NAC became ERA

by John M. Lindley, adapted for the VIP Club's Legacy Anthology by Lowell Benson

PROLOGUE

Northwestern Aeronautical Corporation (NAC) in St. Paul was the 2nd largest manufacturer of WWII Gliders. John M. Lindley masterfully researched the glider topic and created a manuscript in 2016. In a nutshell Mr. Lindley's manuscript is a partial biography of John Parker, president of NAC 1942-'46 then president of Engineering Research Associates (ERA) 1946 - '52. Mr. Lindley's manuscript has 229 pages and 225 listed references. A prime source of information was the John Parker oral interviews from The Charles Babbage Institute at the U of MN.

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"Born of a Wartime Necessity":
From Combat Gliders to Computers in Minnesota 1941-1946.

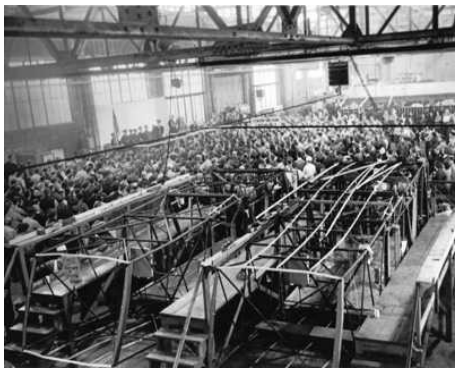


Figure 1. Glider frames in the NAC plant, early 40s.

Figure 2. ERA plant in the 50s, top right had had glider frames.

In 2005 the Unisys/LMCO retirees club formed a Legacy Committee to capture the unwritten history of Engineering Research Associates (ERA). Hereunder are extracted portions of Mr. Lindley's *Introduction* and parts of his Chapter Six [*From Combat Gliders to Computers*] that relate the transition from NAC to ERA.

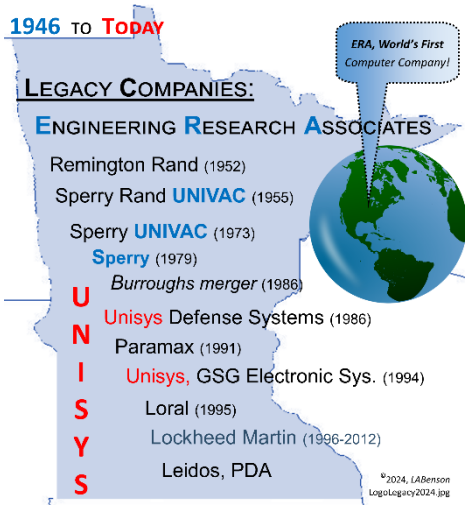
INTRODUCTION

The focus of this book {manuscript} is on the human side of those involved with building the gliders at the Northwestern Aeronautical Corporation. Who did this work, where did the men and women come from, and what was involved in the work they did? As much as can be done using the fragmentary records that have survived from the 1940s, this book tries to answer these questions. Whenever possible, the men and who were NAC tell their story in first-hand accounts. Background on how the glider manufacturing "landed" in the Twin Cities and how NAC's leadership overcame a variety of obstacles to meet the military's war demands provides a Minnesota story of unwavering determination and undying patriotism that so typified the country's Greatest Generation.

Telling the story of NAC includes examining how the company got their glider contracts from the air force; reporting what is known of the men and women who built these aircraft, and evaluating the company's leadership, especially that of John E. Parker[1]. He was the impetus behind the formation of NAC in early 1942 to manufacture widely used gliders during World War II, is central to the story of the Northwestern Aeronautical Corporation.


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

One final question that this history addresses is what happened to NAC after the war. By the time the Japanese government formally surrendered in early September 1945, the future looked bleak for NAC. John Parker had the difficult task of determining how NAC could carry on, and as he had done in 1942, he would again make history by putting the Twin Cities on the map of the country's nascent computer industry. In 1946 NAC morphed into a new corporation, Engineering Research Associates (ERA), with John Parker as its president. A few of the same people who had worked at NAC were holdovers at ERA, but most of the new company's pioneering work resulted from the talents provided by newcomers who were engineers and other technically trained professionals.



Today historians of computer technology acknowledge that between 1946 and 1952, ERA established itself as Minnesota's first computer company. {ERA successors continue yet today as illustrated by this MN Legacy Company icon.}

[1] Mr. Parker's photo scanned from the Sperry ERA 40th anniversary booklet: "Engineering Research Associates – The wellspring of Minnesota's computer industry." Legacy Companies icon from www.vipclubmn.org.

CHAPTER 6 - From Combat Gliders to Computers

The reality was that glider production in a post-war economy simply held no promise. And the conclusion that the consultants outlined in their report was that Parker and NAC would have to choose from the following alternatives:

- Liquidate NAC;
- Continue to operate as at present relying solely on army contracts;
- Manufacture products unrelated to the aviation field; or
- Remain an aviation manufacturing company but expand the scope of products and services NAC offers and, when possible, add non- aeronautical products.

The future of NAC fell to John Parker, and he spent most of the fall and winter of 1945 looking for a way to keep the company in operation. When the Japanese signed the terms of surrender in Tokyo Bay on September 2, 1945, he became more determined than ever. In the interview that Parker gave Dr. Arthur Norberg[2] in the mid-1980s, he told his interviewer, "I had been investigating everywhere." Then circumstances related to military defense, previously unknown to Parker, intervened unexpectedly and would determine the future for NAC and John Parker.

Before and during World War II, the U.S. Navy had enlisted several civilian companies and universities to help with the navy's cryptology program. Their goal was to develop new mechanical techniques for analyzing data derived from coded messages. All the projects, of course, were held in secrecy until long after the war ended. One of the "products" of this effort led to the founding of a civilian company, Engineering Research Associates (ERA), in early 1946 in St. Paul, Minnesota. ERA had its roots in Northwestern Aeronautical Corporation and John Parker's search for NAC's new mission. Arthur L. Norberg, a technology historian, summed up the circumstances that led to the birth of ERA:

> By the middle of 1945, navy personnel were convinced that the effort to enhance analysis techniques by new data processing concepts should continue [after the war] and these techniques should make as much use as possible of the newly developing computing ideas. In the navy, this work was done primarily under the direction of the Communications Supplementary Activity—Washington (CSAW). CSAW was composed of a hastily assembled group of cryptologists, mathematicians, physicists, engineers, and chess and bridge masters. Foiled at keeping this prime group together after the war as civilian employees to pursue such work under direct supervision, the navy assisted in the establishment of a private company, composed of many of those same men, to perform the same investigations with classified contracts. This company was Engineering Research Associates, Inc. (ERA), located in St. Paul, Minnesota.

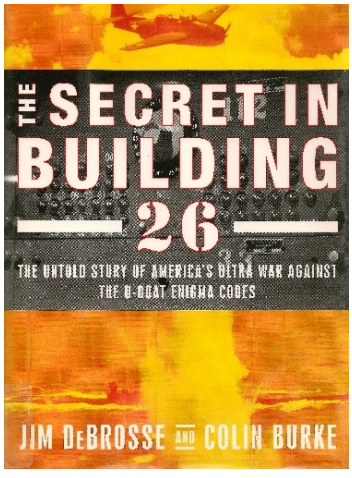
[2] First Director of The Charles Babbage Institute at the U of MN and holder of the Engineering Research Associate's Land Grant Chair for the History of Technology.

CSAW, the navy's operational branch for cryptanalysis, was located on Nebraska Avenue in northwest Washington, D.C. In navy parlance it was labelled OP-20-G, a name that had its origins in World War I. During World War II, the officer in charge of CSAW was Captain Joseph N. Wenger, a 1923 graduate of the U.S. Naval Academy who had served in OP-20-G and had been involved in radio intelligence work in the Pacific in the 1930s. Assigned to the Office of Naval Communications in Washington in 1941, Wenger returned to OP-20-G as its director. Wegner's boss from April 1943 to August 1945 was Rear Admiral Joseph Redman, the Director of Naval Communications, who was directly subordinate to the chief of naval operations. Redman was also a Naval Academy, graduating with the class of 1914, and his younger brother, John "Jack" Redman, graduated with the class of 1918. Jack Redman served as a communications officer in Hawaii on Admiral Nimitz's staff from October 1942 to May 1945. Both Joseph and John Redman were instrumental in solving John Parker's dilemma with the founding of ERA.

OP-20-G was responsible for establishing the various navy codes and for breaking enemy codes. This Washington operation along with its counterpart in Hawaii had played a major, analytical role that led to breaking the Japanese naval code in the spring of 1942. This effort later resulted in the stunning victory for the United States at the Battle of Midway in early June. One of the senior admirals who was privy to this codebreaking triumph was Admiral Chester W. Nimitz, Commander in Chief, Pacific, headquartered in Hawaii.

Of all people, Nimitz certainly understood the value, not only of war-time codebreaking, but also the role it would play in the future. As such, he would later play a part in the navy-civilian collaboration that led to the founding of ERA. OP-20-G was divided into several sections. Civilians in one section were primarily tasked with intercepting enemy messages, direction finding related to enemy naval forces, and with message traffic analysis. Another civilian section dealt with the electronic equipment that had applications for codebreaking and code solution techniques.

Most of the early employees of ERA came from these two sections. In November 1942, following the success at Midway, the navy established the Naval Computing Machine Laboratory (NCML) in Dayton, Ohio, at the home of the National Cash Register Company (NCR[3]). NCML's mission was to design and build machines that could intercept and decrypt coded messages. Earlier in 1942, senior officials at OP-20-G concluded that they needed far more technical assistance with their code breaking, particularly with the German navy code used to communicate submarine activities in the Atlantic Ocean.



[3] **The NCML and NCR story is told by Jim DeBrosse and Colin Burke in their book The SECRET IN BUILDING 26.**

At the time, Nazi U-boats were highly successful in sinking merchant ships supplying Great Britain, and the tremendous Allied losses suffered in the Battle of the Atlantic led to the creation of NCML in late 1942. The navy's Bureau of Ships (BuShips) placed a contract with NCR to design and build the badly needed code-breaking equipment. Given the unconventional requirements of this contract, BuShips had to send someone to NCR's research laboratory in Dayton to oversee the project. The bureau chose a reserve naval officer in his forties, Lieutenant Commander Ralph I. Meader (1897–1963), who was a graduate of Dartmouth and had served in the navy during World War I.


Ralph Meader.

Educated as an engineer, Meader[4] held several patents on his own inventions, and had worked for several large corporations, including Western Union, in their electrical divisions. Hard times in the 1930s and several failed business ventures led Meader to return to the navy as an engineer on the staff of BuShips. And by December 1942, he was off to Dayton to serve as the liaison between OP-20-G and NCR. Joseph R. Desch of NCR's electrical laboratory was the chief engineer at NCML. NCR received the unusual contract with BuShips in part because Desch's credentials. Although he had no knowledge of what the application would be, Desch had previously built electronic equipment used in the Manhattan Project (atomic bomb). In addition, the navy already had a contract with NCR and Desch's laboratory for other equipment. Very shortly after this arrangement with NCR was worked out, the navy, led by Commander (later Captain) Meader assumed leadership of the project over Desch, his staff, and his lab. With the navy in charge, the specialized electronic equipment developed by Meader, and his team provided OP-20-G with the advanced technology needed in their code-breaking operations.

Dayton was important to NAC for a variety of reasons. The foremost reason was the AAF's Materiel Command, which provided the contracts for building gliders, was based there. Dayton was also the home of Wright Field, where much of the testing of gliders was done. Lastly, the city was about twenty miles south of Troy, Ohio, the home of the Waco Aircraft Company, the firm that designed the CG-4A. Coincidentally, it was also the headquarters for the National Cash Register (NCR) Company and the NCML, which was located in Building 26 on NCR's campus.

John Parker was NAC's only salesman. He travelled regularly to Dayton, Chicago, Washington, and St. Paul as NAC's representative to meet with government officials, businessmen, military officers, and politicians. When he was interviewed in the 1980s about the part that Dayton had in the future of NAC, Parker said:

[4] Image from Sperry ERA 40th anniversary booklet.

> The contracting source for the glider program was in Dayton, but the actual administration of it was done through the Chicago office of the government. And that was headed by a Colonel named Nelson Talbot. His brother, Harold Talbot, later became Secretary of the Air Force. He came from Dayton. And apparently in looking around, whoever was doing this, either the Navy itself or this group of Howard Engstrom, [William] Norris, and [Ralph] Meader. Anyway, through Talbot, who had met Meader, he suggested that they talk to me. Well, it is hazy on my part now the steps that actually happened, but... Engstrom and Norris and Meader. They told me that this was a group that had been doing some very classified work during the war and so forth and under certain circumstances that they would like to continue to carry on this work and be together.

During the war, Commander Howard T. Engstrom (1913?–1962), who had previously been a professor of mathematics at Yale University, led the unit within OP-20-G that would benefit from NCML's efforts. A bright young man who worked hard, Engstrom brought impressive credentials to the OP-20-G organization. He had earned an undergraduate degree in chemical engineering, had worked at Western Electric, and went on to earn his doctorate at Yale. Engstrom[5] was also versed in at least four languages, including German, which he had learned while a student at a German university. At the time that Yale hired him as a junior mathematics professor, he also joined the naval reserve, enrolling in a cryptologic course sponsored by OP-20-G. When war broke out, Enstrom resigned from Yale and went on active duty with OP-20-G.

Howard Engstrom.

William Norris.

One of his senior associates was Lieutenant Commander William C. Norris (1911–2006), an electrical engineering graduate of the University of Nebraska who had worked in sales at Westinghouse before the war. Like Engstrom, Norris[5] was also a member of the naval reserve in 1941 who went active and was assigned to OP-20-G. Nelson S. "Bud" Talbott (1892–1952), whose roots were in Dayton, was another Yale graduate who had served as an army captain in World War I. After the war, Talbott joined the army's Officers' Reserve Corps, attaining the rank of major, and went into business in Dayton.

By the time Parker met him while negotiating the early, AAF glider contracts, Talbott was back in uniform, a colonel in the Chicago office of the Quartermaster Corps. Talbott was also a member of the small group of aviation leaders in Dayton that went back to the time of the Wright brothers.

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[5] Images also from Sperry ERA 40th anniversary booklet

Counting the president of NCR among his friends, he was well-connected in both commercial aviation and the military. As Parker explained, Talbott had met Meader at NCML in Dayton. Being well-positioned in the business of military planning and contracting, Talbott saw an opportunity to assist the navy by inviting Captain Meader and Commander Engstrom to meet with John Parker.

Parker was reluctant in the 1980s to provide all the specific details of his initial meetings with the OP-20-G representatives. Meader, Engstrom, and other OP-20-G personnel had the foresight to know, however, the important role OP-20-G would play even after the war. By early 1945 navy leaders, such as Captain Wenger, clearly recognized the accomplishments of civilians in uniform such as Engstrom and Norris at OP-20-G and Meader at NCML. Even though the war was winding down, the advancements these men had made with digital electronics had to continue. As Dr. Arthur Norberg explained, "By the end of the war, the personnel at the NCML and at CSAW had become very knowledgeable about the techniques involved in designing high- speed computing devices. In fact, they were among the most knowledgeable in the world." But would they have the funding to continue their work?

Senior navy leaders, including Admiral Nimitz, who became the Chief of Naval Operations in November 1945, were also concerned about the likely budget cuts that would follow the end of hostilities. And with the widespread talk in Congress about defense reorganization after the war, they had to find a way to retain the services of all these talented individuals. There was also the concern that many of the civilians in uniform at OP-20-G had expressed their desires to return to their universities or corporate jobs once the war was over. The navy's challenge, however, provided an opportunity for Parker.

He needed to find revenue-generating work for NAC, and a contract with the navy might offer just what he was looking for. Secretary of the Navy James Forrestal, who took over his role after Frank Knox passed away in 1944, supported the effort to maintain a small team of well-trained electronic engineers and continue the work on code breaking. To do that, the navy had to identify a commercial enterprise that could continue the cryptographic machine development. Using the contracting template that had been established earlier between BuShips and NCR to get NCML up and running, and with the help of Engstrom, Norris, Meader, and a few others in OP-20-G, NAC (through Engineering Research Associates) could remain in business.

Before ERA was organized, the navy had initially approached NCR to see if they wanted to continue their work in codebreaking, but they were not interested. NCR wanted to return to their peacetime commercial operations of making cash registers and accounting machines. The firm had a backlog of commercial orders they needed to fill now that the peacetime market was opening up, and the company had made no money on the contract involving the NCML.

Ironically, other companies, such as IBM and Kodak, also turned the navy down. The navy even reached out to the nonprofit Rockefeller Foundation to see if they might be interested in this work. They weren't. A former ERA engineer later speculated that one reason these established companies had little interest in this work on code- breaking machines was that during the war, their military contracts had not been that profitable. So, by the time John Parker got involved, the navy was open to any potential investor who was willing to consider a contract for a top-secret research and development project. Fortunately, Parker was in the market to replace the glider production at NAC. As Parker explained in the mid-1980s, he then arranged to meet with Chief of Naval Operations Admiral Nimitz:

> And all Admiral Nimitz said to me, as he tapped me on the chest, was: "I've looked into your background and there's a job I would like to have you do." And he said, "It may be more important in peacetime than it is in wartime."
>
> And I said, "Aye, aye, sir." I had no idea what I was going to do. Well as it turned out, … this group [Engstrom, Norris, and Meader] then said that if they could get someone who would give them half interest in the company, finance the company, and certify that they wouldn't direct any of their scientific research activities, that they would agree to bind themselves together under contract for three years. This was the beginning [of ERA].

Initially, the navy negotiated a consulting contract with Parker and NAC to analyze the navy's data processing needs. This first contract between BuShips and NAC was completed in late February 1946. Having BuShips issue the contract meant it could be buried in obscurity, and since NAC already had a contractual relationship with the AAF, it met the existing conditions for establishing new contracts, a circumstance that prevented an initial contract with ERA.

In December 1945 when NAC received this first contract, Parker, Engstrom, Norris, and Meader had already organized Engineering Research Associates. Once NAC got what it wanted from BuShips in early 1946, the actual work for the navy was subcontracted to ERA. The organization of ERA consisted of a financial group and a technical team. Capitalized at 300,000 shares of stock, the company initially distributed only 200,000 shares at a cost of ten cents per share. The relatively low cost per share meant that the stock was affordable to the electronic engineers who would be the core employees of the new organization. John Parker took on the role of president with Howard Engstrom, Ralph Meader, and William Norris serving as vice presidents and directors. Nelson Talbott of Dayton and Richard C. Lilly of St. Paul also served as outside directors. As president of First Bank St. Paul, Lilly had handled the banking needs for NAC; so, it was an obvious choice that he do the same for ERA. One of the first actions the new company took was to open an office in Washington for the purposes of recruiting additional employees and procuring more work from the federal government.

The establishment of ERA in 1946 meant that several NAC employees could move from their former employer to the new company if their skills were needed at ERA. For example, workers who had been machinists at NAC could transition to ERA, but those with less technical skills, such as sewing fabric to cover wings, were laid off or they left NAC voluntarily. Two senior administrative employees of NAC, George H. Plufka and Harold L. Rutchick, moved to ERA in the same positions they had held in their former company, treasurer and secretary, respectively. Bertil H.T. Lindquist, who was the director of research or chief engineer (sources differ as to his title) at NAC, stayed on as an engineering manager at ERA.

By October 1946, the leadership team of ERA was represented by Howard Enstrom, executive vice president reporting directly to Parker; William Norris, in charge of engineering and research; and Ralph Meader, heading up the manufacturing department. Because NAC held the original contract with the navy, their building at 1902 West Minnehaha in St. Paul, which was owned by the Defense Plant Corporation and leased to NAC, served as the manufacturing headquarters and plant for ERA. The spacious plant was essential to the new company because in the spring of 1946, the navy also moved NCML from Dayton to St. Paul. One of the functions that these holdovers from NCML had at ERA was to provide inspection and quality control for ERA's customer, CSAW. Now, as an official naval facility, ERA could post guards at the gate without acknowledging it was doing secret work for the government.

Although contracts with the navy and other governmental agencies provided the main revenue stream for ERA in its early years, John Parker's knowledge of and connections to commercial aviation enabled the company to develop other revenue sources as well. These additional projects provided the cash flow needed by the start-up firm in its early days.

This necessity for trying out different ways to generate income was important for ERA because at the time no one was sure exactly what technologies were going to be practical for the storage of digital information. By 1947, ERA completed the first navy contract, and the second contract brought a new challenge, to design and develop a "stored program" computer. Thanks to the persistence and savvy of John Parker, ERA established itself as one of the nation's earliest computer manufacturers.

John Parker remained in his role as president and chairman of Engineering Research Associates until 1953. In the company's first five or so years, generating sufficient cash flow was an ongoing challenge. In addition, navy officials in the postwar years were often much less willing to approve payments to ERA for cost overruns and other unexpected expenses. There just wasn't the same sense of urgency as there was when gliders were needed for impending battle. As a result, Parker and his senior associates thought ERA would benefit financially by merging with a larger firm, a firm such as Remington Rand. At the time, Remington Rand also manufactured business machines, competing with NCR, IBM, and other well-funded companies.

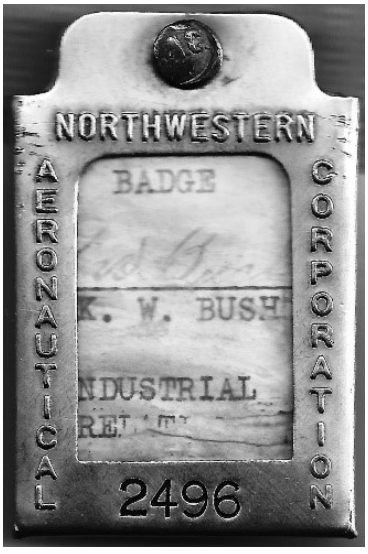
After ERA merged their operations with Remington Rand in 1952, Parker became the general sales manager of its Univac division. When Remington Rand later merged with Sperry Rand Inc., he worked for the new owners until 1956.

Widely recognized today as a pioneer in the computer industry, John Parker also served as a trustee of the U.S. Naval Academy Foundation during his later years. He died in Washington, D.C. on December 23, 1989.

EPILOGUE

Thanks to John Lindley for the manuscript electronic copy.

Mr. Lindley's manuscript needs publication funding, especially to select and insert snapshots and illustrations. For example, the book cover scan on page 4 and other images herein. And, this NAC employee badge that was donated to the Lawshe Memorial Museum by Tom Bush, K. W. Bush's son. Ken was manager of NAC Industrial Relations then manager of ERA Employment department. Tom was a UNIVAC manufacturing engineer. Other photos are available at the Lawshe Memorial Museum in S St Paul.



A restored NAC Glider can be seen at the Fagan Fighters WWII Museum in Granite Falls, MN. www.vipclubmn.org/Articles/Plant2History.pdf. www.vipclubmn.org/Locations.html has info about the St. Paul ERA/NAC manufacturing facility history. *LABenson*