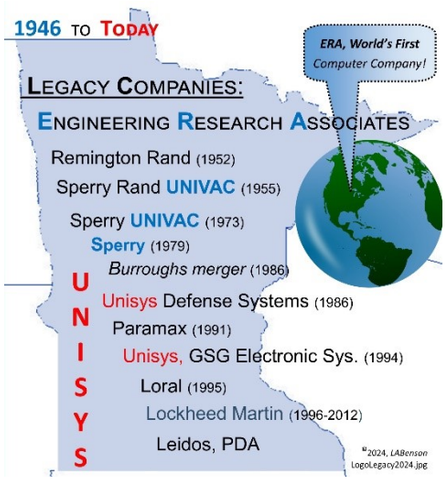
INTRODUCTION

The Dakota County Historical Society (DCHS) developed sixteen ERA/UNIVAC/Sperry/Unisys/Lockheed Martin topical posters in 2014/15, thanks to funding from Minnesota's Arts and Cultural Heritage Fund. These posters illustrate the many, many computer systems developed in the Twin Cities as illustrated by this MN Legacy Companies Icon.



The posters copied hereunder are displayed at DCHS's Lawshe Memorial Museum in S. St. Paul, MN. My personal thanks to the many volunteers who regularly donate time at the museum cataloging artifacts and documents. They were instrumental in picking poster topics and selecting supporting photos from the museum archives.

If you choose to print this paper, it is formatted for legal size paper. If you would like to print any individual poster, .pdf files are linked from https://vipclubmn.org/Exhibits.html#Essay.

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Paper created with Microsoft Word, 1 November 2024

[1] Click on any title for a quick scroll thereto.

1. The Birth of Minnesota's Computer Industry.

The Birth of Minnesota's Computer Industry

Minnesota's computer industry is not a story widely known, and until recently, not widely told. It had its humble beginnings in a company named Engineering Research Associates (ERA), founded in 1946 in St. Paul. Over the years, the company grew, changed names, was bought and sold, and eventually closed up shop.

In its time it was the source of great innovation, brilliant minds, and many dedicated hands. Through their labor they powered naval ships and submarines, sent rockets into space, landed countless commercial airplanes, and predicted the weather.

This exhibit tells the story of ERA and its many successor companies, their many products and systems, and the profound impact they have had on the economy of Minnesota, and the United States.

Above: An ERA representative at a trade show in the early 1950s. Many of the company's products were produced for the U.S. Military and were classified, completely unknown to the public until years later.

You can say quite confidently that the computer industry has its roots in two places in the world, Philadelphia and here (Twin Cities).

Dr. Thomas Misa
Director, Charles Babbage Institute

From a *St. Paul Pioneer Press* article 1/3/10

The exhibit was produced by the Dakota County Historical Society and funded by the people of Minnesota through a grant funded by Minnesota Arts and Cultural Heritage Fund. Special thanks goes to the many company retirees in the VIP Club whose help with this project was essential to its success.

CLEAN WATER LAND & LEGACY AMENDMENT

VIP CLUB
Established in 1980

Dakota County Historical Society

2. An Unlikely Birthplace: The Founding of Engineering Research Associates.

An Unlikely Birthplace: The Founding of Engineering Research Associates

Shortly after World War II, in a building that had once housed a radiator factory in St. Paul, a group of individuals began what would eventually become one of the world's most important computer companies. Founded by Navy code breakers, the company sought to work under contract to produce calculating machines for the U.S. Government.

The man who provided half the capital and the production facilities was John Parker, an investment banker who had run a glider factory in St. Paul during the war. It was called Northwest Aeronautical Corporation. Closed after the war, Parker turned the old building, located at 1902 W. Minnehaha Ave, into the new ERA production facilities. By 1946, Engineering Research Associates (ERA) was born.

Above: John Parker at his office desk. Parker was able to secure numerous commerical contracts for the company in addition to their military ones.

Right: ERA's first plant, had a reputation for being uncomfortable; broken windows, a leaky roof and bird droppings made working conditions less than desirable for ERA employees.

Your first impression (of the building) was of a big, drafty old barn, full of dust.

Bill Drake
ERA Technical Writer

From a ***St. Paul Pioneer Press*** article 5/10/91

ERA's first contract called for a survey of the technologies available for storing data. With this information they began producing magnetic drum memory; storing data on rotating cylinders, these were the world's first hard drives.

For a top-secret project, they designed a calculating machine codenamed Demon; built for breaking code from the Soviet Union. It was delivered to the U.S. Goverment in 1948. However, once the Soviets changed their code, the machine became completely useless. They needed a new machine, one that could adapt itself to new problems.

Below: The ERA machine shop somtime in the late 1940s - early 1950s.

3. "Silicon Prairie" and the World's First Computers

"Silicon Prairie" and the World's First Computers

Today, many people associate the history and production of computers with Silicon Valley. California was important in the development of the personal computer, but Minnesota had a hand in the design of the very first digital computers.

A computer by its definition is a programmable machine; it can be changed to undertake different tasks. In the 1940s these machines were only first being developed. Until this point, there were calculating machines: built to undertake one task.

Above: The ERA research lab in 1952. Many of the engineers hired by the company were graduates of the University of Minnesota.

Image courtesy of the Charles Babbage Institute.

Left: Engineer Earl Joseph programming ERA's first true computer: the 1101. Only two units were ever built. Because ATLAS was the 13th item on ERA's first Navy contract, the commercial version was named 1101 which is binary for 13. Its successor, the 1103, was an immediate commerical success upon completion in 1953; 20 units were sold in the following years.

There are several claims to the title "first computer" including ATLAS, built by ERA in St. Paul. Completed in 1950 for the predecessor of the National Security Agency (NSA), ATLAS was a top secret project designed to break Soviet codes. The Federal Government later allowed the production of a commercial version of the computer named the ERA 1101.

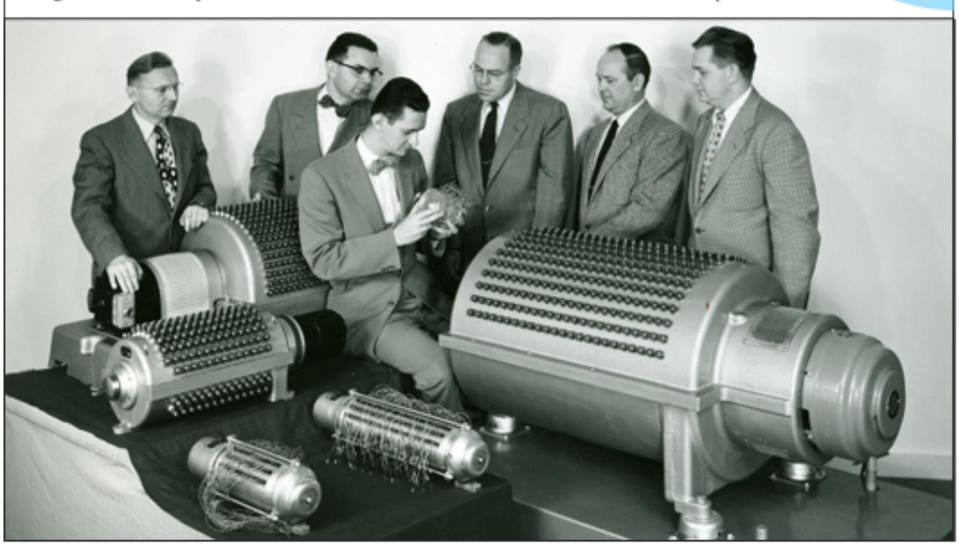
For the next several years ERA continued to be in the forefront of the computing industry. In the mid-1950s, Remington Rand bought the company and combined it with the Eckert-Mauchly Computer Company to form its UNIVAC division. Picking up right where ERA left off, UNIVAC would prove to be plenty successful itself.

You could change the machine to do many problems - just write new software for it.

Don Weidenbach, Original ERA employee

From a *St. Paul Pioneer Press* article 1/3/2010

Below from left: Jack Hill, Dr. Arnold Cohen and other ERA engineers standing around a number of magnetic drum memory units. These "hard drives" were used for some of the world's first computers.



4. Land of10,000 Engineers: UNVAC and the University of Minnesota

Land of 10,000 Engineers:
UNIVAC and the University of Minnesota

Right: Erwin Tomash and Dr. Arnold Cohen (L to R) both joined ERA in 1946. Tomash was a 1943 graduate of the University of Minnesota and Cohen was and later served as the associate dean in the U of M school of engineering.

In the early days of ERA, most of the engineers the company hired were graduates of the University of Minnesota. Over the years, UNIVAC and other Minnesota tech companies continued to stay connected with the University in what remained a mutually beneficial relationship.

Keeping up with the times, the University purchased their first digital computer in 1957. Having first contemplated purchasing an IBM computer, they bought a UNIVAC 1103 for a bargain $250,000. This state-of-the-art machine helped spur on the field of computer science at the University which they later established as a formal department in 1970.

Right: A picture showing the construction of the Computer Science building at the University of Minnesota in the mid-1980s. Prior to the establishment of Computer Science as a field, many of UNIVAC's employees were graduates of the U's Electrical Engineering School.

We took virtually the whole class of 1950 and '51 out of the electrical engineering school.

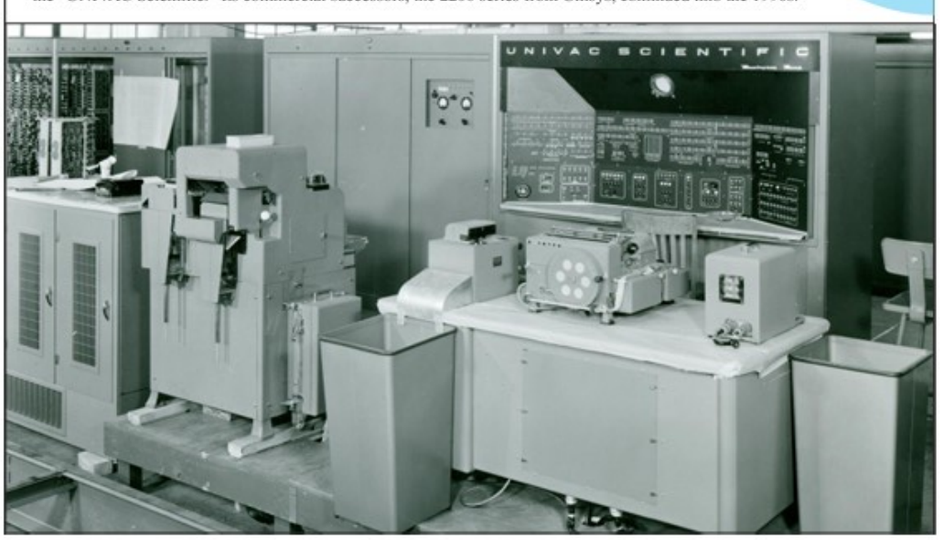
Erwin Tomash
ERA Employee

From a 5/15/1983 oral history interview from the Charles Babbage Institute.

Some of the company's early hires from the University went on to become leaders in Minnesota's computing industry, and for a few, industry giants. Seymour Cray, an alumnus, is widely regarded as a pioneer in the industry. Known for his genius in designing computers, he later founded Cray Research and built supercomputers. The U acquired a Cray-1 computer in 1981.

Today the legacy still remains. Several endowed chairs, one named for William Norris (who later founded Control Data), bear the names of important individuals and companies in Minnesota's tech industry. The University also houses the Charles Babbage Institute, dedicated to preserving the world-wide history of the IT field.

Below: A continuation of their 1100 computer series, UNIVAC rebranded an upgraded 1103 computer as the "UNIVAC Scientific." Its commercial successors, the 2200 series from Unisys, continued into the 1990s.



5. Intercontinental Ballistic Missiles, Satellites & UNIVAC's Athena Computer

Intercontinental Ballistic Missiles, Satellites & UNIVAC's Athena Computer

Completed in 1957, one of UNIVAC's first projects was the Athena computer. Occupying 370 square feet and weighing 21,000 pounds, the machine was built as a ground guidance computer for the Air Force's Titan series of rockets, designed to carry intercontinental ballistic missiles (ICBMs). This program, beginning in the late 1950s, took place during the height of the Cold War arms race between the United States and Russia.

The first in this series of rockets, Titan I, could carry afour-megaton nuclear warhead capable of reaching Russia. The military performed many test launches at Cape Canaveral and the Vandenberg Air Force Base, all of which were supervised in part by UNIVAC engineers.

Above: An image from the late 1950s to early 1960s showing the test launch of a Titan I rocket at Cape Canaveral.

Left: A picture of the Athena II Computer - the successor to the first Athena. Athena was the first Univac-produced computer to use transistors. A transistor is a device that helps control the flow of electricity in a machine. Prior to transistors, engineers had used vacuum tubes inside of computers which frequently caused overheating.

Instead of a nose cone and a bomb in it, it carried a satellite into orbit.

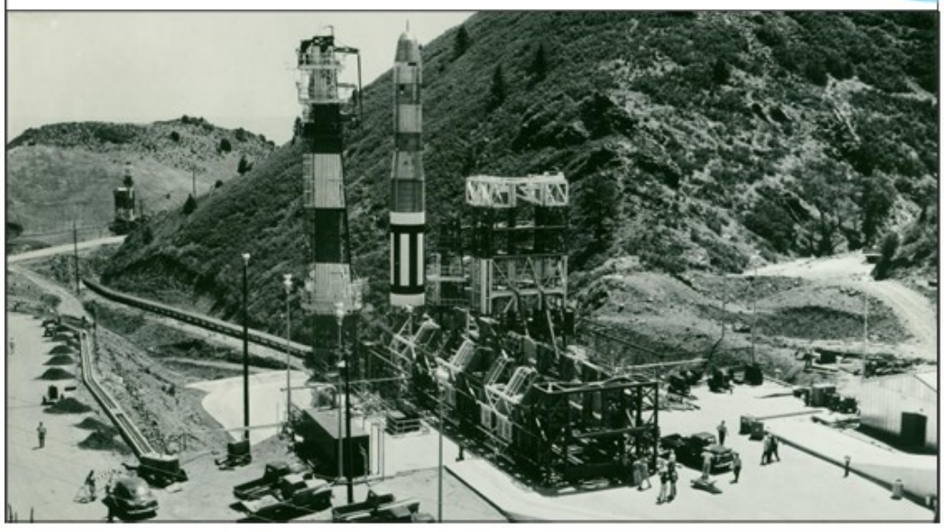
Bernie Jansen
UNIVAC
Programmer

From a 11/20/2008 article in *Thisweek Newspapers*

After the Russians launched their satellite, Sputnik, in 1957, the space race began and the Athena computer got a new job: guiding satellite launches into space. With over 80 launches using the Thor series of rockets, NASA eventually sent dozens of satellites into orbit, again, with UNIVAC's support.

The reliability of the Athena computer proved to be key to the operation's success. Designed to calculate the launch coordinates (accounting for wind, gravitational pull and other factors), the computer, and its programming team, never contributed to a mission failure. Continuing to innovate, later UNIVAC missile guidance computers were smaller and fit inside the rocket itself.

Below: A picture from the early 1960s showing a Titan I rocket at a launch site in Colorado. The rockets were built by the Martin Company which later became Lockheed Martin.



6. Across the Pacific and Back: UNIVAC Commercial Products

Across the Pacific and Back: UNIVAC Commercial Products

Above: Women assembling antenna couplers at ERA's plant 3 along University Avenue in St. Paul, mid-1950s. Women accounted for over 70% of the workforce at the company's assembly plants during the 1950s.

While UNIVAC continued to produce many products for the U.S. government under contract, sometimes the commercial world was more profitable. Beating RCA out of its contract with the Military, (then) ERA began producing antenna couplers for the Air Force in 1953. Later, ERA was awarded a contract with Boeing to produce the devices for their 707 commercial jet.

Designed to connect the external antenna to a plane's internal radio, they were installed in the tail or wing tip and could withstand temperatures down to -65 °F. Immensly profitable, between 1953 - 1970, the company produced over 12,000 antenna couplers; in the mid-1950s the couplers accounted for more than 25% of the company's profits.

Below, right: The family of antenna couplers. In 1956, UNIVAC began making couplers for the President's Air Force One planes. Proving to be one of the company's more successful programs, the antenna coupler profits enabled UNIVAC to open a new plant on West 7th Street in St. Paul.

[Bill] Norris would say it [the new plant] wouldn't have been built but for the coupler profits.

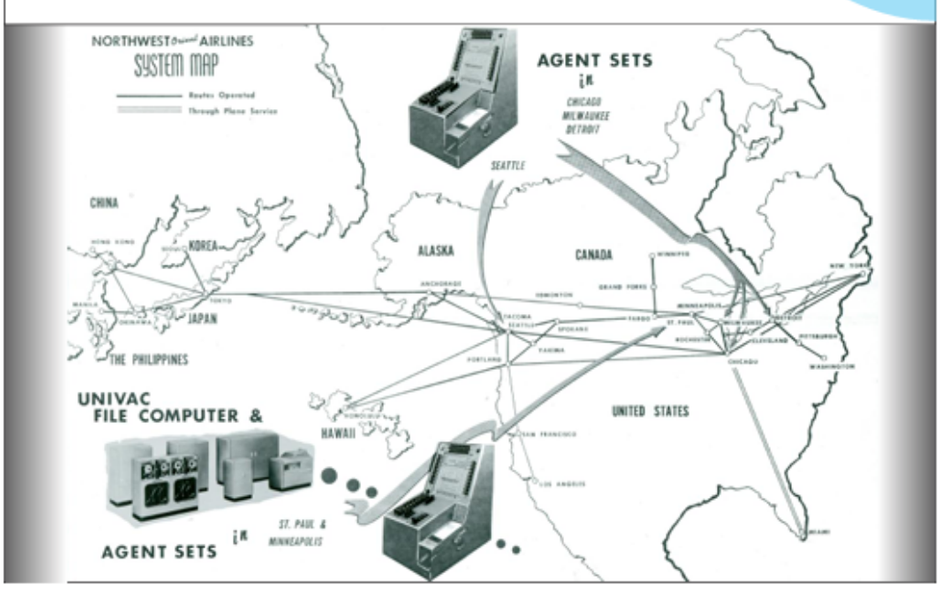
Marc Shoquist
UNIVAC
Engineer

From the VIP Club (retired employees) website

While other products did not enjoy the success of the antenna coupler program, UNIVAC produced a number of other commercial items including its Flight Plan Reservation System – one of the first of its kind. The system used the company's magnetic drum memory.

Numerous airline companies, including Minnesota-based Northwest Airlines (NWA), used this UNIVAC-designed technology. Beginning in 1947 the company began marketing themselves as "Northwest Orient" and offered many transpacific flights to Asian countries. This golden era for NWA ran through the 1970s, all helped along by UNIVAC technology.

Below: A map illustrating the extent of Northwest Airlines' transpacific flights and the UNIVAC technology used by the airliner. The two units in the center of the image are data entry terminals.



7. ERA, UNIVAC & Beyond: An Expanding Minnesota Presence

ERA, UNIVAC & Beyond:
An Expanding Minnesota Presence

ERA had its humble beginnings in an abandoned glider factory, but as the company expanded, it built additional facilities in the Twin Cities. Completing a new plant on Shepard Road in St. Paul, the company (now named UNIVAC) designated this as Plant 1. This was soon followed with more facilities in St. Paul, Roseville, and Eagan. At its height there were 28 Twin Cities locations including 12 in Eagan and a grand total of 13,000 employees in Minnesota.

Above: A picture from 1948 showing a Naval ceremony taking place in front of the 1902 Minnehaha plant. The Navy owned the land on which the plant was built and leased it to ERA and its successor companies.

Right: William Norris breaking ground in 1955 for the Remington Rand UNIVAC plant on Shepard Road in St. Paul. It initially served as the company's Twin Cities headquarters and also as a computer manufacturing facility. It expanded in 1965.

There were many separate company facility locations during the late 1950s through the 1960s and into the 1970s.

Keith Behnke
Former Sperry UNIVAC Employee

From the VIP Club (retirees) website

UNIVAC's Eagan plant was its first expansion across the Mississippi into Dakota County. Completed in 1967, the building cost approximately $3 million and it remained an important company facility until its closure by Lockheed Martin in 2012. It was known as Plant 8 and served as the headquarters for UNIVAC, and later Unisys, defense operations with other facilities located around the U.S. and the world.

Below: The Sperry UNIVAC plant in Eagan, located at the corner of Pilot Knob and Yankee Doodle Roads. It was then known as "UNIVAC Park." Its 1974 expansion brought its size to over 500,000 square feet.

8. Punch Cards and MAPPER: The Evolution of Software

Punch Cards and MAPPER: The Evolution of Software

Software can be found in every computer. Simply put, it is a set of instructions that tell a computer what to do. All software ultimately translates into binary, or 1s and 0s, which is the language of computers. The first such instructional programs were stored separately, outside of the main computer unit, on memory drums. The instructions were then loaded on paper tape and fed through the machine. UNIVAC computers such as the ATHENA operated this way. As further innovations were made, eventually the computers themselves were programmed with these instructions. Computers today have operating systems and use complex software languages.

Above: ERA engineer Jack Hill inspecting the tape from an early company computer. The first "software" was coded this way and was later replaced by punch cards.

Left: A woman sitting at the UNIVAC 418-III computer. UNIVAC programmers invented a software system to be used with this particular machine – it later became known as MAPPER. This software made it possible for anyone connected to the computer to monitor its status or print a status report.
Image courtesy of the Hagley Museum and Library.

In 1968, UNIVAC had their hand in the creation of their own software language. Original created for the UNIVAC 418 computer, MAPPER, as it was known, was later adjusted for other computers and primarily used internally. Eventually a customer noticed the software while touring the factory and demanded that it be available on the 1100 series computer they were planning on purchasing. The software, which was easy to use and pioneered many approaches for its day, then became a staple of the company's commercial sales. At the company's Eagan plant MAPPER saw continued use and it is still used by Unisys under the name Business Information Server (BIS).

There are two kinds of people in the world, those that love MAPPER and those that don't know enough about it.

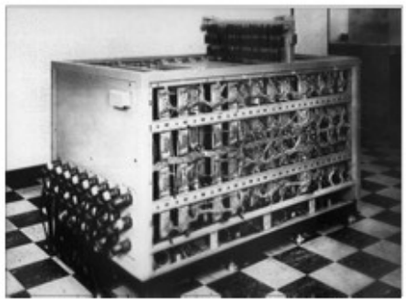
Lou Schlueter
Former UNIVAC Employee

From the VIP Club (retired employees) website

Below: The UNIVAC 1108 computer which was first delivered in late 1965. MAPPER software became a standard in later computers in the 1100 series and is still in use today by Unisys.

9. Computers At Sea: The Naval Tactical Data System

Computers At Sea:
The Naval Tactical Data System



Above: The original NTDS computer, the AN/USQ-17, with its covers off. It was a prototype, designed by Seymour Cray before he left for Control Data in 1957. The finished product, the AN/USQ-20 (installed in 1961) proved to be a very reliable machine.

One of UNIVAC's enduring successes is the Naval Tactical Data System (NTDS). Begun in the 1950s when the company was still ERA, the computers used transistors instead of vacuum tubes which made for a smaller unit. Winning a contract with the U.S. Navy, the company began designing computers to be used on ships and submarines.

While the name of the company changed over the years, designing NTDS computers remained a constant. They followed up the first computer with a second, third, and eventually fourth generation.

Right: An image of the second generation of the NTDS system, the AN/UYK-7, dated 1975. The units were subjected to a variety of tests to ensure their durability. Here it was set at an angle and had water poured over it. The units were also subjected to shock, vibration and electromagnetic interference tests. The computers were exposed to a harsh environment at sea and were designed to continue functioning even in the worst of conditions.

The NTDS shipboard system involved linking multiple computers together to work cooperatively.

George Gray

From: *Sperry Rand Military Computers, 1957-1975*

The second generation of the NTDS system, the AN/UYK-7, was a vast improvement upon its predecessor. One fourth the size and two and a half times faster, it was also designed to be more versatile. However, the Navy's computing needs soon caught up with this machine, and they commissioned yet another computer. UNIVAC designed the first standard naval minicomputer, the AN/UYK-20. Designed to supplement the UYK-7, it was designed for peripheral tasks.

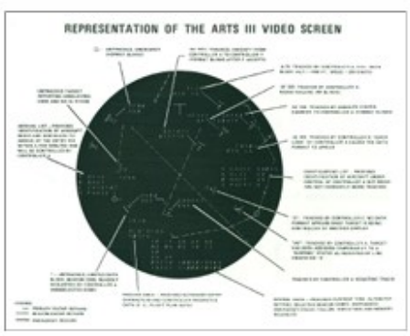
Below: A Sperry UNIVAC employee assembling a AN/UYK-20 minicomputer at the company's Clearwater, Florida, plant. While the units were designed in Eagan, they were assembled in Florida.

10. Landing Planes for 40 Years: Air Traffic Control (ATC)

Landing Planes for 40 Years: Air Traffic Control (ATC)

Until the 1960s, coordinating aircraft at an airport was a manual operation. With more flights, cluttered radar screens and occasional accidents, the Federal Aviation Administration (FAA) realized it was time for a faster, more efficient system. They turned to UNIVAC who then developed the very first computerized air traffic control system. Developed in Minnesota, by UNIVAC engineers, the Automated Radar Terminal Control System (ARTS I) was installed in Atlanta, GA, in 1966.

Above: Two views out of the Chicago O'Hare airport air traffic control tower with radar screen in view. The NTDS system provided the company with the baseline technology used for the ARTS I system.



Left: A diagram explaining the various readings on the video screen of the successor to ARTS I: ARTS III. It provided the controllers with aircraft type, flight number, position, altitudes, and speed as airplanes approached the airport. It also provided warnings for potential collisions.

UNIVAC and its successor companies continued to support Air Traffic Control (ATC) operations over the years. ARTS I was later replaced by ARTS III, which was rolled out in 1971. This was an incredibly reliable system (99.9%), which was designed to reconfigure failing units and resume ATC operations in ten seconds. While a number of operational enhancements were installed over the years, the core ATC system remained in place for over 40 years.

If you have flown any time since the late 50s, part of your flight has been under the control of systems developed by Remington Rand, Univac, etc.

Lowell Benson
Former Unisys
Systems Engineer

From the VIP Club (retired employees) website

Below: Sunset out of the Chicago O'Hare ATC tower. Derivatives of the ARTS III served as a world model for ATC. Numerous foreign governments including Japan, Korea, and Germany purchased ATC systems.

11. From Sea to Sky: Anti-Submarine Warfare and Ocean Surveillance

From Sea to Sky: Anti-Submarine Warfare and Ocean Surveillance

Still fresh from the success of the Naval Tactical Data System (NTDS), UNIVAC became the choice to create similar digital computers for ocean surveillance aircraft for the U.S. Military. In 1963, in conjunction with the Navy's ANEW program, UNIVAC began developing computers for the Navy's P-3C airplanes. With the Cold War still underway, these were launched into service to meet the threat of the Soviet Union's expanded submarine fleet. The company's involvement in the program continued over the years with numerous iterations of P-3 systems.

Above: An image of a P-3C airplane flying over North Island Naval Air Station. Lockheed California Aircraft Company designed and produced the airplanes themselves while Univac oversaw production of the digital computers used inside the aircraft.

Left: A diagram of a typical P-3 system configuration during the aircraft's later years. Computer design, software and systems integration were all the responsibllity of the Eagan employees. The company produced many P-3 systems for the U.S. government as well as systems for many other countries.

The P-3C [was] the first digital airborne anti-submarine warfare system.

Jim Rapinac
UNIVAC Defense Systems Division General Manager

From the VIP Club (retired employees) website

In 1975 the U.S. Navy launched a jet powered version of the P-3C: the S-3A. This became one of the company's more successful Naval programs. Like the P-3C, its mission was anti-submarine warfare and ocean surveillance, except it operated from aircraft carriers. Completed within Navy target costs and schedule, the $200 million contract was the company's largest single award at the time. An upgraded version, the S-3B, was still in service 25 years later.

Below left: An image of an S-3 airplane (front) with its wings folded, sitting atop an aircraft carrier.
Below right: The "T" shaped UNIVAC 1832 airborne computer installed in the rear of an S-3A airplane.

12. Nuclear Secrets, The B-2 Bomber & The End of The Cold War

Nuclear Secrets, The B-2 Bomber & The End of The Cold War

Above: A picture of the Lafayette Class USS Sam Rayburn with all of its hatches open. Decommissioned in 1989, it had a capacity of 16 intercontinental ballistic missiles (ICBMs) and 21 torpedoes.

Many of UNIVAC's and its successor companies' products were part of U.S. Goverment efforts during the Cold War to stay ahead of the Russians. Many submarines, missiles, and other projects were part of the U.S. strategy to maintain military superiority. As such, these projects were top secret.

One such project was the B-2 Stealth Bomber. Sworn to secrecy, the now Unisys engineers working on the project were forbidden from talking about the project to anyone, even their families. The aircraft's Unisys designed computers were "nuclear hardened" – capable of withstanding radiation from a nearby detonation.

Right: An image of a B-2 Stealth Bomber in flight. The airplane was made by Northrop (later Northrop Grumman) and its 13 general purpose computers were designed by Sperry Univac. Production began around 1990, during a period of rapid change in the computing industry.

About 20 engineers each individually knew their part of the design, but no one individual knew it all.

Jim Inda
Sperry UNIVAC
System Engineer

From the VIP Club (retirees) website

The B-2 project began under President Carter, but it was during the Reagan administration when the project finally got underway. As the Cold War was winding down, Congress reduced the original plan to build 132 bombers down to 21. While the bombers were initially intended to carry nuclear weapons, they began to be used for other purposes after the dissolution of the Soviet Union in 1991. In 1999 they saw service in Kosovo, and more recently, in Iraq and Afghanistan.

Below: An image of a B-2 Bomber taking off. The aircraft has a crew of two and can carry up to 16 2,400 lb nuclear bombs. It can fly at 50,000 feet and has a range of over 6,000 miles on one tank of fuel.

13. Silicon & High Standards: Sperry's Foray into Semiconductors

Silicon & High Standards:
Sperry's Foray into Semiconductors

Above: Sperry employees working in a clean-room setting. Making semiconductors requires a tightly controlled environment. From the early 1950s up to the 1990s UNIVAC maintained a state-of-the-art failure analysis laboratory. If its suppliers' parts were defective, they were asked to take corrective action. Semiconductors finally became more reliable in the 1980s.

UNIVAC's military computers demanded a high standard and were built to be extremely reliable – even in dire situations. The quickly changing pace of technology from the 1950s and onward meant greater possibilities but also increased scrutiny. Semiconductors, components of transistors and integrated circuits, are an essential component of all computerized devices. The first semiconductors used germanium which was later replaced with silicon in the 1960s. Sperry UNIVAC remained at the forefront of keeping semiconductor standards high and ensuring their reliability.

Right: A testing facility at Sperry's semiconductor plant. Silicon can be used at higher temperatures than germanium, but it needs to have a higher conductivity in order to be used. Doping is the process of adding elements to the silicon. As shown in the picture, the boron-doped silicon wafers are being heat tested.

We were... a major contributor to the standardization of testing procedures used by the semiconductor industry.

Larry Bolton
Former Sperry Employee

From: *Semiconductor Technology Progression* by Larry Bolton

Sperry had been producing semiconductors for some time when they decided to built a new production facility in 1980. The new plant was a move to produce computer components internally instead of purchasing from other manufacturers. However, the rapidly expanding commercial computer market overtook the military market in the 1980s and '90s, making such a venture too costly. Sperry closed its Eagan semiconductor plant shortly thereafter.

Below: A picture of Sperry's semiconductor facility in Eagan, Minnesota. The $50 million, 280,000 square-foot facility was only used for a total of 5 years. The building was later sold to Northwest Airlines

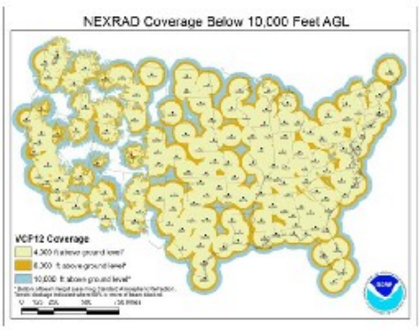
14. Radar, Hurricanes & Unisys on the Evening Weather Report

Radar, Hurricanes & Unisys on the Evening Weather Report

Above: Two pictures of the WSR-88D NEXRAD system being installed in Chanhassen, MN, in 1994. The project was headed up by the Great Neck, NY, division of the company with several key portions of the system (including the digital signal processor) were designed in Fagan, MN.

While Sperry UNIVAC and its successor, Unisys, primarily produced computers for the U.S. Military, they also produced many systems for other government agencies. One such project was a doppler weather radar system, also known as Next Generation Radar (NEXRAD) which was produced for the National Weather Service. Begun in 1980 while the company was still Sperry, the system was engineered to provide real-time information about the size, intensity, direction, and wind speed of a storm.

Right: A map of the completed NEXRAD installations in the contiguous United States. There are two installations in Minnesota (including KMPX - the Twin Cities weather radar) and over 150 total in the U.S.



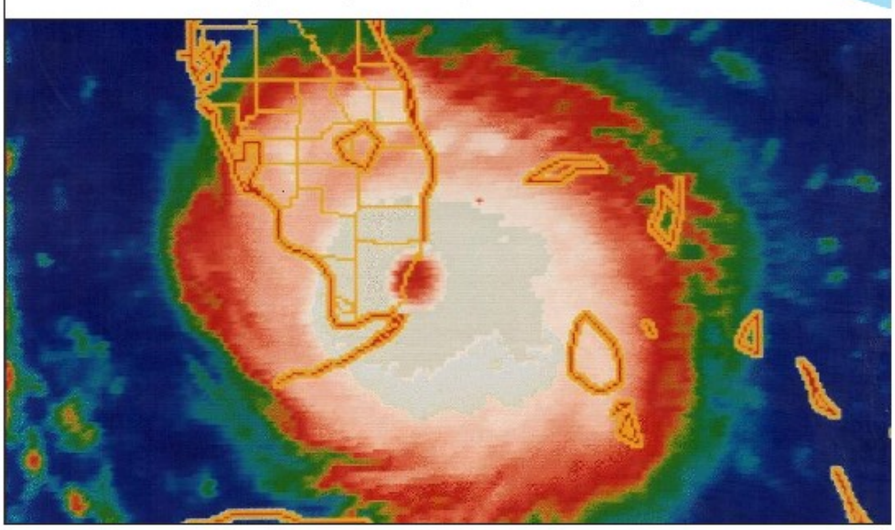
Every time we look at storms with this system, we see more information.

Joe Friday, Jr.
Former Director,
National Weather Service

From: *There's More to NEXRAD Than Meets the Eye* by Ray Ate

The most expensive hurricane at the time when it struck in 1992, Hurricane Andrew was the first major storm to be tracked by NEXRAD. For Andrew, and other such storms, NEXRAD has proven to be instrumental for providing high-resolution data within minutes. Called doppler radar for the way it detects information, it is this same technology that brings you the local weather report on the evening news.

Below: A radar image of Hurricane Andrew hitting the coast of Florida in August of 1992. NEXRAD radar allowed forecasters to accurately predict the path of the storm, with officials evacuating the threatened areas.



15. The Enduring Legacy of the Naval Tactical Data System

The Enduring Legacy of the Naval Tactical Data System

While early incarnations of UNIVAC's Naval Tactical Data (NTDS) system were successful, later versions proved to be just as capable, even exceeding expectations. The third generation of the NTDS system was the AN/UYK-43 computer. Designed at the Eagan plant, it allowed for numerous technology upgrades over its lifetime and was designed to fit onto the same mounting bolts as its predecessor, simplifying replacement. Coupled with the next generation naval minicomputer, the AN/UYK-44, these machines provided computing power to the Navy for several decades, on ships and submarines.

Right: Three company employees standing around an AN/UYK-43, the third-generation NTDS computer. First put to use in 1984 these computers are gradually being replaced by AN/UYQ-70 units. However some UYK-43s will remain in service into the 2020s.

Left: A picture of the AN/UYK-43 (far right) and AN/UYK-44 (on table in middle) and other associated company products. The UYK-43's various components were designed to work in concert with one another to provide a real-time response. In many situations, the seconds that this buys is critical.

[The] innovations [of the AN/UYK-43] pushed the available state-of-the-art [technology] beyond what was previously available.

John Westergren
UYK-43 Engineer

From the VIP Club (retired employees) website

The legacy of the NTDS program survives to this day. The current incarnation and fourth generation of the NTDS system is the AN/UYQ-70 (or Q-70) program. Begun in the 1990s, it comprises a large family of computers, servers and systems that the Navy uses on approximately 90% of its commissioned ships. The computers are ruggedized and undergo stringent testing to withstand the harsh environment of life at sea. A huge success for Lockheed Martin, Q-70 units provide the main computing power for a ship's numerous systems.

Below: A picture of the dedication ceremony of the USS Minnesota, a Virginia Class submarine launched in 2013. Aboard is the 8,000th Q-70 unit delivered to the Navy in 2011 by Lockheed Martin.

16. The End of an Era: Lockheed Martin Closes its Eagan Plant

The End of an Era:
Lockheed Martin Closes its Eagan Plant

The last couple decades of the company's history have a convoluted corporate history. In 1991, Unisys restructured their defense division into a subsidiary named Paramax. The company was then divided in two when they sold this defense subsidiary to Loral in 1995. A year later it was bought by the defense giant Lockheed Martin for $9.1 billion. This proved to be the company's final chapter. Once a Twin Cities giant with numerous locations, Lockheed's Eagan plant on Pilot Knob Road with its 1,200 employees became one of the few company facilities to remain.

Above: The original EngineeringResearch Associates plant on Minnehaha Ave. in St. Paul. This plant remained an important company facility until its closure in 1991 under Unisys.

Left: The company's Eagan facility after its 1974 expansion which more than doubled its size. It was known as "UNIVAC Park" when it first opened in 1967 and affectionatley known as "Plant 8" by the employees who worked there. It was a significant company fixture until its closure in 2012.

In November of 2010 Lockheed Martin announced that to remain competitive in the marketplace they would be closing their Eagan plant by the end of 2012. The property was purchased by CSM Corporation in 2011 and leased to Lockheed until they phased out their operations. By January of 2013 the building was empty. All that remained of Lockheed's Minnesota presence was the air traffic control facility in Eagan. It was the end of a long, and important chapter in the history of Minnesota's computer industry.

In an era of increased affordability, it is essential we drive down costs and optimize capacity at our facilities nation-wide.

Orlando Carvalho
President of
Lockheed MS2

From a ***St. Paul Pioneer Press*** article 11/19/10

Below: The demolition of the Lockheed Martin plant on the corner of Pilot Knob and Yankee Doodle roads in Eagan dated March 2015. It is currently being developed by CSM Corporation as a 434,000 square foot retail and office center which will be known as "Central Park Commons." Image courtesy of Tim Johnson.

EPILOGUE

Over $100 Billion in Economic Contributions to Minnesota

Our Legacy Committee developed this poster for Minnesota's 2008 Sesquicentennial.

Thanks to Quint Heckert for the design and to Lockheed Martin shop for the production.