INTRODUCTION

Greetings ERA history readers: I have received or been copied on many emails with topics related to our history. The Background on page 6 below relates the communications relating to this 'Electronic Research Associates' paper between Harvey Taipale and Lizzie Ehrenhalt of the Minnesota Historical Society (MHS). Unfortunately, we have not had the time to follow-up with a 're-formatted' article for MHS.

My decision is to post this as the Our Stories for May 2026 is to get these details on-line for the browsing public. The timing is apropos since it is now 80-years and counting since Engineering Research Associates (ERA) opened their doors in St. Paul, MN with an office in Washington DC. We had also posted an 80-year celebration paper for January, https://vipclubmn.org/Articles/EnduringLegacy.pdf. Thanks to Harvey for his viewpoint of the story as extracted from his references; yes, there is some duplication hereunder.

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ENGINEERING RESEARCH ASSOCIATES

Prologue

In October of 1950, a train carrying a radically new electronic computing system left Minnesota, quietly signaling the beginning of a big change. Arriving in Washington DC, the system was installed, tested, and in December, turned it over to the buyers, who were soon to be known as the National Security Agency (NSA). The customer proceeded to use this new technology to automate their work of breaking Russian codes on a routine basis. For the first time ever, the computer left the laboratory and became a commercial product.

This inauspicious series of events was a big step in the computer evolution – an evolution with deep roots in St. Paul Minnesota. The story of the company behind this milestone, Engineering Research Associates (ERA) was shrouded in secrecy for years, but it is the tale of catalytic events leading to today's world of the ubiquitous computer.

WWII

This Minnesota saga has roots in World War II, when success in breaking Axis codes provided an important strategic advantage to the Allies. Based in Washington D.C., the US Navy's code cracking experts, then known as Communications Supplementary Activity – Washington (CSAW), relied on several suppliers to provide various machines, cousins to mechanical calculators and cash registers, to speed up the decoding process.

At the end of the war, there was a need to keep this hard-earned expertise moving forward, but the wartime supplier base was reluctant to pursue an enterprise thought to have limited peacetime use.

Post WWII

Encouraged by their Navy superiors, two key CSAW equipment engineers, Commander William Norris and mathematician Howard Engstrom, began to explore the possibility of forming a private company to pursue building the next generation of code breaking machines. They were later joined by Captain Ralph Meader, head of the U.S. Naval Computing Machinery Laboratory (USNMCL) in Dayton Ohio. USNMCL, located at National Cash Register Company (NCR), was scheduled to be disbanded, with NCR declining to continue to support the effort after the war ended.

Any new company critically needs funding, but Norris and Engstrom's efforts to raise venture capital were initially unsuccessful, largely because the proposed work was highly classified and full disclosure of business details to prospective financiers was not possible.


John E. Parker, Investment Banker
President of Northwestern Aeronautical Corporation (NAC)
(manufacturers of wooden gliders for Army/AirForce)

In St. Paul, Northwest Aeronautics Corporation (NAC), the second largest wartime producer of troop-caring gliders, was seeing its business coming to a postwar halt. Its CEO and owner, John Parker, looking for new opportunities, ultimately connected with Norris, Engstrom, and Meader. Parker, a Naval Academy graduate and business savvy entrepreneur was certainly was not privy to the classified details of the proposed company, but was assured by top Navy officials that it was a necessary step forward, he invested $20,000 of his own, secured a $200,000 line of credit and Engineering Research Associates (ERA) officially became the newest company in St. Paul in January of 1946.

Co-located with NAC at 1902 West Minnehaha Avenue, ERA began the process of becoming a qualified Navy contractor. Core business was focused on building new machines to support the Navy's code breaking operation. Seemingly a marriage bred from some amount of desperation, the ERA launch was fortuitously underpinned with several important contributors to future success:

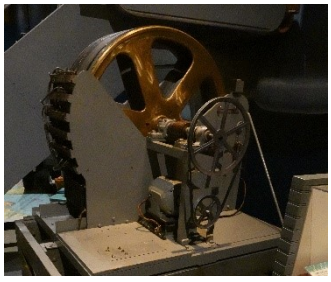
- Support from CSAW: CSAW was a primary (and friendly) source of contracts (revenue) and trained personnel. By the end of 1946 over 40 CSAW professionals became ERA employees, preserving the wartime core of expertise and CSAW contracts kept the technology moving forward.

- NAC "umbrella": As a startup with no Navy track record, it would take ERA some time to become qualified for larger contracts. NAC, as an established contractor, was able to immediately accept larger Navy contracts on behalf of ERA and provide a facility for the new company.
- Support from the Navy: the USNCML was moved to 1902 West Minnehaha, a complex owned by the Navy and leased to NAC, and later, ERA. This brought a contingent of Navy personnel to the site, along with Navy discipline. Although the source of some grumbling at the time, the Navy's insistence on conservative design, modular construction, and reliability would help to instill an industrial culture that would serve ERA and its' St. Paul successors well in the future. The successors are illustrated by this retirees' club logo set.

THE VIP CLUB IS FOR RETIREES AND FORMER EMPLOYEES OF OUR GREAT HERITAGE COMPANIES

Early Developments

The first years were challenging. ERA was assigned contract "tasks," specific activities to study technology, build machines for CSAW, and explore new ideas. Among their innovations, ERA was the first developer of rotating magnetic memory in the form of a large drum, initially with magnetic strips glued on the surface and later with magnetic coatings applied directly to the surface. Data was written and read with electromagnetic heads positioned very near the rotating drum, enabling very fast (for the time) data storage and retrieval. These drums became the heart of early CSAW code cracking machines with code names like DEMON and GOLDBERG. How these machines were used is still somewhat secret, but they would have been very good for pattern identification, character matching and supporting statistical analysis.



One of the early prototype drums, the great-grandfather of modern hard drives, is in the Minnesota Historical Society collection. In 1952, ERA was issued US patent 2,617,705, which covers the seminal technology behind rotating mass storage, aka today's hard drives.

Early computer systems were driven largely by available memory technology, making ERA drums a discriminating element. ERA went on to refine these drums, making them store more data with shorter access times and incorporated them in all their follow-on systems, as well as selling drum systems to other computer developers. Virtually all early computers incorporated ERA drum technology, if not ERA drums.

ERA recognized that systems were far more than drum memories and worked hard on the logical and architectural design of computing systems. They designed and built cutting edge computing systems, complete with logic units, power and cooling systems, and various peripheral devices. ERA was proactive in exploring ways new electronic technology could be introduced into computing systems, and their products and systems were known for their reliability, a hallmark of the organization that would last for decades.

ERA actively participated in various early collaborations regarding future machine design, notably the University of Pennsylvania's Moore School of Engineering computing technology lectures. At the direction of the Navy, ERA collected and, in 1950, published a survey of key computing technologies in a book entitled: High Speed Computing Devices. The Navy's goal was to foster a broad industrial base to satisfy their code breaking needs. Looking back with the benefit of history, this book was the seminal technology tutorial for anyone interested in the emerging computing industry.

ERA's first systems were tailored to the specific code that was to be cracked. When the Russians changed their code (this was the Cold War, after all), the machines became obsolete. Navy Captain Joseph Wenger promoted the concept of a general-purpose machine that could be easily reconfigured (reprogrammed by software) to adapt to code changes. ERA was given a task (#13) to design such a machine in August 1947. The result was the very highly classified ATLAS computer that was delivered to CSAW in December of 1950.

Atlas was a groundbreaking machine. At that time contemporary systems were not able to be moved from the labs in which they were built, were difficult to keep running for extended periods and then only with heavy technical support from their respective creators. ATLAS was shipped cross-country, installed in 8 days, debugged, and turned over to the customer's support people to operate. Customer data indicated the system was "up" for 86 percent of the time. In today's world, 86% availability seems poor (99.999% or better is assumed), but no other computer builder of the time was able to deliver half that number

In October of 1950, a train carrying a radically new electronic computing system left Minnesota for Washington DC. The system was installed, tested, and in December, turned over to the buyers, the predecessors of today's National Security Agency (NSA). These code crackers proceeded to use this new technology to speed their work of breaking Russian codes. For the first time ever, the computer left the laboratory and became a commercial product.

ATLAS was arguably the most powerful and versatile machine of the time and ERA quickly obtained permission to commercially market a slightly modified version. Dubbed the ERA 1101 (the binary equivalent of 13, from the original development task), the ERA 1101 was not a commercial success (only two were built) nor was the 1102, an Air Force version of NSA's upgraded system. ERA built groundbreaking machines, but their performance in the classified world was not enough for ERA's financial survival in the commercial world.

The first years were dynamic. ERA was assigned contract "tasks," specific activities to study technology, build machines for CSAW, and explore new ideas regarding the logical and architectural design of computing systems. They designed and built several versions of cutting-edge computing systems, complete with logic units, power and cooling systems, and various peripheral devices. ERA was proactive in exploring ways new electronic technology could be introduced into computing systems.

Among their innovations, ERA was the first developer of rotating magnetic memory in the form of a large drum, initially with magnetic strips glued on the surface and later with 3M magnetic coatings applied directly to the surface. Data was written and read with electromagnetic heads positioned very near the rotating drum, enabling very fast (for the

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Evolution to UNIVAC, …

Recognizing that they could not adequately fund enough development to remain viable, in 1952 ERA was sold to Remington Rand, who had also purchased the Eckert and Mauchly Computer company (an outgrowth of the U of Penn team). Remington Rand attempted to combine the two into an organization that could compete with the then emerging computer powerhouse, IBM, but with limited success. Through a succession of computer industry computer developers and spin off companies, the Minnesota saga of building on ERA's technology heritage would continue for another 60 years (notably, ERA technology and people ultimately became the core of the UNIVAC brand), but the founding company disappeared from view before receiving wide recognition for their pioneering work. Even today, computer histories generally make scant mention of ERA's groundbreaking technological underpinning of the computer world.

This inauspicious event was a big step in the computer revolution, a revolution with deep roots in St. Paul Minnesota. The story of the company behind this milestone, **Engineering Research Associates (ERA),** was shrouded in secrecy for years, but it is the tale of catalytic events leading to today's world of the ubiquitous computer.

Seeking start-up funding, Norris and Engstrom's early efforts to raise venture capital were unsuccessful, largely because the proposed work was highly classified and full disclosure of classified details to prospective financiers was not possible.

Recognizing that they could not adequately fund enough development to remain commercially viable, ERA was sold to Remington Rand 1952. Remington Rand also purchased the Eckert and Mauchly Computer company and combined the two into a new company, UNIVAC.

Through UNIVAC and a succession of computer industry spin off companies, (including Control Data and Cray) and mergers or acquisitions (UNISYS and Lockheed Martin) the Minnesota saga of building on ERA's technology heritage would continue for another 60 years, but the pioneering legacy of ERA has been largely forgotten.

BACKGROUND

- 5/1/23 Email from Harvey Taipale to Lizzie Ehrenhalt at the Minnesota Historical Society: I am a member of a retiree organization arising from the local operations of various companies arising from Engineering Research Associates (ERA), begun in Minnesota in 1946. An important early developer of computer technology, ERA evolved into the Minnesota operations of such companies as UNIVAC, Unisys, and Lockheed Martin. Our organization has been collecting historical information regarding this particular history (https://vipclubmn.org/Legacy.html) and perhaps the time is appropriate for a more comprehensive and organized article to be included in MNopedia. If you are interested, such a project would likely be undertaken by club volunteers and provided for your use.

Please advise as to the feasibility of such an article for inclusion in the MHS MNopedia?

Harvey Taipale

- 5/8/23 Email from Lizzie Ehrenhalt to Harvey Taipale: Thanks for getting in touch. ERA would be a great article topic for MNopedia. I recommend looking through the writers' guidelines to find out what the process is like from start to finish. In addition to the text, writers need to provide digital images, a turning point, a chronology, a bibliography, and a list of related resources. If you can do this, and you have enough sources to tell the story of ERA's founding, evolution, and sale in '52 (which it certainly looks like you do!), please let me know, and I'll assign the article to you officially. It's fine if you want to write the article as part of a group.

Here's an example of the kind of thing you'd be working toward: https://www.mnopedia.org/group/medtronic. That's another "group" article in the "science and technology" category.

- 9/4/23 Finally, here is a proposed article regarding the early history of Engineering Research Associates for potential inclusion on the MNopedia site. I will forward some candidate photos separately. Any authorship accreditation should include reviewers Keith Myhre and Lowell Benson. If this needs further work, plead don't hesitate to contact me.

Also, this, as you suggested, only covers the early period up to ERA's sale. We would certainly be able to produce additional articles covering the later events if you are interested.

Harvey Taipale

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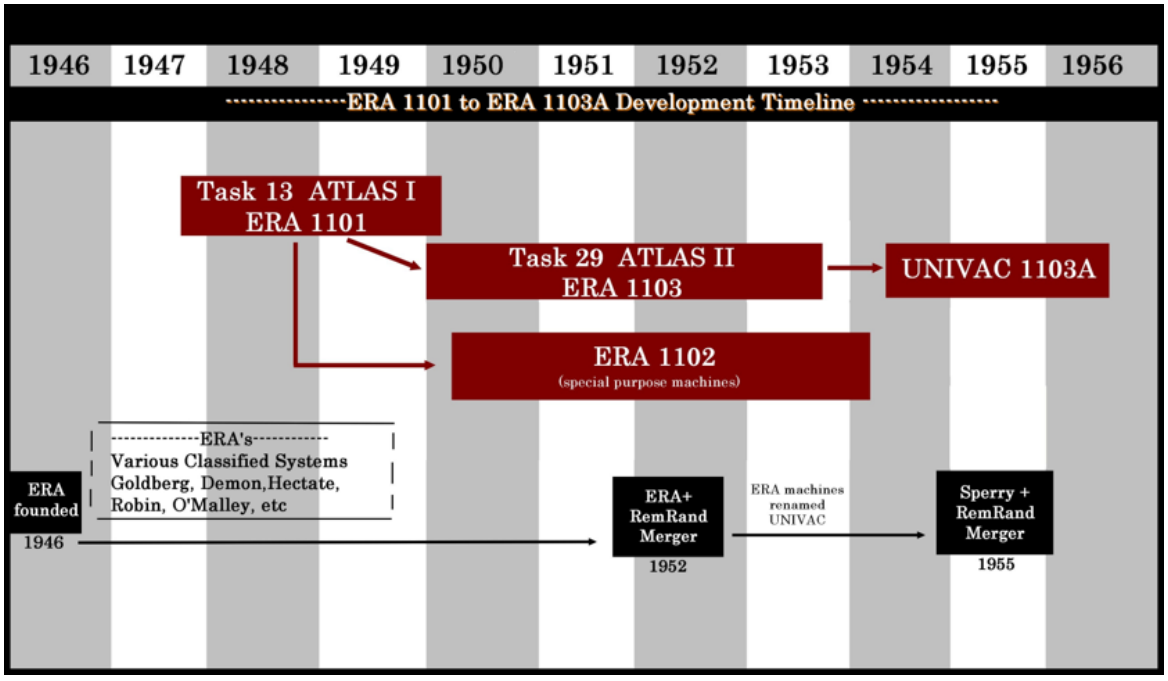

Figure 1. Thanks to CHAP for this timeline, https://vipclubmn.org/Legacy.html#CHAP.