
UNK	37 inactive personnel folders	SLF	pre 1954	UNK
UNK	77 inactive personnel folders	SLF	pre 1954	0.3 cu. ft.
UNK	Industrial health jacket (terminated) alphabetical X-ray film (inactive)	SLF	1946-1954	5 cu. ft.
UNK	Medical Officer: Treatment record, dependent; Laboratory log; Mood log; X-rays, military; X-ray log	GC	1951-1953	2 1/2 cu. ft.
UNK	Directives issued prior to the establish- ment of the Navy directives system at Johnsville, including directives issued by the following activities and com- mands: NAMU, NADS, NADC, NAS numerical file of both orders and memorandums issued by above com- mand	MC	1947-1952	1 1/2 cu. ft.
UNK	Original plans made in laboratory development work. (NAF drawings produced for the NAMU)	MC	1942-1944	1/10 cu. ft.

TABLE I. FROM RECORDS DISPOSAL FILE 1950-1955 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	54 inactive personnel folders	SLF	pre 1955	UNK
UNK	NADC original pencil tracings A, B, C, and D sizes from engineering and development services department (formerly PADL; NAMU)	MC	1944-1948	36 cu. ft.
UNK	Confidential and unclassified reports received in NADC library through 1951 Reports #5100001-5106234	MC	UNK	41 cu. ft.
UNK	Proceedings of aircraft combat survival symposium held 10 May 1955 at NADC	MC	1955	3 cu. ft.
UNK	Correspondence and financial records pertaining to the Commissioned Officer's Mess (Closed)	MC	1951-1955	1 cu. ft.
UNK	29 inactive personnel folders	SLF	UNK	1 cu. ft.
UNK	Original plans made in laboratory development work (NAF drawings produced for the NAMU)	MC	1944-1946	34 1/2 cu. ft.
UNK	Engineering Development and Services Dept.: Original plans made in laboratory development work (project TED ADC GM-307 tool drawings)	MC	1951-1954	1 cu. ft.

TABLE I. FROM RECORDS DISPOSAL FILE 1950-1955 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Engineering Development and Services Dept.: Reproduces of original plans made in laboratory development work (contact prints produced for Fairchild Guided Missiles Division, Wyandanch, L.I., New York)	MC	1951-1955	4 1/2 cu. ft.
UNK	52 inactive personnel folders	SLM	UNK	3 cu. ft.
UNK	Engineering drawings and sketches; engineering reports, requests to engineering and engineering orders	MC	1944-1954	44 cu. ft.
UNK	39 inactive personnel folders 167 inactive medical jackets	SLF	1955	12 7/8 cu. ft.
UNK	Engineering Development and Services Dept.: Original plans made in labora- tory development work (C&D size tool drawings)	MC	1944-1946	1/2 cu. ft.
UNK	Check records (Form No. DD 546)	UNK	1948-1951	15 cu. ft.

TABLE II. FROM RECORDS DISPOSAL FILE 1956-1959

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-59A0321	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of NADC (Confidential)	PR	1951-1953	15 cu. ft.
UNK	Industrial Relations Officer: 9 inactive personnel folders	SLF	1957	0.75 cu. ft.
UNK	Directives issued prior to the estab- lishment of the Navy Directives System at Johnsville, including direc- tives issued by NAMU, NADS, NADC, NAS	MC	1947-1952	1 cu. ft.
UNK	Industrial Relations Officer: 67 inactive personnel folders (NAS, Johnsville)	SLF	1959	1.5 cu. ft.
UNK	Industrial Relations Officer: 45 inactive personnel folders (NAS, Johnsville)	SLF	1959	1 cu. ft.
UNK	Industrial Relations Officer: 83 inactive personnel folders (NAS, Johnsville)	SLF	1958	2 cu. ft.
UNK	Supply & Fiscal Dept.: Fiscal records -Standard Form 2806, Individual Retirement Record (NAS, Johnsville)	SLF	1950-1955.	1 cu. ft.

TABLE II. FROM RECORDS DISPOSAL FILE 1956-1959 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Supply & Fiscal Dept.: Receipt control contract files, transactions of less than \$25,000 and transactions of more than \$25,000 (Confidential)	PR	1950-1956	3 cu. ft.
UNK	Supply & Fiscal Dept.: Supply — Shipping Sec. (Government carrier records) Supply — Issue Control (S&A Form 127, 129, 220/125) Supply — Receipt Control (SR8101/56 through 26650/6 and QR426/6 through 970/6) Supply — Receipt Control (Transactions of \$1,000 or less) Supply — Fiscal (S&A Form 127) Supply — Fiscal (Detail Labor and Lost cards) Supply — Household Goods Section (Std Form 116 and correspondence)	SLM	1953-1957	1.5 cu. ft. 18 cu. ft. 24 cu. ft. 1.5 cu. ft. 1.5 cu. ft. 1.5 cu. ft. 6 cu. ft.
UNK	Research & Development Board, Committee on Electronics, Panel 52-2674D: BuAer ser 001531 BuAer ser 001706 BuAer ser 001781 Canadian Joint Staff RM/3/210-20-3 AF Cambridge Res. Cent. BAGR, C.D. 0029 CNO 0015P05W	MC	1952-1954	6 boxes 5 boxes 6 boxes 6 boxes 1 box 1 box 1 box 1 box

TABLE II. FROM RECORDS DISPOSAL FILE 1956-1959 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-61A0006	Supply & Fiscal Dept.: Receipt control contract files	PR	1953-1954	4.5 cu. ft.
UNK	Industrial Relations Officer: 67 inactive personnel folders (NAS Johnsville)	SLF	1957	4.5 cu. ft.
UNK	Industrial Relations Officer: 41 inactive personnel folders	SLF	1957	3.25 cu. ft.
UNK	Supply & Fiscal Dept.: Individual earnings and retirement cards and listings; individual leave record cards; Civilian payrolls — smooth	MC	1951-1954	6.4 cu. ft.
UNK	Industrial Relations Officer: 14 inactive personnel folders	SLF	1957	1.0 cu. ft.
UNK	Industrial Relations Officer: 16 inactive personnel folders (names listed in NADC file)	SLF	1957	1.5 cu. ft.
UNK	Industrial Relations Officer: 5 inactive personnel folders	SLF	1959	0.25 cu. ft.
UNK	Medical Officer: Industrial Health Jacket (Civilian Federal Employees) (inactive)	SLF	1957	2.0 cu. ft.
UNK	Medical Officer: Outpatient treatment record (dependent-inactive); Mood logs; X-ray log, military; X-ray log, civilian; X-rays, military	SLC	1952-1956	1.0 cu. ft.

TABLE II. FROM RECORDS DISPOSAL FILE 1956-1959 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Industrial Relations Officer: 33 inactive personnel folders	SLF	1957	2.0 cu. ft.
UNK	Industrial Relations Officer: 19 inactive personnel folders	SLF	1956	3.25 cu. ft.
UNK	Industrial Relations Officer: 17 inactive personnel folders	SLF	1956	1 cu. ft.
UNK	Industrial Relations Officer: 52 inactive personnel folders (names listed in NADC file)	SLF	1956	3 cu. ft.
UNK	Supply & Fiscal Officer: Shipping documents and related correspondence pertaining to transportation of house- hold goods	MC	1949-1953	4.5 cu. ft.
UNK	Industrial Relations Officer: 48 inactive personnel folders (names listed in NADC file)	SLF	1956	2 cu. ft.
UNK	Aeronautical Computer Laboratory: GM-307 Brush Recordings, Correction Diagrams & Autopilot Manuals SIGAP RTV-N-15 Brush Recorder Records — longitudinal & longitudinal altitude controller study TYPHOON PIN 2 Recorder data TYPHOON PIN 10 Graphs and recorder rolls Model V-2 Brush recordings	MC	1949-1955	1 cu. ft. 8 cu. ft. 4 cu. ft. 0.5 cu. ft.

TABLE II. FROM RECORDS DISPOSAL FILE 1956-1959 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
	RCA labs. Communication res. blueprints PIN 1 (TYPHOON) Recordings TYPHOON Symposium III mailing lists, addressograph plates, files A19/3 and A19/3-2, and 17 volumes confidential proceedings			0.5 cu. ft. 2.5 cu. ft. 2.5 cu. ft. Total 20 cu. ft.
UNK	Industrial Relations Officer: 23 inactive personnel folders (names listed in NADC file)	SLF	1956	1.5 cu. ft.
UNK	Industrial Relations Officer: 45 inactive personnel folders (names listed in NADC file)	SLF	1956	3.8 cu. ft.
UNK	AEEL Development Support Division: NADC Project Correspondence	MC	1950-1954	3 cu. ft.
UNK	Industrial Relations Officer: 27 inactive personnel folders (names listed in NADC file)	SLF	1955-1956	4 cu. ft.
181-73513	Aviation Armament Laboratory: Computations pertaining to AAL projects ADC-AR-8201, 1	MC	1953	3 cu. ft.
UNK	NADC Officer Personnel Jackets	UNK	1958	0.25 cu. ft.
181-59A210	NAS Supply & Fiscal Dept.: Memo- randum copies of Government Bills of Lading, Forms 1103a -- pertaining to the transportation of material by com- mercial carrier	MC	1953-1955	6 cu. ft.

TABLE II. FROM RECORDS DISPOSAL FILE 1956-1959 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Memorandum copies of Government Bills of Lading, Form 1103a	MC	1950-1955	1.5 cu. ft.
UNK	Records relating to transactions of more than \$1,000 and less than \$25,000. Contract and purchase order files	MC	1952-1956	27.2 cu. ft.
UNK	Records relating to transactions of \$25,000 or more			
UNK	NAS Supply & Fiscal Dept.: Receipt Control Contract files	MC	1951-1956	40 boxes
UNK	NAS Supply & Fiscal Dept.: Fiscal smooth payrolls Fiscal Retirement & Income Records Fiscal Service Cards	SLF	1951-1954	6 boxes
UNK	Supply & Fiscal Dept.: Contracts over \$1,000	MC	1951-1952	9 cu. ft.
UNK	Supply & Fiscal Dept.: Smooth rolls - civilian Service Cards - S&A 206 Ret. Fund Dec., Form 205, Income Record	SLF	1951-1954	9 cu. ft.
UNK	Aviation Armament Laboratory: Closed-out project folders	MC	1951-1952	11 cu. ft.
UNK	Supply and Fiscal Dept.: Std. Form 1103A	MC	1949-1952	3.5 cu. ft.

TABLE II. FROM RECORDS DISPOSAL FILE 1956-1959 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Supply & Fiscal Dept.: Shipment of household effects (Mil.)	MC	1949-1950	1.5 cu. ft.
UNK	NAS: Correspondence files (Confidential)	MC	1951	5 cu. ft.

TABLE III. FROM RECORDS DISPOSAL FILE 1959-1961

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-62A171	Aeronautical Electronic and Electrical Laboratory: Completed project files	PR	1948-1955	26 cu. ft. 26 boxes
UNK	22 inactive personnel folders	SLF	pre 1961	1 box
UNK	25 inactive personnel folders	SLF	pre 1961	1 box
UNK	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of NADC and NARDAC (Secret)	PR	1956	1 cu. ft.
UNK	22 inactive personnel folders	SLF	1961	UNK
181-610426	Engineering Development Laboratory: Original plans of drawings used on projects AC-601, AE 63300, EL-706, EL-719, GM-617, GM-617.1, AE-10006, PA-204, PA-501, PA-501.3, PA-503, PA-505, PA-507, PA-509, PA-607, PA-608, PA-613, PA-614, PA-616, E-161, GM-617.3, E-48, E-100, SI-5501, SI-302, E-184, GM-6204, GM-6204.2	PR	1952-1955	15 cu. ft. 5 boxes
UNK	Engineering Development Laboratory: Original plans of drawings, reports, memoranda and engineering data on projects GM-307, GM-6204.2, E-179, EL-42008, AY-4001, E-156, E-200, GM-6203, GM-3209.2	MC	1948-1956	6 cu. ft.

TABLE III. FROM RECORDS DISPOSAL FILE 1959-1961 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-610421	Original plans of drawings used on projects GM-6208, GM-6205, GM-6204, E-138, PA-305, E-171, E-168, E-102, E-105, E-198, E-199, GM-617.5, GM-617.4, PA-616, PA-509, PA-614, PA-617, GM-6201, PA-501.3, PA-505, PA-617, EL-46026, GM-6203, GM-624, E-26, GM-6209, EL-42011, EL-42015, EL-42032, EL-44002, EL-44020, E-211, E-145, E-129	PR	1955-1957	24 cu. ft.
UNK	Laboratories' Central Correspondence Files relating to development functions in the field of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of NADC (Confidential)	PR	1957	4 cu. ft.
UNK	Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of the NARDAC (Confidential)	PR	1957	1 cu. ft.
181-61A0394	Engineering Development Laboratory: Original plans of drawings on projects GM-622, GM-625, EL-8184, EL-42008, EL-42008.1, EL-42036, NM-001-60, NAM-AE-7054, EL-46015, EL-46026, PA-501.3, PA-505, PA-613, PA-614, PA-616, PA-617, RAD-5, XTBM-3, TBM-3, EL-43032, GM-3209, GM-6201, GM-6202, GM-6203	PR	1947-1956	18 cu. ft.

TABLE III. FROM RECORDS DISPOSAL FILE 1959-1961 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-61A0380	Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of the NARDAC	PR	1955-1956	5 cu. ft.
UNK	33 inactive personnel folders	SLF	1961	1 box
UNK	Central Correspondence Files of the NAS Johnsville relating to the operation and administration of the activity			
181-61A0366	Laboratories' Central Files relating to development functions in the fields of Aircraft Electronics, Aviation Armaments, Pilotless Aircraft and the operation and administration of NADC	PR	1955-1956	12 cu. ft.
181-610347	Original plans, drawings, and reports used on projects E-138, GM-618, GM-621, GM-620, EL-42006, PA-617, GM-617.5, GM-6201, GM-624, AV-45012, GM-617.4, AR-45008.1, AY-4001, GM-619, GM-622	PR	1949-1961	18 cu. ft.
181-61A0364	Original plans, drawing and reports used on project GM-307 (Secret)	PR	1952-1957	6 cu. ft.
UNK	124 inactive personnel folders	SLF	UNK	3 boxes
UNK	Payrolls - NAVCOMPT 534 - audited by GAO (smooth)	PR	1957-1959	4.8 cu. ft.

TABLE III. FROM RECORDS DISPOSAL FILE 1959-1961 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-610337	Original plans of drawings used on project E-168, GM-623, PA-617, GM-617, GM-617.1, E-195, E-200, E-198, PA-501.3, EL-706, PA-501, GM-618	PR	1947-1952	15 cu. ft.
181-61A0277	Aeronautical Electronic and Electrical Laboratory: Completed project files (names listed in NADC file)	PR	1953-1954	3 cu. ft.
UNK	Engineering Development Laboratory: Original plans of drawings used on project E-161, E-168, GM-307, E-66	MC	1945-1955	24 cu. ft.
UNK	Original plans of reports used on projects GM-307, E-136, E-96, E-161, E-148, E-191, E-200, PA-501.2, EL-8184	MC	1945-1953	12 cu. ft.
181-61A225	SF 1103a, memorandum copies GBL's - shipping documents and related correspondence	PR	1956-1957	1 cu. ft.
UNK	Engineering Development Laboratory: Original plans of reports and drawings used on project GM-307, E-66, AC-601, AE-633000, AR-2713, AR-42013, AE-7055	MC	1945-1955	12 cu. ft.
181-610178	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of the NARDAC (Confidential)	PR	1954-1955	17 cu. ft.

TABLE III. FROM RECORDS DISPOSAL FILE 1959-1961 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-61A0168	Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of the NARDAC (Confidential)	PR	1954-1957	2 cu. ft.
181-61A0147	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of NADC (Confidential)	PR	1954-1956	20 cu. ft.
181-61A147	NAS Central Correspondence Files of the Commanding Officer relating to the administration and operation of the Naval Air Station (Confidential)	PR	1954-1957	1 cu. ft.
181-61A161	Records relating to transportation by commercial carrier — issuing copies of shipping documents	PR	1955-1957	6 cu. ft.
181-62A123	Contract files — \$25,000 or more Transportation records; by commercial carrier	PR	1956-1959	3 cu. ft.
UNK	NAVMED 1183 Journal of Rec (Equip) NAVMED 1184 Journal of Exp (Equip) NAVMED 1185 Journal of Rec (Supply) NAVMED 1186 Journal of Exp (Supply)	SLM	1951-1957 1954-1957 1950-1957 1950-1957	1 cu. ft.
UNK	164 inactive personnel folders	SLF	pre 1960	4 cu. ft. 3 boxes

TABLE III. FROM RECORDS DISPOSAL FILE 1959-1961 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-61A35	Central Correspondence Files of the NAS Johnsville relating to the operation and administration of the activity	PR	1953-1954	7 cu. ft.
181-61A0035	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of NADC and NARDAC (Secret)	PR	1955	3 cu. ft.
UNK	ACL project files, laboratory notebooks, IBM punched cards containing IBM 650 programs, program runs, sundry drawings and records pertaining to ACL problems 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 26, 32, 34, 48, 60, 63, 64, 72, 82, 85, 88, 90, 102, 111 eligible for destruction after 5 years	MC	1952-1958	33 cu. ft.
UNK	Aeronautical Instruments Laboratory: 72 project files (CONF & UNCLASS)	MC	1946-1953	1 1/2 cu. ft. 1 box
UNK	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of NADC	PR	1953-1954	15 cu. ft.
UNK	Aeronautical Electronic and Electrical Laboratory: Manuscript copies of technical publications (Confidential)	PR	1951-1952	6 cu. ft.

TABLE III. FROM RECORDS DISPOSAL FILE 1959-1961 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Anti-Submarine Warfare Laboratory: Project files on the AERO X8A (AV-43002)	MC	1954-1957	8 cu. ft.
UNK	10 inactive personnel folders	SLF	pre 1961	1 cu. ft.

TABLE IV. FROM RECORDS DISPOSAL FILE 1962-1963

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-62-03283	Log of incoming correspondence (controlled)	PR	1952-1956	2 cu. ft.
181-62A0363	Laboratories Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of NADC	PR	1957	17 cu. ft.
181-63A30	Case files of NAVAIRDEVCON/NAS Johnsville, PA Instructions and Notices	UNK	1952-1959	6 boxes
181-63A0177	Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of the NARDAC (Confidential)	PR	1958-1962	18 cu. ft.
181-63A0206	Laboratories' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Armament, Pilotless Aircraft and the operation and administration of NADC	PR	1958	1 cu. ft.
181-64A5	Records relating to shipment by commercial carrier	PR	1957-1958	3 cu. ft.
181-64B0005	Project files for integrated systems facility: drawings, specifications, technical design reports originated by NAVAIRDEVCON and contractors	PR	1953-1958	2 cu. ft.

TABLE IV. FROM RECORDS DISPOSAL FILE 1962-1963 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-64D0005	Research and development drawings pertaining to mechanical and physical characteristics of the Regulus II computer	PR	1958	6 cu. ft.
181-64E0005	Specification files pertaining to integrated systems facility	PR	1952-1958	5 cu. ft.
181-64F0005	3,900 Project files for research and development consisting of histories of computer problems	PR	1956-1960	5 cu. ft.
181-63A8	Aeronautical Electronic and Electrical Laboratory, Electrical Division; Completed unclassified project folders	PR	1956-1959	24 cu. ft.
UNK	534 inactive medical folders Industrial health (clinical records): Industrial health jackets of civilian employees	SLM	pre 1963	3 cu. ft.
UNK	19 inactive personnel folders	SLM	pre 1962	UNK
UNK	38 inactive personnel folders	SLM	pre 1962	1 cu. ft.

TABLE V. FROM RECORDS DISPOSAL FILE 1964-1965

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-66A0007	Aeromechanics Department: Engineering Order & Memoranda files: Official (master) file copies of engineering orders and memoranda prepared in connection with AMD	PR	1952-1964	1 cu. ft.
UNK	Aeronautical Instruments Laboratory: Technical Report files: Official (master) file copy of each published technical report (or unpublished manuscript of report) prepared in connection with the AIL, project or task. (Report #s: 4444-6040)	PR	1954-1960	13 cu. ft.
UNK	Aeronautical Instruments Laboratory: Project case files reflecting a com- plete history of work performed by the AIL	PR	1954-1960	3 cu. ft.
181-66J0007	Aeronautical Instruments Laboratory: Project case files reflecting a com- plete history of work performed by the AIL (Confidential)	PR	1954-1959	1 cu. ft.
181-66B0007	Aeronautical Instruments Laboratory: Technical report files official (master) file copy of each published technical report (or unpublished manuscript of report) prepared in connection with the AIL, project or task (Reports #5337-5663, 5666-5886, 5928-6045) (Confidential)	PR	1944-1960	3 cu. ft.

TABLE V. FROM RECORDS DISPOSAL FILE 1964-1965 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-66C0007	Official (master) file copies of Engineering Orders prepared in connection with EDL projects of the Naval Air Development Center	FRC	1952-1964	1 cu. ft.
181-66M0007	Engineering Development Laboratory: Official (master) file copies of published technical reports prepared in connection with EDL projects (Vellums) (Confidential)	PR	1949-1960	2 cu. ft.
181-66K0007	Aeronautical Electronics and Electrical Laboratory, ASW Laboratory: Technical report files - official (master) file copies of published technical reports prepared in connection with NADC projects (Vellums) (Confidential)	PR	1960-1961	2 cu. ft.
UNK	Medical officer, NAF: Officer-of-the-Day logs. Medical officers watch log	SLF	1955-1963	1 cu. ft.
UNK	Comptroller Dept., Fiscal Division: Summary individual earning record; retirement listing, and earnings listing	SLF	1960-1961	1/24 cu. ft.
UNK	Comptroller Dept., Fiscal Division: Civilian payrolls - Accounting copies (smooth rolls)	SLF	1960-1961	3 cu. ft.
UNK	Comptroller Dept., Fiscal Division: Civilian service cards - NAVCOMP 206	SLF	1960-1961	2 cu. ft.

TABLE V. FROM RECORDS DISPOSAL FILE 1964-1965 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-66L0007	Aeronautical Computer Laboratory: Technical report files -- official (master) file copy of each published technical report (or unpublished manuscript of report) prepared in connection with a project or task	PR	1952-1962	3 cu. ft.
UNK	Medical Officer, NAF: 213 inactive medical folders -- industrial health (clinical records): Industrial health jackets of civilian employees	SLF	1965	1 cu. ft.
UNK	Supervisors report of injuries, NAVEXOS-108	SLF	1953-1961	1 cu. ft.
UNK	Injury compensation folders for NADC personnel (civilians) (names listed in NADC records file)	SLF	1953-1961	2 cu. ft.
UNK	Patent Counsel: NADC Navy case files (patents) (inactivated during 1962)	PR	1962	1.6 cu. ft.
181-65F0037	Aeronautical Electronic and Electrical Laboratory: Official (master) file copies of published technical reports prepared in connection with NADC projects (Confidential)	PR	1962	1.6 cu. ft.
181-65C0037	Aviation Armament Laboratory: Completed project files of AAL projects (Confidential)	PR	pre 1958	17 cu. ft.

TABLE V. FROM RECORDS DISPOSAL FILE 1964-1965 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-66F0007	Laboratories' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation, Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Instruments, Photography, Engineering Development, Aeronautical Instruments and the operations and administration of NADC (file numbers listed)	PR	1961	18 cu. ft.
181-66H0007	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Pilotless Aircraft and the operation and administration of NADC (file numbers listed) (Secret)	PR	1961	1 cu. ft.
181-66G0007	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC. Includes 2 folders of NAS files. (file numbers listed in NADC file) (Confidential)	PR	1961	3 cu. ft.

TABLE V. FROM RECORDS DISPOSAL FILE 1964-1965 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-65A0037	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operations and administration of NADC (file numbers listed)	PR	1960	14 cu. ft.
181-65B0037	Laboratories' Central Correspondence Files of the commanding officer relating to the administration and operation of NAS, Johnsville (file numbers listed in NADC file)	PR	1960	3 cu. ft.
181-65D0037	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Pilotless Aircraft and the operation and administration of NADC (file numbers listed in NADC file)	PR	1960	1 cu. ft.
181-65E0037	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Pilotless Aircraft and the operation and administration of NADC. (file numbers listed in NADC file) (Secret)	PR	1960	3 cu. ft.

TABLE V. FROM RECORDS DISPOSAL FILE 1964-1965 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-64G0005	Laboratories' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Pilotless Aircraft and the operation and administration of NADC (file numbers listed) (Secret)	PR	1959	2 cu. ft.
181-64A0005	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC	PR	1959	16 cu. ft.
181-64H0005	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Pilotless Aircraft and the operation and administration of NADC (file numbers listed) (Confidential)	PR	1959	4 cu. ft.
181-65A37	Photographic records - local still picture negatives of pictures incorporated in reports of other appropriate files pertaining to research and development	PR	1959-1962	15 cu. ft.

TABLE VI. FROM RECORDS DISPOSAL FILE 1966-1969.

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-69A0431	Aero Mechanics Dept. unclassified official (master) file copies of published technical reports	PR	1965-1967	2 cu. ft.
181-68A0154	Systems Project Dept.: Completed project files of Anti-Submarine Warfare Laboratory projects	PR	1959-1965	4 cu. ft.
181-68A0121	Aeronautical Photographic Experimental Laboratory project case files reflecting a complete history of work performed by APEL	PR	1947-1960	13 cu. ft.
UNK	Comptroller Dept., Fiscal Division: Summary individual earning record, civilian payrolls, civilian service cards	SLF	UNK	8 cu. ft.
2016	Naval Air Facility: Master flight logs (OPNAV Form 3760-25)	ALX	1964-1965	0.24 cu. ft.
181-67A0404	Systems Project Dept.: Project case files relating to the Eagle Missile System	PR	1953-1958	13 cu. ft.
181-67B0397	Aero Electronic Technology Dept.: Project case files reflecting a complete history of work performed by the Electrical Division	PR	1959-1962	7 cu. ft.
181-67A0397	Office of Patent Counsel: Patent (case) files, inactivated 1961-1965	PR	1961-1965	3.2 cu. ft.

TABLE VI. FROM RECORDS DISPOSAL FILE 1966-1969 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-67A0243	Office of Patent Counsel: Navy case files (NOTS - Patents) inactivated	PR	1956-1965	2 cu. ft.
181-67A0241	Computer Simulation Division, AWRD: Project files (index in NADC file) (confidential)	PR	1954-1964	8 cu. ft.
181-67A0326	Computer Simulation Division, AWRD: Project files (index in NADC file)	PR	1952-1965	15 cu. ft.
181-670060	Aero Mechanics Dept.: Official (master) file copies of engineering memoranda	PR	1956-1965	1 cu. ft.
181-670034	Office of Patent Counsel: Navy case files in which patents were issued (index in NADC FILE)	PR	1954-1964	3.5 cu. ft.
UNK	Naval Air Facility: Outpatient treatment records, dependent (date of last treatment 1962)	SLM	1962	1 cu. ft.
UNK	Medical Office: 178 inactive medical folders - Industrial Health Clinical Records	SLF	1963	1 cu. ft.
181-67A0176	Case files of NARDAC (Naval Air Research and Development Activities Command), Instructions and Notices 1000 through 12230, organizational charts, and manpower listings.	PR	1950-1962	1 cu. ft.

TABLE VI. FROM RECORDS DISPOSAL FILE 1966-1969 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-68A0216	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Develop- ment, Aeronautical Instruments and the operation and administration of NADC (Secret)	PR	1963	1 cu. ft.
181-68A0143	Departments' Central Correspondence Files relating to development func- tions in the fields of Aircraft Elec- tronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Pilotless Aircraft and the operation and admin- istration of NADC (Confidential)	PR	1963	3 cu. ft.
181-68B0143	Laboratories' Central Correspondence Files relating to functions relating to functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Developments, Aero- nautical Instruments and the operation and administration of NADC	PR	1963	19 cu. ft.
181-68C0143	Central Correspondence Files of the Commanding Officer relating to the administration of the Naval Air Facility	PR	1963	3 cu. ft.

TABLE VI. FROM RECORDS DISPOSAL FILE 1966-1969 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Issuance System Records, 5215 - Directives Files: Issues and Notices originated by NADC	PR	1959-1965	3 cu. ft.
181-67A0189	Central Correspondence Files relating to development functions in fields of Aircraft Electronics, Aviation Arma- ment, Pilotless Aircraft, and the operation and administration of NADC (Secret)	PR	1956-1962	1 cu. ft.
181-67B0134	Laboratories' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Pilotless Aircraft and the operation and administration of NADC (Confidential)	PR	1962	4 cu. ft.
181-67B0176	Laboratories' Central Correspondence Files relating to development func- tions in the fields of Aircraft Elec- tronics, Aviation Medicine, Air War- fare Research, Anti-Submarine Warfare, Aeronautical Photography, Pilotless Aircraft and the operation and administration of NADC (Secret)	PR	1962	1 cu. ft.
UNK	Case files of organizational charts and personnel listings (record copy - not included in general correspondence files)	PR	1945-1963	1 cu. ft.

TABLE VI. FROM RECORDS DISPOSAL FILE 1966-1969 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-67A0134	Laboratories' Central Correspondence Files relating to development in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineer- ing Development, Aeronautical Instruments and the operation and administration	PR	1962	21 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971.

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Program and Financial Management Dept.: Summary individual earning record and civilian payrolls	SLF	1964-1967	12 cu. ft.
UNK	Program and Financial Management Dept.: Civilian service cards	SLF	1964-1965	2 cu. ft.
181-70A0496	Technical report files: Official (master) file copy of each published letter report prepared by NADC technical department (Confidential)	PR	1949-1963	8 cu. ft.
181-72A0331	Technical report files: Official (master) file copy of each published technical report prepared by NADC projects (Secret)	PR	1966-1969	1 cu. ft.
181-72A0181	Technical report files: Official (master) file copy of each published technical reported prepared by NADC projects. (Confidential)	PR	1965-1970	8 cu. ft.
181-72E-0134	Departments' Central Correspondence files relating to development func- tions in the fields, of Aircraft Elec- tronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronau- tical Instruments, and the operation and administration of NADC (Secret)	PR	1967	2 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-72B0134	Central correspondence files of the commanding officer relating to the administration and operation of the Naval Air Facility	PR	1967	3 cu. ft.
181-72D0134	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare Aeronautical Photography, Engineering Development, Aeronautical Instruments, and the operation and administration of NADC (Confidential)	PR	1967	3 cu. ft.
181-72A0134	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC	PR	1967	20 cu. ft.
181-71A0407	Project files: Project 632A (MOL secret/special access required)	PR	1964-1966	7 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-71C0114	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC	PR	1966	19 cu. ft.
181-71B0114	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments, and the operation and administration of NADC (Secret and Confidential)	PR	1966	4 cu. ft.
181-71D0114	Central correspondence files of the Naval Air Facility	PR	1966	3 cu. ft.
181-71A0024	Technical report files: Official (master) file copy of published technical reports prepared by NADC projects (Confidential)	PR	1951-1956	27 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-70A0125	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments, and the operation and administration of NADC (Secret)	PR	1965	1 cu. ft.
181-70B0104	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC	PR	1965	18 cu. ft.
181-70C0104	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC (Confidential)	PR	1965	4 cu. ft.
181-70A0104	Central Correspondence files of the commanding officer relating to the administration and operation of the Naval Air Facility	PR	1965	3 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-69B0431	Case files of organizational charts and personnel listings	PR	1945-1963	1 cu. ft.
181-69A0431	Official case files of NADC Notices General Correspondence files	PR	1955-1965	3 cu. ft.
181-69A0106	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments, Aero Materials Testing, Aero Structures, Air Crew Equipment and the operation and administration of NADC.	PR	1964	20 cu. ft.
181-69A0098	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare Aeronautical Photography, Engineering Development, Aeronautical Instruments, and the operation and administration of NADC (Secret)	PR	1964	1 cu. ft.
181-69B0107	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments, and the operation and administration of NADC (Confidential)	PR	1964	3 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-69B0106	Central correspondence files of the Naval Air Facility relating to the operation and administration of the facility	PR	1964	3 cu. ft.
181-72A0311	Office of Patent Counsel: Navy case files in which patents were issued	PR	1968-1970	2 cu. ft.
181-71B0004	Office of Patent Counsel: inactive patent files	PR	1967-1969	1.6 cu. ft.
181-70A0028	Office of Patent Counsel: inactive patent files	PR	1964-1967	2.6 cu. ft.
181-680608	Office of Patent Counsel: inactive patent files	PR	1965-1966	1.6 cu. ft.
181-71D0184	Aerospace Crew Equipment Dept.: Aeronautical Engineering drawings or plans - cancelled drawing of Aircrew Safety Equipment	PR	1955-1966	3 cu. ft.
181-71E0014	Aero-Electronic Technology Dept.: Technical report files (Confidential)	PR	1962-1963	2 cu. ft.
181-71D0014	Aero-Electronic Technology Dept.: Project case files reflecting a complete history of work performed by the Electrical Division	PR	1966-1967	6 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-69A0534	Aero-Electronic Technology Dept.: Project case files reflecting a complete history of work performed by the Electrical Division	PR	1960-1966	14 cu. ft.
181-720264	Aero-Mechanics Dept.: Official (master) file copies of technical memoranda	PR	1966-1970	1 cu. ft.
UNK	Aero-Mechanics Dept.: Official file copies of DASH Project expeditures or incident reports	PR	1963-1968	1 cu. ft.
181-71A0552	Aero-Mechanics Dept.: Official (master) file copies of published engineering orders and technical memoranda	PR	1966-1970	1 cu. ft.
181-710493	Aero-Mechanics Dept.: Official (master) file copies of published quality product control reports	PR	1959-1970	2 cu. ft.
181-71A0240	Aero-Mechanics Dept.: Official (master) file copies of published technical memoranda (Confidential)	PR	1965-1969	1 cu. ft.
181-71F0184	Aero-Mechanics Dept.: Official file copies of each published technical report prepared by the Aeronautical Instruments Lab and the Aeronautical Photographic Experimental Lab (Index in NADC file)	PR	1960-1965	2 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-71E0184	Aero-Mechanics Dept.: Project case files reflecting a complete history of work performed by the Aeronautical Photographic Experimental Lab (Confidential)	PR	1950-1960	1 cu. ft.
181-71B0184	Aero-Mechanics Dept.: Official (master) file copies of published technical memoranda	PR	1965-1970	1 cu. ft.
181-71A0184	Aero-Mechanics Dept.: Official (master) original Lockheed Chronoflex reproducible drawings (Sonobuoy Launching System)	PR	1968-1969	3 cu. ft.
181-71B0024	Aero-Mechanics Dept.: Official (master) file copies of engineering orders	PR	1959-1968	1 cu. ft.
181-70A0476	Aero-Mechanics Dept.: Official (master) file copies of published technical reports	PR	1965-1968	2 cu. ft.
181-70A0456	Aero-Mechanics Dept.: Laboratory note books	PR	1956-1967	1 cu. ft.
181-70A0269	Aero-Mechanics Dept.: Official (master) file copies of published technical memoranda	PR	1965-1966	1 cu. ft.
181-70A0047	Aero-Mechanics Dept.: Official (master) file copies of published technical reports	PR	1963-1967	2 cu. ft.

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HISTORY OF THE NAVAL AIR DEVELOPMENT CENTER(U) NAVAL
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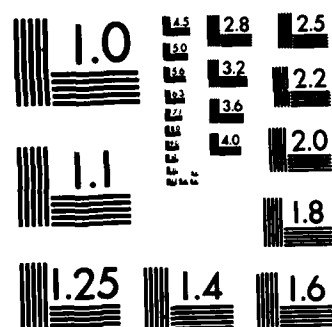


TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-69A0438	Aero-Mechanics Dept.: Official (master) file copies of published technical reports (Confidential)	PR	1956-1966	3 cu. ft.
181-69A0312	Aero-Mechanics Dept.: Official (master) file copies of published technical reports	PR	1964-1966	3 cu. ft.
181-690218	Aero-Mechanics Dept.: Official (master) file copies of published technical reports prepared by Engineering Development Lab	PR	1957-1966	2 cu. ft.
181-69A0176	Aero-Mechanics Dept.: Laboratory note books	PR	1951-1965	2 cu. ft.
181-69A0127	Aero-Mechanics Dept.: Official (master) file copies of engineering orders and technical memoranda	PR	1957-1967	2 cu. ft.
181-68A0573	Aero-Mechanics Dept.: Official (master) file copies of engineering orders	PR	1958-1966	1 cu. ft.
UNK	Aero-Materials Dept.: Completed Project Reports (Index in NADC files)	PR	1935-1960	76 cu. ft.
181-70A0417	Aerospace Medical Research Dept.: Report master files, author files, project files	PR	1951-1967	26 cu. ft.
181-71A0114	Systems Analysis & Engineering Dept.: IHAS Project records (Index in NADC file) (Confidential)	PR	1966-1969	39 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-71A0004	Systems Analysis & Engineering Dept., Computer Simulation Facility: Project files	PR	1963-1967	3 cu. ft.
181-710218	Systems Analysis & Engineering Dept.: Project files (Index in NADC file)	PR	1951-1970	17 cu. ft.
UNK	Systems Analysis & Engineering Dept.: ILAAS Project files	PR	1966-1969	19 cu. ft.
181-69A0107	Systems Analysis & Engineering Dept.: A-NEW Project case files (Confidential)	PR	1961-1967	2 cu. ft.
UNK	Medical officer NAF: Industrial health clinic records of civilian employees	SLF	1969	1 cu. ft.
UNK	Medical Officer NAF: Outpatient treatment records for Navy and Marine Corps. personnel	SLM	1969	3 cu. ft.
UNK	General correspondence, files, reports and related papers (Confidential, Secret, and Top Secret) (Index in NADC file)	MC	1963-1968	5 cu. ft.
UNK	Medical Officer NAF: Industrial health clinical records of civilian employees	SLF	1967	1 cu. ft.
UNK	Operations Officer: Flight records and reports - master flight logs	WNRC	1967-1969	0.2 cu. ft.

TABLE VII. FROM RECORDS DISPOSAL FILE 1968-1971 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
313-2016	Operations Officer: Master flight logs	WNRC	1965-1966	0.10 cu. ft.

TABLE VIII. FROM RECORDS DISPOSAL FILE 1972-1973

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-74A0040	Departments' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments, and the operation and administration of NADC (Secret)	PR	1969	2 cu. ft.
181-73E0429	Central Correspondence Files of the Commanding Officer relating to the administration and operation of the Naval Air Facility	PR	1969	3 cu. ft.
181-73F0429	Departments' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC (Confidential)	PR	1969	3 cu. ft.
181-73H70429	Departments' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC	PR	1969	20 cu. ft.

TABLE VIII. FROM RECORDS DISPOSAL FILE 1972-1973 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-730302	Aero Electronics Technology Dept.: Official file copy of drawings showing final design and technical characteristics of items developed by the Electro Mechanical Design Branch, NADC, formerly AETD	PR	1948-1966	22 cu. ft.
181-73B0168	Technical Report Files: Official (Master) file copy of each published technical report prepared by NADC, Technical Department (Index in NADC file)	PR	1963-1965	10 cu. ft.
181-73D0080	Departments' Central Correspondence Files relating to development func- tions in the fields of Aircraft Elec- tronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aero- nautical Instruments, and the opera- tion and administration of NADC (Secret)	PR	1968	2 cu. ft.
181-73A0345	Technical Report Files: Official (Master) copy of each published technical report prepared by NADC Technical Department (Index in NADC file)	PR	1961-1962	12 cu. ft.

TABLE VIII. FROM RECORDS DISPOSAL FILE 1972-1973 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-73C0080	Departments' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments, and the operation and administration of NADC (Confidential)	PR	1968	3 cu. ft.
181-73A0080	Departments' Central Correspondence Files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments, and the operation and administration of the NADC	PR	1968	19 cu. ft.
181-73B0080	Central Correspondence Files of the Commanding Officer relating to the administration and operation of the Naval Air Facility	PR	1968	3 cu. ft.
181-73A0026	Technical Report Files: Official (Master) file copy of each published, technical report prepared by NADC Technical Department (Index in NADC file)	PR	1959-1960	12 cu. ft.
181-72B356	Technical Report Files: Official (Master) file copies of published technical reports prepared for NADC projects (Confidential)	PR	1964-1969	4 cu. ft.

TABLE VIII. FROM RECORDS DISPOSAL FILE 1972-1973 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-74A0324	Office of Patent Counsel: Inactive Navy case files	PR	1974	2 cu. ft.
181-73A0454	Office of Patent Counsel: Inactive Navy case files	PR	1949-1973	6 cu. ft.
181-73B0454	Office of Patent Counsel: Inactive Navy case files	PR	1949-1973	15 cu. ft.
181-73C0154	Office of Patent Counsel: Inactive Navy case files	PR	1949-1973	10 cu. ft.
181-73D0454	Office of Patent Counsel: Confiden- tial Inactive Navy case files	PR	1973	8 cu. ft.
UNK	Crew Systems Dept.: Project Case Files — Mercury, Gemini, Dynasoar, Astronaut Centrifuge Runs	PR	1956-1963	45 cu. ft.
UNK	Crew Systems Dept.: Project Files — Vision Laboratory	PR	1958-1972	3.3 cu. ft.
181-74A137	Air Vehicle Technology Department: Aeronautical structures lab case file of McDonnell Aircraft Corp. reports 2143-2506, technical reports TED NAM DE 249.2 through 265	PR	1951-1958	2 cu. ft.
181-73B0345	Air Vehicle Technology Dept: Engineering Orders, Technical Memoranda	PR	1969-1971	1 cu. ft.

TABLE VIII. FROM RECORDS DISPOSAL FILE 1972-1973 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-73G0429	Air Vehicle Technology Dept: Project case files reflecting astral analysis of F-14 flight load data for Airframe Engineering Division	PR	1969-1973	5 cu. ft.
181-72B0568	Air Vehicle Technology Dept: Laboratory notebooks prepared by Aero Mechanics projects	PR	1956-1964	1 cu. ft.
181-73E0080	Air Vehicle Technology Dept: Technical memoranda and laboratory notebooks prepared by Aero Mechanics projects	PR	1956-1970	1 cu. ft.
181-72A0568	Air Vehicle Technology Dept: Contractor reports by General Dynamics (Index in NADC file)	PR	1963-1969	18 cu. ft.
181-73A420	Systems Analysis and Engineering Dept: Misc. Secret Project Files (List in NADC file)	PR	1966-1972	2 cu. ft.
181-720436	Systems Analysis and Engineering Dept: Proposals for VFX or VSX from various contractors (List in NADC file)	PR	1969-1969	12 cu. ft.
UNK	Naval Air Facility: Flight records and reports	WNRC	1971-1972	1 cu. ft.
UNK	Naval Regional Medical Center, Naval Air Facility: 138 Inactive Medical folders (date of last treatment 1971)	SLF	1971	1 cu. ft.

TABLE VIII. FROM RECORDS DISPOSAL FILE 1972-1973 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Naval Air Facility: Station Journals	MC	1965-1970	1 cu. ft.
UNK	Naval Air Facility: 142 outpatient treatment records, Air Force (date of last treatment 1970)	SLM	1970	1 cu. ft.
UNK	Naval Air Facility: Transient outpatient medical records	SLM	1965-1970	1 cu. ft.
UNK	Naval Air Facility: 215 outpatient treatment and hospitalization records, Navy and Marine Corps. (Date of last treatment 1970)	SLM	1970	1 cu. ft.
UNK	Naval Air Facility: 711 treatment and hospitalization records, Navy and Marine Corps (Date of last treatment 1970)	SLM	1970	3 cu. ft.
UNK	Naval Air Facility: Industrial Health Clinical Records of Civilian Employees (Date of last treatment 1970)	SLF	1970	1 cu. ft.

TABLE IX. FROM RECORDS DISPOSAL FILE 1974-1977

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
UNK	Naval Air Facility: Flight records and reports	WNRC	1976	0.20 cu. ft.
UNK	Naval Air Facility: Flight records and reports	WNRC	1975	0.20 cu. ft.
UNK	Naval Air Facility: Flight records and reports	WNRC	1974	0.24 cu. ft.
UNK	Medical Officer: Treatment and hospitalization records - Navy and Marine Corps.	SLM	1971	1 cu. ft.
UNK	Naval Air Facility: Flight records and reports	WNRC	1972-1973	0.52 cu. ft.
181-760002	Aeronautical Instruments Lab: Technical reports	PR	1938-1958	8 cu. ft.
181-750378	Air Vehicle Technology Dept.: Aeronautical Drawings (Index in NADC file)	PR	1954-1969	58 cu. ft.
181-75C0140	Crew Systems Dept.: Project case files - Gemini, Mercury	PR	1956-1963	47 cu. ft.
181-7569	Systems Analysis and Engineering Dept.: Misc. ASW and A-NEW files (Confidential)	PR	1967-1970	1 cu. ft.
181-75E0264	Naval Navigation Lab: PA-DRS Material (Confidential)	PR	1974	8 cu. ft.
181-77B0036	Central Correspondence files of NADC and NAF	PR	1974	14 cu. ft.

TABLE IX. FROM RECORDS DISPOSAL FILE 1974-1977 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-77A0036	Central Correspondence files of NADC NAF	PR	1973	13 cu. ft.
181-75C0264	Central Correspondence files of NADC and NAF	PR	1971	25 cu. ft.
181-75A0093	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments, and the operation and administration of NADC (Secret)	PR	1970	2 cu. ft.
181-75A0050	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC	PR	1970	20 cu. ft.
181-75C0050	Departments' Central Correspondence files relating to development functions in the fields of Aircraft Electronics, Aviation Medicine, Air Warfare Research, Anti-Submarine Warfare, Aeronautical Photography, Engineering Development, Aeronautical Instruments and the operation and administration of NADC (Confidential)	PR	1970	3 cu. ft.

TABLE IX. FROM RECORDS DISPOSAL FILE 1974-1977 (Continued)

ACCESSION NUMBER	SUBJECT	LOCATION	YEARS	QUANTITY
181-75B0050	Central Correspondence files of the Naval Air Facility	PR	1970	3 cu. ft.
181-74B0367	Technical Report Files: Official (master) file copies of published technical reports (Confidential) (Index in NADC file)	PR	1966-1970	134 cu. ft.
181-770018	Office of Patent Counsel: Inactive case files	PR	1968-1975	4 cu. ft.
181-770030	Formal Contracts over \$2500	PR	1971-1976	11 cu. ft.
181-760053	Office of Patent Counsel: Inactive case files	PR	1973	0.8 cu. ft.
UNK	Medical files for civilian employees who have left NADC	SLF	1978	1 cu. ft.
UNK	Medical files for civilian employees who have left NADC	SLF	1977	1 cu. ft.

TABLE X. EXISTING PHILADELPHIA FEDERAL RECORDS CENTER ENTRIES
NOT CORRELATED WITH NADC RECORDS FILES

ACCESSION NUMBER	SUBJECT	YEAR	QUANTITY
181-620283	Mail Logs	1952-1956	2 cu. ft.
181-62A0363	Correspondence	1957	17 cu. ft.
181-62B0363	Correspondence	1958	5 cu. ft.
181-63A0082	Project Records	1956-1959	24 cu. ft.
181-63A0177	Correspondence	1958	18 cu. ft.
181-63A0206	R&D Correspondence	1958	3 cu. ft.
181-66D007	Project Files	1966	3 cu. ft.
181-66E0007	Technical Reports	1966	13 cu. ft.
181-66I0007	Technical Reports	1965	3 cu. ft.
181-70A0125	Correspondence	1965	1 cu. ft.
181-71C0184	Technical Reports	1960-1965	2 cu. ft.
181-72C0134	Technical Reports	1949-1963	1 cu. ft.
181-72A0217	Technical Reports	1963-1971	2 cu. ft.
181-72A0503	Technical Memoranda	1972	2 cu. ft.
181-72B0568	Lab Notebooks	1955-1970	1 cu. ft.
181-73A0038	Project Files	1951-1971	3 cu. ft.
181-73B0038	Lab Notebooks	1951-1971	8 cu. ft.
181-73C0429	Project Cases	1973	8 cu. ft.
181-74B0324	Project Records	1959	10 cu. ft.
181-74B0327	Technical Reports	1959-1963	2 cu. ft.
181-74C0327	Project Files	1963-1971	7 cu. ft.
181-74D-0327	Photo Negatives	1974	11 cu. ft.
181-74F-0327	Correspondence	1942-1966	8 cu. ft.

TABLE X. EXISTING PHILADELPHIA FEDERAL RECORDS CENTER ENTRIES
NOT CORRELATED WITH NADC RECORDS FILES (Continued)

ACCESSION NUMBER	SUBJECT	YEAR	QUANTITY
181-74G0327	R&D Projects	1964-1972	15 cu. ft.
181-74B-0357	Correspondence	1960-1974	20 cu. ft.
181-74C0357	Correspondence	1960-1974	4 cu. ft.
181-74D0357	Technical Reports	1950-1973	14 cu. ft.
181-74F0357	Photo Negatives	1958-1974	1 cu. ft.
181-74A0367	Aeronautical Drawings	1954-1969	30 cu. ft.
181-75A0083	Patent Cases	1974	2 cu. ft.
181-75D0264	Patent Files	1975	1 cu. ft.
181-770023	Technical Reports	1966-1971	6 cu. ft.

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