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U. S. NAVAL CODE & SIGNAL LABORATORY
3801 Nebraska Avenue N.W.
Washington 25, D. C.

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DWS/r

Aug 12 1950

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To: Chief of Bureau of Ships,
Navy Department.

Subject. U.S. Naval Code and Signal Laboratory - History of

Reference. (a) VCNO conf. ltr. Op-20-S1(SC)A3-1/ND17-1 Ser 0329626 of 26 June 1943 to Comdt.PRNC
(b) AFSA conf.ltr. AFSA 42/A4-2 Ser 040 of 9 Nov 1949 to BuShips.
(c) Sec Nav ltr. Op-24B/CJ Ser. 446424 of 6 Dec. 1949 to All Ships and Stations.

1. Reference (a) established the U.S. Naval Code and Signal Laboratory at the Naval Communications Annex, 3801 Nebraska Avenue, N.W. Washington, D.C., on 26 June 1943. Reference (b) requested the disestablishment of the Naval Code and Signal Laboratory. Reference (c) effected the disestablishment of NCSL on 10 December 1949.

2. Prior to the establishment of the NCSL at the Naval Communications Annex, the work was performed by the Code & Signal Section of the Radio Laboratory located within the U.S. Naval Gun Factory, Washington, D.C. In the latter part of 1929, Lt. L. F. Safford, USN (now Captain L. F. Safford) then head of the Code and Signal Section, Navy Department, requested the assistance of the Washington Navy Yard to perform work under his direction. In the latter part of 1931, Lt. (jg) J. N. Wenger, USN (now Captain J. N. Wenger) reported to the Bureau of Engineering and he in collaboration with Lt. Safford concentrated on the mechanization of naval cryptographic communications. Lt. Wenger was assigned to the newly established "Signal Devices desk" in the Bureau of Engineering (now the Bureau of Ships). Engineering work required by Naval Operations "Code and Signal Section" was then processed through the Bureau of Engineering's "Signal Devices desk". An initial sum of $50,000 was set up by the Bureau of Engineering for code and signal engineering work as requested by the Chief of Naval Operations. Lt. Wenger then initiated action to establish a new section of the Radio Laboratory in the Washington Navy Yard for the purpose of handling code and signal engineering work. For purposes of security this section was set up in a building adjacent to the Radio Laboratory. This section then became known as the Code and Signal Section of the Radio Laboratory. The establishment of this section became the foundation for the Code and Signal Laboratory.

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3. In 1942, plans to place nearly all phases of cryptographic work performed in the Navy Department on a secure reservation were in process. Captain E.E. Stone, USN (now Rear Admiral F.E. Stone) included the Code and Signal Section of the Naval Gun Factory in these plans and made space reservations. On 26 June 1943, the Naval Code and Signal Laboratory was established and set up under the military command of the Commandant, Potomac River Naval Command. Personnel comprising the Code and Signal Section of Naval Gun Factory formed the basic complement of the newly established NCSL. On 30 June 1943 this group moved from the Naval Gun Factory to the Navy Communications Annex (now Navy Communications Station) and began functioning as the Naval Code and Signal Laboratory. The mission of NCSL established by the Bureau of Ships was.

> Conduct research, development, and design; produce, overhaul, test and maintain cryptographic instruments and their component parts employing the use of electronic theories, electro-mechanical mechanisms, the physical properties of materials, and the reduction of these units into practical application as required for special classified communication devices.

4. The peak complement of 414 which consisted of 22 officers, 350 enlisted personnel and 40 civilians was reached in August 1944. At the time of its disestablishment the complement consisted of 176 civilians, 1 officer and 1 enlisted.

5. The highlights of accomplishment centers on the following items:

(1) Adapted the first commercial cipher machine to military use - CSP 903.

(2) Developed the first practical keyboard operated code machine - CSP 691 and CSP 692.

(3) Developed the reliable rotor maze contacts, now universally used.

(4) Developed in October 1935 the first analogue machine known as M-1 device and X-199.

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(5) Developed adapters to convert CSP 691 and CSP 903 to Jap analytical machines.

(6) Manufactured and developed several Jap analogue equipments known as M-2, M-3, M-4 and M-5.

(7) Designed and developed first mechanical universally controlled cipher maze.

(8) Proposed first the use of rotor maze to control rotor stepping maze 21 June 1932, now used in ECM Mk.II.

(9) Developed automatic word spacing. Converted all CSP 691 equipment for its use.

(10) Developed index maze.

(11) Basic design and development of ECM Mk.I. Made original model, wired all rotors used by system.

(12) Basic design and development of ECM Mk.II now in use by the services.

(13) Development of reverse stepping of rotors. Manufactured all parts and made necessary modifications to accommodate.

(14) Design and development of combined cipher machine.

(15) Design and development of changeable contour ring.

(16) Design of CSP 688 and 845 strip cipher devices. Manufactured 36,000 CSP 845.

(17) Design of CSP 1116 aircraft contact pad. Manufactured 11,000.

(18) Design and development of ball contacts for cipher maze.

(19) Basic design of Mk.I and Mk.II rotors.

(20) Designed and developed rotor bobbin to enable automatic wiring of rotors.

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(21) Designed and developed CSP 1127 adapter units for State Department traffic. Manufactured 150 CSP 1127.

(22) Basic design of 26-To-5 translator for Off-Line ECM operation.

(23) Set up first training course for cipher machine maintenance.

(24) Developed RIP 60, RIP 61 and RIP 62 analogue machines. Manufactured equipments used.

(25) Designed and developed CSP 1800 British type A adapter for CCM use.

(26) Designed and developed One-Time-Pad Machine CSP 2100 - Manufactured 4.

(27) Designed and developed universal rotor contacts for contour control.

(28) Synchronized stepping of forward and reverse rotor movement.

(29) Designed and developed CSP 2200. Manufactured 110.

(30) Designed and developed adapter unit to make the Mk.I ECM the cryptographic equivalent to the Mk.II ECM.

(31) Designed and developed cast metal maze unit. Constructed 100 for CSP 2300.

(32) Designed and developed first removable maze unit.

(33) Designed and developed the first motor driven cipher machine. Made one model installed on the USS TEXAS in 1931.

(34) Designed electro-mechanical rotor drive mechanisms used on present machines.

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(35) Developed and manufactured Navy One-Time-Tape manufacturing equipment.

(36) Designed and developed automatic mechanical interlock. Manufactured 2,500 for use on CSP 889, 2900, 3300 and 2300.

(37) Design and development of CSP 1700, CSP 1600, CCM Equipment. Manufactured 2,000 CSP 1700 and 6500 CSP 1600.

(38) Designed and developed CSP 2900 and CSP 2900A cipher machine. Manufactured 1,196 CSP 2900 and 10 CSP 2900A.

(39) Developed CSP 2300. Manufactured 65.

(40) Developed CSP 3300. Manufactured 85.

(41) Designed and developed 7-rotor devices for proposed, combined use. Manufactured 2 models.

In addition to the above, many more designs and developments of lesser importance were produced, practically all were used, or are now in use.

6. The actual production of many of the items listed was accomplished by the Naval Code and Signal Laboratory. Over 1,000,000 rotors were wired and over 80,000 pieces of cryptographic equipment of various types were produced by NCSL. The activity handled over 300,000 pieces of highly classified registered publications and gear without loss or failure to account for a single item. Throughout its existence the activity was fortunate in its selection of good, well qualified personnel. Morale was excellent and the work output was maintained at a high level at all times. The lasting use of its accomplishments made the establishment of the Naval Code and Signal Laboratory and its tenure of existence a credit to the Navy.

7. The writer of this statement of history of the U.S. Naval Code and Signal Laboratory was continuously associated with NCSL since its beginning at the Radio Laboratory in the Washington Navy Yard. From 1929 to 1942 he was engineer in charge, from 1942 to 1946 he was officer in charge and from 1946 until 10 December 1949 he served as the Director of the Naval Code and Signal Laboratory.

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8. The items and statements made herein have been verified with the files before storage and also with Captain L. F. Safford, USN, and Captain J. N. Wenger, USN, who have been continuously interested in the work of Naval Code and Signal Laboratory since its establishment.

D. W. SEILER
Commander, USN
DIRECTOR, NAVAL CODE & SIGNAL LABORATORY

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