

CREATIVITY – SUCCESS – OBSCURITY

UNIVAC, WHAT HAPPENED?

A fellow retiree posed the question of what happened. **How did the company that invented the computer snatch defeat from the jaws of victory?** The question piqued my interest, thus I tried to draw on my 32 years of experiences in the company and the myriad of information available on the Internet to answer the question for myself and hopefully others that may still be interested 60+ years after the invention and delivery of the first computers. Computers plural, as there were more than one computer and more than one organization from which UNIVAC descended.

J. Presper Eckert and John Mauchly, located in Philadelphia PA are credited with inventing the first general purpose computer under a contract with the U.S. Army. But our heritage also traces back to a second group of people in St. Paul MN who developed several computers about the same time under contract with the U.S. Navy. This is the story of how these two companies started separately, merged to become one company, how that merged company named UNIVAC (Universal Automatic Computers) grew to become a main rival of IBM (International Business Machines), then how UNIVAC was swallowed by another company to end up in near obscurity compared to IBM and a changing industry.



Admittedly it is a biased story, as I observed the industry from my perspective as an employee of UNIVAC. It is also biased in that I personally observed only a fraction of the events as they unfolded within UNIVAC.

This story concludes with a detailed account of my work assignments within UNIVAC. The reader can determine for himself what creditability I personally bring to the accounting of this story of UNIVAC and the industry. The reader should know that I am an octogenarian, retired from the company for 22 years. Recollections of events no doubt have faded over time and my relationships with people, inside and outside the company, friendly or adversarial have influenced my perspective and impressions.

Let the story begin:

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ECKERT-MAUCHLY COMPUTER CORPORATION (EMCC)

J. Presper Eckert and John Mauchly, while working for the Moore School of Electrical Engineering at the University of Pennsylvania are credited with inventing **ENIAC** (Electronic Numerical Integrator and Computer), and were awarded patents for their invention. ENIAC was designed to calculate artillery firing tables for the United States Army's Ballistic Research Laboratory. Work was started during World War II in 1943. When announced in 1946, ENIAC was heralded in the press as a "Giant Brain".

Moore School had received a contract from the Army to design and build a second computer. However, new University policies would have forced Eckert and Mauchly to sign over intellectual property rights for their inventions; rather than do so, they both resigned from the University. After seeking to join the then existing team of IBM and John von Neumann at the Institute for Advanced Study in Princeton, NJ - Eckert and Mauchly decided to start their own company in Philadelphia. The **Eckert Mauchly Computer Corporation** was founded and was incorporated on December 22, 1947. Eckert was the technical guru; Mauchly was the marketing/software guru.

Mauchly persuaded the U.S. Census Bureau to buy an advanced ENIAC which was renamed **UNIVAC** (acronym for Universal Automatic Computer); EMCC received a contract in 1948 that called for having the machine ready for the 1950 census. Eckert hired a staff and launched the ambitious program to design and manufacture the UNIVAC. Mauchly continued to solicit new customers, and succeeded in getting four orders, one from Northrop Corporation for a smaller computer to be named BINAC, and three from the military for UNIVAC computers.

About this time, EMCC became a victim of McCarthyism as company members were accused of communist leanings. The company lost its clearance for government work, and the three military contracts were canceled. Mauchly himself was accused, and for two years was denied access to the company he had founded and currently served as president; he was finally exonerated but by then the UNIVAC was seriously behind schedule. Northrop turned on the company and wouldn't allow any EMCC employee on its premises citing security; though BINAC was delivered, installation was compromised and Northrop claimed the computer never worked well.

Original estimates of the development costs of BINAC and UNIVAC proved to be extremely unrealistic, thus by the summer of 1948, EMCC had just about run out of money. Harry L. Straus, a Baltimore businessman invested \$500,000 in the company, and Straus became chairman of the board, and his company received 40 percent of the stock. When Straus was killed in an airplane crash in October 1949, his company withdrew its support.

Desperate, EMCC had no choice but to offer the company up for sale: potential buyers included National Cash Register (NCR) and Remington Rand. IBM could have been a potential buyer, but because of its dominance of the punch card business, to buy EMCC would likely have subjected IBM to anti trust scrutiny, if not a law suit from the Department of Justice; IBM chose to "go it on their own". There was a rumor that the government nudged Remington Rand into purchasing EMCC to instill some degree of competition into the fledgling industry.

Remington Rand purchased EMCC on February 15, 1950, whereupon it became the **UNIVAC Division of Remington Rand**. The first UNIVAC was not delivered until March 1951. However, upon acceptance at the company premises, truck load after truck load of punched cards arrived to be recorded on tape for processing by UNIVAC. The Census Bureau used the prototype UNIVAC on EMCC premises for months.

Though it provided a much needed infusion of cash, and saved development of the UNIVAC, Remington Rand may not have been the best choice to buy EMCC. Seemingly Remington Rand Marketing management and sales force did not believe in computers and did not have the vision of upgrading its punch card customer

base to computers. Mauchly resigned from Remington Rand in 1952. The UNIVAC I is enshrined at the Smithsonian Institute.

ENGINEERING RESEARCH ASSOCIATES (ERA)

During World War II the U.S. Navy had built up a team of engineers to build code breaking machinery. With the end of the war, the Navy grew increasingly worried that this team would break up and scatter. They found John Parker, the owner of a Chase Aircraft affiliate in St. Paul, Minnesota who was about to lose all his war time contracts. Because of security clearance considerations, the Navy never told Parker exactly what the team did, and Parker was obviously wary, but after several meetings with increasingly higher-ranking Naval officers, Parker agreed to give the team a home in his glider factory. Thus **Engineering Research Associates** was formed in 1946, with ERA Board Chairman Parker providing much of the capital funding.

ERA was a contract engineering company that worked on a number of seemingly unrelated projects. Their first machine, *Goldberg*, was completed in 1947; it used a crude magnetic drum; magnetic drum technology became an early trade mark of ERA. A follow-on machine, *Demon*, was built to crack a specific Soviet code. But when the Soviets changed code, Demon was rendered useless.

Convinced the only lasting solution was a computer that could be quickly re-programmed, the Navy gave ERA a contract, "Task 13"; the first stored program computer; named *ATLAS*, was delivered in 1950. ERA started to sell the Atlas commercially as the *ERA 1101* (1101 is binary for 13). There followed an ERA 1102. Even before delivery of Atlas, the Navy contracted ERA for a more powerful machine; *ATLAS II* was delivered to the still-secret National Security Agency (NSA) in September 1953. Based on Atlas II design, ERA developed the *ERA 1103* for the commercial market; however announcement had to await approval from NSA which took an agonizingly long time. The ERA 1103 became a successful product in the scientific community.

Being a contract engineering company, ERA sold paper designs of a drum computer to IBM. These paper designs went to several IBM labs and engineering groups. IBM presumably used these design concepts to design its IBM 650 computer, which went on to capture the low end computer market; some 2,000 IBM 650 computers were sold, catapulting IBM into a near monopoly position in the low end of the fledgling industry.

In the early 1950's a political debate broke out in Washington about the Navy essentially "owning" ERA; the ensuing debates and legal wrangling left the company drained of both capital and spirit. In 1952 Parker sold ERA to Remington Rand. It was renamed the **ERA Division of Remington Rand**.

Clearly ERA was captive of the Navy; that being said, the Navy would likely not have let ERA go out of business. And from a Navy point of view, Remington Rand may have been the perfect "White Knight" in that they didn't rock the boat. Though the "invisible" hand of the government may have been less obvious in inducing Remington Rand to purchase EMCC, there is much logic that the "hand" was nudging to have Remington Rand come to the rescue of ERA. In the need to have some degree of competition in the fledgling, but destined to be critical industry to the nation's defense.

REMINGTON RAND UNIVAC (RRU)

Upon acquisition, the UNIVAC and ERA Divisions reported to Leslie Groves, the retired Army Lt. General who had managed the construction of the Pentagon and the Manhattan Project. After retiring from the Army in February 1948, Gen. Groves had taken a position of Vice President in Remington Rand.



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Though Remington Rand brought an infusion of cash, and saved the two fledgling companies from bankruptcy, it didn't bring much else. Groves kept the UNIVAC Division of Remington Rand and the ERA Division of Remington Rand operating as independent units for a few years with ERA focusing on scientific and military customers, and UNIVAC focusing on business customers. It appeared to have been a time of frugality, as the UNIVAC Division remained in its marginal quarters at 19th and Allegheny in Philadelphia, and the ERA Division remained in the glider factory at 1902 Minnehaha Ave in St. Paul, MN.

Remington Rand also had a calculating machine division in Norwalk, CT. Lest we forget, Remington Rand marketed the 90 column round hole punch card equipment versus IBM's 80 column rectangular punch card equipment. Needless to say, 80 column won out and became the industry standard.

In 1953 or 1954 Remington Rand merged their Norwalk tabulating machine division, the ERA "scientific" computer division, and the UNIVAC "business" computer division into a single division called **Remington Rand UNIVAC**. This severely annoyed those in ERA and Norwalk who thus lost their separate identities.

During Remington Rand's tenure the product lines remained pretty much unchanged: the UNIVAC Division had its UNIVAC I, and the ERA Division had its ERA 1103 plus assorted contracts for the military. Both the UNIVAC I and 1103 would be categorized as large scale mainframe computers. It was during Remington Rand's tenure that the first UNIVAC I was delivered to the Census Bureau in 1951. Design of a follow on UNIVAC II was started in Philadelphia.

The UNIVAC I became famous [or infamous] for predicting the outcome of the 1952 presidential election. The computer predicted an Eisenhower landslide when traditional pollsters all called it for Stevenson. CBS decided the computer was in error and refused to allow the prediction to be aired. When the predictions proved accurate, CBS embarrassingly announced that they had withheld the earlier prediction. The "giant brain" had in fact proved itself superior to man.

While Remington Rand UNIVAC was basking in the glory of the 1950 census and the 1952 election, in 1953 IBM announced the IBM 650, the world's first mass produced computer. With the 650, IBM leapt ahead of every other company already in the business [i.e. RRU] or contemplating entering the business as a supplier of general purpose computers. Over 2,000 systems were produced between the first shipment in 1954 and its final manufacture in 1962. The 650 was marketed across the board, but its biggest market were users of existing IBM electro-mechanical punched-card processing machines, upgrading from so-called Calculating Punches to computers proper. The 650 pioneered a wide variety of applications, from modeling submarine crew performance to teaching high school students computer programming.

Even before the 650, in April 1952 IBM announced the IBM 701, its first commercial scientific computer, a direct competitor to the ERA 1103, which for NSA security reasons was not announced until 1953. Like ERA, with the military version of the 1100 series, IBM had received government funding to develop the 701. In early 1954, performances of the two machines were compared for a government project. The two machines had comparable computational speed, with a slight advantage to the 701, but the 1103 was favored unanimously for its significantly faster input-output equipment. Nineteen IBM 701 systems were built; the total number of 1101, 1102, and 1103's built by ERA was nearly twice as many. So for a while at least, "UNIVAC" had a comfortable lead over IBM in the large scale computer market.

UNIVAC DIVISION OF SPERRY RAND

On July 1, 1955 Remington Rand and Sperry Corporation merged to form Sperry Rand. Even before the merger Sperry Corporation was an old-school conglomerate. Its divisions sold farm equipment, radars, air traffic control equipment, marine navigation products, and missile guidance control. In addition, Sperry Systems Management - headquartered in Great Neck, NY - did a fair amount of government defense contracting. The merger added typewriters, office equipment, electric shavers and digital computers for business and the military.

Sperry Rand established headquarters in the Sperry Rand Building, a skyscraper at 1290 Avenue of Americas in Manhattan. General Douglas MacArthur, notable in having been fired by President Harry Truman in 1951, and a potential presidential candidate, was chosen as Chairman; "Dugout Doug" served primarily as a figure head, living a pompous life in the penthouse of the Waldorf Astoria Hotel. James H. Rand, Jr., who had built and run Remington Rand since 1929, was named Vice Chairman.

By 1955 when Sperry Rand came into being, IBM with its 650 was dominating the low end commercial business market. And with its 701/702, IBM was competitive with UNIVAC's 1103 and UNIVAC I in the large scale scientific market and the large mainframe business market, respectively. Though the five-year tenure of Remington Rand had been a period of benign neglect, UNIVAC had more than held its own in the large scale market.

Sperry Rand took over a computer division that could be described as shoddy, certainly in terms of office and manufacturing facilities. Sperry Rand moved to improve UNIVAC's image and facilities. A new headquarters facility that would also accommodate engineering, manufacturing, and marketing, including International, was planned in Blue Bell, PA. Additional office and plant facilities were occupied in St. Paul: Plant 1 for executives, administration, engineering, and marketing; Plant 6 for customer and employee training; and a new engineering and manufacturing plant in Roseville, designated Plant 4. The glider factory, designated Plant 2, was retained for military projects requiring secure facilities. A major project, the Naval Tactical Data System (NTDS) under the direction of Seymour Cray was located there. [Yes, there were, at least for a while, Plants 3, 5, and 7 as the St. Paul complex grew dramatically].

Remington Rand UNIVAC was renamed the **UNIVAC Division of Sperry Rand**, or in popular vernacular just UNIVAC. The ERA 1103 became the UNIVAC Scientific Computer 1103A and a user organization was cultivated: USE (UNIVAC Scientific Exchange) became influential in bringing the customers collective needs to the company's attention. There soon followed the 1104 and 1105, slight variations of the 1103A.

St. Paul [aka ERA] was viewed by Sperry Rand management as a pool of engineering talent to support a variety of projects. The decision to move the design of UNIVAC II from Philadelphia to St. Paul was in keeping with that philosophy, but the decision upset nearly everyone involved, in both design groups and led to lengthy delays. The Sperry Rand "big company" mentality encroached on the decision-making powers that had been enjoyed by the ERA founders, and some left in 1957 to form the Control Data Corporation (CDC). These included William Norris, head of ERA since inception, who was named CEO of CDC. Seymour Cray subsequently left Sperry Rand to become chief designer at CDC.

The corresponding decision in late 1957, early 1958 to consolidate all commercial marketing in Philadelphia led to the loss of some people and may have weakened UNIVAC commercial marketing in the short term.

But the bulk of ERA people stayed on in UNIVAC; Norris was replaced by Robert McDonald. The St. Paul group was eventually split in two. The Defense Systems Division (DSD) was responsible to design and manufacture "ruggedized" computers for military use; DSD eventually located to new facilities in Eagan. The Data Processing Division (DPD) was responsible to design and manufacture large scale computers for the commercial market; DPD was located in the newly expanded facilities in Roseville.

Synergism was cultivated to the extent possible. Computers designed and produced under contract for the military were redesigned and produced for commercial use. The militarized NTDS computer was commercialized as the UNIVAC Real Time 490, first delivered in the early 1960's [followed by the 492 and 494]; a Computer Unit Tester was militarized as the 1218 and commercialized as the 418, first delivered in 1963 [followed by the 418 II and 418 III]. DPD produced the 1100 series, and the commercial 490 and 418 series.

UNIVAC II was first delivered in 1958; the UNIVAC III was first delivered in 1962. The UNIVAC III was the last of the original UNIVAC machines. Thereafter UNIVAC competed in the mainframe market with the 1100 series.

In 1957, under contract to the USAF, UNIVAC built a computer for delivery to Hanscom Field, near Cambridge, MA. This computer gave birth to the UNIVAC Solid State which came in two versions: the Solid State 80 [IBM-Hollerith 80 column cards] and the Solid State 90 [Remington-Rand 90 column cards]. The UNIVAC Solid State was aimed at the general purpose business market. Though it enjoyed some success in the U.S. during the early sixties, it sold mostly in Europe.

To date in the early 1960's, all UNIVAC computers essentially had their origin with developments contracted and paid for by the government. ENIAC was developed under contract with the Army; UNIVAC was developed under contract with the Census Bureau, the 1101 [nee ATLAS] and 1103 [nee ATLAS II] were developed under contract with the Navy, the Solid State 80/90 were developed under contract with the Air Force. This was probably the case with other companies that were entering the computer business; their respective computers had their origins with government contracts. The 1004/1005, the 1050, and the 1107 departed from this modus operandi: they were all in-house developments.

The UNIVAC 1004 was a plug-board programmed punched card data processing system, introduced in 1962. Peripherals included a card reader and card punch, either 90-column, round-hole cards or 80-column rectangular cards. An enhanced version, the UNIVAC 1005, was introduced in 1966. The main improvement over the 1004 was conversion from the plug-board program to an internal stored program. The 1005 saw extensive use by the U.S. Army, including the first use of an electronic computer on the battlefield, and was used as terminals on AUTODIN.

AUTODIN (Automatic Digital Network System) is a good example of how government procurement works. The customer has a problem to be solved. In this case the Air Force needed to improve the speed and reliability of logistics traffic [spare parts for missiles] between five logistics centers and roughly 350 bases and contractor locations. The requirement was spelled out in a Request for Proposal (RFP) seeking solution and prices. In the case of AUTODIN, a contract was awarded in the fall of 1959 to the team of Western Union (WU), Radio Corporation of America, and IBM: WU to be prime contractor and system integrator, RCA to build the five switching center computers, and IBM for the terminals which provided both punched card and teletype data entry. During implementation the government realized the broader value of the system and transferred it to the Defense Communications Agency (DCA). In 1962 DCA solicited bids for a nine center expansion which was won by Philco-Ford. Deployment started in 1966. As part of the Philco-Ford team, UNIVAC provided 1005 computers for the terminals.

The UNIVAC 1050 was an internally programmed computer introduced in 1963. The 1050 was used extensively by the U.S. Air Force supply system for inventory control. The 1005 and 1050 illustrate the beginning of a change in government procurement policy, i.e. to use off-the-shelf hardware where possible to save money.

The UNIVAC 1107 was announced in October 1962, establishing the 1100 series that would reaffirm UNIVAC's strong position in large mainframe scientific and business computer market. As was the original UNIVAC, the 1107 was essentially a batch processing machine. The follow-on UNIVAC 1108 was introduced in

1964. In addition to faster components, the 1108 provided multiprogramming and improved input/output capability. As the first UNIVAC 1108 systems were being delivered in 1965, Sperry Rand announced the UNIVAC 1108 II [also known as the UNIVAC 1108A] which was a multiprocessor machine, capable of expansion to three CPUs (Central Processing Units) and two IOC's (Input/Output Control Units). Although a 1964 internal study projected sales of forty-three 1108's, in all, 296 processors were produced.

IBM stayed involved in the mainframe market with the IBM 704 announced in the mid 1950's. But the 704 was not compatible with its predecessor IBM 701. Clearly IBM did not at this time dominate the mainframe market as it did the lower end business market. And other companies, big and small were entering the industry.

The first decade under the umbrella of Sperry Rand was a period of enlightenment. UNIVAC's image as a quality company was improved. Products to serve the commercial markets were abundant. The UNIVAC Defense side of the company was enjoying tremendous success. In accepting NTDS, high officials in the Navy proclaimed "*NTDS is the most reliable system in the Navy today*". And that success and garnished reputation carried UNIVAC Defense Systems to being selected to pioneer a number of command and control, guidance, and communications systems. These included development of an Anti Submarine Warfare (ASW) system, involvement on NASA space programs, and participating with Bell Labs in developing the anti-ballistic missile project designated Nike-X.

Though *IBM and the Seven Dwarfs* may have been a whimsical play on words in the early 1960's, UNIVAC was head and shoulders above the other six dwarfs. Though IBM may have enjoyed greater revenue and greater profit, in no way did UNIVAC yield superiority to IBM in military business, large scale mainframe and real-time and communications computers, or the share of commercial computers sold to the federal government.

The world of commercial computers changed in April 1964 when IBM announced the System/360. The IBM System/360 was a system family of computers designed to cover the complete range of applications, from small to large, both commercial and scientific. The System/360 allowed customers to purchase a smaller system with the confidence they would always be able to migrate to a larger more powerful system as and when their needs grew, without reprogramming application software. Obviously the very large customer with many computers of various sizes could also see an advantage. In short, the IBM System/360 is considered by many to be one of the most successful computer concepts in history.

In response to the System/360, UNIVAC announced the UNIVAC 9000 series [9200, 9300, 9400, and 9700] in the mid-1960s to compete with the low end of the System/360 series. The 9000 series implemented the IBM 360 instruction set, and used only 80-column cards. To the existing UNIVAC customer base, the 9200 was marketed as a functional replacement for the 1004, but the 90 column card user was left out in the cold. Though there were some potential customers that hated IBM's domination of the industry, to most new customers with small computer needs, the question was: "*Why buy from anyone other than IBM?*"

[An important look backward: On August 21, 1956 Sperry Rand and IBM had signed a Cross-licensing Agreement. Both companies felt that Sperry Rand, with the patents granted to Eckert and Mauchly for the invention of ENIAC, held certain rights regarding computer development. It was under the terms of that Agreement that IBM made knowledge of the System/360 design available to UNIVAC to enable develop and quick announcement of the UNIVAC 9000 series.]

At the time of IBM's announcement of the System/360, UNIVAC had very strong offerings in large scale mainframes [UNIVAC III and UNIVAC 1107] and real time and communications applications [UNIVAC 490 and



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UNIVAC 418 series, respectively] and the soon to be announced UNIVAC 1108. There were "experts" predicting that real-time would ultimately encompass half of all computer needs. The challenge was to get the company oriented and playing to its strengths, instead of lamenting its weaknesses.

To effect such a reorientation, Sperry Rand reorganized the UNIVAC Division, putting, if you will, St. Paul in charge. Robert McDonald of Defense Systems Division was made President, and he brought a large contingent of DSD executives to Blue Bell to fill key positions: Gerald Probst as VP Data Processing Division, George Geick as VP International Division, and others to fill top positions in Human Resources, Procurement, Controller, etc. There also followed many middle level managers.

Even before the reorganization, UNIVAC had a strong presence in Washington DC. UNIVAC Federal Government Marketing (FGM) was responsible for marketing commercial products to the federal government; UNIVAC Defense Systems Division was responsible for marketing ruggedized products to the federal government, mostly the military. Though there was a potential for conflict, the government was always clear on what type of computer they required. Both organizations were located in the same building at 2121 Wisconsin Ave in Georgetown though DSD also had system designers and programmers located on-site in government facilities, including NASA Goddard and the Pentagon.

Of all the UNIVAC organizations marketing commercial products, FGM was by far the strongest. From its position of power, FGM effected considerable influence over the design and development ongoing in Roseville, demanding hardware and software features deemed necessary to capture specific government procurements. Because of their strength and expertise in real time, communications, and large scale main frame product lines, and an extremely intelligent and aggressive Vice President (Lee Johnson), FGM often went beyond its federal government charter. For example, FGM sold to the airlines and established UNIVAC as a major force in airlines passenger reservations systems.

FGM first sold Capital Airlines in the 1950's [Capital subsequently merged with United Airlines]. There followed in the early 1960's Eastern Airlines and Northwest Airlines, employing the UNIVAC 490 series. The first foreign airline was British European Airlines (BEA), also employing the 490. The UNIVAC team that implemented BEA stayed together as the Airlines Development Center, located in London, and supported FGM and the responsible Subsidiary in marketing to other European airlines: SAS, Lufthansa, and Iberia, all employing the UNIVAC 494. FGM instigated the formation of a UNIVAC Airlines User Group which met periodically. IBM had a comparable base of airline customers employing its Sabre Airline Reservations software.

FGM sold a system to United Airlines in 1965, but in a departure, employed the newly announced 1108 multiprocessor computer rather than the 494. Air France and Air Canada which followed shortly thereafter also employed the 1108. United, then the largest airline in the world, proved to be an extremely difficult implementation; the 1108 as designed was not equal to the task; considerable hardware and software modifications were required; the system finally met United's requirements in 1970 - two years late. Though late, the United Unimatic System turned out to be an outstanding technical achievement, and an industry success.

The new UNIVAC management team strengthened the commercial marketing organizations, emulating to some extent the FGM organizational concept in each Domestic Marketing Operation and in each International Subsidiary. Consequently each Operation and Subsidiary was made more capable and thereby better able to market, implement, and support real time and large scale business.

UNIVAC management implemented a "war room" wherein "critical" accounts, regardless of product or organizational jurisdiction [excluding DSD], were monitored until the "issues" were resolved. There were normally 20 or so accounts at any one time monitored daily by a small group of experts. [United was a special customer and never became a "war room" critical account.] Acting with the authority of top management, company resources were dispatched as needed to resolve any problem that impacted successful implementation. This could be temporarily increasing project staff, dispatching engineering/programming expertise from development centers to the site, equipment replacement, whatever it took. Customer Satisfaction was paramount.

When DSD finished the design and implementation of a system [e.g. Naval Tactical Data System], and the system was accepted by the government customer, there often followed a production or implementation phase. For example, after acceptance, the Navy had the need to install NTDS aboard each combat ship, a task that would take several years. Though the computer hardware was a carbon copy [manufactured by DSD in St. Paul], each ship class required some modification of the basic NTDS software; modification of basic software was also required to accommodate fleet additions such as a new radar, a new interceptor aircraft or weapon system. To modify the software, the Navy established a Fleet Programming Center in San Diego [a second Center subsequently was established in Virginia]. Though FPCP was staffed with some Navy personnel, most of the system designers and programmers were provided under contract, initially by UNIVAC which had the expertise. Periodically the support contract came up for renewal, and other companies often competed for the follow-on business.

Over the years there resulted several locations in proximity to a government/military complex that provided such system support services. In addition to San Diego CA, these included Washington DC, Warminster PA, Houston TX, Whippany NJ, and Newport RI to name some. Each location included a spectrum of talent and experience, from senior system designers to junior programmers. By customer's dictate, staffs were located on-site in the customer facility or off-site in UNIVAC facilities; rates charged were different for on-site or off-site.

In 1969 these locations were collected within DSD into a single organization named System Support Services (SSS); SSS comprised several hundreds of systems oriented personnel, and was a profit center responsible to generate revenue and profit. Though SSS' business was largely with the government, its charter did not so restrict it and it met with some success in pursuing commercial business using UNIVAC commercial products. The prospect of expanding its commercial footprint caused UNIVAC management to transfer the organization in its entirety from DSD to DPD Marketing.

Because of the audit requirements for government work, SSS continued to be served by DSD payroll and accounting systems. Its mission was "enhanced" to become a source of experienced system designers and programmers for commercial projects. As an example of synergy at work, SSS would hire inexperienced people onto a government project, train them at government expense, and transfer out the most talented and experienced people; thus in part were commercial projects staffed, and key commercial technical positions filled, both domestic and international. But synergy worked too well: government customers objected when a person key to their project went missing, and DSD demanded SSS be returned. It later resurfaced, intact with the new name of Technical Services Division. Though an omen of the future trend in the industry, it seemed the commercial entities of UNIVAC didn't recognize the value of an organization such as TSD.

IBM announced the System/3 in 1969 and the System/370 in June 1970. The IBM System/3 was low-end business computers aimed at new customers that still used calculating or unit record equipment. UNIVAC

countered with the UNIVAC 90/30 Series [90/30, 90/25, 90/40]. In addition to competing with the IBM System/3, the UNIVAC 90/30 provided an upgrade path for UNIVAC 9x00 users.

The System/370 was the successors to the System/360 family of computers. The System/370 was software compatible with the System/360, allowing an easy migration path for customers. Like the IBM System/360 before it, the IBM System/370 would have profound effects on the industry.

SPERRY UNIVAC (SU)

The 1970's started with General Electric (GE) deciding to get out of the industry. Though depicted as a "dwarf" in the phrase "*IBM and the Seven Dwarfs*" clearly GE was not a dwarf, but a huge conglomerate.

GE's origins go back to Thomas Edison; in 1892 Edison's electric company was merged with another electric company to form General Electric. Though initially a lighting company, GE eventually became a major player in manufacturing anything and everything that consumed electricity, including most types of products and appliances in the consumer marketplace. GE became a dominant company in power generation, and subsequently became one of the world's largest manufacturers of jet engines and diesel-electric locomotives. GE evolved into the most successful multinational conglomerate in the world.

It was said that GE got into computer manufacturing because in the 1950's they were the largest user of computers outside of the Federal Government. GE developed an extensive line of general purpose, process control, and message switching computers. GE also became a major provider of online computing services. **In 1970, GE sold its computer division to Honeywell**, thereby exiting the computer manufacturing industry, presumably concluding that, like the Federal Government, they could better satisfy their varied computer needs by outside procurement. GE retained its timesharing operations for some years after it exited computer manufacturing.

IBM's announcement of the System/370 in June 1970 caused the second of the seven "dwarfs" to exit the industry: RCA which also was not a dwarf of a company, but a huge technological firm.

RCA origins go back to General Electric. Thomas Edison was granted the original U.S. radio patent in 1891. More U.S. patents were awarded in the early 1900's, including to Westinghouse Corporation. In 1917 the U.S. Government took charge of all U.S. patents in order to devote radio technology to the war effort. All production of radio equipment was allocated to the U.S. military. Determined to maintain control of long-distance radio communications for military purposes, after the war ended the government asked GE to form an American-owned radio company. The result was the Radio Corporation of America incorporated in 1919; GE owned controlling interest; Westinghouse also had an interest.

Over the years, RCA operated international telecommunications services, and also marketed the radios manufactured by GE and Westinghouse. Subsequently in an antitrust action, the Department of Justice forced GE and Westinghouse to divest their ownership interests. In 1926, to address the rapidly expanding market for commercial radio, RCA formed the National Broadcasting Company (NBC). During World War II RCA became much involved in radar development. RCA became the world's largest manufacturer of consumer audio equipment and the first name in television.

Late for the party, it wasn't until the early 1960's that RCA started marketing the RCA Series of computers. They followed with the Spectra 70 Series which was hardware, but not software compatible with IBM's System/360. **On 17 September 1971, RCA abruptly announced its decision to cease operation of its general-purpose computer systems division.** To keep abreast of the IBM System/370 would have required RCA to

make a substantial new investment and the Board decided against making that investment. **Sperry Rand officially took over the RCA computer base in January 1972.** The decision to exit the computer business marked RCA's move into a diversified consumer oriented conglomerate; they slipped into financial disarray, which led to RCA's takeover by GE in 1986 and its subsequent break-up. The only RCA unit which GE kept was NBC.

And there was left: "*IBM and the B.U.N.C.H.*": *Burroughs, UNIVAC, NCR, CDC, and Honeywell.* But that was a misnomer as additional companies, mostly new, many foreign, had already entered or were about to enter the computer industry.

UNIVAC countered the IBM System/370 with the UNIVAC 90/60 Series [90/60, 90/70, 90/80] which essentially merged the technologies of UNIVAC with that of RCA, including virtual memory (VM), and the VM Operating System (VMOS). The 90/60 series were essentially clones of the System/370; because of the Cross-License Agreement between Sperry Rand and IBM, UNIVAC was able to invest significantly less than would have been required by RCA to achieve the same result.

In 1967, Sperry Rand had filed suit against Honeywell for patent infringement; Honeywell had countered with an antitrust suit against Sperry Rand and IBM. The decision came down in 1973. The court determined the intellectual knowledge to build a computing device was generally known in many quarters at the time the patents were filed; the court invalidated the original ENIAC patents, thereby placing the invention of the computer in the public domain. The court also found that Sperry Rand and IBM had tried in 1956 to monopolize the industry in violation of the Sherman Antitrust Act, but that only IBM had in fact succeeded in creating such a monopoly; the judge awarded no monetary damages despite these findings of conspiracy.

There occurred a rash of other companies entering the business, primarily at the large end, with clones of the System/370. These hardware clones competed aggressively against IBM. Clones were built and marketed by Amdahl, Siemens, English Electric, Fujitsu, Hitachi, Mitsubishi, even the Soviet company ES EVM. The IBM 360/370 instruction set and input/output characteristics essentially became de facto industry standards, giving rise to not only clones but also to "plug compatible" peripheral manufacturers.

With the acquisition of RCA, UNIVAC acquired an ongoing development called ACCUSCAN which was an automated retail check-out, scanning the Universal Product Code. Though UNIVAC succeeded in successfully completing the development, it was unable to get any large retail company to order the system; negotiations were most serious, but not exclusively, with Safeway. In the early to mid 1970's, retail customers were not comfortable buying products where the price was not clearly marked on the package. In frustration, UNIVAC sold the product, and what happened a few years later is history. Accuscan type devices within a few years became commonplace.

In July 1969, the U.S. Justice Department, worrying antitrust, had nudged IBM into "unbundling" software and services from the price of the hardware. Years earlier, hardware maintenance had been unbundled, and UNIVAC had followed suit. But UNIVAC Marketing had seen bundled pricing as a competitive advantage and for years had resisted unbundling. But by the mid 1970's, it was clear that IBM was realizing significant additional revenue and profits from unbundled products and services, and UNIVAC followed suit. All actively marketed product lines were unbundled: application software, system services, education were all separately priced. Only the operating system and initial installation remained bundled in the price of the hardware.

For years UNIVAC Customer Engineering (CE) had been a profit center, providing maintenance of UNIVAC equipment installed in customer facilities; CE was continuously profitable. But through the years CE was



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made to live with archaic parts provisioning and training facilities in a plant in Iliion NY inherited from the days of Remington Arms. With the acquisition of RCA came a modern training facility in Princeton NJ; CE training was relocated to Princeton, and eventually a UNIVAC "hotel" was built in Princeton to house trainees. To expedite availability of spare parts, modern distribution centers were located adjacent to O'Hare International Airport in Chicago and Schiphol International Airport in Amsterdam.

Reflecting the growing importance of UNIVAC in corporate affairs, in 1973 Sperry Rand elevated Robert MacDonald to Vice Chairman; replacing MacDonald as UNIVAC President was Richard Gehring, himself a product of DSD, thereby preserving the St. Paul mentality in managing the computer business. In the late 1970's, Sperry Rand management decided to concentrate on its computing interests, and sold a number of divisions including Remington Rand, Remington Shaver, Ford Instrument Company and Sperry Vickers. The company dropped "Rand" from its title and reverted to Sperry Corporation. The Sperry facility in Salt Lake City was made a UNIVAC facility, specializing in the design and manufacturing of displays, terminals, and communications equipment.

The late 1970's and early 1980s were a time of difficult economic conditions; a severe recession was officially declared by the government in July 1981. Sperry was impacted by the economic downturn. To avoid layoffs, Sperry offered an incentive program to encourage early retirement. This was followed by similar programs in 1984 and 1986. Though each program varied slightly in benefits, and each targeted different groups of employees, each offered the retiree [and spouse] essentially free medical insurance for life, a powerful incentive during a time of escalating health costs.

IBM announced the IBM Personal Computer (IBM PC) in August 1981, a move to get into the small personal computer market then served by Commodore, Atari, Apple, Tandy's TRS-80, and a few others. To get to market rapidly, IBM's design team ruled out in-house solutions; rather they selected the Intel 8088 microprocessor, and the operating system from then start-up Microsoft. The team also decided on an open architecture, making design information available so that other manufacturers could produce and sell peripheral components and compatible software without license from IBM. Other manufacturers were soon producing their own IBM-PC compatible computers. The IBM PC became the industry standard; the term "PC" came to be generic. Only Apple distinguished itself from the IBM-PC.

Of the many companies that entered the computer industry on the low end, Digital Equipment Corporation (DEC), Compaq Computer Corporation, and Hewlett-Packard (HP) had the greatest and most far reaching impacts.

DEC was founded by two computer engineers who had worked for years at MIT Lincoln Laboratory. DEC started by selling digital modules that could be wired together by the user; DEC shipped its first digital modules in early 1958. There followed a Programmable Data Processor (PDP) in November 1960 with which users could perform a specific graphical output or real time task. There were several follow-on versions, each at a lower price: the PDP-8, introduced in March 1965, is considered the first *real* minicomputer because of its low price. [As contrasted to the general purpose computer, the minicomputer was designed to do [more or less] a specific real time task, cheaply and reliably.] Many PDP-11s were sold in telecommunications and industrial control applications; AT&T became DEC's largest customer. **By the end of the 1980's DEC had propelled itself into the second largest company in the industry.** However, DEC couldn't keep pace with the rapidly changing technologies of the 1990's and was acquired in June 1998 by Compaq.

Compaq was founded in 1982 by three former Texas Instruments senior managers to make IBM PC compatible computers. The name "Compaq" was derived from compatibility and quality. Its first PC's shipped

in March 1983. **Compaq grew to become the second largest supplier of PCs in the world.** However, Compaq had little idea of what to do with its acquisition of DEC [and other companies], and soon found itself in financial difficulty. Compaq merged with Hewlett-Packard in May 2002.

Hewlett-Packard (HP) was founded in a one-car garage by Bill Hewlett and Dave Packard. Not only did HP start a line in minicomputers, it also was one of the first to build and market an IBM-PC. Through growth and acquisitions, **HP has become the world's leading PC manufacturer.** But beyond PCs, product lines include servers, storage devices, networking products, software, a diverse range of printers, and other imaging products. HP also has strong services and consulting business built around its products.

In response to the IBM PC, UNIVAC felt the need to add a personal computer to its line of products, and briefly considered having Salt Lake City design a unique product. But sanity prevailed, and the company filled the void by procuring an IBM-PC compatible product from Mitsubishi, on which were slapped a UNIVAC nameplate. The biggest market for the UNIVAC PC may well have been filling the desks of company secretaries for use as word processors; the desks of company administrators and managers to interface on-line with internal mainframe business computers; and the cubicles of company engineers and technicians to interface on-line with internal mainframe scientific computers in the design of new products.

Lest we forget, Sperry was more than a computer company. Though Sperry had divested divisions in the late 1970's that were tangential to its core business, it had retained several divisions that were highly technical. One such division was Sperry Systems Management (SSM), descendent of the original Sperry Gyro Company, and headquartered in Great Neck NY. In the 1980's SSM won two major government contracts: the North Warning System (NWS) and NEXRAD (acronym for Next-Generation Radar). On both projects, SSM subcontracted Technical Services Division to develop the software. Software development work for both projects was performed at TSD facilities in Trevoise PA, a suburb of Philadelphia.

NWS is a modernization of the Distant Early Warning (DEW) Line, constructed in the late 1950's, and becoming obsolete. The NWS consists of both long and short range surveillance radars, operated and maintained by the North American Aerospace Defense Command (NORAD). The NWS began operation in 1988 with the commissioning of three new east coast sites; the transition from DEW Line to NWS was completed by the early 1990's.

NEXRAD is an advanced weather forecasting system using Doppler radar. In a three stage competition during the 1980's against Raytheon and Ford-Westinghouse, Sperry [UNISYS] was selected and awarded a full-scale production contract. The contract was for a network of 159 Doppler weather radars: The first radar site was installed in June 1992; the last in August 1997. NEXRAD detects and processes precipitation and atmospheric movement, finding patterns that enable National Weather Service meteorologists to track and anticipate severe weather and tornados, thereby alerting the public in advance of dangerous storms. NEXRAD data also provides information about rainfall and aids in forecasting flooding.

Neither NWS nor NEXRAD used UNIVAC computers. The competitions were entered because Sperry had expertise in radars and had the best system solutions to the customers' problems. For example the NEXRAD RFP called for a real-time distributed processing super-mini class computer system family, with a range of products to accommodate the varied NEXRAD processing needs. There was no provision in the RFP to fund design and development of a new computer; time and cost constraints required that it be something "off-the-shelf". UNIVAC products were very seriously considered, but could not satisfy the requirements. DEC was considered as were other minicomputer manufacturers. The ultimate choice was Perkin-Elmer [later named Concurrent Computer Corporation], a small company located along the high tech corridor of Boston. It probably didn't hurt that Perkin-Elmer had been previously used by the government study group in their initial Doppler radar feasibility studies.



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That Technical Services Division was a sister division, reporting to UNIVAC Defense Systems, may well have influenced SSM's selection. But through its systems experience working with Bell Labs in the development of NIKE-X, the anti ballistic missile system, TSD was fully qualified for both NWS and NEXRAD projects.

Somewhere about this time, Sperry Headquarters was relocated from Manhattan to Blue Bell. Gerald Probst, who had previously replaced the retired Richard Gehring as President of Sperry UNIVAC, was elevated to Sperry CEO. Rumor had it that, anticipating the shift in the industry away from a hardware mentality to a system/services mentality, Probst sought a merger with AT&T. AT&T presumably had similar thoughts, but rather than Sperry, AT&T eventually acquired NCR. In positioning itself to be an attractive take-over candidate, Sperry had made itself vulnerable to a hostile take-over by Michael Blumenthal and the Burroughs Corporation.

UNISYS

In September 1986, in a hostile takeover, Burroughs Corporation bought Sperry Corporation for \$4.8 billion. A first hostile takeover bid had previously been thwarted. This successful takeover bid was engineered by Burroughs' CEO Michael Blumenthal. The takeover came about even though Sperry used a "poison pill" in the form of a major share price hike to dissuade the hostile bid; consequently Blumenthal had to borrow much more than he had anticipated.

In merging the two corporations, Blumenthal disbanded the names *Burroughs* and *Sperry*; even the trade mark *UNIVAC* was relegated to the trash bin. The name chosen for the new corporation, through an internal competition, was **UNISYS**, acronym from United Information Systems. The merger was the largest in the computer industry at the time and made UNISYS the second largest computer company with annual revenue of \$10.5 billion. At the time of the merger, UNISYS had approximately 120,000 employees.

A short history of Burroughs and Michael Blumenthal:

In 1886, the American Arithmometer Company was established in St. Louis MO to produce and sell an adding machine invented by William Burroughs. In 1904 the company moved to Detroit and changed its name to the Burroughs Adding Machine Company. It soon was the biggest adding machine company in America. Over time, it added typewriters and accounting machines to its product line. In 1953 the company was renamed the Burroughs Corporation. Burroughs worked with the Federal Reserve Bank on the development of magnetic ink character recognition (MICR) for the processing of bank checks. In June 1956 Burroughs purchased the ElectroData Corporation whose products were popular as terminals in banks, where they were connected to [non-Burroughs] mainframe computers. Burroughs also manufactured an extensive range of check processing equipment.

Burroughs collaborated with the University of Illinois in developing the ILLIAC IV computer in the early 1960's. Burroughs came out with its first large scale machine in 1961, the B Series which continued through the 1970's, to be followed by the A series in the early 1980's. Burroughs mainframes penetrated most every large bank, including the Federal Reserve Bank. And Burroughs built the backbone switching systems for SWIFT (Society for Worldwide Interbank Financial Telecommunications) which went on line in 1977. In 1982, following the IBM PC announcement, Burroughs began producing personal computers, which were later manufactured in China. Burroughs also designed and manufactured military computers in its Great Valley Laboratory in Paoli, PA.

Werner Michael Blumenthal was born in 1926 in Germany. His family left Germany shortly before the outbreak of World War II, immigrating first to Shanghai, and then to the U.S. after the war. He graduated from Cal Berkeley and later received a PhD from Princeton where he was Professor of Economics from 1953 to 1956. He joined Crown Cork Corporation, where he rose to Vice President. He then entered public service, serving in the State Department from 1961 until 1967 as a 'trade' advisor to Presidents Kennedy and Johnson. Following a ten-year career as president and then chairman of Bendix International, President Jimmy Carter appointed him as Secretary of the Treasury, where he served from January 1977 to August 1979. [Rumored has it Carter fired him.] Blumenthal joined Burroughs in 1980 as Vice Chairman, then Chairman of the Board a year later. After the merger of Burroughs and Sperry in 1986, Blumenthal became Chairman and CEO of UNISYS, where he remained until retiring in 1990.

Back to UNISYS: Presumably to recompense for the excess amount he was forced to pay for Sperry, Blumenthal almost immediately started selling off Sperry Divisions [although this may have been his plan all along]: Sperry New Holland to Ford; Sperry Marine to Tenneco; Sperry Flight Systems to Honeywell; and the crown jewel since the days of ERA, Sperry Defense Products Group to Martin Marietta. [In 1995 Martin Marietta merged with Lockheed Corporation; this UNIVAC group is now part of Lockheed Martin.]

Though they preached equality, Blumenthal and his Burroughs Team seemed particularly hostile to all things Sperry. Perhaps the hostility was their reactions to Sperry management making the hostile take over difficult. Almost immediately Sperry senior management were replaced, followed soon thereafter by replacement of Sperry middle management. Few Sperry managers remained at UNISYS [nee Sperry] Headquarters in Blue Bell PA. The vendetta extended to other locations including TSD and SSM: the SSM marketing and management team that only a year or so earlier had been lauded as heroes for their success in winning the NEXRAD competition were summarily dismissed. Pat Casey, head of TSD took early retirement; John Guarino, Director of TSD's Eastern Operations was summarily transferred to an outpost job in Baton Rouge LA [either take it or be fired]. And so the purging went, with Fred Jenney, head of the UNISYS revamped Defense Organization wielding the hatchet. Sperry internal processing systems were replaced by Burroughs' systems, creating chaos in processing orders, shipping product, and administering payroll; the Sperry systems [which were without exception superior] had to be reinstated.

Released to the press in 1988 was the fact that a secret investigation, conducted jointly by the FBI and the Naval Investigative Service, had been underway for two years. Labeled "Operation ILL WIND", it had investigated allegations that past and present Pentagon officials were paid bribes by industry employees and consultants, for inside information that gave companies an unfair advantage in bidding for contracts. The investigation had the makings of a scandal of epic proportions. *"It's going to show that the whole procurement process is a joke,"* contended a high-ranking investigator, insisting that *"there hasn't been a significant contract let in the past six or eight years that hasn't been made on the basis of inside information."* The sweep included the offices of at least five Pentagon procurement officials, 15 defense contractors and six consultants, mostly former Pentagon insiders who were middlemen between their former associates and firms seeking military contracts. Sources close to the investigation, predicted that at least 100 people will be indicted. [Two Sperry senior Marketing VPs - one in Great Neck, one in St. Paul - were subsequently convicted and sentenced to prison.]

With his background in Washington politics, Blumenthal may have early on in the investigation gotten "wind" [pun intended] of *Operation Ill Wind*. As UNISYS and its predecessor companies were both heavily involved over the years in government contracts, Blumenthal and other UNISYS executives were likely interviewed by the investigators. Attempting to be proactive, Blumenthal may have identified in his mind possible culprits, and fired them before any bad publicity could occur that would tarnish the image of UNISYS.



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One probable fatality of the takeover [and possibly Ill Wind] was Gerald G. Probst, Sperry CEO at the time of takeover. Friends say he lamented deeply that he had lost the battle for Sperry, and lamented even more deeply as he observed what Mike Blumenthal was doing to the company and its Sperry employees. A little over two years after the takeover, in January 1989 Mr. Probst died at his home in Salt Lake City. He was still a young 65; rumor was he had committed suicide.

Soon after the merger, the market for mainframe computers, the mainstream products of both Sperry and Burroughs and now UNISYS, began a long-term decline. UNISYS offered an early retirement program to both Sperry and Burroughs employees, to be effective 1 April 1989. Many employees took advantage of the offer, which as in past Sperry plans included free medical insurance for life.

As to product offerings, prior to the merger Sperry UNIVAC had replaced the entire 90/30 and 90/60 series with the UNIVAC System 80, an IBM/360-like series developed and engineered by Mitsubishi in Japan. For a time after the merger, UNISYS retained the Burroughs computer products as the A and V systems lines; however, as the market for mainframes diminished, the company eventually dropped these product lines. UNISYS continued the UNIVAC 1100 series which evolved into the UNISYS 2200 series which evolved into the UNISYS ClearPath Series. In a strategic decision to provide high end servers, UNISYS added the UNISYS ES7000 family in 2000, which uses Intel processors and runs Microsoft Windows operating systems. The ES7000 is certified by the Guinness Book of World Records for hosting the largest number of concurrent gamers ever recorded on a single game server.

W. Michael Blumenthal retired in 1990 to be replaced as CEO by James A. Unruh. Shortly after taking over, Unruh announced that UNISYS was going to discontinue providing free medical insurance to retirees of predecessor companies, Sperry and Burroughs, as well as UNISYS retirees. Rather the retirees would have the opportunity to join a new plan, with the population made up entirely of retirees, for which the retiree would be required to pay a monthly premium. For most retiree's the cost would be prohibitive. There followed a lawsuit wherein the retirees claimed breach of contract. In the case tried in Federal Court, the judge found mostly in favor of UNISYS. Though UNISYS "won", they lost the PR battle; even active employees were appalled by the action of their company against the loyal employees of years past.

Unruh saw UNISYS through a difficult period when the industry switched increasingly from high-margin mainframe computers to smaller distributed systems and to system services. He took the company through several restructurings, cutting tens of thousands of jobs. During his watch sales shrank from over \$10 billion in 1989 to \$6.4 billion in 1996, with profits proving erratic. Unruh did manage to pay down much of the crushing debt burden incurred in the takeover; during his watch, debt was reduced from \$3.96 billion to about \$1.25 billion.

Following in the footsteps of IBM, UNISYS has metamorphosed from [almost] solely a computer manufacturer to an information technology services company that in addition to mainframe and server hardware provides systems integration, outsourcing, and related technical services. UNISYS systems continue to be used for many industrial and government applications, including banking, check processing, income tax processing, airline passenger reservations, biometric identification, newspaper content management, and shipping port management. Through its subscription to NEXRAD, which it developed, UNISYS provides weather data services to a multitude of users. UNISYS operates the world's largest radio-frequency identification (RFID) network for the U.S. military, tracking 9 million containers yearly. It also created the universal identification card for citizens of South Africa. UNISYS clients are typically large corporations, government agencies, various state governments, and various branches of the U.S. military.

An increasing amount of UNISYS revenue comes from services rather than equipment sales. In 2008, the percentage was 88 percent from services. In November 2008 UNISYS was removed from the Standard & Poor's 500 Index when its market capitalization fell below the S&P minimum of \$4 billion. UNISYS does not appear in the 2010 Fortune 500.

Of course the industry has changed significantly. The 2010 Fortune 500 lists the following top three companies in the Information Technology Services industry to which I have added UNISYS:

<u>Corporation</u>	<u>Revenue Year</u>	<u>Revenue in Billions</u>
IBM	2010	\$99.870
Computer Sciences	2010	\$16.128
SAIC	2010	\$11.117
UNISYS	2009	\$ 4.598

The Fortune 500 still carries Computer Software and Office Equipment industries. To whit [combined]:

<u>Corporation</u>	<u>Revenue Year</u>	<u>Revenue in Billions</u>
HP	2010	\$126.033
Apple	2010	\$65.225
Microsoft	2010	\$62.484
Dell	2010	\$61.494
Xerox	2010	\$21.633
NCR (with their ATM's)	2010	\$ 4.819

Also of interest in the Aerospace and Defense industry: Lockheed Martin, 2010 Revenue, \$46.890 billion

Though the resulting placement in the Fortune 500 and the respective industries may change when 2011 revenue numbers are released and tallied, it would appear the clever wordsmith can come up something that conveys: *HP and the rest*.

OPINIONS REGARDING MERGER

To the outside observer, the merger of Burroughs and Sperry may have made good sense. Even the selling of Sperry New Holland, Sperry Marine, and Sperry Flight Systems, each tangential to the core business of computers, to help fund the takeover, may have made good sense. But to sell UNIVAC Defense Systems, which had produced so much innovation and products was a tragic mistake; in my opinion.

In incurring so much debt to manage the takeover, and by taking such draconian measures in the Sperry government operations in merging the two companies, Blumenthal seriously crippled the new corporation. Whether Sperry, if remaining a separate company without the burden of debt, and left to its own devices, could have adapted sooner and better to the changing industry is a matter of conjecture. In my opinion I think it could have and would have.

At the time of his retirement, some credited Unruh with saving the company; maybe he did, but it was a potential bankruptcy of his and Blumenthal's own making. At the time of Unruh's departure one critic said: "*There's a lot of technology in UNISYS. If only they could clone [IBM CEO] Lou Gerstner.*" [Or I'd add, Thomas Watson, Sr. or Thomas Watson, Jr.]

CONCLUSIONS

Many, if not most of us that worked for UNIVAC, in one derivation of the company name or another, have felt *WE* were first-est with the most-est in the computer industry. *WE* may have been the first to have a few very bright people working in a couple of labs, talking to some equally bright military people about problems the Army and Navy had that needed solving. And these very bright people developed general purpose computers to solve these problems. Though they were credited with being the first to design such computers, a federal court later concluded that many equally smart people around the country and around the world had similar knowledge and were doing much the same things, and thus computers were already in the public domain.

When these very bright people went on to start their fledgling companies, Eckert Mauchly Computer Corporation in Philadelphia, and Engineering Research Associates in St. Paul, *WE* were one and two in a two-company fledgling computer industry not yet understood by the businesses it intended to serve. But that is faint praise as EMCC and ERA struggled daily with finances, and each had to be rescued by an outsider with no computer knowledge but who gained control of the respective company. *WE* do have bragging rights that *WE* were numbers one and two for a few months, maybe a year or two when the "computer industry" was slowly getting off the ground.

But as soon as the upstart EMCC took away part of its punch card business with one of its large bank customers, and Thomas J. Watson, Sr. decided to enter the computer business, in that instant of decision, IBM became number one. Even at that time IBM was a huge company with huge resources. So huge and so dominating of the punch card business, it was constantly in negotiations with or under suit by the U.S. Department of Justice for antitrust violations. Because of concern with antitrust, IBM refrained from buying EMCC, but rather went it alone, gathering from ERA the technical knowledge to build its first computer to convert its huge punch card customer base to the world of computers.

With a little nudging from the government to instill some degree of competition, Remington Rand, IBM's largest competitor in the punch card business, purchased EMCC and ERA, rescuing each from certain bankruptcy. And thus was formed Remington Rand UNIVAC, one name but still two companies, one in Philadelphia, the other in St. Paul. But Remington Rand's heart wasn't in computers, nor did its management have the same vision of computers as did IBM's Thomas J. Watson Sr. and his son Thomas J. Watson Jr. Thus, RRU floundered as a second class company with third class facilities. But still RRU maintained second place in the growing industry, as other companies entered the fray.

When the Sperry Corporation purchased Remington Rand to form Sperry Rand, it was a transfusion of new blood and new vision. Though a conglomerate catering to image in its selection of Chairman [Gen Douglas MacArthur] and Headquarters [its own skyscraper in mid Manhattan], Sperry had a history of technological innovation. EMCC and ERA were merged into one computer division, UNIVAC, and its image and facilities significantly improved. Though catching and surpassing IBM was neigh on to impossible, the UNIVAC Division of Sperry Rand strengthened its position as number two, being at least equal in the selling of militarized and commercial computers to the government. Sperry UNIVAC also established itself as equal to IBM in certain select industries such as the airlines.

In the early 1960s a clever wordsmith coined the term "*IBM and the Seven Dwarfs*". This was in response to IBM's announcement of its System/360, with which IBM clearly made a quantum jump ahead of the rest of the industry. In the early 1970's two dwarfs, the giant companies GE and RCA, decided to exit the industry. And the same or a different clever wordsmith revised the term to "*IBM and the B.U.N.C.H.*" But as the Dwarfs were not equals, neither were the BUNCH equal; the "U" standing for UNIVAC Division of Sperry Rand was clearly the strongest.

And then a very brilliant, but very ruthless man, who believed he saw a way to combine two of the BUNCH into a single company that could equal, maybe even surpass IBM, made his move. And "B" and "U" became one. But because of the way it was done, there was little or no likelihood that the resulting company, UNISYS would or could ever rival IBM; it is questionable whether UNISYS will even survive as a separate company.

GERALD PICKERING: MY UNIVAC EXPERIENCES

I joined what was called Remington Rand UNIVAC in St. Paul in October 1956. My first assignment was in UNIVAC Scientific 1103A Marketing working under Wayne Aamoth and Ted Helweg. When in January 1958, UNIVAC commercial marketing was consolidated in Philadelphia, I remained in St. Paul, transferring to the Defense Group to work on development of NTDS under Dr. George Chapin. When NTDS prepared for Service Test, I with some 35 system designers and programmers transferred from St. Paul to San Diego. I was promoted to Supervisor, Service Test Operational Programming.

Service Test was very successful and I stayed on in San Diego for the NTDS production phase of installing NTDS aboard all combat ships, a task that would take several years. For this task the Navy built a new facility on Pt. Loma: the Fleet Computer Programming Center, Pacific (FCPCP). I was assigned as UNIVAC Director FCPCP, overseeing a group of some 120 system designers and programmers. About this time Dr. Chapin relocated to San Diego, and established a separate facility in Gross Center to capitalize on the success of NTDS, and pursue other business inside and outside the company. I was reassigned to Gross Center, still reporting to Dr. Chapin; Ray Kot replaced me at FCPCP. Dr. Chapin returned to St. Paul, replaced by Bob Nyvold who reported, at least for a while to Leon Findley.

Sometime thereafter, in January 1965 I was asked by Gerry Probst, then VP Engineering in Defense Systems to establish a group similar to San Diego in Washington DC. Though DSD had a marketing presence in Washington, it didn't have a systems presence. And there was some concern that the ultra aggressive Lee Johnson, VP UNIVAC Federal Government Marketing (FGM) may usurp business rightfully belonging to DSD. I inherited the remnants of the Gemini Project [6 programmers located at NASA Goddard, and was given the responsibility to staff the Apollo Project [100 plus system designers and programmers; I transferred Don Myers from San Diego as Project Manager; when Don resigned, I assigned Jay Longbottom from the AWR Project], also on-site at Goddard. The Army War Room (AWR) project, being installed in the bowels of the Pentagon, ongoing at the time in St. Paul was transferred to Washington; Dave Redin was Project Manager. I also hired on staff Wes Seville, a retired Air Force Colonel to interface with the Pentagon. Within a year or so, when Bob MacDonald, Gerry Probst, et al left DSD for Blue Bell to take over management of UNIVAC, I reported to Joe Stoutenburg. Before joining UNIVAC, Joe had been a Commander in the Navy Bureau of Ships which was overseeing the development of NTDS, and we were familiar with and respected each other.

Joe Stoutenburg and I and others were convinced the future of the industry would be in systems and software, rather than hardware. Joe initiated a study; participants included people from St. Paul, San Diego, Washington and other sites that had sprung up as a result of systems work done in DSD. But before the study got underway, I was asked to take the position of Technical Director, International Division, reporting to the newly installed VP, George Geick. George had been DSD Controller and knew me from my assignment in Washington. My good friend Vern Leas tried to talk me out of it: *"Every dime the commercial organization makes domestically, International loses that and more overseas"*. I took the assignment. I was replaced by Wes Seville.

International's home office staff consisted of Geoff Cross [Controller], Paul Spillane [Manufacturing with plants in Germany and Japan], Jim Chaffee [Materiel/Logistics], myself [Technical and subsequently Personnel], and eventually John Horton [Marketing]. Overseas, major players were Jim Donovan [VP European Operations], Shiro Omata [Managing Director, Nippon-UNIVAC Kaisha], and Subsidiary GM's Don Orr [UK], Olaf Carlstein [Scandinavia], Rom Slimac [France], Detliff Meyer Olert [Germany], Mario Nuti [Italy],



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Luis Meyer [Spain], Herr Steinman [Switzerland], Gordon MacNiece [Canada], and Earl Milburn [Australia]; there was also a Benelux subsidiary but the name of the GM escapes me though I do recall being in Amsterdam the night the first male heir to the throne in some 120 years was born.

I immediately set about to build a Headquarters technical staff: From Blue Bell development groups: Renold Capocasale [trilingual in Italian & Spanish], Werner Mangold [bilingual in German], Joe O'Brien; from my Washington organization: Don Hill, Merle Crain, Doug Hanson. NUK established a cadre of Japanese analysts in Blue Bell under Ken Fijitsu. Because the staffing of International Projects was such a significant part of the job, my title was soon expanded to include Personnel Director. And I was soon up to my eye balls in such issues as ex-patriate's, tax equalization, third-country national's, etc. I transferred Donnie Uppman, from my Washington organization to help define personnel policies and implement procedures. I also had inherited responsibility for guest services which included transport of foreign visitors back and forth to the Philadelphia airport, and tours of UNIVAC Blue Bell facilities and meetings with executives and development engineers; for that job I had inherited Bob Peluso.

A large percentage of my time was initially consumed by one project: Scandinavia Air Systems (SAS). FGM [Lee Johnson] had sold SAS 494's and 418's for their reservations and communications systems. Though International had a very capable Airlines Development Center in London [key players: Phil Fellows, John Harrison, Ed Mack, Brian O'Heron] that had implemented BEA, SAS management insisted their projects be staffed by Americans, and also demanded the personal attention of Lee Johnson or his personal representative. On the other hand, George Geick was equally committed to make SAS and every other airline truly International accounts. We swung SAS around but it took several months. In the process, I gained the internal company reputation of being an airlines expert.

In 1965, FGM [Lee Johnson] had sold to United Airlines. But in a departure from the UNIVAC 494, the configuration for the largest airline in the free world was the largest computer made by UNIVAC, the recently announced 1108: 3 CPU's, 2 I/O units. And Lee being the "expert" marketer, promised even more than the United RFP required: *"You want a 2 second response time, we'll give you 1 second"*. The cut-over date was committed for October 1968. Just days before acceptance tests, the UNIVAC Project Manager, Chuck Riley, who had been installed by Lee Johnson resigned. Mr. MacDonald personally asked me to finish the job; Mr. Geick agreed to hold my job open as I would only be gone a few weeks, a couple of months at the most. I would report directly to Mr. Probst, VP Data Processing Division. The few weeks turned into a year and a half.

The United project was an absolute and complete disaster. The 1108 3x2 was not up to the job. And nobody had even a hint of how bad it was: not UNIVAC management in Blue Bell, not United management in Chicago EXO, not the United project team who monitored progress. With the probable exception of Chuck Riley, and possibly Lee Johnson, nobody knew the catastrophe that was now upon us.

There was never any consideration by UNIVAC or Sperry managements to back away, or seek an alternate solution. UNIVAC President Robert MacDonald met with United President George Keck to inform him that UNIVAC would meet its contractual commitments, and was prepared to do whatever was required; Mr. Keck promised United's total cooperation. I was given Carte Blanc authority to command any company resource. I was also given a direct order by Gerry Probst to keep Marketing out of United: *"Marketing [Lee Johnson] has caused the problem and I don't want them any where near the project to further mess things up."* It must be said that the Chicago Branch Manager at the time was Joe Kroger, and I dutifully followed orders and kept Kroger and his boss, the Central Ops VP out of United premises for the next year and a half.

Already on the project were Vamand Crane and Larry Walker, who I quickly came to recognize as hardware and software geniuses, respectively. They led the hardware and operating system redesign efforts, imposing the project's requirements on Roseville who responded magnificently. Another genius, Ed Mack along with Brian O'Heron and others from the Airline Development Center in London were brought in to offer guidance for improving applications programs, which were United's responsibility. I brought in people to strengthen

management and technical staff: Jay Longbottom as Deputy Project Manager, Merle Crain, Doug Hanson to name a few. Jan Brundin developed a model by which performance could be very accurately predicted.

And we succeeded! The acceptance test run in early 1970 demonstrated that the system met all performance requirements, and Brundin's model showed it would far exceed the requirements with the additional improvements that were underway. **And the very next day George Keck canceled the contract:** we learned later that United didn't have the funds to pay for the system. With no advance warning to me or anyone including the United staff managing their side of the project. The Sperry CEO in New York heard of the cancellation on the radio, and was furious. I prepared the UNIVAC project team for a lawsuit. But cooler heads prevailed in Blue Bell, and rather than sue, we set about to renegotiate the contract; negotiations were led by UNIVAC Controller Harry Steinberg, who had already made accounting adjustments to write off possible losses. When negotiations were finalized in May 1970, United turned the system on, and it ran without a hitch. The account was eventually expanded to accommodate aircraft maintenance and other functions, to the satisfaction of the local Chicago Branch.

My job in International had been filled [by two people, one each for Technical and Personnel]. I was given the job of Director, Worldwide Customer Engineering - a newly created staff position reporting indirectly to Gerry Probst. Though CE was a well run, profitable organization, management felt it had become somewhat in-bred and needed a new system vision. Though I didn't ruffle the CE hierarchy to any large extent, I did bring in Ray Maurstad to modernize parts warehousing and distribution. Shipping through New York was ripe with pilferage, so we set up a parts distribution center at Chicago's O'Hare Airport, and another at duty free Schiphol Airport in Amsterdam. The CE maintenance training facilities in upstate Illion, New York [near the manufacturing plant in Utica] was inconvenient and archaic, dating back to the days of Remington Arms. We relocated CE maintenance training to the new modern education facilities in Princeton NJ acquired in the RCA acquisition. And the European CE maintenance training group in Zurich, Switzerland was made a more integral part of the CE function. We strengthened the role CE played in product design to insure that more efficient maintenance procedures were incorporated into the design, e.g., modular swap out. I really enjoyed my 2 to 3 years in CE; in my going away ceremony, I was awarded a lifetime membership. I recommended John Bucci [not Vince Donovan] as my replacement.

When asked to take over System Support Services, I didn't hesitate. I really wasn't a hardware guy, my primary interest and experience was in systems and software. I was still convinced that the trend of the industry lie in services, not exclusively hardware. The study initiated by Joe Stoutenburg in 1966 had culminated in the formation of an organization within DSD, System Support Services (SSS), to undertake service contracts with their military and government customers. I have no knowledge of when and why SSS was transferred from DSD to DPD Marketing; I suspect Bob MacDonald and/or Gerry Probst, seeing the advantage such a group in the commercial venue, likely had something to do with the transfer. But it wasn't MacDonald or Probst or [at the time DPD Marketing VP Geoff Cross, recently Controller, International Division] that asked me to take the job, it was Brian O'Heron, who was Cross' Technical Director. I knew Cross very well from our days together in International, and I knew O'Heron from his days at the London Airlines Development Center and his help on United.

At the time SSS was headed by Ray Kot, my good friend from NTDS and San Diego. Ray and a small staff including his controller Dick Colby were located in Eagan. Ray had organized SSS on a regional basis: At the time the key players were Gordy Erickson in San Diego CA, Jim Sarver in Morris Plains NJ, Zeke Heller in Washington DC, and Bob Barfnecht in St. Paul. There were also sites in Warminster PA, Houston TX, and Grouton CT but the names of the managers there escape me. The organization consisted of some 600 to 700 people. In addition to Ray, I inherited Vern Leas, also a long time acquaintance dating back to my early days on NTDS. As he was winding down his career, Vern had been assigned as SSS's marketer.



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Brian O'Heron had no concept of the disciplined environment of DSD and SSS: direct labor, indirect labor, overhead rates, on-site versus off site, etc. were completely foreign to him. As Ray, Vern and I were to learn, Brian O'Heron was a wild man, and never should have been given the authority he had.

Though the preponderance of SSS contracts were government customers, there were two commercial contracts: Store-to-Door [UNIVAC 9300] in California, and Union Carbide [UNIVAC 418] in Tarrytown NY. It was the nature of the DPD organization that the geographical DPD Branch would stay involved and was ultimately responsible to DPD Marketing management for customer satisfaction. The Union Carbide account hit the fan when the customer demanded changes not in the original scope. The position of the Branch Manager was to give the customer what he asked for; that is the way it had always been done. The discipline of SSS was to negotiate a change-of-scope with appropriate increase in price. Brian O'Heron, in support of the Branch, designated himself on-site Project Manager to implement the changes at no charge. And he demanded the near constant on-site presence of Jim Sarver, Ray Kot, and me, SSS management in ascending order. Finally recognizing that the equipment configuration was not capable of handling his expanded desires, the customer canceled the contract.

That SSS and DPD Marketing were two very different cultures was obvious, and the differences would not soon be breached. Whether DSD requested or DPD offered, I don't know; I could imagine DSD was concerned that some military or government customers could be alarmed by DPD Marketing management style. In exchange for benchmarking space in Eagan, SSS was transferred back to DSD. It was the mid 1970's. Sometime thereafter I learned Ray Kot died of a brain hemorrhage. The organization resurfaced in my world some years later as Technical Services Division with Pat Casey as VP.

For the first time in my career with UNIVAC, I requested a transfer: Back to International, to the position of CSS Director, the Americas International Group (AIG), reporting to Walter Hammerle, VP. The scale was smaller than my previous assignment in International, the job was similar. The countries were different: Argentina, Australia, Brazil, Canada, Mexico, New Zealand, Puerto Rico, and Ecuador including subsidiaries and distributors which had largely been ignored in my previous tenure in International. The challenges were similar; build up local technical expertise, don't over commit to the customer, and resolve problem accounts. The Australian Post Office in Melbourne and the New Zealand Police in Wanganui were reprises of SAS in demanding my attention and on-site presence.

Ten to twelve hour flights crossing the Equator to Argentina and Brazil, and 24 hour flights crossing a dozen time zones to Australia and New Zealand are not for the aging body and mind. So when the request came from Executive Management for me to join a small team to unbundle the company, I accepted. But with the regrets of ending some very close relationships: Roberto Garcia and Alex Heredia in Mexico, Gus Sichero in Brazil, Bjord Haarland in New Zealand.

IBM had unbundled in 1969; other than separately pricing maintenance, UNIVAC Marketing had strongly resisted unbundling services, application program packages, education, etc. from the price of the hardware. Commercial Marketing believed there was a competitive advantage for bundled pricing. But over the years, our intelligence showed IBM was profiting handsomely from separate pricing. And the Branches giving away the farm with each hardware sale simply had to stop. I was a member of a three man team: Dick Esteves with Logistics/Pricing discipline, Don Ford with Controller discipline, and myself with Systems/CE discipline. We added Bill Hirsch of Contracts Administration to draft new standard contract forms, and we consulted closely with the Law Department. The team reported to Glen Haney, a Marketing VP who sat on the Executive Committee. Late in the game Haney was replaced by Don Neddenriep, an Engineering VP. Though the Executive Committee approved the order in which actively marketed products were unbundled, the Team was largely on its own in defining policies and procedures.

The Team prepared and published a brochure that was distributed to the Field: Operations, Branches, and Subsidiaries which was frequently updated as new product lines were added or procedures altered. Though the brochure was the primary means of conveying unbundling policies and procedures, seminars were conducted for Operations and Branch and Subsidiary management.

When policies and procedures and separate prices were in place, the job of the Team was over, and I was transferred to DPD Marketing, reporting to Gene Rawles, VP Customer Support Services (CSS) who had replaced Brian O'Heron; Gene reported to Joe Kroger, VP DPD Marketing who had replaced Goeff Cross. [Goeff had left UNIVAC to be CEO of the British computer company ICL.] Although I had other responsibilities, I was the "unbundling expert" and monitored the revenue from separately priced products and services, and forecast future revenues. The percentage gains [though starting from a low base] were impressive. Gene Rawles and I became close personal friends. When Gene accepted a position of Branch Manager in the Midwest near his roots, and was replaced by Vince Donovan, I concluded it was time to evaluate my future with the company. It was the early 1980's.

If at one time Bob MacDonald and Gerry Probst were my mentors, those days were long gone. MacDonald had moved up to CEO, Sperry Corporation, and Gerry Probst had assumed the position of President, Sperry UNIVAC. Though in recent years I had been offered positions in the Development side [London, Salt Lake City, or Roseville], my wife and I agreed that our moving days were over. "You can take the job if you want to. But I'm not moving. And when and if you come by Blue Bell, we'd love to see you. But I'm not moving." I had to agree, for the sake of family, as our children were now married and grandchildren were coming each and every year. I pretty much had had it with traveling. International is for the young, and I was now over 50. I was also sick of the intrigue of a Headquarters environment. My very good friend Bill Lowe and Personnel Director fell victim to the backbiting when Joe Kroger won out over Bill's boss, Paul Spillane, in the selection of UNIVAC President when Probst moved up to replace MacDonald as CEO; Bill committed suicide on a Friday morning while he was dressing for work.

So when Jim Sarver, Director NE Region of TSD humbly asked me to take the position of Manager, Philadelphia Operations, reporting to him, I was ready. Recall that when I ran SSS, Jim Sarver was two levels below me, reporting at the time to Ray Kot. Now Jim reported to Pat Casey, VP TSD. I called Pat to insure that he approved of my rejoining TSD; he did. Instead of commuting 12 miles west to Blue Bell, I now commuted 12 miles east to Trevoise. TSD had recently won, as subcontractor to Sperry Systems Management (SSM), two major systems: North Warning System and NEXRAD. In addition, Philadelphia Operations had two contracts for Anti-Submarine Warfare services with the the Naval Air Development Center (NADC) in nearby Warminster, and a couple of smaller service contracts. There was more than enough very interesting work to challenge my managerial skills.

I loved the job: it was like running my own small company of 150 or so people. My contacts in Blue Bell helped in getting some company surplus office equipment and PCs to facilitate the personnel expansion of Philadelphia Operations to accommodate the new business. I won the TSD Manager of the Year award two years in a row. Bonuses were rewarding. Life was good.

Jim Sarver and Pat Casey had a falling out: Sarver was reassigned to a menial job in Atlantic City until he could retire; he was replaced as Director by John Guarino, who I had vaguely known from previous assignments. Though I grieved for Jim Sarver, and we remained personal friends, I got along fine with Guarino. My relationship with SSM program management in Great Neck on the NWS and NEXRAD projects was excellent as each milestone was achieved on time. Life was good.

I was in Trevoise when the merger with Burroughs occurred in 1986. Word soon filtered down that Mr. Blumenthal, who traveled the PA Turnpike from his home in Princeton to his office in Blue Bell was extremely upset with the Sperry signage over our building, clearly visible from the turnpike. "Get it down" Blumenthal ordered even though the name of the new company had not yet been determined. Mr. Blumenthal's



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priorities were becoming clear. On the rare occasions when I visited Blue Bell, familiar faces kept disappearing, and soon there were only a couple of Sperry faces to be seen.

Pat Casey retired. Senior VP and marketing people in Great Neck who only a few months earlier had been lauded for the fantastic job they did in winning NWS and NEXRAD were fired or demoted, presumably because they may be soiled by "Ill Wind". My boss John Guarino, who hailed originally from New Orleans, was demoted and transferred to Baton Rouge for no apparent reason other than to make room for a Burroughs guy, Jim Steen, a recent reject from IBM. Though the new head of UNISYS Defense organization, Fred Jenney never made an appearance at Trevoise, rumors spread that he was very upset with our incompetence and that I was in his sights and was the next to go. Burroughs had a similar SDC organization under George Shryock providing contract services to NADC, and it made sense to consolidate the two groups in new facilities being built in Ivyland, closer to NADC. Life was tenuous. Life was not good.

When a volunteer layoff/early retirement plan was put forth for DSD personnel, effective April 1, 1989, I clamored to be included. I was on the DSD payroll so technically qualified. The promise of free medical insurance for life for me and a cost of \$2.50 a month to cover my wife was all the enticement I needed at a time of escalating health care costs. Jim Steen graciously escorted me out the door, and I never looked back. I never visited the new TSD facilities in Ivyland. I never visited Blue Bell except to attend retirees meetings. I was 58 years old, ready to start a new passage in life. Life away from UNISYS was good.

Until a couple of years later when the new CEO, James Unruh announced that UNISYS was discontinuing providing free medical insurance to retirees. A new retirees' medical plan had been formulated in which the insured population would be exclusively retirees. In other words the retirees had been removed from the general employee population, and thus the premiums for the new retirees plan would skyrocket through the roof. My wife was working and I immediately obtained medical insurance through her employer, so I wasn't personally damaged to any great extent. But there were many retirees that simply couldn't afford the new plan. Unruh couldn't be allowed to get away with such an abominable and illegal action. It was a matter of principle.

I worked with the Blue Bell Retirees Group as hard as I had ever worked as an active employee to reverse Unruh's action and reinstate free medical insurance. Working with Alan Sandals as lead attorney, I provided discovery and testimony. Alan filed a class action suit in Federal Court, claiming a breach of contract. I volunteered to be one of the ten named claimants. The court determined there were several classes [e.g., Sperry 1981, Sperry 1984, Sperry 1986, Sperry 1989, Burroughs, and UNISYS]. The court found mostly in favor of the company. Though small consolation, the appeal of my class to the U.S. Supreme Court was titled "*Gerald E. Pickering et al versus UNISYS*"; the Supremes never heard the appeal but I take some pride that my name is associated with fighting the good fight.

I am very proud of my 32 1/2 years with UNIVAC. It is the only company I ever worked for. By and large I felt that UNIVAC could accomplish technically anything it set out to do; more than anything the United Airlines Project was proof of that. I am particularly proud of my contributions to NTDS, the turning of International into a profitable division, unbundling the UNIVAC product lines and in essence turning UNIVAC commercial from strictly a seller of hardware into a provider of system services. I am proud to have ended my career with an involvement with NEXRAD which proved Sperry was the provider of state-of-the-art system solutions. Each and every time I watch a weather report tracking a dangerous storm, I must restrain myself from jumping up and proclaiming to everyone within listening distance: "*That's NEXRAD at work. I had a hand in developing it.*"

I am very proud that I could contribute to the effort and lawsuit that attempted to reinstate medical insurance to retirees. Though I didn't personally suffer irreparable damages, many retirees did. What UNISYS did was wrong, and we had to join forces to fight evil. We lost to a prestigious Philadelphia law firm who did an outstanding job of presenting their side of the case. We were well represented, and our case had legal and moral merit. But the judge . . . I best say no more, other than I am proud we fought the good fight.

POSTSCRIPT

But as a matter of historical interest, whatever happened to the rest of the B.U.N.C.H: To NCR; to CDC; and to Honeywell?

NCR began in 1879 as the National Manufacturing Company in Dayton OH, which was established to manufacture and sell the first mechanical cash register. In 1884 the company was renamed the National Cash Register Company. A significant figure in the early history of the company was Thomas J. Watson, Sr. who as General Sales Manager introduced the motto "THINK!". [Watson went on to become CEO of IBM, taking with him what would become the widely-known - if ridiculed by outsiders - symbol of IBM.] NCR expanded quickly, and by 1911 had achieved control of 95 percent of the U.S. cash register market. In 1912, the company was found guilty of violating the Sherman Antitrust Act; several executives including Watson were convicted of illegal anti-competitive sales practices and were sentenced to one year imprisonment.

During World War I, NCR made shell fuses and aircraft instrumentation; during World War II it built aero-engines, bomb sights, bombs, and code-breaking machines. Building on its wartime experiences NCR became a major post-war force in developing new technology. In 1956, NCR introduced a bank machine using magnetic stripe technology, and in 1957 it manufactured its first computer. In 1962, NCR introduced the NCR-315 Electronic Data Processing System which was followed by the Century series in 1968 and by the Criterion series in 1976. During this period NCR also produced a minicomputer and began to make inroads into the ATM market. In the 1980's, NCR sold IBM-PC compatible computers as "intelligent terminals". In 1982, NCR established itself as a pioneer in bringing open systems architecture to the computer market.

NCR was acquired in 1991 by AT&T to form the subsidiary AT&T Global Information Solutions. The subsidiary suffered losses in the billions of dollars for the next three years, becoming a drain on the parent company which downsized the subsidiary by 20 percent in an attempt to save it. AT&T decided to spin off AT&T Global and changed its name back to NCR. NCR re-emerged as a stand-alone company on January 1, 1997. **In 1998, NCR sold its computer hardware manufacturing assets and ceased to produce general-purpose computer systems.** Thereafter its main products are self-service kiosks, point-of-sale terminals, ATM's, check processing systems, and barcode scanners. In 2009, NCR relocated its corporate headquarters to Duluth GA from Dayton, OH which had been NCR's home for 125 years.

The Control Data Corporation was formed in 1957 by a group of dissident Sperry Rand employees who traced their roots to the original ERA. The group included Seymour Cray who had led some computer design work at ERA. CDC soon released a version of the ERA 1103, re-designed as the CDC 1604; the first 1604 was delivered to the U.S. Navy in 1960. In 1964, CDC announced the CDC 6600, out-performing everything on the market by roughly ten times. IBM took notice and announced the System/360 Model 92, which would be just as fast as CDC's 6600. The Model 92 did not exist, but its announcement impacted sales of the 6600. CDC filed an extensive antitrust lawsuit against IBM, and won a settlement valued at \$80 million.

In the same month it won its lawsuit against IBM, CDC announced the CDC 7600. The 7600 offered more than four times the total throughput of the 6600. However, its complexity led to poor reliability; the 7600 damaged CDC's reputation. There followed an internal conflict: Seymour Cray was designing the 8600; another project called the STAR was also underway. Because of limited funds, the company could not

support simultaneous development, and chose STAR. Cray left CDC to form Cray Research. In 1974, CDC announced the STAR, designated as the Cyber 203. It turned out to have performance problems. An updated version, the Cyber 205, had considerably better performance. But by this time, the CRAY-1 was complete, computing much faster, and Cray Research became synonymous with supercomputers.

CDC decided to fight for the high-performance niche, and in 1983 set up a spin-off company, ETA Systems, with a design goal of 40 times the speed of the Cray-1. ETA was unable to achieve its goals and the effort ended. **In 1989 CDC was out of the supercomputer business.** Though it became a major player in the hard disk drive market, the end was a foregone conclusion **and the company broke apart** with parts bought out by a subsidiary of the BT Group, another ending up with Siemens.

Honeywell's roots trace back to 1885, to the invention of the *dampner flapper*, a thermostat for coal furnaces, by Minneapolis Heat Regulator Company. In 1906, Mark Honeywell founded Honeywell Heating Specialty Co., Inc. in Wabash IN. Honeywell's company merged with Minneapolis Heat Regulator Company in 1927. The merged company was called the Minneapolis-Honeywell Regulator Company. Minneapolis-Honeywell became a global technology leader in thermostatic heating control. Minneapolis-Honeywell entered the defense industry in World War II, producing aerospace elements. During and after the Vietnam War Minneapolis-Honeywell produced a number of [controversial] products, including cluster bombs, missile guidance systems, napalm, and land mines.

Minneapolis-Honeywell originally entered the computer business via a joint venture with Raytheon, but soon bought out Raytheon. The computer was called the Honeywell 800, later updated to the Honeywell 1800. In 1963, Honeywell introduced a small business computer, the Honeywell 200. In 1965 the company's corporate name was officially changed to Honeywell. In 1970, Honeywell bought General Electric's computer division. The company was reorganized into two operating units, one of which was Honeywell Information Systems. In 1990, Honeywell began a restructuring. Its defense division was spun off; Honeywell continued to supply aerospace products including electronic guidance systems, cockpit instrumentation, lighting, and primary propulsion and secondary power turbine engines. **In 1991 Honeywell's computer division was sold to Groupe Bull**, a French computer company headquartered in the suburbs of Paris.

The original Honeywell lives on in name only. In 1999 what was left of Honeywell merged with Allied Signal; although AlliedSignal was twice the size, the combined company chose the name Honeywell International Inc. because of its superior brand recognition. The new corporate headquarters were consolidated in Morristown NJ. Honeywell closed its facilities in Minneapolis after a presence of over 70 years; over one thousand employees lost their jobs.

And so the principal players of the computer industry of the 1960's have been reduced to two: IBM and UNISYS. It is of some consolation that UNISYS survived when all the other Dwarfs met their demise.

I have no more to say. Good night and Good luck. *Gerry Pickering*



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