DAILY ENTERPRISE

(U) HISTORY TODAY - 15 September 2014

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(U) On 23 January 1947, CAPT Joseph N. Wenger, USN, head of the Communications Supplementary Activity, Washington (CSAW), the Navy's cryptologic organization, assigned the covername "ATLAS" to one of its special development programs. ATLAS represented an effort by Navy cryptologists to acquire a high-speed digital computing machine to facilitate their work. Its success marked a watershed not just in cryptology but in the history of computing.

(U) The roots of ATLAS went back to World War II. Naval cryptologists had experience with early efforts to automate cryptologic work, including proto-computers like COLOSSUS and the cryptanalytic bombe. Postwar, they recognized that they needed rapid data processing, and their ultimate goal was to design and field a general-purpose computer.

(U) A turning point came in the summer of 1946, when two CSAW personnel, Dr. Howard Campaigne and LCDR James Pendergrass, attended a watershed conference on computing advances at the University of Pennsylvania. There, they were exposed to new technologies for general-purpose devices, such as the Moore School of Electrical Engineering's ENIAC, IBM's Harvard Mark I, the work of the Bureau of Standards, and Bell Telephone Laboratory's relay system. A seed was sown at the conference as a result of the sharing of ideas on potential computing advances.

(U) On October 15, 1946, Pendergrass submitted to his chain of command an assessment entitled "Preliminary Report on Cryptanalytic Use of High Speed Digital Computing Machines." In this report, he laid out the limitations affecting the current state of technology, and described the means by which calculation speed and memory storage could be greatly enhanced. In a follow-up study dated December 18, 1946, he and Dr. Campaigne described in depth the applicability to cryptanalysis of computers. These reports set the stage for the wave of innovation that would come, with the first achievement for the Navy being ATLAS.

(U) The Bureau of Ships allocated funding for the program. With the go-ahead for ATLAS under way, in 1947 the Navy contracted with Engineering Research Associates (ERA), a company formed by cryptologic veterans of the war. CSAW directed ERA to undertake what was known as Task 13, i.e., the design of the system as the thirteenth project of CSAW. Demonstrating the close role between government and private industry in this area, CSAW closed its activity in Dayton, Ohio (where the wartime cryptanalytic bombe had been produced), and moved a significant number of personnel to oversee ERA in St. Paul, Minnesota. In November 1948, ERA submitted its design description to the National Bureau of Standards, and construction followed thereafter.

(U) Ultimately, the Navy and ERA fielded ATLAS at three times the cost they had anticipated. However, it was innovative for the time, and merited the high price tag. Based on John von Neumann's stored-program architecture, ATLAS consisted of 2,700 vacuum tubes, a magnetic drum memory with drum locations recorded electronically, and a capacity of 16,384 words of 24 bits; in modern terms, approximately a 49-kilobit capacity. ATLAS also was the first computer to be moved from its place of manufacture to an off-site location. Excellent testing and maintenance afforded the computer a ninety percent "up-time."

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(U) In December 1950 ERA delivered the first of two of the initial ATLAS computers to Naval Security Group headquarters on Nebraska Avenue in Washington, D.C. Work on a faster model had already begun by that time. Known as ATLAS II, it had a unique two-address construction and a memory consisting of electrostatic tubes; it came out in March 1953. In November 1954, ERA delivered a revised version of ATLAS II. This

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latter model included the first magnetic core memory developed by an American company.

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(U) The ATLAS computers were put to vital use in attacking the Soviet target, including wartime traffic known as VENONA. ATLAS models remained in service within the cryptologic community into the early 1960s.

(U) They also would make a splash in private industry. Only one commercial model of ATLAS I was built before ERA's acquisition by what would become Sperry Rand. ERA formed the core of a combined military and commercial computer development division of Sperry Rand. That division went on to build a large number of the UNIVAC 1103, which had previously been known as the ATLAS II.

(U) ATLAS had proven that a universal machine could be used for cryptology. Its legacy would persist into the future on subsequent generations of computers. For instance, the first completely transistorized computer ever built, SOLO, was based on the ATLAS logic design. It is no understatement to note that the successful run of ATLAS marked a significant step in the advent of the modern computer age.

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(U) Larger view of graphic.

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