IT Legacy Article Compendium

1 Introduction – Lowell A. Benson, Editor

Write a Book? How about an autobiography? Shortly after the Information Technology (IT) Legacy Committee was formed, Dick Lundgren began to write Legacy articles for the VIP Club newsletter. During the committee's decade of volunteering, several other committee members have also written Legacy associated newsletter items. This booklet[1] is a collection of those VIP Club newsletter articles. The first several articles are the history of the Legacy Committee as we felt our way through the quagmire of gathering documents and hardware artifacts and then cataloging them. So, to some degree, this is both a book and the IT Legacy Committee's autobiography.

This book complements our December 2015 'Article for the Month'. That too was a booklet: *Measuring Success = Volunteer Hours;* recapping a decade with summaries of over 100 on-line IT Legacy articles.

> *I dedicate this document to James 'Rapp' Rapinac who passed away 23 January 2016. Rapp was a steadfast supporter of our legacy initiatives and a good friend.* ***LABenson***

If you are using Adobe reader; clicking on any section in the table of contents will get you there.

2 Table of Contents

[1] We have drawn a line through Universal Resource Locators (URL) that are no longer valid.

3 2006, First Year Articles

3.1 March 2006 – Richard Lundgren

Lockheed Martin has initiated a project to document the historical legacy of LM Tactical Systems (Eagan) from 1946 until 1996. This project is now gaining steam. It is an opportunity to document the significant events, programs, technical innovations, customer relationships, etc. of the past decades for perusal by past, current and future employees.

The VIP Club is investigating the archival resources of the Charles Babbage Institute (CBI) at the University of Minnesota. CBI (http://www.cbi.umn.edu/) is the repository for archival material in all forms related to the history of information technology. We have also begun to identify artifacts/documents held by former/current employees who are willing to participate in this project.

Following is a list of the types of items that we are seeking. Please identify useful items in an email to Dick (Ole) Olson at ~~r.d.olson@lmco.com~~[2], or Dick Lundgren at rflundgr@aol.com.

- Pictorial Collections - Any photos, pictures, slides, etc. that were not prepared by the Eagan Publications Department. Publications - Any publication that shows our superior capabilities. This category includes writings by third parties appearing as articles in newspapers, magazines, and professional publications as well white papers and books. The best book we have encountered is When Computers Went to Sea by David Boslaugh. This book fairly and accurately traces the history of the development of early digital computers to solve the problems encountered in WWII during air attacks on allied ships.
- Artifacts - We have identified several great artifacts so far including models of early computers, models of ships/planes that carry our computers, and several computer components/chassis.

Progress on the legacy project will be reported periodically in this section of the newsletter.

3.2 April 2006 – Richard Lundgren

3.2.1 Support for Charles Babbage Institute (CBI) at the University of Minnesota

The VIP Club Board has decided to express its gratitude in tangible form to the CBI (http://www.cbi.umn.edu) for their assistance in support of the Legacy History project. Board President Bernie Jansen has sent a letter to Dr. Arthur Norberg, Director of CBI, reiterating our thanks and making a $100 contribution to CBI, thereby becoming a "Friend of CBI." As of Friend of CBI, the VIP Club will receive a free subscription to *Annals of the History of Computing* and the CBI Newsletter.

3.2.2 Email List Compiled for Retirees Interested in Legacy Project

Dick Olson has compiled a list of email addresses for those retirees who have given him their email addresses and are interested in the Legacy History project. His original list of about 100 was recently augmented by another 60 who are retirees from the ATM (Air Traffic Management) group. Dick will be sending the compiled list to all list members, who should encourage other interested retirees (not on the list) to participate.

[2] Ole retired and is now in an assisted care facility in Zumbrota, Minnesota – 1/5/2016.

3.2.3 Interested Group in Arizona

A group of retirees in and around Mesa, AZ have shown considerable interest in the Legacy project. The group is a mix of permanent AZ residents and snowbirds who hold an annual soon-to-happen spring get-together with up to 45 in attendance. Their interest and input to our legacy history will be discussed. They have already made some excellent contributions and we are expecting more. The point of contact for Arizona is Jim Rapinac (EISENHUT@aol.com).

3.2.4 History Sources besides Retirees –

Retirees and longer term active employees are remarkably good sources for our legacy history project, but there are other sources with perhaps a more objective view. The archives of the Babbage Institute have already been explored in a cursory fashion, and several books in the popular press have already been mentioned in this newsletter. Additionally, we have paid visits to some local history organizations which have maintained files on our company (under its various names). So far, we have explored the files of both the Dakota County Historical Society and the Eagan Historical Society. Both were very interested in our effort and hope that we can, in return, provide information to supplement their files. We found articles on various topics such as the company decision to move from St. Paul to Eagan, the construction of Plant 8 (both initial construction in the late 60s and expansion in the mid-70s), complaints by neighbors of noise during construction of the Semiconductor Building, announcements of workforce expansion/contraction, bargaining unit issues, and of course major program wins.

3.2.5 Legacy History Draft Website –

Lowell Benson, VIP Club director, is the VIP Club committee chairman for the Legacy History project. As a catalyst to move this project along, Lowell has created a "rough draft" website as a link off his personal website. The URL is ~~http://www.usfamily.net/web/labenson/Legacy.htm~~.[3] You are encouraged to take a look at this starting point and offer your feedback to Lowell at ~~labenson@usfamily.net~~. We thank you in advance.

3.2.6 Memory Jogger Question

- We are trying to determine with our traditional inordinate degree of precision just when Plant 1 was built and when Univac began operations there. Does any reader out there have the incontestable, irrefutable, incontrovertible answer? Email the data to Richard Lundgren at rflundgr@aol.com. A reward will be available. Submitted by Richard Lundgren

3.3 MAY 2006 – RICHARD LUNDGREN

3.3.1 A Sexagenarian in the Family

70-years ago J. Presper Eckert and John Mauchly gave birth (an odd situation) to ENIAC for the benefit of the U.S. Army. The 30 ton (oofda!) baby ENIAC, short for Electronic Numerical Integrator and Computer, was one of the very early predecessors of the digital machines that launched the computer age. ENIAC was an 18,000 vacuum tube (that's all they had in 1946) machine that could perform 5000 additions per second. It was also a decimal (at least one redeeming human feature) machine that would soon be superseded by the digital variety. ENIAC's younger brother EDVAC (Electronic Discrete Variable Automatic Computer) followed shortly, and then came the most famous family member UNIVAC (Universal Automatic Computer).

[3] The web site is now http://vipclubmn.org,

"What hath Babbage wrought" evolved into "What hath Eckert and Mauchly wrought?" The private company founded by Eckert and Mauchly in Philadelphia had marvelous engineering talent, but was undercapitalized and could not (in spite of clever machine names) survive on its own. An attempt to go public in 1947 bought a little time, but didn't solve the undercapitalization problem. Finally, in February of 1950 the company was bought by Remington Rand Corporation, with orthodox decimalists, Eckert and Mauchly, undergoing a saving conversion to reformed binarism. The RemRand company name was followed by Sperry and Unisys, but the name UNIVAC was indelibly imprinted on our industry and on our legacy history. What ever happened to the baby? ENIAC began calculating for the government beginning in postwar 1945, continued calculating for more than 80,000 hours without getting bored, and was laid to rest in 1955. Submitted by Richard Lundgren.

3.3.2 "Common Roots" with NWA

Our Company's Twin Cities operations has shared some common history with Northwest Airlines. Most know that the computer industry in Minnesota began at the former glider factory at 1902 West Minnehaha in St. Paul. The glider factory was owned by Northwestern Aeronautical Corporation (NAC) that had begun manufacturing gliders for the war effort in 1942 using hangar space leased from NWA at the Minneapolis airport. By 1943 the hangar space was much too small, and NAC President John E. Parker, who was also on the board of directors of Northwest Airlines, was able to acquire the much larger facility on West Minnehaha. In 1945 the glider demand evaporated, but Parker, through connections and luck, sensed an investment opportunity in a classified business area. Parker's financing group teamed with a technical group which included William Norris (later of CDC), and Engineering Research Associates (ERA) was launched in January of 1946. As the computers of ERA evolved, so did the name on the company sign from ERA to Remington Rand to Sperry and Unisys Postwar headquarters for Northwest Airlines were located at 1885 University Avenue in St. Paul. New headquarters were built at the Minneapolis Airport, and the governing functions and personnel were transferred there in the 1959/60-time frame. When NWA moved out of 1885, Univac moved in. At least one NWA employee at 1885 went on to become a Univac employee (VIP Club founding member Millie Gignac) in the same building.

NWA also tracks its history and keeps a visual (and visit able) record of it at the NWA History Centre, 8101 34th Ave. S. in Bloomington, MN. It's open M-F 11-5. More information is available at www.NWAHistory.org. NWA has been a consistent Univac/Unisys customer for reservation systems and for Lockheed Martin heritage aircraft, such as the Lockheed Orion 9D, the Lockheed Electra 10-A and Super Electra 14-H, the Lockheed Super constellation 1049G, and L-188C Electra, and the Martin 202.

3.3.3 Response to Memory Jogger Question

Three VIP members responded to last month's Memory Jogger Question about the origins of Plant 1 (Shepard Rd). The responders were Jim Hyslop, Dave Durand, and Ed Michaud.

- Jim wrote that he "went to interview for a job with a company named Remington Rand UNIVAC in November of '56. The personnel office for said company was on Minnehaha Ave. between Fairview and Prior Aves, south side of the street. It was located in the Guard Shack for Plant 2." He was subsequently directed to start work at RRU's new facility on Shepard Road and W. 7th St. in early December. He added "I believe I was told that Plant 1 had opened for occupancy in late Sept., or early October."

- Dave Durand started at Plant 1 in January of '57, working on the file computer punch units in a department called "Medium Digital Machines." Dave added, "At the start of summer the computers would shut down because of the heat. The test floor was on the south side of the building. Management had air conditioning units brought in so checkout could continue. I am supposing the lack of air conditioning in 1957 implies the plant was built (completed) in the fall of 1956." Dave also noted, "Bob McDonald used to wander the halls in his blue suit and red bow tie."
- Ed Michaud provided even more detail. "The original Plant 1 at 1902 W. Minnehaha Ave, St. Paul was constructed sometime in the late 1800s and began its career as a horse livery. The second Plant 1 on Shepherd Road began construction in late 1954, completed in early 1956 and occupancy began and was essentially completed in 1956. It was sold to the Prudential Insurance Co. on a 25-year leaseback with a very lucrative buy back provision. At the time I worked in R&D Sales and Contracts which was one of the first departments to move into the new building. As it so happened I was also involved with the repurchase of that facility 25 years later."

3.4 JUNE 2006 – RICHARD LUNDGREN

3.4.1 Legacy Website Taking Shape

The project initiated by Lockheed Martin to chronicle our company legacy history is taking shape in our website. Check out ~~http://www.usfamily.net/web/labenson/Legacy.htm~~ for a preview of our current status and the direction we are heading. We are looking for contributors. This is a "collective authoring" project. We need people to fill in the blanks. If you see areas where something is missing, and you know a lot about it, we need your input. Please provide a description of the piece of company history that is your strong suit in an email to VIP Legacy Committee chairman, Lowell Benson at labenson@usfamily.net. Each contributor is also asked to provide a short biography of his activities at the company to be included with the write-up.

3.4.2 Legacy Project Represented at VIP Picnic

The June 14th VIP retiree picnic will have a focal point for our legacy history discussions. Some artifacts that have been collected will be on display. Examples include an 1824 computer, a CPF (Canadian Patrol Frigate) Model, and a P3-C Orion Model. Attendees who have artifacts to contribute are invited to bring them to the picnic. Also some debates are raging over the naming/numbering of various plants/buildings. If you have any old documentation, such as old company phone books with plant locations, please bring them to the picnic. Also another debate is raging over where was the first Univac Park. Was it the Shepard Road facility or was it the Eagan location? No doubt firmly entrenched memories will resolve these debates.

3.4.3 Were You a Movie Star?

A discovery was recently made at a Lockheed Martin warehouse in Eagan, Minnesota. A pallet, stacked 3' high, with boxed-up 16 mm films was found. This was old Univac/Sperry/Unisys material going back to at least 1967. These films, which have not been viewed, were inventoried by title. Perhaps a VIP member out there played a lead role in one of these "movies." Space does not allow publishing all the titles here, but the list will be available at the History table at the VIP picnic. A few sample titles are:

- Automation in Air Traffic Control,
- Design and Accuracy – The Essentials of Reliability,
- Electronic Servants,
- Introduction to the AN/USQ-17 Computer Set,

- Man and Computer, A Perspective.
- Mr. Edler's Class,
- No Time for Cookie Jar,
- The Critical Ingredient, and
- The Priceless Component,
- Wave Soldering Machine June 1967,
- You Pack your own Chute,

If you recognize any of these titles, or better yet, if you starred in one, please let us know. Submitted by Dick Lundgren, Dick may be reached at rflundgr@aol.com.

3.5 JULY/AUGUST 2006 – RICHARD LUNDGREN

3.5.1 LM Corporate Legacy Initiative Team to Visit Eagan

Members of the Lockheed Martin Corporate Legacy Initiative Team are planning a visit to the Twin Cities in July or August. Team members are from Corporate Headquarters in Bethesda, Maryland and from a west coast location. They are interested in our efforts to date on the Legacy History Project (ERA to Lockheed Martin) and also in the computer industry archival resources found locally at the Charles Babbage Institute at the University of Minnesota. They have recently been exploring archival data from Lockheed Martin in Palmdale, California.

3.5.2 The Eleventh Commandment, almost

Thou shalt not use transistors! Imagine what our world today would be like if this commandment had been heeded. In fact, a very careful engineering study performed in 1950 came to this conclusion. The exact words were: "In view of the foregoing individual characteristics of transistors, their non-uniformity and easy burn-out, their adverse temperature effects, and their poor matching qualities, the present use of transistors as elements of computing circuits is believed to be inadvisable. High cost is at present a further deterrent to their use in lieu of vacuum tubes." Well, an "inadvisable" admonition is perhaps not as strong as a fundamental proscription, but the message was clear. The future of computers did not lie in the use of transistors. Fortunately for all of us, not all commandments are religiously obeyed. Early transistor transgressors (among them Seymour Cray at Univac) saw beyond the copious problems of early transistors and set about designing computers using more idealized (and soon to be productized) versions of the new device. The rest is history. Discrete transistors evolved into integrated circuits with the level of integration getting continuously more and more complex. And it continues today. Two other conclusions from that early study reflect the state of the art of the technology at that time as well as where it was to go.

- The first: "The results of this investigation indicate that it is possible to build computing circuits using transistors of current manufacture. To achieve maximum reliability, however, it is necessary to carefully select only the units with favorable characteristics. Then each circuit must be tailored around the characteristics used." Laborious handpicking of components and tedious circuit tailoring was a long way from standardization and a bottleneck for mass production.
- The second conclusion revealed more optimism: "Improvement of transistors in the course of time is to be expected. The recent announcement by Bell Telephone Laboratories of the coaxial, filamentary, and p-n-p transistors is evidence of continuing effort in transistor development. A device as new as the transistor will undoubtedly undergo many improvements and changes. Future developments should produce transistors of a quality and uniformity suitable for computing circuits."

The conclusions quoted above came from a Report called "The Potentialities of Transistors in Digital Computing Circuits" by Ron Toth, dated 12 July 1950. It was prepared under a contract between

Engineering Research Associates and the Navy Department Bureau of Ships. The report is on file at the Charles Babbage Institute. If transistor technology had been totally rejected, a major anchor on progress would have been instituted. It would have been akin to a commandment such as "Thou shalt neither invent nor use the wheel," a major stagnating limitation in certain historical societies.

3.6 SEPTEMBER – VISIT FROM LOCKHEED MARTIN CORPORATE OFFICE

Two directors, Barbara Reinike and Shelly Paup, from the LM Corporate Office in Bethesda, Maryland visited LM on August 1st and 2nd to hear about our efforts in documenting the Legacy of LM Eagan. They represent the LM Legacy Initiative at the highest corporate level and have purview over all divisions/units of the company in this respect. They regarded their visit as very successful, and they were impressed by the enthusiasm of all involved.

- At the LM facility in Eagan on August 1st, various Legacy team members, including the Executive of Interest Lee Meyer, presented the current status of our legacy effort as well as our plans for the future. We emphasized the involvement of both active employees and retirees, and VIP Club member Lowell Benson walked the corporate visitors through our initial legacy website (~~http://www.usfamily.net/web/labenson/Legacy.htm~~). They mentioned that the website approach was consistent with their vision at the corporate level. An innovative feature of the website was the "Collective Authoring" approach which provides for written input of many employees who have lived through so much history and are so very capable of capturing it for future reference. Another key element of our presentation was our comprehensive computer genealogy chart from 1946 to the present. We presented this genealogy chart as the roadmap of our legacy effort. The evolution of our computers, and the systems built upon them, is the record of our legacy.
- On August 2nd the group convened at the Charles Babbage Institute at the University of Minnesota. The past director (Dr. Arthur Norberg) and the current director (Dr. Thomas Misa) welcomed all and discussed the background, purpose and functions of CBI. They also provided a tour of their underground repository for the safe storage of all their archival material. The LM directors then spent time examining historical material which had been brought to the reading room for them, and making copies of selected items to take back to the corporate office.
- The last stop of the day was at the Minnesota Historical Society to view two legacy artifacts - the first magnetic drum produced by ERA in 1946 and a UNIVAC II console. All members found the two days to be very interesting and rewarding. LM Legacy Website features "Collective Authoring" The development of the legacy website continues with additions of multiple written inputs from many very knowledgeable employees from all different business areas and decades. The goal is to exceed "Collective Authoring" content from more than 100 different legacy sources.

Check out some of these write-ups by going to the website, ~~http://www.usfamily.net/web/labenson/Legacy.htm~~, and clicking on "Careers." Great examples are provided by Lowell Benson, Millie Gignac, Keith Behnke, Don Lovely, Manny Block and many others. Also click on "Systems" and then "Air Traffic Control" to find an excellent write-up from Jack Sater. Likewise click on "Support" to find an excellent write-up by Mike Svendsen on the topic of "Component Acquisition."

3.7 OCTOBER 2006 – RICHARD LUNDGREN

3.7.1 LM Eagan Legacy Presented to the Corporate Office

The content and approach of the LM Eagan Legacy effort were presented on September 1st to the LM Legacy Program Executive Steering Council in Bethesda, MD. The presenter was LM Director Barbara Reinike, who visited Eagan in early August. To support Barbara in covering our six decades of progress, we made available several carefully chosen items from our growing collection of artifacts and documentation. A major item of captivating interest was our computer genealogy chart beginning in 1946 and continuing to the present. The evolution of our computers, and the systems built upon them, is the record of our legacy. Published books by noncompany people were also made available with selected pages flagged for interest. These books were *When Computers Went to Sea* by David L. Boslaugh (retired USN Officer) and *Computers and Commerce* by Arthur L. Norberg, Ph.D. (former director of the Charles Babbage Institute and very well respected historian of technology). The Boslaugh book chronicles the history of NTDS development in which many ERA/Univac personnel played crucial and indispensable roles. The Norberg book is an academician's analysis/assessment of our company's legacy in the first decade (1946-57). Incidentally copies of the definitive Norberg book with personal dedications from the author were also provided to members of the LM Legacy Initiative Team. We also supplied one hardware item which was a chassis for an 1824 computer, a missile-borne computer from the late 60s. Supporting documents addressed our efforts in inertial guidance and ground guidance. Overall, the presentation was very well received, and the Executive Steering Council foresees the Legacy Program running into 2008.

3.7.2 More Career Summaries Needed

The LM Eagan Legacy website, ~~http://www.usfamily.net/web/labenson/Legacy.htm~~, continues to expand with the addition of more career summaries submitted by many interesting employees from many different work areas. Check out the write-ups provided by Jim Hyslop, Keith Myhre, Phil Phipps, Bill Butler, Bob Bro, Dr. John Esch, Bruce Grewenow, and many others. Our collective memory via our collective authoring approach is growing and succeeding, but we are far from complete. Many areas have barely been touched, and we need more inputs. A typical career summary can be 1-3 pages and include career highpoints, "impact" items from your career, leading technology items from your career, and of course memorable anecdotes (humorous or serious, but publishable) from your days as part of our legacy. If you are ready to submit something, or have questions about it, contact Dick (Ole) Olson at ~~r.d.olson@lmco.com~~ or ~~651-456-3158~~. Each person's input is often a catalyst to trigger the memories of others.

3.8 NOVEMBER 2006 – JANSEN AND LUNDGREN

3.8.1 Project Background – Bernie Jansen

The Legacy Project was initiated by Lockheed Martin MS2 in 2006 with VIP Club Support to document its 60-year Information Systems Legacy. This Legacy began with the founding of Engineering Research Associates (ERA) in 1946 in St. Paul and the development and applications of computers in Defense Systems Projects. This Legacy today is resident in Lockheed Martin MS2 in Eagan, Minnesota. In support of this project, VIP Club Director Lowell Benson developed a Legacy Website which is hosted on his personal website. The Legacy Website is the vehicle to document this 60-year Legacy. The Site Map identifies nine areas for gathering pertinent Legacy information. These are: Legacy, Artifacts, Careers, Computers, Facilities, Hardware, Software, Support and Systems. The website content is updated regularly by Lowell

but there are still several areas that need inputs from retirees who made contributions in these areas. Approximately 30 career summaries are recorded under the "Careers" area but many more are needed. To find relevant information on our Legacy, go to the Legacy website at: ~~http://www.usfamily.net/web/labenson/Legacy.htm~~. Your part of our Information Technology heritage is important to us and is needed to make our Legacy complete. Send your inputs via e-mail to Ole or to Lowell using the contact links on the Legacy web site main page; or send hand written submittals (two of the career summaries came in this form) to the VIP Club, P.O. Box 131748, Roseville, MN 55113-0020. Please submit anything and everything to us by November 15th so that we can merge it all together before 2007!" Submitted by Bernie Jansen.

3.8.2 LM Eagan Legacy Website – Progress Continues Admirably

The Legacy website has seen some interesting, informative, and enticing additions in the last month. Taking it from the top, as in top management, be sure to check out the "Presidents List,' recently provided by Lowell Benson. From 1946 to today, this list presents the leaders of the St. Paul organization in chronological order. If you can fill in some missing data or provide any corrections, please contact Lowell at labenson@usfamily.net.

3.8.3 Other great additions

These have been supplied by Marc Shoquist, John Byrne, Jim Rapinac and Bob Blixt.

- Marc Shoquist provided "The Antenna Coupler Program," the critical revenue generating program that allowed ERA to survive and eventually grow as the St. Paul computer pioneer. Marc recalls the history of the Coupler, its technical aspects, and the personnel involved, as well as his travels with Fred "Hargy" Hargesheimer. The Fred Hargesheimer story itself is a not-to-miss highlight of our legacy.
- John Byrne's "Early Memories of an Old Programmer" is a fascinating piece on software development in the early days of assemblers and compilers, including customer pressures, fledgling software and hardware, shipboard systems, and all in historical perspective.
- Jim Rapinac's input is entitled "Anti-Submarine Warfare - A History of the Relationship between Sperry Univac Defense Systems Division and Lockheed California Aircraft Company." It could be a stand-alone chapter in the legacy of involvement between Lockheed California Aircraft Company (CALAC) and Univac. What an amazing breadth of knowledge for company history and customer (USN - NAVAIR) history, as well as competition and key personnel.
- Bob Blixt's write-up, "P-3C Early Computer Development at Univac," describes the conception-to production process for the CP-901 Computer and its operational software. This system has truly stood the test of time of a generation in the fleet of P-3C ASW aircraft.

3.8.4 Legacy the Website, or Legacy the Book?

The LM Legacy website is clearly off and running and gaining momentum. In addition, some Legacy committee members have suggested capturing our history in book form. Consider the following. If we were to print the web site as a first draft, it would be just over 150 printed pages. Eliminating the web navigation buttons and headers would give a 100 page second draft. Many more inputs are still needed, so KEEP WRITING!

3.8.5 Legacy of Patents

Our history would not be complete without compiling a catalog of our patents. Patents from 1975 forward can be researched from the government website http://patft.uspto.gov/netahtml/PTO/searchadv.htm.

However, to gather information about patents from 1946 to 1974, we will need inputs from readers. If you have patents yourself, or can identify people and their patents from that early time period, please contact Dick (Ole) Olson at ~~r.d.olson@lmco.com or 651-456-3158~~. Submitted by Dick Lundgren, rflundgr@aol.com

3.9 DECEMBER 2006 – RICHARD LUNDGREN

3.9.1 Legacy of a Centenarian

I am part of your Legacy. I was born in 1906 and I would be celebrating my centennial on December 9th, but I'm on the other side now. You may celebrate for me. As I look back now, I have a clarity of vision that satisfies my feelings and accelerates my understanding. I became part of your legacy when I went to work for EMCC (Eckert_Mauchly Computer Corporation) in Philadelphia in1946, but my interest in computers and technology preceded that. In my youth I was a gadget kid, taking apart alarm clocks and other things to see how they worked. My father insisted on good schooling, and I got my Ph.D. in math and physics from Yale. In 1943 I enlisted to serve my country in the U.S. Naval Reserve, and I was ordered to the Bureau of Ordnance Computation Project at Harvard University. I became the co-inventor (with Howard Aiken) of the Harvard Mark I computer, and I became the first Mark I programmer. I uncovered a fault in the Mark I which was, in fact, a dead moth in a relay. Since that time I have been given credit for originating the computer terms "bug" and "debugging." Many people I worked with in my early Univac days gave me a bunch of honors, but true now as it was true then, every successful effort is the result of teamwork. I helped with the design of the UNIVAC (1000 times faster than the Mark I), and I led the team to develop the first compiler, A0, and I verified COBOL at its inception. I was the first Computer Science "Man of the Year" in 1969, and I even received the National Medal of Technology in 1991. My commitment to the U.S. Navy was also a lifetime commitment, taking me from Lieutenant J.G. in 1943 to my retirement status as Rear Admiral. The Aegis Destroyer DDG-70, commissioned in San Francisco in 1997, was named after me. Applied mathematics was always my first love, but in real life, I had no children. Some have said that my progeny are the legions of software engineers implementing the endless ideas buzzing in their heads. One colleague suggested my gravestone should read "Mother of all Compilers" or even "Mother of the Bug." I hope neither of those was realized, but you can check at Arlington National Cemetery.

In my world now, I have met and talked with many old friends including Howard A., John M., Pres. E., and Bob MacD. What wonderful conversations we have had. I have also met the Muses, Fates, and Graces (one of whom is my namesake). The Muse Clio suggested I apply for a Muse position in your Legacy Project. I feel it's a good fit. It often happens that history, especially of conflicts, is written by the victor. In your project, for once, the chronicling of history is noble, egalitarian, and seductive, not to mention INNOVATIVE. I commend your efforts and command its continuance. (If my identity is not readily apparent, it will be revealed in the next newsletter.)

3.9.2 Legacy of Legacies

As we all know, the legacy of Unisys and Lockheed Martin (Eagan) is now 60 years, tracing our origins to Eckert-Mauchly Computer Corporation (EMCC) in Philadelphia and Engineering Research Associates (ERA) in St. Paul. As Burroughs and Sperry merged in 1986 to become Unisys, each of those companies had its own legacy. Burroughs traced its origins to 1886 when William Seward Burroughs (brother of Edgar Rice Burroughs) invented and patented the first practical adding and listing machine. With this device he founded the American Arithmometer Co. in 1886 which later became Burroughs Corporation in 1905. Sperry traced its origins to the Remington Typewriter Company, begun in 1873 and the Sperry Electric

Company, founded in 1880 by Elmer Ambrose Sperry, who also began gyroscope development in 1896. Lockheed Martin traces its roots back to 1909 with Glenn Martin's aircraft company and to 1913 with the company of Allan and Malcolm Loughead (later "Lockheed"). Clearly a centennial celebration is approaching.

Some of our competitors also have legacies of business interest and/or local interest.

- Control Data Corporation had a 35-year legacy begun in 1957 and ending when operations ceased in 1992. Portions of CDC morphed into Ceridian, Seagate and General Dynamics and carry on there.
- Honeywell traces its historical founding to Albert Butz's 1885 invention of the Damper Flapper, a precursor to the thermostat. The Butz Thermo-Electric Regulator Company evolved through many names and corporate transactions, becoming the Minneapolis Heat Regulator Company in 1912. That name, plus MCMXXVII, is still on the original building's tower in south Minneapolis (W. 28th St. and Wells Fargo Way). In 1924 Mark C. Honeywell developed clock-controlled thermostats in his company, Honeywell Heating Specialties Company. William R. Sweatt of Minneapolis Heat Regulator and Mark Honeywell merged their companies in 1927 with the Honeywell name surviving. Honeywell (now part of Allied Signal) sees a 125-year celebration not too far off. Honeywell's thread in the computer industry started in 1955 when it formed a joint venture with Raytheon called Datametric Corporation. In 1970 Honeywell bought GE's computer division and in 1986 they merged with the French Compagnie des Machines Bull and Nippon Electric Company (NEC) to form Honeywell-Bull. By 1991 Honeywell was out of the computer business.
- IBM traces its corporate founding under the name Computing-Tabulating-Recording Company (C-T-R) to 1905 with predecessor companies dating to 1888 and 1889. It adopted the International Business Machines name in 1924.
- Have you ever wondered what happened to other Minnesota companies such as Data 100, Lee Data, EMR-Computer, Atron or others with legacies of varying length? The Charles Babbage Institute at the University of Minnesota has an exhibit called "The Computer Industry in Minnesota." The URL, http://www.cbi.umn.edu/exhibits/mncomputing/inde x.html, contains many encapsulated histories and other data for many Minnesota companies.

Lest we be too proud of our "long" legacies, consider the 360-year history of the Bofors company. Based in Karlskoga, Sweden, it has a long history of defense products and is well known today for the Bofors gun used in many naval applications. Bofors has been in existence since 1646, thirty-five years before Philadelphia was granted its city charter by King Charles II. The best known owner of Bofors was no less than Alfred Nobel, of dynamite fame, who managed the company for two years from his office Paris. Bofors also has a strong connection to United Defense and British AerospacE (BAE).

3.9.3 LM Alumni Network

Are you aware of the Lockheed Martin Alumni Network? It is for former LM employees and provides a lot of company news in general (like major wins that insure our pension stability), alumni news, coming events, job postings, and even email contacts for staying in touch with other participating alumni. The website (www.lockheedmartinalumni.com) is not at all a nuisance website, and its fun to check what's going on now and then. You have to register one time to use it, but it's free and sends no spam.

3.9.4 Something Missing in our Legacy

The business of doing business is an indispensable part of our legacy. In particular, our financial accounting systems and how they have changed over the years is a lacuna in our history project. After all, everything we did was subject to government scrutiny by auditing offices, internal and external. How did we as a company do our accounting over our 60-year legacy? What accounting tools did we use, and what are we still using? Surely there are readers out there with knowledge in this area. If you have this expertise, please consider providing us with a career summary write-up which addresses this topic. Contact Dick (Ole) Olson at ~~r.d.olson@lmco.com or 651-456-3158~~.

3.9.5 Legacy of Flops (not ours)

The "10 Biggest Computer Flops of all time" have recently been chronicled by Miguel Currasco of Winnipeg (www.miguelcarrasco.net for 10/23/06). None are traced back to any of our legacy companies, but here are a few to tickle your memory. His Top Ten list includes the IBM PCjr, the Apple Newton and the Apple 3, Microsoft "Bob" (Operating System) and the Windows ME, and the NeXT Computer. Submitted by Dick Lundgren, rflundgr@aol.com.

4 2007, SECOND YEAR OF ARTICLES

4.1 JANUARY – RICHARD LUNDGREN

4.1.1 A New Year of Legacy

The Legacy Project team wishes all newsletter readers a Happy and Prosperous New Year as we enter the 61st year of our legacy history. We hope you have enjoyed the Legacy News Update in the past months of 2006 and have to some extent relived your own personal history in your career with us. We also hope that you have been visiting our legacy website, ~~http://www.usfamily.net/web/labenson/Legacy.htm~~, and following the monthly updates in the Careers section. The Career Summaries are our key to reconstructing the significant events over our six decades of company history. Check out some of the recently added very interesting summaries.

- For example, Jim Bougie engagingly describes how his early work at Univac on the Control Format Unit (a 1218 computer) was an overachieving effort. Instead of near misses on drone targets, he was reprimanded for 100% "skin-to-skin" hits and had to "correct" the software to save the drones. His path then followed a "guns to butter" route influenced by world events and personal choices.
- Another great summary is George Fedor's career in field engineering. George supplies many stories of traveling domestically and internationally for business purposes (going to where the rubber meets the road to solve computer problems), resolving issues of colored timecards, developing training curricula, extending his expertise into work with the community, and identifying dozens of coworkers (we know all of them) in various contexts.
- Mike Bukovich also does an excellent job of tracking his career from a start on the technical side to becoming a pillar of marketing. In a span exceeding 41 years he worked UYK-20, CP-901, UYK-7, UYK-43, UYK-44 and others in various capacities. His strength lay in marketing with solid presentations to critical customers for both computer production jobs and for systems jobs. Of particular interest is the "Price to Win" approach as well as the sharing of credit with dozens of former and currently active employees.

4.1.2 It's a Must-Read.

Legacy Project Breaking New Ground Since the last newsletter, LM Eagan has begun the process of capturing oral histories on videotape. The first two contributors, each providing 45-50 minutes of their recollections, were Manny Block and Marc Shoquist, both of whom trace their careers to early ERA days. Several others, all with high responsibility for building the St. Paul/Eagan division, have already agreed to recorded oral interviews, and many more are being sought.

The histories recorded by LM Eagan are over and above the 300 plus oral histories currently held in the computer industry archives of the Charles Babbage Institute at the University of Minnesota. The CBI database of oral histories can be viewed at http://www.cbi.umn.edu/oh/index.phtml and includes such notables as Sid Rubens, Bill Butler, Jack Hill, Bill Norris, and Bob McDonald. This database can be searched by a person's name or company name. The ERA company name, for example, appears in 176 different oral histories. A recent addition to the Legacy Project team is Ed Nelson who hired into ERA in 1951. Ed is looking into how the CBI Oral Histories can complement our Legacy effort and the Legacy Web Site.

4.1.3 Retro is IN

Here's a chance to visit "how it was then" on those who only know "how it is now." LM Eagan, as it does every year, is recognizing the 2007 National Engineers Week, February 18-24, by creating a display of what the workstation of an employee in the computer industry might have looked like in the 1950s (or 60s, 70s, or 80s). If you still have vintage "tools of the trade," please consider loaning them to LM Eagan for the display. These engineering tools can be from mechanical, electrical or software engineering (we still call it programming) or other areas. The actual date, February 19, would be a good opportunity for Retirees to come in and educate "Newbies" about the good old days. We think that they need some new/original ideas. POC for LM Eagan is Dick (Ole) Olson, ~~651-456-3158 or r.d.olson@lmco.com~~)

4.1.4 Centenarian Identity Revealed

Last month's newsletter had a feature called Legacy of a Centenarian. The person's name was not stated, but many clues were provided to help identify her. This key person in our corporate legacy and in the history of the onset of the computer age itself was Grace Murray Hopper, Ph. D., Rear Admiral USN Ret.

4.2 MARCH – RICHARD LUNDGREN

4.2.1 Following the Philosophy of a Proven Leader

A proven world leader, known to everyone, said "History will be kind to me for I intend to write it," and he did. And we, the Legacy Project team, subscribe to his philosophy as we chronicle our own company past and put the emphasis on the positive. We all made positive contributions which grew the company, established its reputation, and secured its future, and even helped the company to be in a position to provide support to us in retirement. By the way, this famous world leader (1874-1965) is remembered for a 1946 speech he gave at Westminster College in Fulton, MO in which he coined the phrase for a symbolic metallic drapery in Europe which finally fell under President Reagan.

4.2.2 Legacy after One Year

After one year into the legacy initiative, it's time to give a status update for the main efforts. The first focus was to chronicle in graphic form the many successful computer developments in our first six decades. The resulting product is the Military Computer Genealogy chart which is shown in the "Computers" section of the legacy website*. This chart was checked for accuracy and brought up to date by the Computer

Genealogy Subcommittee consisting of Dick Erdrich, Gary Hokenson, Harry Wise, Lowell Benson, and John Skonnord. The performance and unmatched reliability of the early military computers directly led to our initial involvement in the Air Traffic Control (ATC) systems for 62 major U.S. airports, and this effort continues today as Air Traffic Management (ATM) which is now part of Lockheed Martin's Transportation and Security Solutions (TSS) division. The chronology of this excellent 40-year+ effort, with many international spin-offs, is shown in the "Systems" section of the legacy website under "Air Traffic Control." Thanks to Tom Montgomery and Jack Sater for their efforts in the legacy of ATM. Also thanks to Anil Deodhar for the depiction of significant Postal Programs over the years. Developments over the decades for Navy Surface Systems (thanks to Dave Kolling, Bob Scholz, and John Byrne) and for Navy Subsurface Systems (thanks to Quint Heckert) are also shown in the "Systems" section. Additional great historical perspective is supplied for International Programs (Bruce Grewenow, Keith Myrhe, et al.), Missile Systems (Bob Hanson, Dick Kistler, et al.), Canadian Programs (Gene McCarthy, Marc Shoquist, et al.), Hardware Design (Don Mager, Jack Hill, et al.), P-3/S-3 ASW Systems (Jim Rapinac, John Spearing, et al.), Field Engineering (George Fedor and Dick Erdrich), etc.

4.2.3 Career Summaries Initiative

The second major focus of the legacy initiative has been the compilation of Career Summaries (typically 2-3 pages) from many current and former employees. To date about 60 have been submitted (long range goal is 200 or more) and the list of names whose career summaries have been posted to the legacy website follows below. If these names and their stories don't jog some of your personal career memories, then you need to get new batteries and/or increase the refresh frequency of your own "storage device.":

- Archie Lahti
- Ben Manning
- Bernie Svendsen
- Bill Butler
- Bob Bro
- Bob Chappelear
- Bob Hanson
- Bob Russell
- Bob Scholz
- Bruce Grewenow
- Bruce Klugherz
- Curt Nelson
- Dave Kolling
- Dick Kistler
- Don Lovely
- Don Mager
- Don Neumann
- Don Weidenbach
- Dr. John Esch
- Ed Michaud
- Ed Nelson
- Ed Tilford
- Gerry Del Fiacco
- Hank Dotzler
- Jack Sater
- Jim Bergum
- Jim Bougie
- Jim Hyslop
- Jim Rapinac
- Jim Stephenson
- John Alton
- John Booher
- John Byrne
- John Spearing
- John Westergren
- Keith Behnke
- Keith Myhre
- Larry Bolton
- Lee Granberg
- Lowell Benson
- Manny Block
- Marc Shoquist
- Mert Nellis
- Michael Doll
- Mike Bukovich
- Millie Gignac
- Monte Widdoss
- Norb Santoski
- Phil Phipps
- Richard 'Ole' Olson
- Ron Irwin
- Sam Walzer
- Steven Kloner
- Thomas Grendzinski
- Tom Sinkula
- Vernon Sandusky

Many more career summaries have already been requested. A frequent response we get is that "I don't know what to say," "I never did anything that was that important," or "I have no idea what is important."

We believe that our history is so rich and so varied that once you get started, your career summary will flow onto the paper, and that every piece will be important. In addition to your work chronology and memorable anecdotes, you might consider commenting on some highlights of your career, such as examples of events or circumstances that were the most challenging, the most satisfying, the most frustrating, the luckiest, the most difficult, the most misunderstood, the most important to the company, or the most important to our nation. Relationships with your customers, coworkers, or teaming partners and suppliers are also important pieces of information to preserve.

4.2.4 Oral Histories

The third major focus has been to respond to the request from LMHQ that we compile "Oral Histories from the top five people responsible for our division history." We told them we couldn't do five, but we could identify 16, and we are already in the process of recording these audio-visual histories. To date four individuals have provided videotaped historical narrative (Manny Block, Marc Shoquist, Clyde Allen, and Gene McCarthy), and many more have agreed to do so. These interviews are structured around a set of questions provided by LMHQ and given in advance to the interviewee, and from that point the history just flows. Another good one we are expecting soon is the Fred Hargesheimer story which is being documented by Ed Nelson (of early ERA days). Fred has taken 15 trips back to New Guinea to help the natives who saved his life when he was shot down there in a Lockheed P38 during WWII.

4.3 APRIL – RICHARD LUNDGREN

4.3.1 What are those things? What are they good for? How do they work?

These were questions heard at the Eagan facility at "engineering legacy day" during the recent National Engineers Week. And what was the subject of interest? Well, of course, the collection of slide rules that was part of our legacy exhibit. Some younger employees had obviously never seen one, so it made the more seasoned employees feel a bit dated. One oldster commented to one youngster, "Real men went to the moon with these (pointing at the slide rules)!" The "How do they work?" question was met with "It's too long to explain here." Slide rules, programming templates, and repertoire cards joined many other artifacts spread over eight large display tables in the Plant 8 courtyard. Easels held our computer genealogy charts and a large picture representing 50 years of Air Traffic Control. Although the target of the exhibit was younger engineers, it was clear that it was an irresistible magnet for the experienced employees as well. People could not just walk by without stopping at a photo, a printed circuit board, a metrology item or special tool, an engineering drawing or other document without commenting on where it intersected with their own histories. Memories triggered conversations and conversations triggered more memories. Everybody could relate to a piece of history, and the variety of connections showed the breadth of the teamwork involved. A major attention-getter and conversation-starter was an operable U1600 (AN/UYK-20). This computer was recently acquired by the legacy team thanks to the efforts of Bob Kubat. Thanks too to Harvey Taipale and Gary Hokenson for the loan of many artifacts, and to Ralph Werner for providing and explaining Q20 design drawings that were generated by such "primitive means." We are also grateful for retiree contributions – Bernie Jansen (missile pictures), Larry Bolton (hardware cards), and Lauren Conrad (1K memory and engineering documentation). Legacy team members, Ed Nelson, Lowell Benson, Dick (Ole) Olson and Dick Lundgren also provided stories and interacted with many exhibit visitors. Overall, the legacy exhibit certainly drew a lot of interest from the experienced engineers who lived through so much of it, but it's the younger engineers who will inherit it and move it forward.

4.3.2 Legacy Website Continues to Expand

The legacy website is continuing to add new material and to update existing material. To check recent contributions, have a look at the "What's New" section at the top right of the legacy home page. You may have to scroll right to see this area. The first article focusing on a peripheral device has been provided by Dick Kuhns. Everybody loved the DEAC (Data Exchange Auxiliary Console) in the 70s and 80s. It was a mainstay peripheral to the AN/UYK-7. Dick chronicles the DEAC story through the phases of requirements specification, pre-proposal and proposal efforts, contract award and production. He adds interesting insight regarding the DEAC form factor and its ability to withstand shock and vibration. Other major career summaries are provided by Gene McCarthy, Don Moe, and Rollie Schwitters. All three of these are must-read histories within our legacy. Their common denominator is breadth – breadth in major programs worked, in engineering disciplines, in customer variety, in calendar years (of course), and more. They are insightful, engaging, and instructive. Also intriguing is Lou Schlueter's historical synopsis of MAPPER which adds to Gerry Del Fiacco's tour de force description of MAPPER development from initial need to current products.

4.4 MAY – RICHARD LUNDGREN

4.4.1 Legacy of International Programs– Focus on Norway

This article is the first of a series of articles highlighting the legacy of LM-Eagan in international business. Why start with Norway? The reasons are provided at the end of the article. Norway was one of the 12 founding members of NATO (North Atlantic Treaty Organization) which marks its 40th anniversary this year. SHAPE (Supreme Headquarters Allied Powers Europe) is the military wing of NATO, and Norway is the strategic northern anchor of SHAPE's command structure. LM-Eagan has had a significant business relationship with Norway for more than 20 years.

Our legacy of Norwegian business began in 1986 with the sale of the Maritime Air Support Center (MASC) to the Royal Norwegian Air Force (RNoAF). The RNoAF assigned Major Hans Joakimsen to oversee the 2-year development of the MASC in Eagan. His presence in Eagan was engaging and masterful, and he was a delight to all who knew him. The MASC was a ground support center similar to the US Navy's ASWOC (Anti-Submarine Warfare Operations Center) used for P3C operations. The RNoAF did not yet have the (Lockheed-built) P-3C Orion aircraft, but their arrival was imminent. The RNoAF did have five P-3B Orions, and in fact they had them since 1969 when Norway, because of its strategic monitoring location for Soviet submarines, became the first P-3 operator in Europe. The MASC was delivered to the RNoAF P-3C 333 Squadron at Andøya Air Station in the Vesterålen Islands (70º north latitude).

Company people involved in the MASC program from conceptual development to delivery and on-site support included Keith Myhre, Art Francis, Denny Drake, and Gary Reetz. The MASC is still at Andøya and still in use today. Four Norwegian P-3Cs, with avionics built around the Univac CP-901 computer (AN/ASQ-114), arrived in Norway in 1989 to replace the P-3Bs.

They operated mostly in the as-delivered condition until 1996 when Lockheed Martin received a contract for the Upgrade Improvement Program (UIP) to "add capability and increase service life." The RNoAF assigned Captain Sverre Aastorp to LM-Eagan as the on-site customer representative to coordinate the effort. Sverre was a very competent and impressive professional as well as surprisingly multi-talented. From 1997 to 2000, the four Orions were modified at the LM Aircraft and Logistics Center facility in

Greenville, SC and then returned to Norway with the "P-3C UIP" designation. The modifications included the replacement of the original Univac central computer with the CP-2044 (AN/ASQ-212) computer.

Another facet of Norway's commitment to NATO has been the order by the Royal Norwegian Navy (RNoN) of five new frigates. The lead frigate, delivered in 2006, is the Fridtjof Nansen, named, of course, for Norway's outstanding explorer, scientist, diplomat and winner of the 1922 Nobel Peace Prize. The Nansen class ships are being built by a consortium that includes the Spanish shipyard Navantia (Ferol, Spain), Lockheed Martin Maritime Systems and Sensors (MS2 - Moorestown, NJ and Eagan, MN), and Bath Iron Works (Bath, ME). MS2 is the maker of the Aegis system and Legacy Eagan equipment on board these Frigates includes UYK-43s and UYQ-70s. Status, Control, Alerting and Reporting System (SCARS) is a program that emerged on the Eagan consciousness about the time that Burroughs was swallowing itself and Sperry and becoming Unisys. SCARS, actually SCARS II, was not a Norwegian program, but it involved Norway. The customer for SCARS was SHAPE with its headquarters in Mons, Belgium. SCARS was a long overdue replacement for a pretty archaic command and reporting system used throughout SHAPE commands in all NATO countries. Communications stretched from northern Norway, through the UK and west central Europe, and down to Turkey. Mark Swanson was our onsite lead at SHAPE (1987-89).

So why do we begin our legacy of international business with a focus on Norway? There are abundant reasons. Consider the following. Norway was the unchallenged master of the seas from the 8th to the 11th century, and Norway is still pre-eminent in keeping the northern sea lanes secure as well as keeping the southern seas peaceful (think Norwegian cruise lines). Norway is consistently at the top of the world's countries with the highest standard of living, and Norway is the host country for the annual Nobel Peace Prize award. Norwegian-American relations have always been very strong, with the US among the first to recognize Norway after the peaceful dissolution of its union with Sweden in 1905. And needless to say, Minnesota-Norway connections are very vigorous and thriving. Witness the coming Lockheed Martin Syttende Mai luncheon, mentioned elsewhere in this newsletter, as well as many other activities of Norwegian-Americans.

4.4.2 Legacy Website Continues to Grow

Contributions recently posted to the Legacy website have come from Al Heiden, Tom Kratz, Dick Roessler, and others.

- Al Heiden's is interesting because of his recollections from his 1978-1989 career span with us when he worked in PC Test Engineering at Plant 1, part of Quality Assurance. He recalls many coworkers by name and a simulator named INDICATES. He now lives in Phoenix where he discovered our Legacy website.
- Tom Kratz recounts his early days with the CS-1 compiler and how it was a programming necessity to also know the computer hardware architecture. He worked the beginnings of the P-3C software development in Willow Grove, PA and Patuxent River, MD, and also at prime contractor Lockheed in Burbank, CA. This led into the German Fast Patrol Boat program with work at Signaal in Hengelo, Netherlands and later in Wilhelmshaven, Germany. Then followed a long career in program management for a wide variety of international programs. Tom recalls a great many names from those programs over the years and also includes some great anecdotes.
- Dick Roessler's account is a well-written classic progression of experiences lived and lessons learned. Who would have thought that a career headed at radio broadcast engineering or color TV broadcasting

would have taken a turn to the digital world? Check out some of Dick's background experiences and the paths they led to in his varied career at our company. Note too, his emphasis on the importance of community involvement, for active employees and retirees as well.

4.5 JUNE – RICHARD LUNDGREN

4.5.1 Major Meetings Drive Legacy Project

In the last month two major meetings have taken place to focus the legacy project and engage many more participants.

1. The first meeting was a visit to LM-Eagan by Dr. Thomas Misa, director of the Charles Babbage Institute at the University of Minnesota, and R. Arvid Nelsen, CBI archivist. These guys are professionals in documenting the history of technology, and it was a pleasure to have them among us. Dr. Misa has written a history of the American steel industry as well as a recent book entitled *From Leonardo to the Internet* in which the interaction of political events and the evolution of technology over the last half millennium are superbly discussed. We are, of course, a part of that evolution, and Messrs. Misa and Nelsen are seriously interested in our legacy project (unique in the industry, by the way). We provided them with our current legacy status and they provided us with feedback. An interesting major hole in our legacy record is that of high tech manufacturing over the past five decades. The assembly line story of Henry Ford in the auto industry is well known, but the production processes for our high tech computers need to be detailed. It is understandable why companies did not publish proprietary information. But enough time has passed so that we could talk about HI TECH Manufacturing, such as for Plated Wire Memory. We know the resources are out there to help fill this gap.
2. The second meeting was an amalgam of active employees and retirees, again to provide legacy status/planning and a glimpse of future possibilities. Major contributors at the meeting were Lowell Benson (legacy website demo and artifact cataloguing), Gary Hokenson (selecting and condensing archival material for transmitting to CBI), Quint Heckert (developing different legacy documents appropriate to different target audiences), Harvey Taipale (possibility/problems of creating a video documentary), and Dick Olson, John Westergren and Dick Lundgren (general legacy background and organizational/interfacing considerations). Many hard object and document artifacts were on hand for review, and as always sparked conversations. The storage and display of such artifacts, possibly as a rotating exhibit, were discussed in addition to the importance of documenting of the artifacts for their historical significance (as stressed by the CBI people). Artifacts need to be identified, with the contributor (to receive proper credit), with the calendar time, and the Legacy Significance. One theme that was hard to miss among this group: "Our common Legacy is our common bond." Short status summary: We now have career contributions from about 75 current and retired employees. When we started the Legacy Initiative Dr. Robert Monson projected that at 100 career summaries that we should have enough material for a book, and Dr. Arthur Norberg projected that at 200 career summaries that we should be able to reconstruct the history of our division. We are far enough into this Legacy Initiative that both projections appear to be accurate. Please consider adding your story to the overall picture. Inputs are welcome in all business areas, but we really need your help in business areas such as manufacturing, human resources, financial, and others. We also now have five recorded oral (video) histories of the original 18 people identified as key figures in building our division. Four more are on tap when the snowbirds migrate back north. The most recent oral history was Jack Hill whose career

began with ERA. Jack, now 97, is one of the "First Friday" bunch who still meet monthly for lunch at the old Parrish's on West 7th in St. Paul. This group has been featured in an article entitled The Original Geek Squad, which appeared in Minnesota Monthly magazine. Several of the regular monthly attendees are an invaluable source for our early history.

4.5.2 Recent contributors to Legacy Website

(~~http://www.usfamily.net/web/labenson/Legacy.htm)~~ Recent contributions posted to the Legacy website have come from Dennis Christ, Patricia (Bailey) Myhre, Mike Wold, and others.

- Dennis traces his career from neophyte programmer to seasoned programmer on sophisticated systems, followed by upwardly mobile steps in marketing and program management for European programs, and ultimately culminating in the position of President of Unisys Electronic Systems, which included Eagan. When Unisys sold off its defense division to become part of Lockheed Martin, Dennis filled out his Unisys career in a very challenging position as President of Airline Systems.
- Pat Bailey launched her career (now 31+ years) in software test on the Iranian DD993 program in the mid-70s. That program fell victim to international political events, and Pat went on to work software test, expanded appropriately to include system integration, in various programs such as MATCALS, Undersea's Engineering, RAN (Royal Australian Navy) DDG, CPF (Canadian Patrol Frigate), and ABCCC. She has many great stories of the competent lady succeeding in the man's world including becoming "flight qualified" by the Navy for the P-3C MPA (Maritime Patrol Aircraft). Her competence also has taken her to never-imagined on-site assignments in Australia and Norway, the latter for the UIP (Upgrade Improvement Program, see last month's newsletter).
- Mike Wold had been a member of the "Tonkin Bay Yacht Club" before joining Sperry Univac in 1970. He tracks his career from early work in Navy Systems and ARTS Enhancement to MATCALS (Marine Air Traffic and Landing System) and the (originally black) B-2 program. Mike's quote, "We would kill ourselves making sure that we never let a customer down," can be compared to Lockheed Martin's corporate mantra, "We never forget who we're working for." Check out Mike's contribution to see the Eagan group characterized as a "national treasure."

4.5.3 Additions/Corrections Welcome

We need your help. Last month's summary of the Norwegian business legacy has now been posted to the Legacy website. If you worked any of the programs mentioned in any capacity, let us hear about it, and we'll add your contribution to the posting. We need to build as complete a picture as possible. The same goes for any of the programs mentioned in the previous paragraph. If you have additions or corrections, please email them to Lowell Benson, the Webmaster.

4.6 JULY – RICHARD LUNDGREN

4.6.1 Volunteers Needed to Describe Patents

Some recent research for the purpose of Legacy has discovered 40 packing boxes in storage containing information about past patents. Before such data is sent for archiving at the Charles Babbage Institute at the University of Minnesota, we need some help to provide one line descriptors for each patent. Contact Dick (Ole) Olson at ~~r.d.olson@lmco.com~~ if you can help with this effort.

4.6.2 Recent Contributors to Legacy Website

~~(http://www.usfamily.net/web/labenson/Legacy.htm)~~ Recent contributions posted to the Legacy website have come from Ernie Lantto, Quint Heckert, Jerry Raveling, and others.

- The name Ernie Lantto has been synonymous with engineering thoroughness, business integrity, and customer satisfaction (for tough, exacting customers like the Dutch and the Germans). His career tracks the history of the industry, and he was a historical witness to the ERA name being replaced by Remington Rand at Plant 2. Other interesting stories include time at Ascension Island, early work on NTDS development, and life-stretching assignments in Holland and Germany.
- Quint Heckert has provided a topical description of Submarine Systems, three and a half decades' worth of submarine system developments for both USN and international customers. It's a great summary resource. In addition, Quint is in the process of generating an outline for a legacy brochure which could provide the basis for a potential documentary film.
- Jerry Raveling discusses the coming of age of software in the sense of subjecting it to the same requirements as hardware, such as standards for configuration management, quality assurance, life cycle development, etc. An interesting development was how "computer systems" transitioned to "Mission Critical Computer Resources (MCCR)" and became "force multipliers."

4.6.3 Legacy of International Programs – Focus on the Netherlands

This article is the second in a series of articles highlighting the legacy of LM-Eagan in international business. The focus is the Netherlands, but it also loosely extends to Belgium and Luxemburg (all collectively known as the Benelux countries). All Benelux countries were founding members of NATO and have participated to varying degrees in NATO activities over time. LM-Eagan has only had a direct business history with the Netherlands, but other divisions of Lockheed Martin have a long established presence both in the Netherlands and in Belgium.

Our legacy of business with the Netherlands began in 1970 with the sale of Univac equipment to Hollandse Signaal Apparaten (known as HSA and as Signaal) in Hengelo. The Dutch were not the end user, but they were our customer. The end user was the West German Navy with the equipment becoming the core of the combat system for German Fast Patrol Boats (S-143) in the North Sea and the Baltic Sea. The equipment involved were the 1830B Computer (a modification of the highly reliable CP-901/1830A Computer used in the USN P-3C aircraft), the 1840 Magnetic Tape Unit and the 1532 I/O Console. The Dutch were not too pleased with the selection of Univac equipment since they had their own SMR computer as a candidate for the GFPBs, but the Germans had made their decision and so Signaal became our customer. Signaal in turn sold the subsystem to AEG Telefunken who in turn passed it on to BWB (the procurement agency for the German armed forces) for shipboard installation. Our portion of the business was not only hardware. There was initial training for hardware and software onsite in Hengelo and significant software development as well. The initial onsite office personnel in Hengelo included Ernie Lantto, Lowell Benson, Bill Rogers, Tom Kratz, John Rachac, Jim Gannon, and others. The program manager was the well-known, well liked and energetic Fred Billingsley. For more stories on GFPB and the early days in Hengelo, check out the contributions of Lowell Benson, Ernie Lantto, and Tom Kratz to the Legacy website.

In 1978 some interesting software training took place in Hengelo under contract to HSA. The 8-week course, by lead instructor Tom Dunn and co-instructor Peter Dress, had to address some logistic concerns

that would be unknown today. The course content was a mix of low level AS-1 assembler language and the high level CS-1 compiler, normally presented in that order. However, the students were to do the coding using 30-bit coding sheets in Hengelo, these sheets were then key-punched at a different HSA facility in Hengelo, the card decks were then carried by "personal courier" over the border from Holland to Germany and shipped off by train (Bundesbahn) to the German Navy programming center in Wilhelmshaven for processing. Finally, the results (listings, error printouts, program numerical results, etc.) were returned to Hengelo via a similar route for student analysis. Needless to say, this process was not instantaneous, with 7-10 days turn-around time being typical. Against the initial judgment of the Signaal representative, Mr. Dunn insistently reworked the schedule from day one to interweave the low and high level languages using alternating instructors to devise a real-time solution that accommodated the logistic concerns and ultimately satisfied all the concerned parties. The happy students were a mix of two Dutch Signaal employees and about a dozen Germans, from Radarleit (a unit of Phillips), German industry, German civil service and German Navy.

In 1981 Signaal contracted for some more software training for which the strategic goal was to qualify their employees and position themselves as a company to win the Canadian Patrol Frigate business. The CPF was destined to use 16-bit processors, the UYK-20 and the UYK-502, both Sperry products with the 502 a product of our Winnipeg facility. Two instructors, Steve Kloner and John Henrikson, were sent to Hengelo to present four weeks of training on the suite of standard 16-bit software products, namely ULTRA16, CMS-2M, MTASS/M, and SDEX-20. The goals of the training were accomplished admirably, but the higher aspiration of HSA to win CPF was not successful.

For more stories on CPF, check out the contributions of Gene McCarthy to the Legacy website. The Royal Netherlands Navy (RNLN) operated the Lockheed-built P-3C Orion maritime patrol aircraft from 1981 to 2006. During this time the RNLN acquired 13 Orion aircraft whose normal missions found an extension in airborne reconnaissance over land during the NATO "Eagle Eye" operation over Kosovo. From August 2001 to June 2006, 10 RNLN P-3Cs were significantly improved in the Capabilities Upkeep Program (CUP). LM-Eagan was the prime contractor for this effort, replacing the aging CP-901 computer with the advanced CP-2044 computer, purchasing advanced sensors and other avionics, and integrating the whole hardware suite with Eagan-developed software at the LM facility in Greenville, SC. In the course of events, the Dutch parliament decided to discontinue P-3C operations, and the 10 RNLN P-3Cs were sold to the Germans and the Portuguese. Tom Rougier was the program manager for CUP and Rollie Schwitters was the project engineer. For more stories on CUP, check out the contribution of Rollie Schwitters to the Legacy website.

The Netherlands has been a challenging customer and a challenging competitor over the past decades. No surprise. Their naval expertise at the world level goes back no less than five centuries, having been decreed into existence in 1488 by Emperor Maximillian of Austria. They have done battle with the sea and on the sea, and they have won most. Not bad for a country one-fifth the size of Minnesota with one-fourth of the land below sea level, and in direct competition with major European powers. Other divisions of Lockheed also have a significant presence in the Royal Netherlands Air Force. Current equipment includes the F-16 Fighting Falcons and the C-130H Hercules. The Belgian Air Force is also a showcase for Lockheed aircraft. In the past it has had the T-33A Shooting Star and the 104G Starfighter (single and dual seater), and currently it has the C-130H Hercules and the F-16. The "Lux" of the Benelux does not have an air force.

4.7 SEPTEMBER – RICHARD LUNDGREN

4.7.1 Good Progress on Patents

Last month's newsletter sent out a call for help with the effort to create one-line descriptors for many patents of our legacy companies. On July 27th well over half of the 40 packing boxes were processed by a great group of volunteers who responded. The group consisted of Lowell Benson, Larry Bolton, Bernie Jansen, Dick Lundgren, Ed Nelson, Dick (Ole) Olson, Phil Phipps, and Ralph Werner, with administrative support from Robin Dexter. Some patent titles were truly vague (e.g. "Data Processing System") and the thick files had to be perused more deeply to provide a more specific descriptor. Other data recorded were the names of the patent originator (inventor), patent numbers, dates of original submission, dates the patents were granted, and exact location of the patent file for any future reference. Most of the patents were from the 1960s with serial numbers in the 3 million range. Current patents are well up into the 7 million range. As you might guess, it was fun to come across names of previous coworkers which of course stimulated some good social discourse. The job is not yet finished, so if you would like to be involved at the next meeting, contact Dick (Ole) Olson at ~~r.d.olson@lmco.com~~. Ultimately the data will be sent to the Charles Babbage Institute at the University of Minnesota.

4.7.2 Recent Contributors to Legacy Website

~~(http://www.usfamily.net/web/labenson/Legacy.htm)~~ Recent contributions posted to the Legacy website have come from William (Bill) Geiger, Eldon Weinhold, and David Peterson.

- Bill Geiger's article, called "Career Insights," traces his 30+ year career from joining Remington Rand Univac in 1959 to his final position of VP&GM of the Eagan Division. Like any new employee, he was flooded with unknown acronyms and unfamiliar customer names and organizations. His well-crafted story tracks such memorable highlights as octal notation, ubiquitous pocket protectors, and desktop calculators (from Frieden). He recounts stories of major customer players in our legacy with names such as Capt. Eric Swenson, CDR. Ming Chang, Adm. Wayne Meyers (Bill learned what a "vessel" was and what it was not), Capt. Joe Hager and others. And of course he had quite a flow through various technical areas as well as functional areas. Bill's legacy is our legacy.
- Eldon Weinhold started off in 1967 to be a field engineer for Joe Graham at METC (7 years in that memorable facility). His first trip was to Bath, ME to work the SATIR program of the West German Navy, an experience which then led into DLG class NTDS modernization. Other involvement over the years included the SSQ-59 switching system, support of the AEGIS system at RCA Moorestown (now LM-MS2), NAVMACS, and presently Maritime Surveillance. Eldon is particularly good at citing the names of many of his coworkers over his long career.
- David P. Andersen's article on "The Invention of Voice Mail" is a gem. He carefully recounts the 14-year history of the Speech Research Group, part of Sperry Univac's Defense Systems in Eagan. Many coworkers and their "interesting traits" are woven into his history of this effort which began in the early 1970s. One succinct and valuable quote: "Our unique ability to create high-quality computer generated speech led to a contract with the FAA." The VRU (Voice Response Unit) was a major product of the group and the Eagan division. Many captivating stories relate to the VRU (not only with English but with other languages as well). This a great story about a not too well known business area.

4.7.3 Legacy of International Programs – Focus on Germany (and France) – The Prologue

This article is the first (the prologue) of a series of articles highlighting the legacy of LM-Eagan in doing business with Germany. "Germany" was officially the Federal Republic of Germany (FRG) or just West Germany for the majority of years in which we had significant business there. The reunification of the FRG and the DDR (German Democratic Republic) occurred on October 3, 1990, from which point on "Buy European" became the modus operandi. It started with Adam (didn't it all?). In the early days (1960s), in the case of the FRG Navy, it started with the order of three Adams (Charles Adams) Class destroyers (F-DDGs) in 1964. These ships (the Lütjens, Mölders, and Rommel), all named after prominent German figures, were not originally intended to be NTDS ships, but progress with NTDS in U.S. and French ships convinced the FRGN to develop those ships with NTDS capability. The French Navy, a NATO member at that time, had the SENIT (Systeme d'Exploitation Navale des Informations Tactiques, read early French NTDS) system built on the USN/Univac USQ-20 computer and peripherals. To prepare for the receipt and subsequent support of the three Adams Class destroyers, the FRGN sent personnel to the French programming center CPM (Centre de Programmation de la Marine) in Paris near the Eiffel-Tower for initial hardware training (1966/67). At the same time other FRGN personnel were sent to San Diego for software training. These FRGN personnel then returned to Wilhelmshaven, Germany with knowledge and experience in the early Univac 30-bit systems (hardware installation/maintenance and software generation). This was to be the launching pad for a long legacy of business with Germany. Well, some romances flourish and some fizzle. The relationship with the German Navy and other German customers certainly blossomed and continues today. It will be further discussed in the next newsletter.

It was not to be the case with France, although in 1977 a fleeting flicker of French romance was rekindled with Thompson-CSF and realized by W. S. Howe on a 3-month assignment in Paris (direct quote: "That may have been one of the best jobs I ever had!"). The product sold to Thompson, which included installation and training support, was a software generation system based on the AN/UYK-20 computer and commercial peripherals. The Mini Systems group, under Bob Potter at that time, was the responsible organization. The greater potential of this relatively minor business with France was never realized and the ember died out and remains cold until today.

4.7.4 Legacy with Norway Continues

In June the governments of Norway and the United States signed a Letter of Offer and Acceptance (LOA) for the sale of four Lockheed Martin C-130J Super Hercules aircraft to Norway. The aircraft will be built by LM Aeronautics Co. in Marietta, GA.

4.8 OCTOBER – RICHARD LUNDGREN

4.8.1 Recent Contributors to Legacy Website

Just when it appeared that the quality bar of new author contributions had reached the limit, new additions have raised the bar even higher. The exciting recent inputs, now posted to the Legacy website, have come from the pens (read keyboards) of Kevin Hoffmann, Burton O. Gunderson, and John Nemanich.

- Kevin's career started in 1976 with software work of the IIN (Imperial Iranian Navy) DD-993 program. Almost instantly world political events had an impact as the Shah of Iran was deposed and the customer switched contractually from IIN to USN (Kidd/Ayatollah Class ships). Kevin relates the "primitiveness" of the software world at that time as he describes the efforts involved in a system

build, debugging, and patching, and also the pluses and minuses of the paper tape and magnetic tape media then in use. He further describes the challenges of shipboard Radar Alignment and Satellite Navigation (SATNAV), the latter in an environment where GPS had not yet become a household word. It's all worth a good read, especially for technical content and for the adaptation of old experiences to new programs.

- Burt Gunderson's 40+ year career began at the RRU Nike Zeus Dept. under Earl Joseph, not an inauspicious beginning. His personal history and the places where it took place are marvelous memories. So many of Burt's inclusions are like sound bites from Grandpa's knee: Project Moonbeam, GPDC, 1004 plug boards, 1218, Army War Room, DVRs, 418, and many more. Burt evolved into the test lead for programs too numerous to mention and in so doing faithfully recalls his managers and co-workers throughout.
- The name John Nemanich is not too well known on the defense side of LM/Unisys, but it will be after you peruse his article, A Brief History of Networking at Unisys. John originally wrote this article in 1997 in response to a request for a short history of Networking at Unisys, which was to be used at the opening ceremony of the new Network Management facility at Blue Bell. This article is a genuine 24 carat nugget of our (Unisys commercial AND defense) historical legacy. The roots of networking go back to ERA days in the late 40s, and from that launch pad John traces developments in networking that occurred in both Burroughs and Sperry and then continued at Unisys. Revisit names/acronyms like, AUTODIN, POTS, DCPs, DCTs, GOSIP, and many more. Also check out the roles played by the defense side (St. Paul/Salt Lake City) by the 1616 computer (predecessor to the 3760 Comm Controller), the1206 and the AN/UYK families, and the FDDI token ring developments. Even Loral Communications Systems (later LM) partnered with Unisys in the development of wireless telephony. And the development of the Internet itself (contrary to Al Gore) was not a singular undertaking. Quoting John, "Unisys was an Internet pioneer from the beginning." John's whole story was done the right way. He talked to all the players, past and present, who were involved in networking developments. He assembled a ton of data into this engaging history and even ventures a few "visionary guesses" into the future. Don't miss it. With ALL our multiple inputs in this "collective authoring" approach, we are realizing a "double sourcing" in pride. We can all be justifiably proud of both our technical accomplishments and of the creative writing finesse of our many contributors. Many thanks, and we look forward to more.

4.8.2 Legacy of International Programs – Focus on Germany, cont.

This article continues the story of our legacy of business with German customers. Last month's newsletter recounted the story of how the first three West German destroyers (the Lütjens, Mölders, and Rommel) introduced NTDS to the West German Navy (FRGN). These ships, of the class Z-103B (Z for Zerstörer, = Destroyer), carried the USQ20/642B computer as the core of the FüWES/SATIR (Führungs- und WaffenEinsatzSystem/System zur Auswertung Taktischer Informationen auf Rechnerschiffen) combat system. It was complemented by display equipment from Hughes and communications equipment from Collins. FüWES/SATIR translates roughly as Guidance Control and Weapon Delivery System/System for the Evaluation of Tactical Data on Computerized Ships.

The next project for the FRGN was the acquisition of the S-143 class Fast Patrol Boats (GFPB) to patrol the North Sea (bounded by West-friendly Denmark, Sweden, Norway, the Netherlands and the UK) and the

Baltic Sea (bounded by East-friendly Poland, the German Democratic Republic, the three Baltic nations, and Russia itself).

The GFPB program for Univac started in 1970 with deliveries of 1830B computers, 1840 mag tape units, 1532 I/O consoles, and 1299 switches. Ten FPBs of the S143 Albatross class and later ten more of the S143A Gepard class were built. The S143A equipment had modifications to the 1830B computer with the addition of Control Memory and expansion of main memory to 96K. For the GFPB program hardware integration started at Signaal (later Thompson CSF and now Thales) in Hengelo, Holland, and company involvement for shipboard integration soon moved to Wilhelmshaven, West Germany. Software development continued in Wilhelmshaven, supported by many company expatriates as well as many German nationals who had developed expertise in 30-bit software in the Z-103B program. The land-based software test and development site in Wilhelmshaven was known as the EZ/AZ (Erprobungszentrum/Ausbildungszentrum or Development/Training Center), a practice that continued for all subsequent ship systems. The combat system for the German Fast Boats (Schnellboote) was known as AGIS (Automatisches Gefechts- und InformationsSystem, or Automatic Combat and Information System).

In the late 1970s, West Germany, as part of a NATO commitment, began the development of the F-122 (F for Fregatte, = Frigate) class of ships. By this time, the US Navy had advanced the NTDS to the 32-bit AN/UYK-7 hardware base plus contemporary peripherals. Eight F-122 class ships (lead ship Bremen) would be built, to be followed later by four F-123 class ships (lead ship Brandenburg), based on the AN/UYK-43 computer (UYK-7 replacement in the USN). Another ship system used on ships of several classes was the PALIS (PAssiveLInkSystem) which used either the AN/UYK-20 or later the AN/UYK-44 computers. The use of German/American training and development teams was a precedent set with the early S-143 systems and followed in subsequent systems efforts. The spin-offs from these German Navy activities were numerous. The accumulated technical experience expanded the talent base for many future foreign and domestic programs, and the management experience advanced many careers. World perspectives were broadened and lives were enriched. Of a personal nature, many multicultural lifelong friendships were established and even a few marital involvements were sparked.

However, in the non-Navy area, the company had some other notable business accomplishments, specifically for the German equivalent of the FAA. In 1976 Sperry Univac-Eagan and Sperry Univac Germany jointly performed on a contract called ZKSD with the German Air Traffic Control Agency (BFS) to develop a central Flight Data Processing (FDP) system that would distribute and print flight strips at all civilian airports in West Germany. ZKSD stands for Zentraler KontrollStreifenDruck (literally, Central Control Strip Printing, or more descriptively, Central Flight Plan Data Processing and Strip Printing System). BFS is the Bundesanstalt für FlugSicherung (Federal Institute for Flight Safety). The initial architecture utilized multi-IOP computers from the US-FAA programs but as the architecture matured, main frame commercial 1100 series processors were used. Unisys Germany continued to support this system including a major upgrade called UKD into the late 1990s. Another program was the German Short Term Conflict Alert (STCA). As a direct result of an STCA product demonstration at the annual Air Traffic Control Association Conference in 1990, Unisys was awarded a contract with the German BFS, later called DFS (Deutsche Flugsicherung, German Flight Safety/Air Traffic Control) to integrate the aircraft conflict avoidance safety feature into the existing German air traffic control system. The STCA product was based on the safety algorithm used in the Micro EARTS program. Unisys Eagan was responsible for design and system development with Unisys Germany responsible for hardware procurement and system installation. The system was installed at 11 air

traffic control centers throughout reunified Germany. In 1997 Lockheed Martin – Air Traffic Management received a followon contract for system upgrades.

An interesting non-governmental customer was the Otto Versand Inc., Germany's largest catalog ordering company. Otto Versand in the mid-1970s was already a huge customer for the Univac 1100 series main frames, but they wanted new technology to give them a competitive edge. They threatened to switch to IBM unless Sperry could come up with the "technical advantage." Enter the VRU (Voice Response Unit) developed by the Speech Research group of Sperry Univac Defense Systems. This unit could streamline the handling of multiple customer phone orders and smooth out the peaks and valleys of customer calls. The synthetic German speech worked perfectly with many customers mistaking the "voice" for a well-known German TV announcer. Not only did the technical solution satisfy the customer, but the reliability was unbelievable. The customer engineers had no experience in repairing the VRUs because they never failed. Credit the VRU's "ancestors." The VRU product was a derivative of the ruggedized, mil-spec UYK-20 and the Canadian (Winnipeg) UYK-502 computers. With component selection and hardware construction aimed at functioning in a tough environment, the VRUs thrived in the benign conditions at Otto Versand. If the ancestors are strong, so too the descendants. It should be pointed out too that we also had many non-German customers in Germany. The U.S. Army is one example, but this article only focuses of the German customers. Further inputs?

4.9 NOVEMBER – RICHARD LUNDGREN

4.9.1 Legacy Project Origins

The Legacy Project was initiated by Lockheed Martin with the goal of compiling a record of company history tracking back through the St. Paul/Eagan, MN business organization (defense/air traffic management) of Unisys/Sperry/Univac/ERA and other shorter-lived names on the door.

4.9.2 Effort to Describe Patents Completed

The remainder of the 40+ packing boxes containing patent files has been processed. This completes the effort to provide one-line (or short) descriptors for these patents which only exist in paper copy. These patent boxes along with their index of descriptors are now cleared to be transmitted to the Charles Babbage Institute at the University of Minnesota. The following people met September 28th to complete the task: Larry Bolton, Bill Butler, Anil Deodhar, Quint Heckert, Dick Lundgren, Dick (Ole) Olson, Phil Phipps, and Harvey Taipale

4.9.3 Involvement in 2008 Minnesota Sesquicentennial

The Legacy Committee is looking into potential involvement with activities of the 2008 Minnesota State Sesquicentennial. Minnesota turns 150 years old next May 11th, and there will be an appropriate week-long celebration at that time on the Capitol Mall. Members of the Legacy Committee and the Minnesota Sesquicentennial Planning Commission are meeting soon to discuss what we might do. We are a company of Minnesota origins and with 60+ years of longevity. We have truly been part of the State's economic growth as well as contributing heavily to the reputation of innovation in technology and high tech production. Next month's newsletter will provide results of the meeting.

4.9.4 Recent Contributors to Legacy Website

Tom Soller, Roy Valentini, and Ben Nilsson have provided valuable contributions which have recently been posted to the website.

- Tom Soller's recollections over a 42-year career are truly a chronicle of the "sig events" of our company's past, both commercial and defense and combined. Tom worked NTDS in the very early days when jumping ship to Control Data was more common and popular than completing contractual tasks, but those that stayed demonstrated unparalleled commitment and the concomitant success which would become the hallmarks of future business. Tom has great stories of discovering "engineer unions" at Sperry Great Neck and taking tough technical stands against allegedly high power engineers from outside, and the kid won. He describes the initial ARTS (Automated Radar Terminal System) activity as the "most gratifying of his career." Subsequent work took him to the C&T (Communications and Terminals) Division in Salt Lake City, and then back to Roseville for a major joint effort with Hitachi in Japan and eventually to and through the merging of the engineering organizations of Burroughs and Sperry to form Unisys. With a great memory for names, he identifies at least 50 coworkers in the course of various projects over the years of his career.
- Roy Valentini's career spanned 37 years and the last 20 were in director level positions. What a great vantage point from which to view both technical and financial accomplishments, not to mention responsibilities! Roy had extensive experience in the management of ASW/Under sea's programs and eventually broadened into business development, marketing and sales for Navy and International System Engineering, DIS and C3. His career summary identifies an amazing number of different programs as well as both domestic and foreign customers, as his financial accountabilities spiraled to the multi-megabuck level.
- Ben (Bengt) Nilsson provides a unique perspective of the Navy customer representative working in residence at our facilities. Ben traces a lot of the significant history of the early "Navy Office," later known as NSTR (NavSeaTechRep), and he identifies the major players and their activities on both the Navy side and the company side, plus some memorable anecdotes. Legacy of International Programs –

4.9.5 Focus on Africa

Our company does not have an extensive business history in Africa, but there are two notable stories at Africa's geographical extremes. The earlier story began in Johannesburg, South Africa (officially the Republic of South Africa or RSA) in 1969. We were the Univac Division of Sperry Rand Corp. at that time, and headquarters in New York City had decided to set up a subsidiary in South Africa. Glen Hambleton was the head of the old DSD Education Department at that time, reporting to Roy Hegler. Glen was tapped to relocate with his family to Johannesburg and become part of the "landing crew" to establish the subsidiary.

Others from St. Paul who went with Glen were Dave Klinzman and Art Larson, and they were joined by an overseas American Eli Hiller and the British Robin Luggard-Brayne. There were some early sales successes with commercial 1106s and 1107s, supplemented by DSD's 1004/1005 punched card handling equipment. Sales were accomplished either through the newly established subsidiary or through various "agents" at that time. Maintenance services for the commercial computers were handled by Univac France. The office clearly had an international atmosphere.

There were no sales of DSD military equipment to South Africa, although Glen became aware of DSD equipment in South Africa when they received calls for logistic support from a NASA Apollo tracking station just outside Johannesburg. The NASA tracking stations worldwide were using the extremely high reliability DSD computers (primarily found in USN shipboard applications) for processing and transmitting tracking data. This equipment included the 642B and 1218 computers as well as the 642B EMU (Expanded Memory

Unit) and the 1540 mag tape handler. Over the years NASA continued to be a good customer for Sperry's commercial 490 and 1100 series at the Johnson Space Flight Center in Houston and at other sites.

An interesting side story to the NASA tracking stations occurred in 1967 when two young engineers/instructors paid training visits (for DSD equipment updates) to the NASA tracking stations worldwide. The training was carried out by Walt Dietz (married guy) and Paul Burley (single, irresistibly dashing, and with a great future ahead of him in the best company in the computer industry). Both had memorable eye-opening experiences at Atlantic, Pacific and Australian tracking sites as well as in transit between them.

Glen Hambleton was also later very active in the pursuit of the Russian ARTS (Air Traffic Control) business. For that purpose, Glen was assigned to the London Office from late 1973 to 1976 with many trips into Moscow and many memorable stories. Although Russian ARTS did not pan out for us, much later Lockheed Martin did form a joint venture with a Russian company for building rockets.

Egypt, at the northern extremity of the African continent, was the customer for our effort in the Romeo Class Submarines. The Romeo-class Submarines were Russian-designed, Chinese-built, and American-modernized. The name on our door was Paramax at the time we got this turnkey contract from the Egyptian Navy which covered the range from system specification and design through total system installation, test and acceptance on board each of the subs. The initial effort began in early 1988 when Quint Heckert and others did the initial survey of the boats and then wrote the system requirements paper and the basic specification. Within two weeks the price and proposal were delivered to the Egyptian Navy. By the end of the year we were under contract to develop the system. The system was initially priced based on the TMD (Tactical Mode Display) with its embedded 502. We, however, changed that soon after award to the new MMD (Multi-Mode Display) that we developed for this effort. The MMD was 680xx-based, and since we had developed a CMS-2 compiler for the 680xx we had all the tools including a lot of the software required to do the job.

Besides Quint, the other key players for this Egyptian program were John Booher, Dan O'Keeffe, Rod Ewert, and Dick Wagner. At the Legacy website you can find more details about the Egyptian Submarine program provided by contributing authors John Booher (including his near fatal automobile accident in Egypt) and Quint Heckert (including lots of info about other submarine programs as well).

4.10 DECEMBER – BENSON, TAIPALE, LUNDGREN

4.10.1 New Web Site

The VIP Club Board announces a new web site to provide ongoing and Legacy information to our members. Enter http://www.vipclubmn.org into your browser's address line to look at what's done so far. Although still under construction, we welcome your feedback.

4.10.2 So what is all this LEGACY stuff about, anyway? Harvey Taipale

Over the past year and a half, VIP Club newsletters have had articles about the early history of our various businesses, and reports from the legacy committee. Although this activity has been going on and is supported by the VIP Club leadership, many people are unaware of just what is happening, why it is happening, and of the opportunity for everyone to participate. This summary should provide some clarification.

4.10.2.1 Background:

In late 2005, Lockheed Martin Corporate, motivated by the realization that their current company was created from over 20 predecessors, asked the various operating units to "capture their legacy" without a real concept of what was to follow. In Eagan, Ole (Dick) Olson was tasked to respond; he formed an ad hoc group of volunteers and contacted the VIP Club Board. The group quickly realized that the history of Engineering Research Associates (ERA), continuing to the present, was a remarkable story of technological innovation and contribution to the computer industry in general and to Minnesota in particular. This story, particularly the early years, has never really been completely told; e.g. ATHENA launching missiles. To be sure, there are accounts written from the business history perspective, from various customer and user perspectives, and partial documentation in many places. However, we are unaware of any account, which properly gives credit to the ingenuity, vision, and hard work of ERA and its successor company employees, and their contributions to Minnesota and the world.

The legacy committee feels that it would be a terrible loss not to capture the full history, thus inspiring our efforts to determine just what can be accomplished. There is a bit of urgency, as the memories and materials relating to the ERA beginnings are disappearing rapidly. Our pioneers are dying, successor corporations are shredding records, and memories are fading.

Objectives: The committee has defined three priority objectives.

- First, we need to capture whatever remaining material and information we can. To date, this had been in the form of career and program summaries contributed by long-time employees, oral histories from past company leaders and technologists, and reviewing and saving Lockheed Martin files before they are forwarded for destruction. There have also been donations of various documents and artifacts (hardware components, models, displays, photos, marketing brochures, and memorabilia) from various individuals.
- The second objective is to catalog and archive all the material collected. Cataloging is necessary to make a record of the material to support our third objective (keep reading), but for the long term we need to get all this material to a place that will provide safe, durable storage and future public and scholarly access. The archival strategy is evolving, but almost certainly will involve the U of M's Charles Babbage Institute and the Minnesota Historical Society.
- The third objective is to publish/publicize our history and heritage in a way that interests others within our industry and our fellow Minnesotans. The committee is considering three forms/formats.
    1. We may be able to put up some sort of an 'innovations' display at the Minnesota Sesquicentennial exhibit on May 17 and 18, 2008. This would be a relatively broad (and hopefully high in "wow" factor) introduction to the ERA legacy, and would be an excellent way to gauge the general interest in the ERA story.
    2. Secondly, we envision a book that thoroughly documents the whole ERA story.
    3. Finally, from (or in parallel with) the book, we would like to see a PBS-style documentary that would popularize the story for a wider audience. Some of the early findings are on the web – Check out the information on Lowell Benson's site: ~~http://www.usfamily.net/web/labenson/Legacy.htm~~, which will be moving to the VIP Club site http://vipclubmn.org over the next two months.

4.10.3 Opportunities:

The activities to date have been the efforts of a relatively small group, but to really be successful, we will need much broader support. Every current and former employee of a company that traces its roots back to ERA (including companies which sprang from or supported ERA and its successors) has a potential contribution of material, information, or support. Discovering sources of material, collecting and archiving it, and organizing it in a form for public consumption will be a long term enterprise and will need virtually every type of skill and effort we all employed in our work lives. The VIP Club is the greatest repository in the world of these resources and we are inviting all of you to join in and help where you can. Almost by accident, the initial activity occurred on the Lockheed Eagan side, but we all recognize that the Twin Cities Unisys folks have an equal stake in this story, and we need to make sure that their contributions and history are preserved and documented as well. There is a spot to use everyone's skills – just a few ideas of where folks can help:

- Contributions – We would like everyone to provide a career summary, any historic material you may wish to contribute, and to urge your fellow retirees to do the same.
- Collecting and cataloging – We need to ferret out material in a bunch of creative ways, identify it and its significance, then prepare it for archiving and for our own publication and use. Every source we have looked at to date reinforces the realization that this involves a lot of work, and every source seems to point to a new pathway for discovering more information.
- Publication and Publicizing – We need information organizers, people who can help write up the source material (we intend to get professional help for the final product), and ultimately we will probably need to raise (not collect) some money to finance the effort. If we are to participate in the Sesquicentennial, we need your help starting NOW! If you are interested in joining in this engaging effort, please contact one of the following:
  - Lowell Benson* VIP CLUB 651 483-3709 ~~labenson@usfamily~~.net
  - Ole (Dick) Olson* LMCO ~~651 456-3158~~ ~~r.d.olson@lmco.com~~
  - Quint Heckert VIP CLUB ~~651 484-8729~~ ~~heckertquintin@msn.com~~
  - Dick Lundgren VIP CLUB 952 922-9587 Rflundgr@aol.com
  - Ron Smith UNISYS ~~651 635-3287~~ ~~RonQ.Smith@UNISYS.com~~
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* Legacy Committee co-chairs. ** Principal author of this 'paper'

4.10.4 Follow-up on Involvement in 2008 Minnesota Sesquicentennial

VIP Club members met with the executive director of the Minnesota Statehood Sesquicentennial Commission, Jane Leonard, and her staff on October 10th to discuss our potential participation in the 2008 sesquicentennial activities. Jane welcomed us and appreciated our enthusiasm to be involved and explained where and how we might best fit in. She reviewed the five major themes of the sesquicentennial, and identified the Innovation theme as clearly where we belong. The details are far from worked out, but a likely venue will be exhibit space within a large pavilion tent set up on the Capitol Mall for the Statehood Festival and Expo during the weekend of May 17/18. Ideas for our exhibit are in the formative stage, but it will clearly be a joint effort of the VIP Club, Unisys and Lockheed Martin along with support from the Charles Babbage Institute at the U of MN. The focus will be on our origins in Minnesota,

our 60+ year legacy of technical advancements/high tech production, our economic impact on the state, and also especially on our business areas to which the general public can relate.

Our company history is a story that has mostly escaped the attention of the Minnesota (and national) media, and so this is our chance to bring it to the forefront. Some early ideas for our exhibit include graphics of historical timelines (including spin-off companies), running of selected videos, PowerPoint presentations, significant hardware artifacts and historical documents, Internet feeds (e.g. relevant YouTube clips), and other flat paper eye-catchers (posters, charts, etc.) for background. A strong suggestion also came from Jane Leonard to offer some public talks/panel discussions/press conference style events for public interest and interaction. Needless to say, there will be many volunteer opportunities to celebrate the legacy of our company and our state. Personnel involved in the initial meeting were Ron Q. Smith, Tom Turba, Ed Michaud, Quint Heckert, Lowell Benson, and Dick Lundgren. The second meeting is scheduled for November 29, again at the Sesquicentennial Commission offices in the James J. Hill house on Summit Avenue.

4.10.5 Recent Contributors to Legacy Website

A couple of recent contributors to our website have made serendipitous connections to our company's legacy.

- Ralph Hileman, an ERA badge holder (which officially classifies him as an endangered species), was at a recent Lockheed Martin Small Business conference in San Diego where he met company people John Samuelson, Craig Meyer, and Joe Bulger. Reminiscing ensued and he learned of our Legacy website. Check out his career history input at our legacy website including items of significance such as co-authoring the patent for the first digital computer (NTDS) and his IEEE involvement.
- Jim Donaldson was a recent discoverer of our website, and he too provided a personal history input. Jim had worked in the Navy as a DS (Data Systems technician) at Mare Island, CA (1960-64) and then was hired by Dave Kolling to become a programmer for NTDS development. He worked in Plants 2, 5, and 8 (sound familiar?), and adds "Thank you for your efforts to recall that fascinating time."

4.10.6 Legacy of International Programs – Focus on Australia

Last month's newsletter featured our business legacy in Africa, a piece of which was overlooked and is added below. This month we stay below the equator and feature our legacy in Australia. Our first Australian customer was the Royal Australian Navy (RAN) which began the acquisition of their first NTDS-equipped ships in 1972. Bruce Grewenow was assigned as program manager for what became known as the RAN NCDS (Naval Combat Data System) for the three DDGs, HMAS (Her Majesty's Australian Service) Perth, Hobart, and Brisbane. The NCDS was developed from the Junior Participating Tactical Data System (JPTDS) used in the USN DDGs at the time. The core team of Univac engineering personnel included Morley Moe, Denny Drake, Tom Grendzinski, Jim Heidbrink, and Jerry McGee, and the interface to the USN side was PM Faith Rawdon-Smith.

The RAN NCDS project involved the design and construction of a Combat Data Systems Centre (CDSC) in Canberra, extensive mods to existing software, and completed system installation on the three RAN DDGs in 1977. The original NCDS was based on the UYK-7 computer which eventually came to be replaced by UYK-43 computers in the 80s, at which time the mission and simulation systems were also brought up to the modernized USN DDG standard. An often overlooked aspect of international sales is Offset. What does the host country get other than the systems they buy? In the case of the Australians, Univac later

established a joint venture company (C3I) with EMI Australia (EMI worked closely with us in the CDSC) and we transferred mil-spec circuit board technology to Morris Productions in Sydney.

The UYK-20 computer also found its way down under with a small sale to Singer-Librascope for use in a RAN Submarine program. In the early 80s, the RAN began adding six FFG ships with NTDS capabilities. They are currently operational as decommissioning for the first three DDGs began in the late 90s. In 1977-78, a study was undertaken to extend NCDS capability to smaller RAN ships. Members of the original NCDS core team participated as did other employees from what was the Sperry Univac International Systems Division at that time. The Small Ships Combat Data System (SSCDS) study effort included ISD employees Max Tiede, Ernie Lantto, Steve (Wyatt) Howe, Pat Gartner, Chuck Burk, and others. The potential business looked extremely good until Australian voters at the time opted for a change in government, and the wind went out of the RAN's sails for the SSCDS.

The Royal Australian Air Force (RAAF) has also been a customer for our P-3C maritime surveillance systems. The RAAF's experience with the P-3 goes back to 1968 when they took delivery of their first Lockheed P-3Bs, and in 1977 they got their first P3Cs with the Univac CP-901 computer. In 1995 computer upgrades (and many others) were in order. Work began in Greenville, TX in 1997 with LM Eagan under contract to E-Systems to provide the CP-2044 computer as well as other hardware and software enhancements. Australia's neighbor New Zealand has also had Lockheed P-3Bs going back to 1966. However, their upgrades/life extension programs have taken a different path involving other contractors.

It was mentioned earlier that there was an oversight in last month's focus on African business. Specifically, the Egyptian AN/TPS-59 air defense radar system was omitted. This program, originally from the mid-80s, involved the UYK-7 computer (including the fan-out tester) and the S-2049 data terminal set (USQ-69 displays) from Sperry-Eagan. It was an FMS case via the USN to the Arab Republic of Egypt under program manager Carl Rumsey. Depot-level hardware training took place in 1987 at the Eagandale facility, and was performed by Bob Vogel and Owen Hefner from the Customer Training Department for two Egyptian military officers. It was interesting to note that the two officers were chauffeured daily to and from the Eagandale building (a cultural norm for them/a cultural oddity for us). In 2001 Lockheed Martin's Naval Electronics & Surveillance Systems (NE&SS)-Radar Systems unit in Syracuse was awarded a contract for the refurbishment of the eight Egyptian TPS-59 systems, following an earlier similar refurbishment in 1995.

5 2008, Third Year of Articles

5.1 January

{**Editor's Note:** I, Lowell, apologize for not doing a cut and paste from the Jan/Feb 2008 newsletter, my archived pdf file is corrupted and I didn't want to try retyping the pages of blurry info.}

5.2 March – Richard Lundgren

5.2.1 Legacy Website Transitioning Continues

The transitioning of our legacy website from its original draft version to http://vipclubmn.org is now 80% complete. Many thanks are due to Lowell Benson for his Herculean efforts. Legacy is now a click away from the VIP Club website under the "Legacy-LMCO" button. A "Legacy-Unisys" button provides a path for the commercial side of the house. Lowell has also implemented a hit counter feature which allows us to

measure how often users are coming to our site and where attention is being focused. An unanticipated side effect has been a social one. Some former employees from long ago have discovered our site and in so doing have recognized names of colleagues and close friends from the "early days." Some quick email exchanges have put the long separated persons in touch once again.

5.2.2 Recent Contributions to the Legacy Website (http://vipclubmn.org)

Recently authored contributions which have been posted to our website have come from Glen Hambleton, O. Wynn Roberts, and Dick Petschauer.

- Glen's write-up traces his career chronologically through his working years (1957-1986, and then some) and geographically through the U.S. (MN and TX) and the rest of the world (South Africa, Korea, Germany, England, and Russia, then the USSR). His experience is fascinating and expansive and defies a two-sentence encapsulation, but in brief, Glen provides insights into many major programs and marketing efforts over the years, inter alia, Russian ARTS, Korean ARTS, and German ZKSD, plus many anecdotes of the machinations within organizations and at the customer interface. It's a great read, and Glen's recollection of coworkers by name is a history by itself.
- Owen (Wynn) Roberts is the Welshman (from Caernarfon) who didn't stay in Wales but took a chance on a new life in America. In 1958 he started at a Remington Rand Univac manufacturing plant in Utica, NY. The plant produced nostalgic hardware such as Card Punches, Card Readers, Uniservo Tape Drives and medium sized Mainframes - Univac III at the time, later 1004s, 9200s, and 9400s. He continued in mostly manufacturing roles in different states and overseas and even had a role in the Eagan Semiconductor Division under Bob Erickson. He witnessed but did not participate in the exodus from Univac to Mohawk Data Sciences in upstate New York, choosing instead to remain at Univac. Later a company called Mobydata looked equally tantalizing, so then he gave it a try, only to return to Univac later. His retirement home is near Aitkin, MN.
- Dick Petschauer, retired Unisys Fellow, has offered us a stand-back-on-your heels assessment of global warming. It's not really company legacy, but a global issue, or is it? Dick has given an engineering analysis of "Carbon Heat Trapping," the results of which fly in the face of the current conventional wisdom on the subject. See for yourself.

5.2.3 Involvement in 2008 Minnesota Sesquicentennial Continues

Our planning efforts continue with a current focus on acquiring data to highlight the economic impact of the computer industry in Minnesota. Our roots go back to ERA in 1946, and our company succession and spin-off descendants all represent our family blood line. We will depict our economic impact in our exhibit on the Capitol Mall May 17-18. To gather the impact data, we are working with the State of Minnesota Department of Employment and Economic Development (DEED) and also the James J. Hill Reference Library in St. Paul, a non-profit business research organization. We will need VOLUNTEERS (retirees and active employees of Unisys/Lockheed Martin or predecessor company names) to provide a presence at our exhibit, answer questions from visitors, or otherwise crow about our significant Twin Cities legacy. If you are interested, contact rflundgr@aol.com.

5.2.4 Legacy of International Programs – Focus on Republic of China (Taiwan)

Ever since the Communists forces under Mao Zedong gained control of mainland China in 1949 and the Koumintang Government under Chiang Kaishek fled to Taiwan (Formosa), the U. S Government has supported the Republic of China (Taiwan). The mainland Peoples Republic of China still claims Taiwan as a

renegade province while Taiwan continues to maintain autonomy. The economy of Taiwan experienced a transformation "miracle" from a labor-intensive agrarian base to capital-intensive commodity production and high technology. For a long time, the mainland remained mostly agrarian and politics ensured economic stagnation, but in the past two decades, political changes have unleashed the energy and entrepreneurship of the Chinese peoples. It remains to be seen how current economic events will impact the relationship between the two Chinas.

Until recently, the role of LM-Eagan in support of defense concerns for the Republic of China (Taiwan) has been mostly indirect. Our naval shipboard systems have only come into the ROCN (Republic of China Navy) as a result of government-to-government sales. With U.S. Government approval, the USN sold four previously decommissioned Kidd Class DDGs to Taiwan. The Kidd class was also known as the Ayatollah class (the Imperial Iranian Navy was the first intended customer) and then became known as the "Dead Admirals" class for Adm. Kidd and three other admirals all of whom died in WWII Pacific combat. In December 2005 the ROCN took delivery of the first two DDGs, the Kee Lung (formerly USS Scott, DDG 995) and the Su Ao (formerly USS Callaghan, DDG 994). In November 2006 they received the Ma Kong (formerly USS Chandler, DDG 996) and the USS Kidd, DDG 993). These ships had all been considerably modernized with the New Threat Upgrade and NTDS. The ships' systems contain USN legacy equipment from LM-Eagan, and support has been provided to the shipyard in Kaohsiung, Taiwan as needed, the pervading mantra being: 'Where go our ships, there go our systems'.

Taiwan has also been a customer for our Air Traffic Control systems with the ATCAS program (Air Traffic Control Automation System). Initial work began in 1990 with the Taiwan Micro-ARTS (Automated Radar Terminal System) program, a small PC-based system that came be used in a backup role. In 1991 Unisys, under contract to IBM, produced the Taiwan Micro-EARTS (En-route Automated Radar Tracking System) which covered three airport (terminal) sites in Taiwan plus the en-route control as well, achieving operational status in 1996.

LM-Eagan began a different program in support of Taiwan security in 2003. This program, dubbed Po Sheng (Broad Victory), is Taiwan's biggest C4ISR program (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance). Po Sheng is a foreign military sales program designed to enhance C4ISR capability for the air force, navy, army, joint defense platforms, and command and operations centers. Taiwan has been characterized as an "Electronic Fortress" under the Po Sheng program. This program is ongoing and involves large efforts for LM in Eagan and San Diego.

Lockheed P-3 aircraft have also been used by Taiwan. The Republic of China Air Force (ROCAF) operated at least two P-3s in a highly classified CIA black program from mid-1966 to early-1967. The electronic surveillance mission was completed and the aircraft returned to the U.S. Other LM aircraft, currently in use in Taiwan, include F-16 Fighting Falcons and C-130 Hercules.

5.3 APRIL – RICHARD LUNDGREN

5.3.1 Legacy Website Transitioning Complete

The transitioning of our legacy website from its original draft version to http://vipclubmn.org is now complete. On the home page there is a "Site Update Log" that tracks the updates going back to November 2007 when the transfer began. Great job by our stellar webmaster.

5.3.2 Legacy Project Summary – Brown Bag Event

A brown bag event was held March 5th at the LM Eagan facility to discuss the status of the legacy project, major events in our company history, and plans for future activities. This event, held nominally over the lunch hour, was open to all employees and attracted an SRO crowd. Lee Meyer, John Westergren, and Ole Olson provided the welcome and legacy project status briefing. Warren Burrell, an early ERA employee recalled some stories from our wellspring company. Millie Gignac described her experience as the company's first female director and founder of the (Sperry at that time) VIP Club. Then came Bernie Jansen with his experience as the first on-site missile guidance programmer at Cape Canaveral. Significant engineering history was provided by Marc Shoquist on the subjects of the antenna coupler, fiber optics, and NATO Standards Committee membership. Gary Hokenson, drawing from his vast personal experience, presented the evolution of computer designs over the last 40 years. Plans for future activities were presented by Harvey Taipale and included our efforts for an exhibit at the Minnesota Sesquicentennial Expo (May 16-18 on the Capitol Mall), a book to chronicle company history, and a documentary movie on the same subject. The brown bag wrapped up with Lowell Benson, our webmaster for http://vipclubmn.org, giving a website demo for significant areas and programs in our legacy.

5.3.3 Recent Contributions to the Legacy Website (http://vipclubmn.org)

Recent postings to the website include a career summary from Don Blattie, a contact tidbit from Richard Prokop, and a transcribed oral interview with Fred Hargesheimer.

- Don Blattie started with the ERA Division of Remington Rand in 1955 in antenna coupler field engineering. After a few related jobs he came to work under Fred Hargesheimer in R&D Sales and Contracts. After some time in Blue Bell, PA, he then came to roost in International Contracts, beginning with the German B2 program (his first foreign military sale, FMS) and the German Fast Patrol Boat program (his first direct international contact, to HSA in the Netherlands). He much preferred the direct sales programs' as they weren't so limited by government rules and audits. Don also did much contracts work for the Japanese customers, especially the CP-2044 License Production Agreement with Toshiba. His wide international travels allowed him to visit many nice places, meet people of other cultures, and only once get hijacked on a Lufthansa flight from Frankfurt to Bonn. All in all, he "worked on a lot of good programs and a few bad ones (unnamed)," with many good people he does cite by name.
- Richard Prokop was an employee in Univac Plant 3 (196364). He did wiring and rework on the night shift. He discovered our Legacy Website and recalled the Nike/Zeus program. It prompted him to start a search activity for any old photos or other stuff he might have.
- The oral interview with Fred Hargesheimer, in transcript form, is a great example of what we have been doing with our oral interview program. It clearly demonstrates the value of capturing oral interview data while we still can.

5.3.4 Legacy of International Programs – Focus on the Kingdom of Thailand)

What do Anna Leonowens, the Emerald Buddha, the River Kwai bridge and RTADS have in common? The answer is Thailand, or more specifically the Kingdom of Thailand (or Ratcha Anachak Thai). Historically Thailand has tenaciously and cleverly protected its independence, and in fact it was the only Southeast Asian state to avoid colonial rule, quite a feat considering its location between French Indo-China and the British rule in Burma, India, and Malaysia. Much credit goes to political savvy in playing off the two giant colonial powers against each other. Following WWII Thailand emerged as a strong ally of the U.S. although

a string of military regimes ruled the country until stable prosperity and democracy arrived in the 80s. The Thai have been influenced by many developments in the west, and when the need was at hand to modernize their Air Defence System, they turned to Unisys.

Unisys became the prime contractor for RTADS, the Royal Thai Air Defence System, a countrywide air defense system which went into operation in 1990. It should be noted that Unisys was the COMPLETE prime contractor for RTADS with responsibility not only for all of the system components of the data processing system, radar integration, and communications, but also for the civil infrastructure. The latter included such tasks as building several communications towers and stringing miles of fiber optic cables. In May of 1991, Unisys also began the Joint Air Defence Digital Information Network (JADDIN) system. JADDIN, which was designed to work in conjunction with RTADS, is an integrated air defence information system whose mission is to provide for the exchange and display of digital information, air tracks, and command and control information at key Thai military service air defence sites. The JADDIN system supports Army, Navy and Air Force centers within the command structure of the Royal Thai Supreme Command. JADDIN consists of the latest technology in work stations, systems and application software, voice and data transmission communications equipment, and large screen displays. All software applications were done in Ada requiring more than 230,000 lines of code. JADDIN equipment is located at the Royal Thai Air Defence System (RTADS) Air Operations Centre/Sector Operations Centre in Bangkok and at 11 remote sites throughout Thailand. JADDIN installation began in Thailand in June 1993 with system acceptance following in late 1993.

It should be noted that the hard work done on RTADS laid the groundwork for many challenging and successful systems projects to follow. The immediate successor was the Turkish Mobile Radar Complexes (TMRC) and after that the Air Sovereignty Operations Center (ASOC). It's a classic example of leveraged value and product evolution. It continues today and will be detailed more in subsequent newsletters. Other units of Lockheed Martin have provided three squadrons of F-16s to the Royal Thai Air Force (RTAF) as well as six C-130Hs and three P-3T Orion aircraft.

5.4 MAY – SESQUICENTENNIAL EDITION

About a year ago this newsletter provided the status of the LM-initiated Legacy project after one year of progress. It is now time to provide again a status summary at the two-year point. Many pioneering initiatives have taken place and the passion for this project has become contagious. **Dick Olson**, Legacy committee co-chair, recently took it upon himself to summarize our current status to the seven key people for Legacy at the LM Corporate level. In Ole's last climactic act of autonomy before retiring, he created a report of LM-Eagan's significant events and activities going back to the founding of ERA in 1945. He sent this report to **Sharon Watts** and **Denise Stonecypher**, who have been tasked by LMHQ with lead responsibility for Legacy, as well as to the other five major players. Ole's role as Legacy committee co-chair has now been passed to **John Westergren**.

5.4.1 Historically Significant Relationship between Univac St. Paul (now LMTS) and CALAC (now Lockheed Martin)

A very important part of the Lockheed Martin Tactical Systems - Eagan (LMTS) Legacy is the relationship between Lockheed California and Sperry Univac. The 1830 (CP-901) computer and a later version, CP-2044, used on Lockheed P-3C aircraft and sold to U.S., Dutch, Norwegian, Japanese, and Australian Navies, are the earliest and longest computers in operation. The 1832 (AN/AYK-10) aboard the S-3A and S-3B and the

Canadian CP-140 (P-3C) was the first airborne multiprocessor. Much less known is the AN/UYK-23 computer used in Lockheed U-2 aircraft for NASA weather surveillance and the SR-71 for high altitude airflow control.

Sperry Univac Defense Systems Division had a long and successful relationship with Lockheed Aircraft Co., Burbank, then known as CALAC, as a supplier of airborne computers and systems software for P-3C and S-3A and B antisubmarine warfare aircraft. Univac Marketer **Jim Rapinac** and many other DSD managers developed close working relationships with Lockheed management including **Sherm Mullin**, who was a major contributor to the success of the P-3 and S-3 programs before becoming president of the Lockheed Skunk Works later in his career.

5.4.2 Significant Pioneering Origins in the Computer Industry

Engineering Research Associates (ERA) in St. Paul, MN was the first American Computer Company, incorporated in December 1945. Some amazing inventions occurred at ERA, including the first magnetic drum in the world (the world's first hard drive).

5.4.3 Significance within Academia

ERA is historically significant within the University community. ERA pioneer **Erwin Tomash** established the Charles Babbage Institute (CBI), a leading international center for the history of information technology, and the Engineering Research Associates Land Grant Chair at the University of Minnesota. The CBI Director, currently **Dr. Tom Misa**, occupies this endowed chair. ERA 1103 S/N 4 was donated to the University of Minnesota in 1958 to initiate their computer science program.

5.4.4 Significant Response to LMHQ Legacy Request

LMTS Eagan has been responsive to the LMHQ Legacy request for the names/contributions of the most historically important key figures. LM-Eagan furnished LMHQ with a list of 18 names, both living contributors and deceased. LM-Eagan has completed capturing historical recollections of all the selected living personnel in Legacy Videos and in Oral Legacy interviews. In addition, the Legacy Committee has identified over 30 individuals who joined ERA in the 1940's and 1950's, and we are in the process of interviewing the oldest/most significant ones. Unfortunately, two prime candidates recently passed away before we could do the Legacy Interview (**Harry Wise**, 77 and **Earl Joseph**, 80).

5.4.5 Keeping our legacy alive - a continuous process for decades in St. Paul

Keeping our Legacy alive, back to its origins with ERA, has been a continuous process for decades in St. Paul. First Friday Luncheons have continued monthly for over 40 years. This was originally formed by four of the early ERA pioneers, (**Dr. Sid Rubens**, **Dr. Arnold Cohen**, **Jim Nikitas,** and **Don Nemanic**). Sid Rubens, who recently died at age 97, was the last survivor of the original group The Legacy Committee had recent communication with Sid, prior to his passing. The fifth person to join the luncheon group was **Warren Burrell**, now the coordinator. **Jack Hill**, another frequent participant at the First Friday Luncheon is now 97 years old. Jack had been an engineer at 3M before joining ERA in 1946. He is one of two engineers who delivered and setup an ATLAS stored program computer at the NSA predecessor in October 1950.

5.4.6 Significant contributors to the "greatest generation"

Many of our former employees served in various theaters and capacities in WWII. To all of them, a salute of sincere gratitude and enduring friendship. Probably the best known story, which recently got worldwide publicity in an AP feature, is that of **Fred Hargesheimer**. Fred was an early ERA and Remington Rand

employee whose phenomenal success as an Antenna Coupler salesman assured an income stream to ERA that enabled the company to stay in business and eventually become the early leader in the digital computer industry. Fred achieved notoriety after his Lockheed P-38 reconnaissance plane was shot down over New Guinea in WWII. He was rescued by natives who hid him from the Japanese and restored his health. In gratitude for his life, he repaid them with a school and a hospital in subsequent years. An AP reporter, who recently visited his school in New Guinea, learned of Fred from the natives and then sought him out in California for three days of interviewing which resulted in the AP article. This article was prominent in both major Twin Cities newspapers. Of interest is the fact that Fred's classmate in engineering at Iowa College (now Iowa State University), **Bill Butler** (EE 1940), encouraged Fred to come to ERA. Bill, now 91, is also a regular participant at the first Friday Luncheon.

5.4.7 Significance at the National Level for the U.S. Navy.

The Naval Tactical Data System (NTDS) took UNIVAC computers to sea in the 1950's. NTDS was demonstrated to President Kennedy, and it is believed that the naval superiority enabled by NTDS was a factor in "push back" of the Russians (Khrushchev "blinked") during the Cuban Missile Crisis. The original computers for NTDS and all subsequent generations of them, until today, have been developed in St. Paul by Univac/LMTS. This whole story has been chronicled in David Boslaugh's (Capt., USN, ret.) book, *When Computers Went to Sea, the Digitization of the United States Navy*. His book describes a significant portion of LMTS Legacy (over 40 years) and stresses the incredible performance and reliability of the computers (some were 30 years in the fleet, outlasting their ships). NTDS capabilities were also extended to several foreign navies.

5.4.8 Significance at the National Level for the Air Traffic Safety

Our involvement in Air Traffic Control began with an FAA contract to provide digital systems at 62 major airports in the U.S. The reliability realized in our early NTDS computers was a clear factor in winning this business. The number of airports in the U.S. has expanded and foreign customers have also chosen our systems. These systems continue today throughout the world.

5.4.9 Significance at the National Level for NASA

NASA, in its infancy, was inexperienced, untested, and unsure. It needed in its own mind and in the public's mind to establish confidence in its capabilities. Our company's contribution was the Athena Missile Launch Computer System. This computer and associated UNIVAC developed software successfully launched 350 missiles from the Cape, Vandenberg, and Johnston Island. No launch was ever scrubbed due to a hardware failure or software glitch in our systems.

5.4.10 Pride in our Legacy Continues at the Minnesota Sesquicentennial

Legacy retirees (LM/Unisys) are planning a joint exhibit for the 150th Minnesota State Anniversary Celebration to be held on the Capital Mall in May 2008. The retirees are in the process of constructing a large graphic depiction which will show our evolution of ERA through the years to LM, including spin off companies, key events, key people and major customers. The 150th Committee expects that 80,000 people will attend.

5.4.11 Broad Support for Legacy at LMTS-Eagan

Our current effort has a core of about twenty-four seriously committed Legacy "doers." About 150 individuals have made contributions to the Retiree Legacy Web Site (http://vipclubmn.org) with write-ups of their own career and/or of technical topics. The vast majority of the effort is by committed retiree

volunteers. The retiree club, formed in 1979, has over 1000 members, many proud of their collective accomplishments and passionate about seeing history correctly recorded. Legacy news updates are also a regular feature of the VIP retiree club newsletter.

5.4.12 Unbiased Documentation Sources

Our legacy is not simply written by us for us. There are three great non-company, neutral sources that are excellent in describing our early years and deserve to be included here. The authors and book titles are as follows.

- Arthur L. Norberg - Computers and Commerce, A Study of Technology and Management at Eckert-Mauchly Computer Company, Engineering Research Associates, and Remington Rand, 1946-1957
- David L. Boslaugh (Capt., USN, ret.) - When Computers Went to Sea, the Digitization of the United States Navy
- Engineering Research Associates, various – *High-Speed Computing Devices* (with introduction by Arnold A. Cohen and published by Tomash Publishers)

5.5 Sesquicentennial Story – Richard Lundgren

5.5.1 Minnesota Statehood Festival and Expo – May 17 and 18, 2008

Mark your calendars for the weekend of May 17th and 18th, when Minnesota celebrates 150 years of statehood with a weekend of events and exhibits in St. Paul, planned by the Sesquicentennial Commission and the Minnesota Historical Society. As part of the Statehood Week festivities, a pair of huge tents, showcasing "Minnesota Innovation: 150 Years of Ingenuity," will be erected on the State Capitol grounds for two days of public exhibition. Other events and speakers are planned throughout the weekend, culminating with a formal program beginning at 6:58 PM Sunday evening. On the 24-hour clock, that is 18:58, which represents the year Minnesota was admitted to statehood. At that minute, the Minnesota Air National Guard will kick off the evening program with a flyover of the Capitol grounds. This is a great weekend opportunity for everyone in Minnesota to come and browse through our state history a get a snapshot of the vitality of the State of Minnesota today.

The VIP Club will be participating by providing an exhibit in one of the tents, developed around our common Engineering Research Associates (ERA) legacy. This exhibit has been planned as one of the elements of the legacy history initiative. Our steering committee has been developing the concept for a booth for the past several months. Both Unisys and Lockheed Martin are providing various significant resources to make this exhibit a reality.

5.5.2 Our Capitol Grounds Exhibit

The primary objective or our exhibit is to begin to reveal the untold story of the great contributions that ERA made to the State of Minnesota, the local technology industry, and the computer industry in general. Increasingly, as we gather and catalog materials, it becomes apparent that ERA's historical role as a technology innovator is largely under-reported and under-appreciated. Most local folks are unaware of ERA's existence, much less its key role in the development of revolutionary technologies and its role as the wellspring of Minnesota's computer industry and related technology businesses. Unlike many companies, ERA also appears to have had an early tradition of publishing and sharing information, which fostered growth of the computer industry nationwide. Some of the remarkable achievements from ERA include:

- Production of the early, highly classified, US code-breaking computers

- The first highly reliable commercial computer – the start of 24/7 operations
- The first "hard drive" (actually drum) based processing systems, so prevalent today
- Development of computer-based combat systems still deployed throughout the world
- Development of the first automated Air Traffic Control system, the successors of which are still managing air traffic around the world and who still represent important businesses for our current corporate sponsors
- Provider of ground-based missile guidance for hundreds of early space shots and satellite launches
- The first space operations management and training systems, carrying through to planning and training for today's Space Shuttle missions
- Development of the airline reservation and cargo management systems, modern versions of which are still being supported by Unisys
- More than 100 billion dollars of direct and indirect economic contribution to Minnesota

Our exhibit will graphically depict this history and some of these accomplishments. One super-graphic will show the progression of companies, founders and early notables, key equipment developments and spin-off companies. Others will photographically portray some of the key "firsts" highlighted above. We will have interesting early computer artifacts on display, highlighting early ERA equipment, and showing the state of the earliest computer technology.

The VIP Club exhibit promises to be an exciting opportunity to be a part of the celebration of 150 years of statehood, and VIP Club members are encouraged to be active participants in the occasion. First, and foremost, if you have time for nothing else, plan to take part in the statehood weekend festivities. Spend some time on the Capitol grounds, see the sights, and visit the VIP Club exhibit - you might even meet some familiar faces there. For a comprehensive list of all Minnesota Sesquicentennial events throughout 2008, check their website, www.mn150years.org. Program and schedule updates to the Statehood Festival and Expo will be posted there.

More importantly, for those of you that are willing to take a more active part, we need volunteers at various times between the 12th and the 19th of May. Early in that week we will be staging the exhibit at Unisys Roseville, then transporting it to the Capitol grounds on the 15th or 16th for setup. Many hands will make light work of these tasks. In the period from the evening of the 16th (State VIP tour of the exhibit), and during the days of the 17th and 18th, we need roughly two dozen volunteers to be in the booth and meet the exhibit visitors (around 3 hour shifts, 3 people per shift). Booth duty will not require any special knowledge (you will get a quick brief before your shift) and does not require any special skill other that an ability to be open and friendly to the public. On the flip side, being a part of relating this history to the public can be great fun and personally very rewarding. Finally, late on the 18th and on the 19th we need to take down the booth and transport it to Eagan, where it will be on display in the courtyard there. Tom Turba is coordinating the volunteer schedule. If you can help in any way, please contact Tom by email at TNTurba@Comcast.net. If you do not have email, you can call him at 651-489-0779.

So, as Minnesotans commemorate 150 years of statehood, remember three things: Check out the schedule of events on the Sesquicentennial website, Volunteer to be a part of the VIP Club's contribution to the flagship event, and come and enjoy the Minnesota Statehood Festival and Expo on May 17th and 18th.

If you have any comments or questions, feel free to contact any member of the steering committee.

- Lowell Benson 651-483-3709 ~~labenson@usfamily.net~~

- Dick Lundgren 952-922-9587 Rflundgr@aol.com
- Quint Heckert ~~651-484-8729 heckertquintin@msn.com~~
- Ron Q. Smith ~~651-635-3287 ronq.smith@unisys.com~~
- Harvey Taipale 651-748-5083 hjtaipale@comcast.net
- Tom Turba 651-489-0779 TNTurba@comcast.net

5.6 JUNE – LOWELL BENSON

5.6.1 Thanks for a Team Effort - Real Synergy at Work

The VIP Club thanks our 'Sesquicentennial Team' for bringing our Legacy to the Minnesota public on the Capitol Mall Exhibition May 17th and 18th. The 8' x 24' booth was setup at UNISYS the week before then at LMCO the week after. The team is Dick Lundgren, Quint Heckert, Ron Q. Smith, Tom Turba, Larry Bolton, and Harvey Taipale with support from Lowell Benson, John Westergren, and numerous behind the scene individuals. Special thanks to Quint for doing the majority of the draft layout of the booth's artwork and trucking the display between venues. Also, we thank the family of Harry Wise for their artifact contribution of a 1950's vintage drum memory [representing invention of the world's first hard drive] and a 1950's vintage Antenna Coupler - both of which are part of the display.

5.6.2 Web Site – Report and Request

Our Club/Legacy web site consists of four information levels: 1) Main tab level, 2) Secondary tab level, 3) sections within individual pages, and 4) documents, slides, spread sheets, or pictures which open in a separate window as linked from text within section 3s of the various pages. The structure of our Legacy web site enables the collection of statistics regarding site visitors for this year. The year-to-date visitor "hits" are reported in this table.

Month	New Visitors	Visitors
January	487	704
February	822	1298
March	1304	1803
April	1262	1866
May week 1	258	343

In April, webmaster Lowell Benson created a person index to facilitate readers finding where people are mentioned in various mini-bios or project articles. There are approximately 1,200 names of people now on our site; you may be there! Look at main tab Home, sub-tab Index/Acronyms, Section 4 to locate your name followed by the page numbers on which you are mentioned (or contributed to an article.) Then, scroll up to section 3 of this page to see titles (tab names) of the individual pages along with other UNIVAC-ers listed on that page. Most of the mini-bios and a few of the technical articles have had a grammar and spelling review by John Skonnord of LMCO. Much of the introductory material and tidbits sent directly to me have not had such a diligent review. A request of you, the reader, is to participate in a web site Quality Control check. Please read the web site pages on which I've located your name. If you notice any spelling or gross technical errors in the paragraph/section with your name mentioned, please send a 'correct it' message to ~~labenson@usfamily.net~~. Thanks for your help to reduce errors in these parts of our written Legacy.

5.6.3 Web Site FAQs

5.6.3.1 What's new since you last looked at the web site?

Section 4 of the Home Page lists all additions and updates since the site's inception.

5.6.3.2 Who has written technical articles?

Each of the second level People Pages lists authors of articles, section inputs, and other contributions. Specific *.pdf formatted articles are listed on main tab Legacy, LMCO, sub-tab Documents.

- How do I get in touch with the VIP Club Board or Legacy committee? Use the topical e-mail links or the general form on the Contact Us page.
- I want to do my own research, where do I start? The main tab Links will lead to many other computer history web sites. We always welcome new mini-bios or articles about your project.

We are short of general descriptions of facilities that we've occupied outside of the Twin Cities, i.e. who is willing to collaborate on articles about Winnipeg, Pueblo, Clearwater, Valencia, Johnsville, Patuxent River, etc. In the next couple of months, we'll be providing articles about our Computer Aided Design development and the Evolution of Environmental Test Laboratory – stay tuned!

June 2008 newsletter articles submitted by LABenson, with editing by Richard Lundgren.

5.7 JULY – RICHARD LUNDGREN

5.7.1 Sesquicentennial Exhibit Story

Many, if not most, readers were old enough in 1958 to remember, at least vaguely, Minnesota's Centennial. Perhaps you would recall, as would our contemporaries in the general public, the very popular Centennial Train (which hit every county except Cook which had no railroad tracks), the Parade of the Century (which featured foreign dignitaries from 26 different countries invited by Gov. Orville Freeman), or school history projects (which dwelled on the Minnesota 100-year-old birthday theme).

But little known is the fact that our genesis company, Engineering Research Associates (ERA), was in its 13th year of operation in 1958 and was reeling from the effects of large numbers of opportunists "defecting" to start Control Data Corporation. Fast forward now another 50 years to the state's Sesquicentennial. Last fall, as ideas for Sesquicentennial events were still bubbling to the surface, we (the VIP Club) contacted the State of Minnesota Sesquicentennial Commission. We believed that our two-year Legacy project might lead to a role in celebrating the Sesquicentennial.

Our story was to present the role that ERA played in the founding of the Minnesota Computer industry, leading to our present companies (Unisys, Lockheed Martin, and all predecessor names) as well as to over 100 spin-off companies. The Sesquicentennial Commission knew nothing of our story, but they liked our idea, they liked the presentation of an industry's history within the context of the state's history, and they liked the fact that this industry (with enormous economic impact upon the state) had true Minnesota origins and significant longevity. The wheels were set in motion. Ideas flowed from the VIP Sesquicentennial team (Ron Smith, Tom Turba, Quint Heckert, Harvey Taipale, Dick Lundgren, and others), and our Sesquicentennial Exhibit plan evolved. The initial deadline was to have the exhibit ready for the Sesquicentennial Expo on the Capitol Mall May 17-18.

To prepare the exhibit (without a PERT chart, by the way), Unisys Roseville provided a staging area in the employee cafeteria. Over time, the supporting structures (provided by Unisys) were erected, the graphics mounted, the artifacts added, and the large flat panel display (provided by Lockheed Martin) installed. As expected, a bit of debugging for technical, editorial, and aesthetic concerns took place, and the final product was ready to roll in time. Pictures of the exhibit follow below, but the main features are the two

large panels with graphic displays (one of the evolution from ERA in 1946 to the present, and one of the various business areas in which we have played major roles), a large display with a series of rolling images with historical highlights, and an interesting, maybe even nostalgic, assemblage of industry artifacts.

The two-day weekend event on the Capitol Mall was a capital success. We had a minimum of four volunteers staffing the booth at all times, and all were consistently engaged in conversations with exhibit visitors. The booth drew visitors from the U of M Charles Babbage Institute, the MN Historical Society, the Sesquicentennial Commission itself, a gaggle of MN State politicians, former/current employees of our company and of other high-tech companies, and a surprising number of (Blackberry/iPod-toting) youngsters appreciating the gee-whiz-ness of six decades of technology evolution.

It was noted that the ERA magnetic drum of 1947 did not have enough memory to hold even one iPod song. Other anecdotes of visitor interchanges include three former CDC employees, all of whom thought they would have ended their careers with CDC. One CDC guy actually had shared an office with Seymour Cray. He mentioned that the office walls and even the ceiling were carpeted to muffle any distracting noises. He said Seymour drove him nuts. A retired military guy worked maintenance on virtually all aircraft that contained the ERA antenna coupler. The extensive market for that device was amazing. And lastly we had input from a visitor who said that our graphics substantiated the lie that Minneapolis is the Capitol of Minnesota. Well, you learn something new every day and just have to roll with the punches. Many other people helped with a lot of logistic support (transportation, setup, teardown, staffing, etc.) for the Capitol Mall venue. Among them are Tom Burns, Max Tiede, Alden Allen, Brian Berggren, and Jim Larson. Following our successful run on the Capitol Mall, the exhibit was moved to the courtyard of the LM Eagan building, where employees and others could view it over several days. One day included a gathering of original ERA and early RemRand people (Manny Block, Jack Sater, Phil Phipps, Warren Burrell, and others) to recount stories of the early days. Next, the exhibit moved to the Unisys MACS building where it drew a lot of attention over a two week stay. One Unisys employee with the history gene, James Stramel, was helpful by recording digital images of the major elements of the display including artifacts and descriptive placards.

Most recently, a subset of the exhibit was erected at the July 3/4 Eagan Funfest near the Eagan Community Center, the purpose of which was to talk to the community visitors and explain what business goes on in our buildings. One young exuberant visitor extolled “My dad works for Lockheed Martin!,” as proudly as if his dad was president of the world. Gotta love the youth! For support of the exhibit at the Eagan Funfest, many thanks to Peggy Mullikin, John Westergren, Ron Smith, Quint Heckert, Tim Toba, Abner Yemaneab, Eric Anderson, David Feely, Dennis Severson, Bernie Jansen, Millie Gignac, Todd Witchall, Ed Nelson, Don Weidenbach, Ole Olson, Scott Benjamin, and Larry Bolton.

5.7.2 The Exhibit Has Now Taken on a Life of Its Own.

The Sesquicentennial Commission has already asked us several times to be part of the Sesquicentennial “action” for the full 12 days of the 2008 Minnesota State Fair (Aug. 21 to Sep. 1). We have agreed, but many volunteers will be required to staff the exhibit and provide logistic support. If you go to the Fair anyway, or need a new excuse to go this year, here is your opportunity. Preparation and training for staffing the exhibit will be provided at Unisys Roseville where the display will be set up prior to the Fair. Volunteers will be reimbursed for Fair tickets up to $8/ticket (the cost of advance sale tickets). If you are interested in working a minimum four-hour shift during this event, contact Tom Turba

(TNTurba@comcast.net) for schedule assignment and the latest info. All you need to do is be friendly and converse with visitors to the booth. We'll have the luxury of an air-conditioned venue with entertainment and a beer garden nearby, plus there are also plans for public panel discussions involving the pioneers from ERA and other early company names (e.g., Remington Rand UNIVAC). This won't happen again for 50 years, so be part of it while you can!

5.8 SEPTEMBER – RICHARD LUNDGREN

5.8.1 State Fair/Sesquicentennial Update

To quote from the Minnesota Sesquicentennial Commission's web site (http://mn150years.org/statefair.html): Don't miss the last big event to commemorate Minnesota's Sesquicentennial: "The State Fair Chautauqua - 150 Years of Statehood" – two Big Top tents full of entertaining and educational extravaganzas to send us all off to MN @ 2058 better informed of and engaged in Minnesota's past, present, and future opportunities and challenges. Well, that's us, the "entertaining and educational extravaganza" to engage us and all Minnesotans in appreciating our past and preparing for the next 50 years. No small challenge, but in our company's past, we have a legacy of meeting unprecedented challenges, of going forward where no path existed and relishing the success built on efforts that even we didn't know were so great until it was all over.

5.8.2 So Just What Are We Up To Now?

Well, the role of the VIP Club in this year's Minnesota Sesquicentennial events is now moving to a new arena. Our exhibit of company history, stretching back to its 1946 origins with Engineering Research Associates, will now have a presence in the "Sesquicentennial Compound" for all 12 days of the Minnesota State Fair. The compound will consist of two very large air-conditioned tents just to the north of Heritage Square. One tent is primarily for selected exhibits/merchandise and the other for on-stage performances/presentations. Our booth in the exhibit tent will be open and staffed daily from 9:00 AM to 9:00 PM. Come pay us a visit, or better yet, volunteer to work a 4-hour shift at the booth in return for a free Fair admission ticket (details below). In the performance tent, the important dates to remember are Sunday August 24th and Thursday August 28th.

5.8.2.1 Exhibit Tent Activity

Our display in the exhibit tent is described by the MN Sesquicentennial Commission as the Minnesota Innovation Heritage exhibit. It will be a reconfigured version of the setup we had for the Sesquicentennial Expo on the Capitol Mall in May. Last month's newsletter contained photos from the May Expo. Space considerations at the Fair necessitate a smaller footprint, so there will be some modest downsizing in graphics and artifacts, but the essential story will still be told. We will share the exhibit tent with other selected groups such as the Minnesota Historical Society, Minnesota Authors, Indian Affairs, MN/WI Tourism, as well as the Sesquicentennial Commission itself. We expect a lot of visitors as the exhibit tent is the walk-through path to the show tent. Our goal is to share with all interested visitors our role in the origin and growth of the computer industry in Minnesota (as well as to acknowledge spinoff companies), to emphasize our major innovations and developments over the last six decades, and to describe the significant business areas in which our programs played key roles in the nation's history. For the general public, the story of our past is barely known and certainly underappreciated in Minnesota, so it is our chance to set the historical record straight.

5.8.2.2 Performance Tent Activities

Every day in the performance tent, from 10:00 to 11:30 AM, there will be on-stage performances or presentations under the billing: "Minnesota Real & Imagined—What Minnesotans Need to Know for the Next 50 Years." Our company legacy takes the stage on August 24th when well known and well respected Unisys and Lockheed Martin retirees/active employees will give interesting presentations supported by visuals, graphics and artifacts as necessary.

The starting point will be the unique story of our company's founding and the early products and applications developed by our industry pioneers. Also discussed will be the six decades of evolution of the technologies in our industry as well as the historic roles played by our legacy companies in the early years of data processing. Highlights of the Eagan branch include failure-free support for early missile launches by NASA, the computerization of the U.S. Navy, and the automation of Air Traffic Control in the U.S. Highlights on the Roseville side include automation in transportation (railroads, airline reservations, check-in and cargo), financial and business processing, space operations, and oil exploration. The finale will be a look to the future from the vantage point of our past. A representative of the Minnesota Futurists organization (founded by our own Earl Joseph) will provide that peek into where we're going. The likely candidate will be Brian Toren, also a former company employee.

The other on-stage performance of interest is on August 28th, and it is of sufficient importance that it will be taped by PBS. The theme for that day is Business and Innovation, and the panel discussion will include a conversation on Sustaining a Culture of Innovation in MN. Panelists will include members of the Charles Babbage Institute at the U of M, the Minnesota High Tech Association, the Minnesota Inventor Congress, and a highly regarded St. Paul educator whose expertise is in attracting students to the sciences, math and engineering. Although no panel member is directly from our employee ranks, the representative from CBI is acutely aware of our role in the story of MN innovation, and we expect to gain some visibility there.

5.8.3 Free State Fair Tickets Now! (*NEXT CHANCE IN 50 YEARS, MAYBE*)

We will need volunteers to staff the exhibit and provide logistic support. If you are a routine Fair goer, or need a new excuse to go this year, here is your opportunity. For each volunteer a free Fair admission ticket will be provided. If you are interested in working a minimum four-hour shift, contact Tom Turba (TNTurba@comcast.net) for schedule assignment and the latest info. Our exhibit will be set up for a preview at Unisys Plant 4 in Roseville prior to relocation to the Fairgrounds. The sign-up schedule is already posted to the VIP Club web site at http://vipclubmn.org/Calendar.aspx. All you need to do is be friendly and converse with visitors to the booth. The more company names you can remember, the better qualified you are. This won't happen again for 50 years, so be part of it while you can!

5.9 OCTOBER – RICHARD LUNDGREN

5.9.1 Sesquicentgennial WrapUp – An afFAIR to Remember

HAVE A LOOK... A video clip from the VIP Club exhibit at the 2008 MN State Fair has been posted to the VIP Club website. Go to the vipclubmn.org home page and under Announcements click on "State Fair Sesquicentennial tent." MANY THANKS... The VIP Club exhibit of our Unisys/Lockheed Martin legacy has now run its course at the 2008 Minnesota State Fair. It was very popular, as evidenced by a nonstop stream of interested visitors of all ages who engaged in a wide variety of conversations with our booth staffers. Many thanks go to the enthusiastic, tireless volunteers who worked 4-hour shifts at the booth (even

multiple shifts) to provide a presence of knowledgeable current and former employees of Lockheed Martin Eagan and Unisys Roseville. The schedule of booth staffers can be viewed at the VIP Club website (vipclubmn.org) under the tab "Calendar/Activities." A modicum of gratitude also goes to the core group (Ron Q. Smith and Tom Turba of Unisys and Quint Heckert, Harvey Taipale, Dick Lundgren, and Lowell Benson of Lockheed Martin) for providing planning, training, setup for the Fair preview, daily opening/closing/security/housekeeping functions, and the final "decommissioning" of the exhibit on Labor Day.

Also not to be overlooked are the key people of the MN State Sesquicentennial Commission (Exec. Dir. Jane Leonard, her assistant Karen Rickert, and others) who realized the value of our exhibit in the context of the MN Sesquicentennial year, who invited us (as the sole representative of MN industry) to participate in all days of the Fair in the Big Top Chautauqua exhibit tent, and who themselves were present dawn to dusk every day of the Fair.

5.9.2 The Artifacts Were a Hit.

Besides our devastatingly attractive booth staffers, our trove of historical industry artifacts was the big hit, the magnets to draw visitors' attention to our display. The kingpins of the artifacts were the antenna coupler and the 1955 magnetic drum. The antenna coupler got the attention of some company people who had actually worked on it, and it also attracted some NWA mechanics (in town for 757 training) who knew it from earlier NWA aircraft and from military aircraft. A few visitors from the general public thought it was a bomb of some kind. In a like fashion the magnetic drum was thought to be a mine of some sort. With its porcupine look, it really drew a lot of visitors, especially the younger set who couldn't imagine it had anything to do with the computer world, but we explained it was a forerunner of the hard disk in their home computer. One youngster, who heard our stories of the early computers being used for classified programs, asked if we could still get the "data" (i.e., the "secrets") off the 1955 drum. We had to disappoint him. Visitors of a rural background, who inspected the drum, said it reminded them of a mechanical chicken plucker. The other artifacts fell into two main series, one representing the evolution of digital technology for storage media and the other for logic circuitry. Most visitors could follow, at least superficially, the flow of storage technology from the 1955 drum (37 kilobytes) to the contemporary Seagate hard drive (1000 gigabytes, or one terabyte) in just over five decades. When we told many youngsters that the 1955 drum would not even have enough capacity to hold one song from their Ipod, they seemed to grasp the scope of it all. The density of logic circuitry was tougher.

Larry Bolton led an intently interested couple down the technology evolution trail starting with the Athena module with its four individually visible/countable transistors. Next he progressed to the 15-pin cards (642B) with six transistors, and then to the 56-pin cards (UYK-7) with 16 chips, each of which was the logical equivalent of 2 to 4 of the 15-pin cards. From there the trail got fuzzy as the level of logic integration went from small scale to very high scale (UYK-44 gate arrays, 1100/90 series board, and the single very complex component at the end). However, the trail hit the impenetrable forest when the visitor asked Larry to explain the technology that enabled millions of transistors, as exemplified in the Athena module, to be contained in that one final complex block. Just how was that possible? The full 12 days of the Fair would not have been sufficient to cover the semiconductor process and the advances in photolithography and silicon and fabrication purity which enabled all of this.

5.9.3 Post-Fair Artifact Status:

Not one artifact walked away. All originally present are still present and accounted for. However, they need a bit of a cleanup. State Fair dust continually blew into our tent and none blew out. It just settled and stayed. Also a lot of handling of artifacts left contact oils for the dust to cling to, but we'll be ready for the next event, whenever that is. Actually the artifact count grew a bit with some of the staffers bringing in their own contributions and some visitors also promising future donations.

5.9.4 Personal Connections.

An exhibit open to the general public attracts all kinds of people, most from outside our industry, but many familiar faces showed up too. It's impossible to name them, but many current/former employees from both Unisys and LM stopped by, often with many family members in tow. Sometimes we heard, "Oh, my dad (or uncle or neighbor, etc.) worked there," but they usually didn't know what he did. A number of people, mostly women, said "I remember building those (circuit cards)" or "my mother built those." Some had us mixed up with CDC, not too big a surprise, but one asked what part of 3M were we (we only bought magnetic tape from them), and another asked where does Honeywell fit in all this? One visitor was a retiree from the U.S. Bureau of engraving, and he remembered attending a Remington Rand Univac open house in May of 1956. The invitation to that open house was engraved/etched on a primitive pc board artifact included in our exhibit. One young boy, middle school age, was assigned to do a paper about the economy of Minnesota, and our exhibit and web site became a source of data and an important part of his paper. Also teachers from St. Paul's Arlington High School, Minnesota's first high-tech high school, showed a lot of interest and inquired about a possible presentation at their school. And lastly a Quality Assurance guy from UYK-44 production days searched in vain for his personal QA stamp on the UYK-44 cards.

5.9.5 On-Stage Event

On Sunday August 24th VIP Club and company representatives took the stage in the Big Top Chautauqua show tent to give a 90-minute presentation of our significant past achievements as well as a look into the future.

- Dr. Pete Patton led off with the ERA story: the founders who had worked during WWII in Naval Intelligence, the early engineering pioneers at ERA and their products, ERA's early work in the computer revolution, and ERA's legacy today.
- Next came Marc Shoquist to tell the story of the antenna coupler, an engineering marvel of its time which almost singlehandedly enabled ERA to survive as a business and make the transition to computers. Marc gave credit to Fred Hargesheimer (true home town WWII Greatest Generation member) as the antenna coupler salesman extraordinaire.
- John Westergren then told our story of computerizing the U.S. Navy, starting with the USQ-20 computer, and explained the role of the Naval Tactical Data System (NTDS). The early USN computers and subsequent generations as well have made Reliability our middle name in the minds of many customers. John also compared technology of the 60s to the present day with regard to capability and cost.
- Bernie Jansen followed with the story of our early work in missile guidance to support the USAF and NASA and build confidence at a critical period in our country's history. We provided the ground guidance computer system for early Titan I and Thor Delta launches at Cape Kennedy and eventually the guidance computer for the Titan IIIC. Our astounding product reliability prompted the FAA to entrust the safety of all U.S. skies to us.

- Jack Sater recounted the story of automating air traffic control in the U.S. From the late 50s to the present, we have played the critical key roles for both terminal control systems and for en-route systems.
- Ron Q. Smith followed with the history of Unisys commercial systems. He described the applications of Minnesota computers in the fields of Aviation (reservations/cargo handling), Government (running the city of Minneapolis and the IRS processing our tax returns), and Science and Technology (from oil exploration in the 60s to space shuttle astronaut training in 2008).
- Lastly, former employee Brian Toren, provided the Minnesota Futurists's (mnfuturists.org) peek into the computer world's crystal ball – what's coming in the near future and the far future in the areas of computer technology, computer applications, nanotechnology, quantum computers and more. The slides of this 90-minute presentation have been posted to the VIP Club website under Announcements on the home page. Look for the "ERA-to-the-future" link. A video recording of the 90-minute presentation was also made. For more information, contact John Westergren (~~john.h.westergren@lmco.com~~).

5.9.6 What's Next

Our history at the Fair is now history, although the last hurrah has not happened yet. The Executive Director of the MN Sesquicentennial Commission has asked us to give our 90-minute presentation to a focus group of the Minnesota Historical Society. The Society will be opening an exhibit called Minnesota's Greatest Generation (MGG) in May 2009, and they are very interested in our history whose roots clearly trace directly to Greatest Generation figures. They are interested in our artifacts and our stories, and we want to work with them to influence the content of our part of the MGG exhibit and make it exciting and interesting to future viewers.

5.10 November – Richard Lundgren

5.10.1 CBI Shined Its Spotlight on Engineering Research Associates

The Charles Babbage Institute at the University of Minnesota is continuing its series of talks on Minnesota' Hidden History in Computing. On October 8th, Dr. Tom Misa, director of CBI, featured the singular role of ERA as the seedbed of Minnesota 's computer industry. The line of true succession, of course, leads down today to Lockheed Martin in Eagan to Unisys in Roseville. Other seeds from the bed also sprouted to form over 100 companies, the most notable of which was probably Control Data Corporation. In the coming months, the Babbage Institute topics will be as follows: 11/19 Control Data Corporation; 12/17 Univac –> Unisys; and 01/21 Honeywell. Spring dates yet to be set will be IBM Rochester; early Gopher Internet; IBM's Blue Gene; and Biomedical technology The location for the talks is Andersen Library 120 on the University of Minnesota, West Bank. For more info, go to www.cbi.umn.edu and click on Minnesota's Hidden History in Computing under SPOTLIGHT. It should be noted that this series of talks is already drawing attendees from the employee/retiree ranks of CDC, Honeywell, various U of M departments, and many others. It makes for interesting interchanges.

5.10.2 Sesquicentennial Follow-Up

In May of 2009 the Minnesota History Center will open its Minnesota Greatest Generation (MGG) exhibit. Early G2 on MGG indicates that this is a well-planned, intriguing, exhibit both in layout and in technical content. Our wellspring company, ERA, will have its 1947 magnetic drum (property of the Minnesota Historical Society) featured as part of the MGG exhibit. Needless to say, ERA early technological innovation

helped spawn an industry that has ushered in the information age, which of course our children and grandchildren take for granted, as if it had been born with humanity in the post-Ice Age caves. Discussions are also currently underway with the Minnesota Historical Society regarding the transfer of certain artifacts (recognized as highly desirable) from our Sesquicentennial exhibit to MHS custody.

5.11 December – CBI Talked About CDC, Richard Lundgren

The Charles Babbage Institute at the University of Minnesota continued its series of talks on Minnesota's Hidden History in Computing with a lecture on ERA spinoff Control Data Corporation. On November 19th, Dr. Tom Misa, director of CBI, presented an interesting talk entitled *Lives and Legends at Control Data Corporation*. Of course, ERA pioneers Bill Norris and Seymour Cray were the headliners, and the technology stars were world-leading supercomputers and innovative educational computing.

The talk also unveiled CBI's online site where a site visitor can help document CDC photographs which are part of the CDC corporate archives held at CBI. Perhaps some of our legacy enthusiasts with long memories will recognize former Univac co-workers in the CDC photos. But take note: OUR TURN in the lecture series will occur on December 17th. CBI will cover the Univac to Unisys era which continues today with Unisys in Roseville and Lockheed Martin in Eagan. Future talks at Babbage are as follows: 12/17 Univac –> Unisys 01/21; and Honeywell Spring dates are TBD: IBM Rochester, the U of M's Gopher (an early document search and retrieval protocol), biomedical technology, and IBM's Blue Gene .

The location for the talks is Andersen Library 120 on the University of Minnesota, West Bank. For more info, go to www.cbi.umn.edu and click on Minnesota's Hidden History in Computing under SPOTLIGHT. It should be noted that this series of talks is already drawing attendees from the employee/retiree ranks of CDC, Honeywell, various U of M departments, and many others. It makes for interesting interchanges and can stir old rivalries and bragging rights.

6 2009, Fourth Year of Articles

6.1 January – Richard Lundgren

6.1.1 The Icing on the Cake

As a direct result of our efforts to support the 2008 Minnesota Sesquicentennial Celebration, the Legacy team received a special request in early December from the Sesquicentennial Commission. We were asked to provide suggestions for items to be included in a special "Time Capsule" that would be "buried" for 50 years and then opened for the 2058 Minnesota Bicentennial. Of course we could not cover all interest areas for all Minnesotans, but we could certainly provide artifacts and documents that were of significance to the origin and development of the computer industry here.

From our experience with Legacy we felt very qualified to make suggestions and provide the items on relatively short notice. The capsule 'seal' date was January 6th, 2009 at which time there would be the final official event of the yearlong Sesquicentennial Celebration. This event, now history, consisted of Sesquicentennial entertainment, gratis distribution of remaining Sesquicentennial memorabilia, various speeches of significant Sesquicentennial Commission staff and state government officials, expressions of gratitude to all volunteers, and then capped off by the ceremonial sealing of the time capsule. VIP Club

members Tom Turba, Dick Lundgren, and Lowell Benson attended the event with three young grandsons who should be able to recall it in 2058.

The short list of items which we submitted for inclusion is as follows:

1. First is a letter to the 2058 Bicentennial Commission describing who we are, what our role was in the Sesquicentennial, and what items we have included in the time capsule.
2. Secondly, we provided samples of computer hardware from vintages ca. 1958 and 2008. The 1958 PC card was a 15-pin, four transistors (4 gates) module such as was used in the 642A NTDS shipboard computer. By comparison, the 2008 module was an ASIC (Application Specific Integrated Circuit) with 14 million gates and 65 contacts in about the same physical volume. The ASIC was used in the Unisys 2008 Clear Path and ES-7000 systems.
3. Thirdly, we provided copies of documents (including photos) which were significant to our company legacy as well as to the Charles Babbage Institute. We provided them in both hard copy and in electronic form, the latter being a memory stick with a USB connector. Who knows if that will be readable in 50 years?
   a. One document included is the chart of our company's evolution from ERA in 1946 along with the myriad spin-off companies. This chart, in large size, was one of our background wall boards used in our Sesquicentennial display.
   b. Another document is a 2001 issue of the IEEE "Annals of the History of Computing" in which the role of Erwin Tomash in establishing the Charles Babbage Institute is described. Erwin Tomash, an early ERA engineer, was the primary founder of the Charles Babbage Institute and the establishment of its "ERA Land-Grant Chair in the History of Technology" at the University of Minnesota.
   c. And lastly we provided a copy of futurist Brian Toren's 2008 look into the future for computers and their applications. Brian's presentation was given on stage in our public forum in the Sesquicentennial tent during the 2008 MN State Fair.
4. The complete story of our Sesquicentennial involvement including the time capsule inclusions is posted to the VIP Club web site as the February 'Article of the Month.' (vipclubmn.org).

An additional series of articles, called "On the Edge of the Digital Age," was also included in the capsule. This future-looking series, although not part of our own Legacy effort, had been published in the Minneapolis Star Tribune, and it did make reference to our early history. If we are on the "edge" of the digital age now, where will we be in 50 years?

6.1.2 CBI Featured "UNIVAC-TO-UNISYS" and HONEYWELL in Its Latest Talks

The Charles Babbage Institute at the University of Minnesota continued its series of talks on "Minnesota's Hidden History in Computing" with lectures on the Univac-to-Unisys period and on Honeywell's Computer efforts. On December 17th, Dr. Tom Misa, director of CBI, presented an interesting talk entitled *The Legacies of Univac*. He examined the legacies of the Twin Cities' Univac Division of Sperry-Rand including the super-reliable computers for the U.S. Navy, direct follow-on business in automating U.S. terminal air traffic control, early experiments in real-time networking, and the transitioning to create today's Unisys corporation.

On January 21st, Dr. Misa presented "Partnerships and Patents: Honeywell and the Computer Industry." He examined how Honeywell, even though they didn't survive as a major player in the computer industry,

came to shape the computer industry through its own computer innovations, its corporate partnerships, and its foray in the patent courts that successfully contested the landmark ENIAC patent.

6.2 MARCH – RICHARD LUNDGREN

6.2.1 Our Drum is Beating!

The early (ca. 1947) magnetic drum from Engineering Research Associates is about to beat the cadence for our Legacy project as we roll into 2009. This drum is in the possession of the Minnesota Historical Society and is soon to be featured as part of the MHS Greatest Generation Exhibit, which will open May 23, 2009, at the Minnesota History Center. The drum is symbolic of local Minnesota industries, which were started in the early post-WWII days and grew to significance on the world scene.

ERA, of course, grew and flourished under a sequence of familiar names, Remington Rand, Univac, Sperry, Unisys, and Lockheed Martin. Other local companies to be featured in the exhibit include Honeywell, 3M, General Mills, Medtronic, Ford and NWA.

The ERA drum has sat untouched (and, until recently, underappreciated) for many years in basement storage at the MHS. Under the guidance of **Matt Anderson**, MHS curator for three-dimensional objects, the drum has been restored to exhibit-quality condition, and with help from Legacy personnel some missing hardware elements will be recreated and a functional description provided. A photographic replica of this drum was a major attraction at the display we developed for last year's Sesquicentennial events.

6.2.2 New Interest in Legacy at the Lockheed Martin Corporate Level

Over the past couple of years, Lockheed Martin has appointed various people at its Bethesda, MD, headquarters to be responsible for the corporate-wide Legacy efforts. The new head of the LM Legacy Initiative is **Mickey Clemons,** who recently received our latest communication (initiated by **Dick (Ole) Olson).** Mickey let **John Westergren** know that the activities in Minnesota rank among the best within the Corporation for collecting and establishing a Legacy program. He also sought input about our lessons learned concerning audio and video interviews; review and distribution of documents; receipt, handling and disposition of artifacts; and usage of the website as an archival repository. In addition, he was very supportive of our relationships with the U of MN and Charles Babbage Institute and with our colleagues in Unisys. Furthermore, he is interested in using our Minnesota efforts as a model in a future article in the Lockheed Martin-wide monthly newspaper, *Lockheed Martin Today*, if that comes about, many Legacy participants will be asked to offer input.

6.2.3 What's Coming?

Annually we make a summary of the previous year's major activities within the Legacy project. Look for the third year summary in the next VIP newsletter.

An effort is also underway by Legacy team members to bring an "early" computer to the Twin Cities. It isn't just any early computer. It is the Atanasoff Berry computer (ABC) built in the basement of the Physics

Building at now Iowa State University from 1939 to 1942. The ABC was originally built by **John V. Atanasoff**, an ISU professor of physics and mathematics, and **Clifford Berry**, a graduate student. It won't be the actual machine but a working replica built by **John Atanasoff II** and others at ISU. This is the machine upon which Judge **Earl R. Larson** based his controversial and highly charged 1973 decision to invalidate the ENIAC patent. The lengthy legal/engineering (more legal/less engineering) saga was digested and recently encapsulated by CBI's Director, **Dr. Tom Misa,** in his engaging January 21st presentation on Honeywell's computer efforts

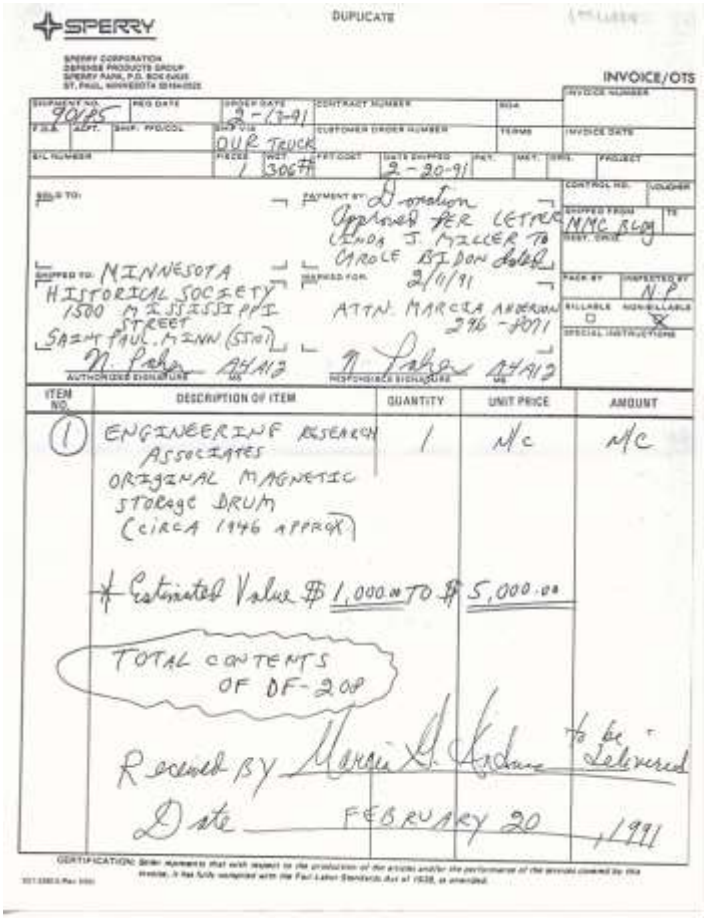
6.2.4 Inputs Needed

Two areas of our Legacy effort remain relatively weak, and we can use help in fleshing out the stories. One is the Legacy background for the Unisys commercial side of the house, and the other is the development efforts for our software products. If you can help with either, please contact the author or any of the Legacy team members. Thank you.

6.3 APRIL – RICHARD LUNDGREN

6.3.1 How the ERA drum got to the Minnesota Historical Society (MHS)

Just how did the early (ca. 1947) magnetic drum from Engineering Research Associates (our founding company) come to be in the possession of the Minnesota Historical Society? Well, the answer is easy. Just cook up an OTS (Order to Ship), specify Ship By "Our Truck," fill in the Shipped To Address for the MHS (actually their warehouse), throw on an Estimated Value, and slap on enough approval signatures to make it happen. The actual OTS is still included in the MHS file for this museum artifact. It was received by the MHS designee on February 20, 1991. {editor's note: see scanned copy on next page}


SPERRY

DUPLICATE

INVOICE/OTS

OUR TRUCK

2-20-91

Donation

Approved PER LETTER

LINDA J. MILLER TO CAROLE BIDON dated 2/1/91

MMC Bldg

MINNESOTA HISTORICAL SOCIETY
1500 MISSISSIPPI STREET
SAINT PAUL, MINN (5510)

ATTN: MARCIA ANDERSON
296-7011

ITEM NO.	DESCRIPTION OF ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	ENGINEERING RESEARCH ASSOCIATES ORIGINAL MAGNETIC STORAGE DRUM (CIRCA 1946 APPROX)	1	N/C	N/C
	* Estimated Value $1,000.00 TO $5,000.00			
	TOTAL CONTENTS OF DF-208			

Received By _____ To be Delivered

Date FEBRUARY 20, 1991

So where did the drum, actually the engineering prototype for the delivered production models, sit from 1947 to 1991? The best guess is that sat forlorn and forgotten in a back corner of Plant 2 (1902 W. Minnehaha in St. Paul) for long after its usefulness had expired. It was lucky to escape the scrap heap, or fall into the mitts of "Junkman Jack" (VIP member Jack Lavers) whose job it was to dispose of any and all items that were costing the company something for storage space. The actual Shipped From location was the MMC, our Materials Management Center near the Eagandale Business Campus. When Plant 2 was nearing closure, it was probably shipped to the MMC.

A few people realized the true historic value of this early drum and they took steps to save it. But the ones that realized the value were company people and not MHS people. It took major efforts to convince the right people at the MHS of its value and that they should be delighted to accept it. Foresight at that time is being well rewarded now as the drum has a significant place in the MHS Greatest Generation Exhibit due to open May 23rd. The drum will have other Minnesota products as "neighbors" in the exhibit, among them a 1955 Ford from the St. Paul Ford plant and a WWII military support vehicle called a Luber built by Grayco. Thanks to VIP Club members Tom Lindquist and Carole Bidon as well as MHS curator Matt Anderson for helping to reconstruct this story. If any readers can add more details, please contact the author.

6.3.2 The Spook Scoop

So what was this drum used for? It's been mentioned before that ERA had its origin in American efforts to break enemy codes during WWII. All this work was of course highly classified, and following WWII as the Cold War started to emerge, it was deemed necessary to continue this type of work. A coded intercepted radio message could of course be recorded, but then it needed to be analyzed to "break" it. This is where the drum medium came into play. The message was transferred to paper tape and then recorded from paper tape onto the surface of the drum. The relatively slow speed of the paper tape reader became the limiting factor in the transfer rate, not the fact that the writing of data to the drum could only happen when the drum was stationary. Frame by frame the drum would be advanced by a worm gear arrangement on the back of the drum. Once the message recording was complete, the motor drive could spin up the drum and the read heads could pick off the data to be analyzed. The "analyzers" became our programmed computers. The message could be scanned and rescanned looking for patterns or other clues to break the code. VIP Club member Don Weidenbach, who later went to the customer site to resolve some equipment problems, related the high degree of customer satisfaction. The idea worked.

6.3.3 Legacy Year 3 – Status Summary

Year 3 of the Legacy project has demonstrated a strong continuing effort. Our web site has grown tremendously with over 150 different people providing inputs toward the complete documentation of our history. The web site itself is experiencing over 1,500 hits per month, many coming as a result of Google or Yahoo searches. The interest is out there. Our history still has some weak areas that need strengthening and some holes to be filled. To this end we are continuing to seek inputs as well as proceeding with video recordings of various key people to capture their significant memories. We are still discussing what the "final product(s)" of our Legacy efforts will be. Options include a book, a video documentary, or a series of brochures organized by our various pillar business areas.

There is also ongoing weekly research in the archives of Lockheed Martin in Eagan. Larry Bolton, Harvey Taipale and Quint Heckert have been identifying and cataloging documents and photographic images as well as over 200 elusive hardware items. Working in the plant has created a "marriage" or collaboration of retiree volunteers and interested active employees. Collaboration has also continued with the Charles Babbage Institute as reflected in our Legacy input to CBI's "Hidden History of Computing in Minnesota" lecture series by CBI Director Dr. Tom Misa and his staff.

In support of CBI's mission of "preserving the history of information technology and promoting and conducting research in the field," the company has allowed us to send to CBI more than 70 packing boxes of materials covering the decades from the 40s to the 70s. More than 40 of these contain patent archives (applications, attorney correspondence, and resulting action (patent granted, rejected, withdrawn, etc.).

CBI has acknowledged receipt and will carefully catalog all the files and send them to permanent storage in their secure climate-controlled underground caverns.

In the public area, our third year of Legacy has been dominated by our involvement with the State of Minnesota Sesquicentennial. Previous newsletter articles have provided detailed coverage, but by way of recap, the highlights were: the presentation of our full-up Unisys/LM history display at the Sesquicentennial weekend on the Capitol Mall (May), subset of history display at Eagan Fun Fest (Jul), reconfigured history display at the MN State Fair for all 12 days (Aug/Sep), and providing artifacts to be sealed in a Time Capsule at the Sesquicentennial Closing Ceremony (Jan 2009). Of course the ERA drum will also soon have public attention as mentioned above. For all the aforementioned efforts we gratefully acknowledge the support provided by Unisys-Roseville and Lockheed Martin-Eagan.

6.4 MAY – RICHARD LUNDGREN

6.4.1 Progress on Building Our Historical Stash

The authorized people in LM Eagan have turned over to the Legacy team a treasure trove of photographic history. In mid-March John Westergren, Legacy committee co-chair, was quoted as saying: "Today we became the proud caretakers of ten (10) upright file cabinets full of historical pictures and negatives. I took a couple quick glances and found some negatives of early 15 pin cards (probably USQ-17 or a little earlier). Also pictures of many products. I think we have some tremendous new information and pictures for the website."

In addition, we continued with the videotaping of key company people with their stories of the early days. The most recent additions to our video library were provided by Jerry Williams, Jim Wright, and Don Weidenbach. The video recording took place at the Casa Vieja restaurant, the old Parrish's on W. 7th in St. Paul, following the monthly "First Friday" lunches. These lunches were initiated by early ERA (Engineering Research Associates) people and continue today. Incidentally, some surprise attendees have showed up at the First Friday lunches due to their discoveries of our Legacy website and activities reported there. Some friends have reconnected after 40 years or more.

6.4.2 More Involvement Encouraged at Next Legacy Committee Meeting.

If you have been following our reporting on Legacy in this newsletter or other Legacy activities, then perhaps you have more to offer than just a spectator role. There is always room for more input and more action in building the historical record of Lockheed Martin Eagan and Unisys Roseville and all our former company names. Please join us for the next Legacy meeting which is scheduled to take place Wednesday May 6th at 1:00 PM in the conference room off the main lobby, Pilot Knob Rd. entrance, at the Eagan facility (yes, we still call it Plant 8). Several committee members who showed initial interest have become members in name only, so with winter no longer an excuse, it is time to reappear and play a more active role. Remember that the company legacy is the sum of the individual legacies, so we always welcome more stories/recollections on various products, services, organizations, customers, etc. over the last six decades. For further information, call Dick (Ole) Olson at ~~507-645-7746~~. or John Westergren at ~~651-456-3380~~.

6.4.3 The "*Hidden History of Computing in Minnesota*" by CBI is Concluding Soon.

The Charles Babbage Institute at the University of Minnesota is soon to conclude its yearlong series on the "Hidden History of Computing in Minnesota." Some of Dr. Misa's talks have directly dealt with our own Legacy, e.g., the role of ERA in the early days of computing, the Univac-to-Unisys evolution, and the

Honeywell challenge to the Univac computer patent. Although not particularly well attended at the U of M Andersen Library location, the talks on these topics are fascinating to our own legacy. Dr. Misa will be presenting these talks again at some future (probably fall) dates at the VIP program meeting evenings. Details will be provided later.

6.5 JUNE – RICHARD LUNDGREN

6.5.1 Have Ability, Will Travel. Where Did We Work and When?

The Legacy Committee would like to fill in many of the missing facts about the where and when of our rich computer and systems legacy. We're looking for specifics on dates and sites (not websites, which didn't exist back then, but geographic sites and time spans). Here are some questions to give you the flavor of our search.

Do you remember when UNIVAC opened or closed the Pueblo plant? How about Winnipeg or Plant 3 on Prior Avenue in St. Paul? What about Jackson, MN, or Clear Lake, IA, or Clearwater, FL? Did you do anything at or with the SLC plant which reported to St. Paul for a period of time? Who were the managers or directors at these places? What was the major product? Please send your tidbits to Ole [~~olelela@charter.net~~] or Lowell [~~labenson@usfamily.net~~]. Remember: Incomplete history is like unrequited love, so send us your info.

6.5.2 Reconstructing History Continues

John Westergren reports the receipt of the next set of "planned for destruction" materials from Iron Mountain. He has reviewed them and found there are about 10 boxes from about 20-30 years ago with patent information and applications from the 60's through early 80's. He has asked for a postponement of the destruction until further review by Legacy team personnel.

In addition, John has provided recently recorded video tapes for the "3W's plus One" – Wright (Jim), Williams (Jerry), Weidenbach (Don) and Nelson (Ed) to Taipale (Eric) for transcribing to CD/DVD along with the Block (Manny) interview focusing on Cray (Seymour).

6.5.3 Strip Club Visits Continue

Let it be known that the long established tradition of the Strip Club visit is alive and well among VIP Club members. A follow-up to our 2008 MN Sesquicentennial involvement occurred May 8th when certain VIP Club members hosted an appreciation luncheon for our three favorite (read most active and engaged) members of the MN Sesquicentennial Commission.

Just for the record, the Strip Club isn't what you think. It's a legitimate east side St. Paul restaurant (check it out at domeats.com) with an imaginative menu (sturgeon, cheese curds, Swede Hollow meatballs, anyone?). This luncheon, originally slated for the time of the Sesquicentennial closing in January, had to be slipped a few months due to schedule conflicts, but finally a workable date emerged. It was our goal to thank the commission ladies, director Jane Leonard and her assistants Karen Rickert and Denise Cumming for all the hours they put in to make all the Sesquicentennial events successful and to open for us an opportunity to showcase our company legacy within the context of Minnesota's history. They truly helped us get the VIP Club name, as well as the UNISYS and LMCO names in front of the Twin Cities public. Attending the luncheon were members of the core Sesquicentennial team, Ron Q. Smith, Tom Turba and

Bernie Jansen from Unisys, John Westergren and Dick Lundgren from Lockheed Martin. No closet ecdysiast stepped forward.

6.6 JULY - END OF AN ERA

Although it has been quite a few years since computers were built in Building #1 in Roseville, it's still sort of sad to see the building come down. Computer manufacturing moved to Roseville in the 1960's and continued there through the hay-days of mainframe computers until the late 1990's when it was moved to California. Tens of thousands of computers were built and tested in Building #1 and were the main profit source for an untold number of years. The building is now history, but the memories live on.

ROSEVILLE BUILDING 1

6.7 SEPTEMBER - OUR WEB SITE STATISTICS AND TIDBITS

Internet users have been coming to our site at a rate of just over 1,700 hits per month for the last 18 months. During the first seven months of 2009, the most popular 10 pages visited are: Home; Systems, Missiles; Engineering, Memory; People; UNISYS Legacy; Computers; Links; Engineering; Computers, 30-bit; and LMCO Legacy. During the first seven months of 2009, the most common keywords used for searches are: rope memory, core rope memory, deceased people, vipclubmn.org, uyk-7, an/uyk-7, legacy, commercial processors, systems, and uyk-43.

Over the last month, i.e. from July 7th to August 5th: – 730 users have come to our site from Google, 310 readers have come from direct links from other sites, 100 have come from within the site, 75 have come from bing.com [Microsoft's new search engine], and 50 have come from Yahoo. These were the top five. For those of you who go onto the site to read or re-read newsletters linked from http://vipclubmn.org/archive.aspx, be sure that you have pop-ups enabled from the vipclubmn.org site because the newsletters will open in separate windows so that readers may have multiple issues open at the same time. Submitted by LABenson

6.8 OCTOBER – RICHARD LUNDGREN

6.8.1 A Centennial of Mystical Quality

Did you know that the legacy of Lockheed Martin envelopes a centennial of almost mystical, if not epic, proportions? It is true, and it is a centennial of silk and bamboo. Admittedly this sounds like 100 years of the oriental fan or umbrella but only insofar as it might relate to motion through air. A true corporate milestone occurred in 1909 with Glenn L. Martin's maiden voyage of his first "aero plane." The picture/caption below, from the Lockheed Martin Corporate website, chronicles this seminal event and shows Martin's silk/bamboo flying machine. The Loughead (later Lockheed) brothers, Allen and Malcolm, followed in 1913 with their own maiden voyages and joined Martin in the elite cadre of aviation pioneers. In the century since Martin first took to the air, Lockheed Martin and its heritage companies have created milestone after milestone in aviation and in other fields too.

1909 Aviation pioneer Glenn L. Martin launches the maiden voyage of his first aero plane, made of silk and bamboo, in Santa Ana, California.

Many readers of this newsletter are retirees from Lockheed Martin (or predecessor companies) in Eagan, MN. Most recently we belonged to Unisys, but joined the LM family of companies in 1996. This experience was like marrying a beautiful woman with lots of money. You had instant access to all her assets without any responsibilities. Well, OK, it didn't happen quite like that, but the image was irresistible. What we honestly can feel is pride in our corporation's historic accomplishments, and we can share bragging rights, not "proprietary ownership," but bragging rights with the rest of the company. We in MN can brag about "our" (LM's) 100-year legacy, just as "they" can brag about our six plus decades of achievements, going back to the development of the first digital stored-program computer. Now we can create new shared milestones together.

So now what is special about 2009 and what is the connection with LM? 2009 is the International Year of Astronomy, a global celebration of astronomy marking the 400th anniversary of the first use of an astronomical telescope by Galileo Galilei. LM (in partnership with NASA) has been, and continues to be, a remarkable contributor to the exploration and understanding of our universe. What LM has accomplished is akin to a 5-year old folding paper to make a paper airplane and then at age 105 being the chief engineer for the LM Joint Striker Fighter or Hubble Space Telescope. This century of progress leapfrogs conventional wisdom. Progress doesn't come in increments; it comes in giant steps.

To focus just on LM milestones in astronomy, did you know that we (LM) have played a significant role in the exploration of every planet in the solar system visited to date? Enumerating all systems on all programs for planetary exploration is not possible in the space available here, but the very short list of spacecraft/LM contributions would be:

- Viking I and II – Two Mars lander spacecraft, sensors, robotic arm surface sampler, instruments, launch vehicles, mission operations
- Voyager 1 and 2 – Propulsion module subsystem, attitude control electronics, instrument, radioisotope thermoelectric generators, launch vehicles (n.b. these spacecraft, 32 years after launch, are still out there, "phoning home" occasionally about their experiences in the helio-pause, following their "grand tour" of the major outer planets)
- Mars Exploration Rovers – Aeroshells, UHF data relay (Spirit and Opportunity still function and continue their missions)
- Galileo – Attitude and articulation control system electronics, three probe instruments, radioisotope thermoelectric generators (7 years of orbital observations at Jupiter, ending with deliberate plunge into the crushing Jovian atmosphere)
- Cassini – Propulsion module subsystem, radioisotope thermoelectric generators, probe instrument, launch vehicle (currently on duty at Saturn)

And not to forget: –

- Hubble Space Telescope –Spacecraft, launch operations, mission operations, servicing (on duty in earth orbit, relaying images/data of the universe and living up to its motto "Conscious Expectation of the Unexpected")
- Gravity Probe B – Spacecraft structure, Dewar and flight probe payloads (on duty in earth orbit, testing predictions of Einstein's general relativity)

- Spitzer Space Telescope – Spacecraft, launch operations, mission operations (currently on duty in earth-trailing solar orbit studying the universe in the infrared)
- International Space Station – Solar arrays, solar alpha rotary joint units, thermal radiator joint units (multipurpose manned project in earth orbit)

In conclusion, if you need a reason to celebrate; let us lift our glasses high to silk and bamboo and the century of all the good things that have come of them. And lift them higher to celebrate the ingenuity, innovations, and engineering and manufacturing excellence which created realities out of men's dreams. And higher still to recognize and honor those giant leaps forward for mankind's irrepressible curiosity and indomitable spirit. Submitted by Richard Lundgren.

6.8.2 A Legacy Tribute

John 'Jack' Lindsay Hill 12/14/1909 - 8/30/2009

Jack, we honor you as a real Information Technology Pioneer – thanks for our Legacy start.

The fall of 1950, 59 years ago, Jack and other engineers completed design, assembly, and factory test of the Atlas I computer at Engineering Research Associates (ERA) in St. Paul, MN. In October that year they took it apart and shipped it [two or three truck loads.] During November '50 they re-assembled it at the Communications Supplementary Activity-Washington (CSAW) facility – Jack had stated that they were home for Thanksgiving. The ATLAS was fully operational in December 1950 performing cryptography algorithms and other intelligence processing for CSAW - shrouded in secrecy for over 25 years by CSAW's successor, the NSA. This was the world's first stored-program computer to be delivered and operational in a customer's facility [History books credit one or two other experimental units as the first stored-program computer.]

In 1951 ERA received government permission to market a commercial version of the ATLAS which Jack identified as model 1101 because it was designed on contract Task #13. [13 in binary is 1101] The ERA 1101 with updates became the UNIVAC 1102, …, 1108 - a computer line which still operates today, the UNISYS 2200 series. The prototype of the ATLAS drum memory is now on exhibit at the Minnesota Historical Society. Jack, your compatriots of the 'Original Geek Squad' will miss you! An October memorial is being planned. www.johnsonpeterson.com. Submitted by LABenson.

6.9 NOVEMBER – BENSON & LUNDGREN

6.9.1 Open House & Technology Forum

The U of MN's Department of Computer Science and Engineering (CSE) hosted their annual forum on October 9th. Club President, Tom Turba, and VP, Lowell Benson, set up a 'computer history' display using artifacts from the Legacy Committee, signboards from last year's Sesquicentennial Team, and a booth back-wall support courtesy of Dave's Custom Fabrication [www.dcfmfg.com]. About 65% of the 50 displays at the forum were poster papers by students about their student research projects.

Industry booths including 3M, Microsoft, Cisco Systems, IBM, etc. focused on new products including the emerging Windows 7 PC operating system. A few students asked where our main office was and whether we were hiring. CSE Dean, Dr. Vipin Kumar, was quite interested in our 60-year corporate history chart and thanked us for participating in the forum. Also, a few former employees stopped by just to chat. Submitted by LABenson.

6.9.2 A Museum in the Wind?

Secret high level meetings have recently (Sept. 30) taken place between members of the VIP Club and representatives of the Minnesota Air National Guard (MN ANG) with independent neutral observers also present. (Translation: Some of us VIP guys met with some of those MN ANG guys, along with some hangers-on to discuss an interesting future option.) One VIP Club operative was on special assignment in Morocco and could not attend.) As in any such "negotiation" they have what we want (or can get) and we have what they want (or can get), and the third party independents want the best of both worlds (a win-win situation).

To be a bit more specific, the MN ANG currently has an aviation museum adjacent to the MSP (Minneapolis St. Paul) airport, but it has reached its limits of displaying/maintaining aircraft (indoors and outdoors) and of the many services it can provide to the general public. The MN ANG has well thought out plans for a future multi-faceted aviation museum, and we are in a position to be part of the effort. It will be a chance for us to tell our legacy story and to gain some museum space to display relevant artifacts.

Ground breaking is not close enough to start chilling the bubbly just yet. In fact, land acquisition is not even locked in yet, and that whole process involves about as many players as the U.N. often has to deal with. However, land is "available" from the old Ft. Snelling area and the location would be ideal. What the ANG hopes to get is about 20 acres to establish the largest flight museum in the upper Midwest. Clearly many more aircraft could be on display, and a much larger building (read museum/education complex) could be built and dedicated to all aspects of aviation/flight. This is where our opportunity lies.

The current aviation museum as well as the future one would have dual themes: Aviation and Minnesota. We (the MN units of our companies - Unisys and Lockheed Martin and predecessors) have played huge roles in the aviation/aerospace arenas, and we should be proud of it and we should tout it in a world class museum facility. We can bring to the table our legacy of many "air-related" systems – air tracking, air traffic control, airline reservations, air cargo handling, missile guidance (ground based and missile borne), air surveillance, air sovereignty, airborne computers in many different military aircraft, NASA astronaut training, and much more. The ANG new museum can provide us the venue, and we can enrich their collections, their education, their historical perspective, and our collective local pride.

Future articles in this section will keep you posted of developments, but in the meantime think "air." We will need to know computer/system nomenclature and functions as related to the airborne/space borne world, and future "perfect fits" for this new dream. If you worked any aspect of any "air-related" product or system from concept to design to manufacturing to follow-on support, we'll be asking for your inputs. So refresh and fine tune your "air" memories, and they'll become part of our MN legacy. Submitted by Richard Lundgren.

6.10 DECEMBER

6.10.1 Legacy – Wrapping Up 2009; Boldly Going Forward.

To date, the LM legacy project has been unfunded and undirected. We consider this a double bonus. Had we had funding, it would have been accompanied by schedules, milestones, and probably even judgmental evaluations. Had we had direction, we would probably have been three years further behind from where we are now. So we are content with our approach. We have (we are) our own inertial navigation system, relying on mutual goals and our experience-based instincts.

he year 2009 started with the conclusion of the 2008 Minnesota Sesquicentennial celebration. We have played an important economic role in Minnesota's first 150 years, and we were invited to contribute to the Sesquicentennial time capsule which will be opened in 2057. A retrospective report will be provided at that time, perhaps by this writer's grandson. The year continued with our investigative team mining the past - unearthing the artifacts of our legacy in photographic form and in documentation. The detective work is paying off as we continue to reconstruct the string of events in our early history. We have also been collaborating with the Charles Babbage Institute at the University of Minnesota to evaluate our work and share our pride. A recent presentation by CBI director Dr. Tom Misa has strengthened and expanded our claims of primacy. Of course, primacy in the world of computer development is not so different from primacy in the automotive world. Who made the first car? Who made the first thing that looked like a car? Who made the first thing that looked like a car and actually ran for a few minutes? Who made the first "car" that actually ran, carried passengers to a destination, and returned for more without failure? Who made the first mass-produced, affordable, reliable, admirable, braggable, commercial product called a car? Et cetera. Well, we know where we stand, not with cars, but with computers, and we're solid.

Is our legacy effort coming to a close? Is the auto industry a museum relic? Unequivocally, no. The perimeter of our future is expanding faster than we approach it. We have prospects for local museum involvement which we would cheer. We have prospects for a video documentary of our early fight-for-survival years which we would laud. And we have prospects for anticipating/witnessing the critical achievements of our younger employees as they trod the unbeaten paths. Today's business activities are tomorrow's legacy, and we'll track it. Submitted by Richard Lundgren.

6.10.2 Who Are You?

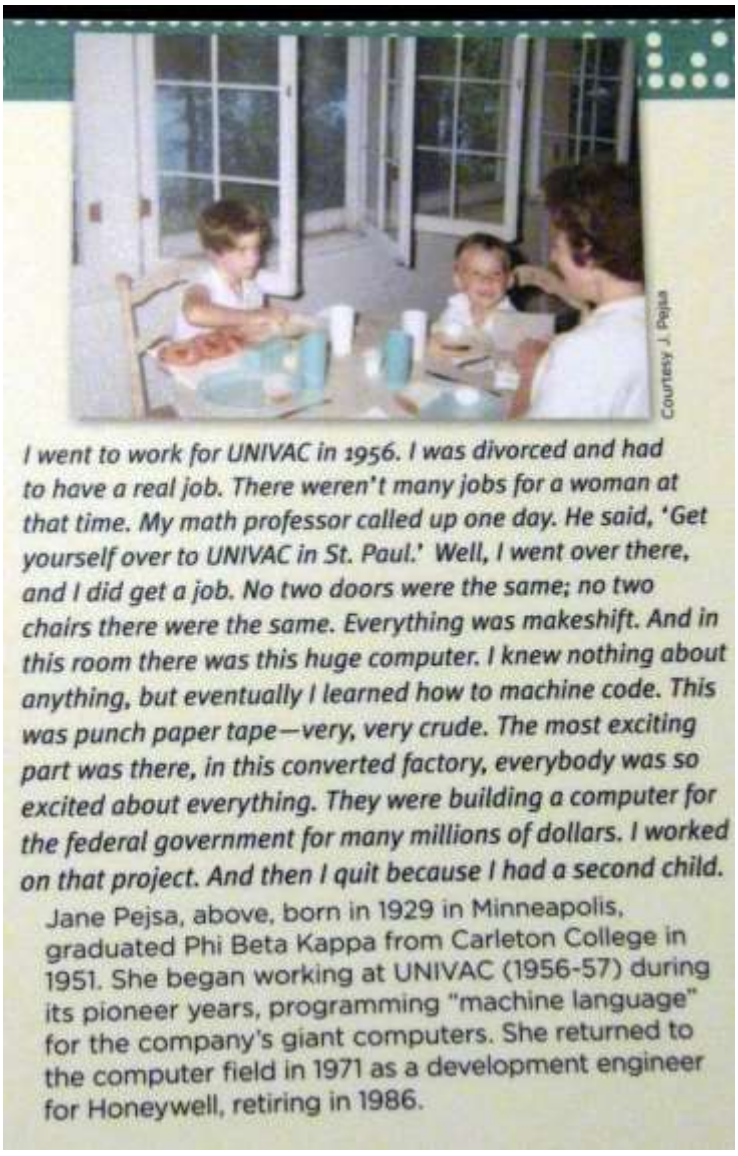
Our web site now has a new page with some 'Old Photos' and some new photos – we need help to identify the persons therein. Take a look at ~~http://vipclubmn.org/WhoIsIt.aspx~~, then e-mail us with your identifications of the un-named persons. We expect to have more photos of this ilk as our Legacy Committee catalogers go through four file cabinets of photos accumulated at LMCO. One of the more intriguing pictures is from the ERA 40-year celebration shown below. We've identified the first and third persons as 'Rollie' Anderson and Lou Cramer. The fourth person may be Laverle. Any readers help in identifying the others is welcome.

7 2010, FIFTH YEAR OF ARTICLES

7.1 JANUARY – RICHARD LUNDGREN

7.1.1 Even Grumpy Old Men (GOM) Get Christmas Presents

Especially GOMs, who pretend to be historians (company historians), can be gifted with something that these odd people can really appreciate, and better yet when it comes at Christmas time. It might even put some belief back into jaded non-believers. It all began with a visit to the Minnesota History Center's Greatest Generation exhibit by Lowell Benson and Dick Lundgren to make a digital photo record of our content in that exhibit. Many pix were taken, thanks to Lowell, but the one below was the catalyst for the Christmas gift.



From reading the placard associated with the photo, you can see that a lady named Jane Pejsa went to work for Univac (RemRand Univac at that time) in 1956. Her short descriptive paragraph of work life at Univac was but a teaser of the gift to come. The detective gene kicked in, asking if this lady, born in 1929, was still alive, still lucid, still reachable, contactable, and in possession of a perfect memory for a tiny slice of her life 53 years ago. With the help of everybody's best friend Google and other rich Internet resources, this author managed to get in touch with her. Not only was she still with us and with it, she offered to write up (she called it a treatise) her recollections. Talk about a historian's dream! When her 4-page email attachment came rolling in, I knew that even GOMs can still get Christmas presents. Two main points here: her recollections are magnificent and her writing is exquisite. She has, by the way, authored several books, but that's a subject for a separate look.

Jane's "treatise" will be posted in its entirety to our VIP Club legacy website, but a few pieces are excerpted here. {**Editor's note:** *http://vipclubmn.org/people6.html#Pejsa has her story*.}

7.1.1.1 Regarding getting a job in the first place:

"Then one day I received a phone call from my Carleton Math Professor. This was in mid-year 1956. He asked me, "Are you still working in that dippy job at the phone company?" And of course I was. He told me to get myself over to a place in St. Paul called Remington Rand, where one of his women math majors, a year ahead of me, had just signed on. And so I did. I was promptly hired, on my own terms—3 full days a week—since I had a small child at home."

7.1.1.2 *Regarding the new working home:*

What an absolutely wonderful place I found my new working home. It had originally, during WWII, been a glider factory, and more recently the home of a new "computer" firm ERA (I forget the name.) It was in the process of acquiring new ownership and a new name. Mr. Norris and several other senior employees had left to start a firm that would become very famous—Control Data. Thus the glider factory crowd had been acquired by Remington Rand and at the time I joined was being taken over by Univac. That is how I remember it though this may be backwards.

I was given a table next to a wall—upper half a glass wall--in a tiny office with my boss Jules Mercel, clearly a very, very intelligent man. I spent the first days studying what this computer, the Univac Scientific, was all about. It was being built under government contract. I even had a title—Systems Analyst—though I had no idea what the title meant. I was a new programmer. And of course this was machine language—binary, which we early interpreted in octal. Octal arithmetic came very easily to me. Our programming tasks included putting the contents of numbered stored locations, into the accumulator and at least two other registers, removing them, and doing other stunts to simulate addition, subtraction, multiplication, and—the most difficult—division."

7.1.1.3 Regarding the work environment:

"I am sure no 2 doors in the entire building were the same. Probably no two desks were the same. This giant computer comprised several large metal floor-standing metal containers, with a working table standing among them, all this housed in a large room. On the table stood a keyboard to punch paper tape with our octal numbers, pairs of scissors and glue pots, plus a little machine to secure pieces of paper tape, as we corrected and otherwise changed our little programs. Imagine, at this time we still did not have a way of saying directly "add," "subtract", "multiply", "divide." Each day we signed up for a stint on the computer to try out our latest coding. There was always a lineup for this privilege. I believe there was also the possibility of "testing," a means of developing a meaningful set of commands, particularly in the case of division. In hot weather, even with air conditioning, the Univac Scientific very early would be shut down because of heat. I think of all the time wasted that year in shutdowns and waiting for one's turn at the Computer.

For all the problems and the makeshift work areas, the glider factory was the most exciting place I had ever encountered. Then one day my boss, Jules Mercel, told me he was leaving for California, to join the Rand Corporation. I knew he was very, very smart as well as tolerant of this babe in the woods. I remember him storming into our little office, slamming the door and saying, "I have never attended a meeting out of which came a new idea. This meeting was no different."

7.1.1.4 Regarding relocation and a new boss:

"Very soon after my boss left, our whole operation was moved to the Griggs-Midway building on University Avenue. I believe the computer pieces were also moved. This time we programmers took over a part of an entire empty floor, no partitions of any kind. I don't even remember for whom I worked at that time. All I remember was that everyone from the top to the bottom took 2 to 2.5-hour lunch hours and no one seemed to care. (I did not. Somehow this really disturbed me.) Apparently the firm was rolling in money at this time. We were now moving into not only government money but also some private contracts.

Eventually we were given a proper office and my new boss was Earl C. Joseph. We were 4 women who worked under him and we all sat with him in a nice modern little office. As you may recall, Earl Joseph sometime later left Univac and launched himself into a new career. He really defined and founded the whole area of Futurists, an area that now seems to thrive. About a decade ago I attended one of his lectures. I reminded him that I had worked for him for about 6 months. He, however, had no idea who I was. So it goes."

7.1.1.5 Regarding her target computer and a new programming language:

"This was now the first months of 1957. The Univac Scientific was now the 1103, which presumably had been completed. We were together, now designing software, still in machine code, to test what was new in the emerging 1103A. Presently we were again on the move, this time to a very pleasant building out on Mississippi Drive in St. Paul, right at the corner of Ford Parkway and the river. I recall it was one-story with large broad show windows facing west and south. Possibly it had previously been a show room of some kind. From the beginning it was just temporary since Univac had started construction of a major plant downstream on the river. Probably I worked here just a few weeks. What is memorable is the fact that we all were pitching in to develop a new high-level language that would take over the world. We all knew that IBM was equally busy on its new high-level language. I was already convinced that Univac would lose. And of course it did, for IBM's Fortran did take over the scientific world. I wish I could remember the name given to the language Univac was trying to develop.

I worked just a few weeks at the Ford Parkway plant, for my second child was scheduled soon to be born. Actually he arrived three weeks late. I could have stayed longer. I had no interest in coming back after the baby was born. The new plant seemed too far away from Old Lowry Hill in Minneapolis, where we had built a little house. Presumably this was the end of my computer life." (It wasn't.)

There's a lot more, but she ended her treatise with "End of story and it all began at Univac. Thank you, VIP Club, for asking. Jane Pejsa, December 15th, 2009."

My Christmas wishes have been exceeded again, Dick Lundgren.

7.1.2 Web Site – Lowell Benson

This is the first of a new newsletter series. About 40% of our membership doesn't have an e-mail address, thus may not have ready access to Legacy items on our web site. Over the next year [or two or three] I'll write summaries about the pages or articles posted thereon. If you are curious, go to the library and use public internet access to read the entire item.

In April of 2007 we started posting an '*Article for the Month*', beginning with a 1965 Goddard News article submitted by Don Mager. This article describes the Apollo computer network, identifying the 39 sites. It mentions Don Mager, Glen Johnson, Les Brunker, Ed Willis, and Dale W. Call.

In May of 2007 we posted "Sperry Military Computers" by George Grey. This is an excellent five-page synopsis of our early computer history including Athena, Bogart, NTDS, Nike-Zeus, 1824, 1108, AN/UYK-7, and 1832.

{Editor's Note: All of our 'Article for the Month' synopses were published as a 'Readers' Digest recap of a decade of the Legacy Committee's work. See the website's December, 2015 'Article for the Month'.}

7.2 MARCH – LEGACY AT/WITH THE UNIVERSITY OF MINNESOTA - RICHARD LUNDGREN

On a recent visit to the Institute of Technology at the University of Minnesota's Walter Library, the current exhibit by our VIP Club evoked the old interchangeability requirement mantra of "Form, Fit and Function." This exhibit, located on the second floor in the reference desk hall, has an inviting and appealing FORM in that it provides info panels at eye level height and artifacts easily perused in display cases. Even someone with a cursory interest in our St. Paul roots and subsequent evolution, will find eye catchers which will lead them to greater inspection for greater detail. And the FIT is a good one too. It is centrally located a few steps from the reference desk where it is neither obtrusive nor intrusive to the busy student traffic nearby.

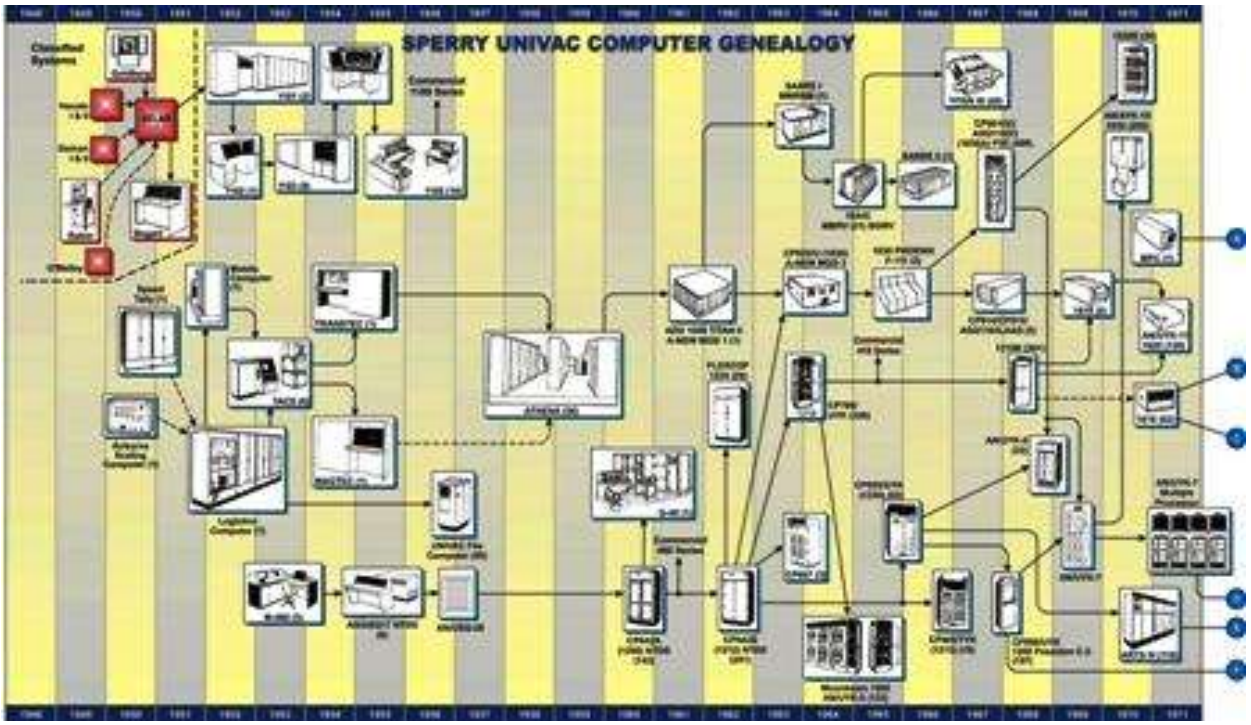
The FUNCTION is obvious. It attracts visitors to our theme of being the original seedbed of the computer industry in Minnesota, displays the evolution into the currently active Twin Cities firms (Unisys Roseville and Lockheed Martin – Eagan), gives credit to the many spin-off companies that we spawned and to their accomplishments, illustrates our growth genealogy and sample artifacts from our legacy, and emphasizes our strong ties to the University of Minnesota in general and to the Charles Babbage Institute in particular. We're proud of our collective history and ongoing progress.

Photo 1 shows the display centrally located in front of the reference desk. At the right is current VIP Club President Tom Turba who collaborated with Vice-president Lowell Benson to set up the display on January 20th. (Who says officers/management can't do real work?) This exhibit will run at least for a year and have three rotations of content in that time.

Photo 2 shows the primary side of the display which contains two large posters generated by VIP Club sponsor Lockheed Martin. The family history (ancestor chart) of Unisys is also displayed here with roots going back through Sperry and Burroughs to Remington and other originators. Another interesting "time-lined" chart shows our corporate interactions with the University from 1958 to the

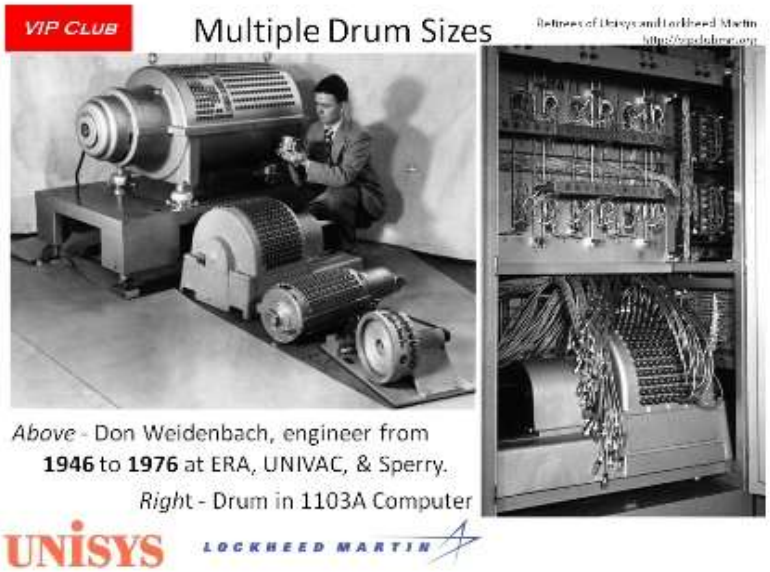
present. In the display case are significant hardware artifacts (or photos thereof) as well as newspaper articles, photos, booklets and books drawn from and attesting to our legacy.

Photo 3 below shows the first two decades of our computer genealogy as hardware advancements in one generation pushed ingenuity and inventiveness onto the next generation. This process has been uninterruptible and continues today.



An amazing and essentially unknown part of our early history was the development and production of magnetic drums. It has been mentioned in a previous newsletter that one of our very early (ca. 1947) prototype drums is currently on display at the Minnesota's Greatest Generation exhibit at the Minnesota History Center in St. Paul. Photo 4 on the next page shows engineer Don Weidenbach with various drums of multiple sizes as well as a drum in an 1103 Computer. Such were the granddaddies of today's hard drives.

There is a lot more to the exhibit (posters, charts, photos, artifacts, etc.), and you can read more about it at the VIP Club website (vipclubmn.org) March Article for the Month. Better yet, schedule a campus visit and see for yourself.



7.3 April – Richard Lundgren

7.3.1 A Parallel Legacy - SIGART, SIGACCESS and SIGBOOZE.

What the hey? That doesn't sound like a parallel legacy, at least not one with reason behind it. And no, these are not projects of the National Endowment for the Arts or AARP or AA. SIGs are Special Interest Groups, and they are special interest groups for the Association for Computing Machinery (ACM) (http://www.acm.org). It is the ACM that has a long arm of legacy—almost as long as our company's—and with some of the same major players. A notice dated June 25, 1947, read, We believe there is ample interest to start an informal association of many of those interested in the new machinery for computing and reasoning. Since there has to be a beginning, we are acting as a temporary committee to start such an association."

One of the dozen persons attending the ACM formation meeting was G. Tompkins, the ERA representative from the Washington D.C. office! Remember, this was 1947 when Engineering Research Associates was not yet out of diapers, but nonetheless was among the group charting a course that would alter the world. Also at an ACM meeting in September of 1947, it was noted that "Many of the attendees had worked in some capacity with computers during World War II [sound familiar?], anticipated their potentially broad applications to post-war activities [talk about real foresight!], and viewed the creation of a communications network for computer professionals as a necessity for national security [couldn't be truer]." By the way, the SIGxxx's will be clarified at the end of this article.

7.3.2 CBI Exhibit – Association for Computing Machinery

A recently concluded exhibit in the Andersen Library Gallery at the University of Minnesota chronicled the significant events of the ACM's history. In the founding meeting of ACM, the association's purpose was stated in their constitution as "to advance the science, development, construction, and application of the new machinery for computing, reasoning, and other handling of information."

One committee member, known to many readers, was John Mauchly, who became ACM's first vice-president and second president, and, of course, was well known for his work on ENIAC. T. Kite Sharpless presented a paper at that 1947 meeting entitled, "The Pilot Model of EDVAC." Later on in 1954 the ACM nomenclature committee, headed by Grace Hopper, produced a glossary of programming terminology with terms and definitions fitting that period. The exhibit also had correspondence between ACM and John von Neumann. An interesting book, published in 1997 to commemorate the 50th anniversary of ACM, was entitled, Beyond Calculation: The Next Fifty Years of Computing.

Today's ACM website introduces itself boldly and broadly: "ACM, the world's largest educational and scientific computing society, delivers resources that advance computing as a science and a profession. ACM provides the computing field's premier Digital Library and serves its members and the computing profession with leading-edge publications, conferences, and career resources." A mouthful but accurate. Most of the active ACM work is carried out by the various SIGs within ACM. There are currently about 35 SIGs in all, representing virtually every major area of computing. There are too many to list them all, but a few are defined below. There is no SIGmund, SIGurd, SIGmoid or SIGma.SIGART (Artificial Intelligence), SIGACCESS (Accessible Computing), SIGBOOZE (serving computing and the imbibing arts), SIGEVO (Genetic and Evolutionary Computation), SIGMAP (Mathematical Programming), SIGBIO (Biomedical Information Processing), and SIGCHI (Computer-Human Interaction). The complete current list (some past ones have arisen and then fizzled, at least in name) is available at the ACM's website. A particularly definitive and precise paper regarding the SIGs' growth or lack thereof was delivered about 1990. Its title: "Why are SIGs Not Growing? Stabs, Guesses, and Shots in the Dark." Computer professionals just don't have professionalism without humor!

It should also be noted that the ACM records were donated in 2008 to the Charles Babbage Institute for safekeeping in archival storage and for future research. Lastly, the Chicken Entrails have been examined, the Joss Sticks shaken, and the Oracle at Delphi consulted for a look into the future. Here it is: ====➔

Submitted by R. F. Lundgren

7.3.3 Legacy Archiving Support Days

Our core team of Harvey, Larry, and Quint are in need of help! The Legacy Committee requests up to 20 people to go through boxes of documents in order to catalog or to develop an abstract, or to write a synopsis. The items for review are:

- Invention Disclosures from the 1960's and 70's.
- Patent Applications from the 1950's, 60's and 70's.
- Miscellaneous boxes of documents or photos.

The MPR room (LMCO East Lobby; inside the door, immediately on the right) is reserved for Friday afternoon review sessions at 1 p. m. on March 26th, April 23rd, and May 21st. ***Refreshments will be served!*** Please volunteer for one, two, or all three sessions by sending a note to [~~john.h.westergren@lmco.com~~] or [~~labenson@usfamily.net~~]. *No e-mail?* Leave a message at 651-456- 3380 or 651-483-3709 with your name, phone number, and date of your help. Thanks, John and Lowell – Legacy Committee Co-chairs.

7.4 MAY – RICHARD LUNDGREN

7.4.1 Progress on Permanent Home for Company Artifacts and Stories

Slowly, surely and carefully, progress has been made towards a strong Unisys/Lockheed Martin involvement with the Minnesota Air National Guard Museum (http://www.mnangmuseum.org). Two points are very important here. The first is that the whole character and scope of the museum will be changing, and the second is that all the major players are finally onboard.

Regarding the change in the museum character/scope, it will no longer be just airplanes on a stick (read pedestal) with a small indoor exhibit area, but a facility with a major focus on education in math, science, technology and Minnesota's rich aviation history. It will move to "outside the fence," i.e., not be on the base of the 133rd Air Wing, with all its attendant security requirements, but in a publicly accessible area. The overall broadening of scope will be reflected in its new name, the Minnesota Air and Space Museum. And perhaps best of all, not only will the museum itself expand (it's already the largest collection of aircraft in the Midwest), but the whole facility will turn into an ambitious multi-building "campus" which will revitalize the Ft. Snelling Upper Bluff area. Beyond the museum itself the major additions envisioned are a Challenger Center for Space Science Education (http://www.challenger.org), an Aviation Learning Center (similar to Seattle's Museum of Flight), and a NASA Aerospace Education Laboratory (AEL)

What's important to us is the chance to showcase our Minnesota legacy products and systems over the years that relate to "air" activities (air defense, air traffic control/management, airline reservations, air cargo management, air sovereignty, etc.) and space activities (missile guidance, missile tracking, NASA deep space network, etc.). We envision putting on display artifacts, photos, and graphics illustrations to tell our (little known) story. The MN ANG museum people themselves are already so confident that they are putting out advance requests for artifacts to fill their expanded space. So come join us for a visit August 11th (see program announcement for August) and bring yourselves plus slide rules, pocket protectors, programming templates and white socks.

As you might guess, there is a multitude of players who perceive the need to make their voices heard regarding this project. The list is long, and each wants to have his oar in the water, spinning his own little parochial eddy. Well, that has now happened, and the independent actions have now turned into cohesive motion – forward. Here are the players/organizations:

- MAC (Metropolitan Airports Commission)
- Cities of Richfield and Bloomington
- Hennepin County
- Metropolitan Council
- National Park Service (Mississippi National River and Recreation Area)
- Minnesota DNR (Dept of Natural Resources, owner of the land)
- Minneapolis Park and Recreation Dept
- Minnesota Historical Society Preservation Office
- Friends of Fort Snelling
- Northwest Airlines History Center
- District 63 (airport and immediate surroundings) State Senator Ken Kelash

Patience and persistence are paying off for a noble goal. The VIP Club will maintain a presence in the ongoing planning with strong efforts to support and influence the museum content.

7.4.2 Legacy Archiving Support Days (Second Session)

Our core team of Harvey, Larry, and Quint are in need of help! The Legacy Committee requests up to 20 people to go through boxes of documents in order to catalog or to develop an abstract, or to write a synopsis. The items for review are:

- Invention Disclosures from the 1960's and 70's.
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Thanks to Lowell Benson, Larry Bolton, Hank Dotzler, Quint Heckert, Ed Nelson, Dan Rogers, and Don Weidenbach who came on March 26th and reduced 14 boxes to 1.5 boxes of 'keep' materials.

7.5 SUMMER & FALL OF 2010

7.5.1 June - Legacy Document Reviews

Thanks to the several volunteers who gave of their time in March and April to help the Legacy Committee review and 'purge' boxes of old documents. There is one more session scheduled, **May 21st -** 1 to 3:30 p.m. in the LMCO MPR room, East Lobby. Refreshments will be served, contact Quint Heckert or John Westergren to get onto the volunteers access list.

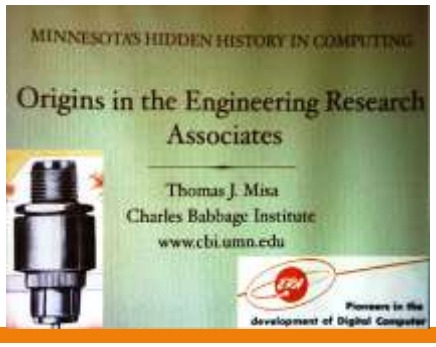
7.5.2 July – University display Updated

The VIP Club's Legacy display at the University of Minnesota has been updated for the current summer session. The display is located in Walter Library on the second floor in front of the reference and information desk. The current display focuses on the amazing ERA spinoff history and the rich legacy of our involvement with computers and systems in the space age.

If you are on the University campus, you can pay a visit to the actual display, or you can find a pictorial summary at the VIP Club website at http://vipclubmn.org/Articles/DisplayUniv2rev1.pdf.

7.5.3 September Announcement - October Club Program

The October meeting will start at 6:30 p.m. with ice cream, pie and coffee. The October program will feature Dr. Tom Misa, Director of the Charles Babbage Institute at the University of Minnesota who will present "Origins in the Engineering Research Associates" at our Club's October 13th 30-year celebration. This presentation was the keystone of a year-long University lecture series (2008/09) covering "Minnesota's Hidden History in Computing".



Dr. Misa holds the Engineering Research Associates Land-Grant Chair in the History of Technology. He is also an advisor to our Legacy Committee. Come and hear about the very significant role of our founding company, ERA. The first snapshot {previous page} is the first slide! This is also a second chance for those who couldn't get to Eagan to hear Tom's excellent presentation last September.

A second photo {right] shows Tom Misa (left) and Tom Turba in front of one of our Sesquicentennial posters.

7.5.4 October, Legacy Project Report - LABenson

After over 50 monthly Legacy reports, Dick Lundgren is on an introspective leave of absence, thus a September guest author. Dick has nicely arranged the August tailgate party in conjunction with a tour of the Minnesota Air National Guard Museum – as he has written, we are looking forward to their new museum being a potential exhibit location of our artifacts.

In October we'll recognize 30 years of CLUB operations. We will also note 5 years of Legacy Committee activities! Although a core half-dozen volunteers have done most of the work, over 150 of you have made written contributions to our web site with articles and career summaries. Highlights of these five years are:

1) the sesquicentennial exhibits on the Capitol Mall, at the State Fair, and documents into the bi-centennial time capsule,
2) delivery of two pallets, 40 boxes each, of history documents to the Charles Babbage Institute,
3) consolidation and cataloging or hundreds of documents and artifacts in two offices and a storage room at LMCO,
4) a one-year legacy display contract with the University of Minnesota, two of three semesters already completed,
5) the keystone parts of Dr. Misa's U of MN year long lecture series about Minnesota's Hidden History of Computing, and
6) a super Pioneer Press article.

As we begin the 6th committee year we are looking forward to: a) at least one more load of documents sent to the Babbage Institute, b) identification of people in the dozens of photos provided by Jeff Leas, son of former Vice President Vern Leas, c) identification of people and hardware items in four file cabinets of old photos, d) participation in the Lockheed Legacy display opportunity in Washington DC, e) surprising inputs from historians [the CP-823/U just emerged after 40 years in storage] as well other web site browsers and f) Dick Erdrich finishing his 47 year career summary!

What can you, the reader do? 1) write your career summary to supplement those we already have, or 2) write a brief story about a facility or product which is not adequately covered on our web site, or 3) come to the 1:00 o'clock Legacy meeting at LMCO on September 1st to meet the core group and volunteer for whatever. Submitted by LABenson, Legacy Committee co-chair.

7.5.5 November Legacy Project Tidbit – Ordean Joachim

Were you there in 1958? The UNIVAC softball league had a banquet at the season's end where the officers for the following year were announced. Shown in the photo on page 6 is Leo Oxman (left) congratulating incoming 1959 president Frank Schottman (center). Between them is the incoming vice-president, Greg Ehalt. Watching at the right were Vic Snyder, Sec/treas for 1959 and Dean Joachim (Sec/treas '58 and president '57.) A high-res scan of the banquet participants is posted on the web site, section 2.4 of ~~http://vipclubmn.org/WhoIsIt.aspx~~. According to Dean, Vern Leas was an adept shortstop on one of the teams. Submitted by VIP Club member Ordean Joachim.

7.5.6 December Legacy Committee Report – Lowell Benson

Time flies when we're having fun! As we celebrated 30 years of the VIP Club, I silently noted that it had been five years since October 2005 when Ole and I became co-chairs of a new VIP Club & LMCO Legacy Committee. The first volunteer committee member was Dick Lundgren who accomplished our first notable milestone in January 2006, a meeting with Dr. Arthur Norberg to establish a working relationship with the Charles Babbage Institute (CBI) at the University. Ole began to cajole old timers to create career summaries and Lowell established Legacy web pages on his personal web site to publicize the artifact and article gathering initiative. Our second notable milestone was the 2008 Capitol Mall Sesquicentennial Legacy display. This activity was triggered by Dick Lundgren who brought the idea to the VIP Club Board in August of 2007, he then organized a planning meeting with Jane Leonard – the Sesquicentennial Director. I'm very appreciative of the support of LMCO and UNISYS to the team of volunteers who made this milestone happen: Quint Heckert, Bernie Jansen, Dick Lundgren, John Skonnord, Ron Q. Smith, Harvey Taipale, Tom Turba, and John Westergren. Materials from this first public display have since been used at the State Fair, Eagan Community Days, the University of Minnesota, and many retiree gatherings. The third milestone to note was the January 3, 2010 St. Paul Pioneer Press article "The almost Silicon Valley" by reporter Tom Webb. This was initiated by John Westergren, Ole's LMCO replacement as the committee co-chair, with a phone call in early 2009.

Things don't just happen! Over these five years about 150 have contributed artifacts, documents, photos, career summaries or web site paragraphs about people and projects. Our artifact spread sheet has 284 line items identifying 481 objects. Our document spreadsheet has 1,475 line items. Our photo spreadsheet has a potential of 38,000 entries. Thanks to Larry Bolton, Harvey Taipale, and Quint Heckert for the spreadsheet entries. Over the last three years they have spent at least two days each and every month in the Legacy cubicles at LMCO cataloguing these items. The artifact spread sheet is 99% complete as a few items still trickle in. The document spreadsheet is in the 85% complete range – we've shipped a couple of pallet loads of document to the CBI. The photo/negative initiative is in the 5% complete range, correlating five file cabinets of five drawers of items with a converted MAPPER list is painstakingly tedious. Four other behind the scenes 'workers' should be recognized: John Skonnord for editing most of the career summaries and articles which appear on our web site; Jim 'Rapp' Rapinac for many, many web site items and occasional interfacing with Navy and Marketing individuals outside of the Twin Cities; Lyle Franklin for several web site

bits and catching errors on the web; and Dick Lundgren for Legacy reporting and development of outreach leads – he made the Minnesota Air National Guard Museum contacts where we had our last August Club program and where we may someday display artifacts and history materials.

Our Committee work isn't done yet! In addition to the ongoing photo correlation initiative, we'd like to develop a history book and a documentary video. Our web site is a 'living' repository of book material, waiting for information gaps to be filled. We don't have much about our interaction with Salt Lake City. Some projects were interactive with SLC engineering and manufacturing. Some individuals transferred there for long term careers while others were there for but a year or two. We also need some of our readers to write a bit about our interactions with Great Neck. We need inputs about developing the Pueblo and Clearwater facilities. Projects deserving descriptions are the Postal equipment developments and ASOC. We'd like to get another 50 to 75 career summaries – legal department, publications department, prototype shop, financial management, … Please contact any committee member to let him or her know what you can contribute, team writing is encouraged.

8 2011, Sixth Year of Articles

8.1 January

8.1.1 UNISYS Status by Ron Q. Smith:

Unisys has had a good year so far with 2010 running ahead of 2009 in overall revenue and profit and that was after 2009 being the best year in a while. At the end of November, we released a new mainframe computer in our 1100/2200 Series, the Dorado 4100. We expect to have more new systems to release next year as well. We have also started hiring new employees including new grads and a few experienced people. We hired 6 in Roseville in 2010 and expect to hire at least that many in 2011. The Roseville facility lease runs out at the end of 2012 so we may move to another location, possibly the MACS building in Eagan. It will probably be the winter of 2011 before we know more as negotiations for several possible locations, including just staying in Roseville, are underway.

8.1.2 LMCO in Transition Transition by Peggy Mullikin

Washington, DC, November 18, 2010 – Lockheed Martin [NYSE: LMT] today announced that it will close its Eagan, MN facility by 2013 and move manufacturing work from its Middle River, MD., site by the end of 2011.

The decisions, announced by the company's Mission Systems and Sensors (MS2) business, will affect about 1,000 jobs in Minnesota and 60 in Maryland. Additionally, the majority of the Ground Vehicles business, including the Joint Light Tactical Vehicle program, managed by Missiles and Fire Control (MFC) and based in Owego, will transfer to MFC's facility in Dallas, Texas, in 2011. That move will result in the elimination of 40 jobs in Owego, bringing the total impact of these actions to approximately 1,100.

Layoffs will be partially offset by the transfer of approximately 650 jobs from Eagan to Owego, NY., San Diego, CA.; and Manassas, VA. In addition, about 35 positions on the Ground Vehicles program will transfer to Dallas and additional jobs will be created in Camden, AR. when some Middle River, MD manufacturing work moves there. Layoffs and transfers will commence in the first quarter of 2011 and continue over the next two years.

"In an era of increased affordability, it is essential we drive down costs and optimize capacity at our facilities nationwide," said Orlando P. Carvalho, president of MS2. "While these changes will result in layoffs in some locations, they will strengthen employment in others and provide efficiencies that make us more competitive. We estimate these actions are expected to save approximately $150 million over the next ten years."

Headquartered in Bethesda, MD, Lockheed Martin is a global security company that employs about 133,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The Corporation's 2009 sales from continuing operations were $44.0 billion.

8.1.3 University of Minnesota

Paul Welshinger brought an exhibit item to the Unihog luncheon, giving it to the Legacy Committee. This exhibit item has 11 vacuum tubes representing vacuum tube technology advances from 1925 to 1950.

This tube history display has been donated to the Computer and Electrical Engineering department at the University of Minnesota. It is now in a glass case just inside the South entrance to the Kenneth Keller Hall. Tubes like the second and third from the right were used in early ERA computers. A small 'poster' next to it provides Paul's mini-bio. Paul was a 1950 BEE graduate from the U of MN, worked at ERA, et al from 1954 to 1986. He built the display in 1991. Thanks to Paul for this fine technology history piece.

8.1.4 MATCALS Reunion

Sperry*Univac/Paramax/Unisys/Lockheed-Martin operated the MATCALS Support Facility on Mare Island from 1977 until the shipyard shut down in 1995. MATCALS, of course, is the acronym for Marine Air Traffic Control And Landing System. This was the facility responsible for the software development, integration and testing of MATCALS. Many people in the twin cities also worked on portions of this program especially the Multi-Mode Display (MMD) and the Control and Communications Subsystem (CCS).

On October 8, those of us still in the area met for lunch. Pictured in the photo from left to right are:

Scott Hovey, Doug Mogler, Harold Brondum, Mark Schroeder, Dennis Larson, Vern Sandusky, Jeff Pauling, Foster Poole, Ron Irwin, Gordy Erickson and Ted Lingenfelter. Some of those pictured were on the project from its inception in 1977 until the shipyard closed. Ron Irwin continued to support the program long after it moved to San Diego. With the exception of Mark & Jeff, all are retired.

MATCALS featured several significant "firsts" for Univac including Finger on Glass (FOG) overlaying a full-color raster scan display, embedded UYK-44, Serial Data Bus (very similar to the CPF SHINPADS bus), distributed & fault tolerant operating system and more that I just cannot remember. Submitted by Vernon Sandusky.

8.2 April – Fact or Fiction, Another Legacy Computer?

While on Maui in February, I read "Blind Man's Bluff" by Sherry Sontag and Christopher Drew. Three extracted paragraphs are:

- from page 86: "There was a dark room, a data analysis room, and a computer room stuffed with one massive computer: the Univac 1124. It was a huge machine with big tape reels and blinking lights, and it gave the cavern [bat cave] the feel of the science fiction-adventure realm for which it was named. (Still, Univac had only a tiny fraction of the power of the average modern laptop.)"
- from page 88: "The computer's 'Interleaf' operating system needed more than the computer's 32 kilobytes of memory to operate. When computer components in the fish [U.S.S. Halibut] failed, new ones were secreted into Pearl Harbor in the luggage of American Airlines stewardesses."
- from page 99: "Things became even more difficult when the Univac 1124 crashed."

From a Wikipedia sections about the USS Halibut, I'd guess that this 1124 system was installed about 1965. Do any readers remember anything about this computer or the 'Interleaf' operating system? If yes, please contact a board member or one of our legacy committee members. Thanks, Lowell

8.3 May – Legacy of Reliability Continues - John Westergren

The LMCO MS2 team recently delivered the 8,000th AN/UYQ-70, or Q-70, combat console suite to the U.S. Navy on March 2nd, 2011. A ribbon cutting ceremony to commemorate the milestone was held at MS2's Clearwater, Fla. facility and attended by over 100 Q-70 program team members and Clearwater employees. Ceremony attendees were also able to hear from Robert Jackson, Deputy Program Manager for the U.S. Navy's Submarine Combat System Program Office (PMS-425). Jackson spoke about the value the program has brought to the Navy, saying "The one thing that never comes up is reliability problems with this product. That's something everyone needs to be proud of…because it's appreciated. [The Navy] is taking your product into environments that are harsh…and the product stands up, day in and day out."

MS2 has been the lead contractor on the Q-70 program since it was first awarded in 1994. Components of the system can be found on surface warships, aircraft and shore stations around the United States. Q-70s have also benefited other internal MS2 products over the past decade, such as the Aegis combat system found on *Ticonderoga*-class cruisers and *Arleigh Burke*-class destroyers and the E-2C Hawkeye Airborne Early Warning (AEW) aircraft. The Q70's have been primarily built by our teammate/subcontractor DRS Technologies in Johnstown, PA (former congressman Jack Murtha's district) along with a subset of units being built in Clearwater. Clearwater is now building about 40% of the units annually.

The program is approaching $3B over its life – not bad for a projected loss leader that no one really wanted in the 1990's. There is a bit more about the Q70s on our web site "Computers, Other" page. Submitted by John Westergren with editing by Lowell.

8.4 JUNE – CALL FOR WOMEN-IN-COMPUTTING

The Legacy Committee has been attempting to document our Information Technology (IT) history here in Minnesota. We started long before last fall's LMCO Eagan plant closure announcement, but that announcement has added additional emphasis to our efforts. You can see some of the results on the website: http://vipclubmn.org/lmcolegacy.aspx

We are working with the University of Minnesota, Charles Babbage Institute (CBI), Center for Information Technology to store historical items in their archives, also to document additional items of a historical nature. If you go to their website (http://www.cbi.umn.edu/) you'll see that one of their many pages is an Oral History Page, an extensive collection of oral histories which they've gathered over the years from people associated with the Information Technology industry here in Minnesota and around the world. In discussions with Dr. Tom Misa, CBI Director, he has said that they are lacking information about women associated with the early years of IT and manufacturing. I suggested to him that we had a number of women still employed and retirees that would make excellent, potential candidates and might be willing to be interviewed. He agreed! The Legacy Committee has reached out to Lockheed Martin and UNISYS employees, but we also want to make sure that the wealth of experiences from the Retiree population is considered.

So first, please let me know if you'd be interested in participating. It is strictly voluntary and it might be fun. Second, if you are interested I'd ask that you put together a short, abstract like, document which highlights your career. For this first effort it doesn't have to be long. Here are some questions to answer:

– Why did you come to work at Sperry/Legacy company?
– What was your first job and subsequent jobs leading to today's work?
– Short paragraph on the changes you've seen in the workplace?

If you want some additional ideas, there are over a hundred Career Summaries of every type and style on our website (http://vipclubmn.org/Authors.aspx.) The abstract I'm asking from you doesn't need to be as lengthy as some of those, but they might trigger your memories and thoughts. Next, I'll review the abstracts you provide with Dr. Misa at CBI. We'll use them to formulate some additional questions in an interview format. We'll share those questions in advance so you'll have some time to think about them prior to any interview.

Then we'll schedule some interview time with those of you interested. Once an interview is completed and transcribed, a hard copy will be provided for your editing and concurrence. Finally, if you're OK with the results, it will be posted to the CBI website as part of the Lockheed Martin or UNISYS history and we'd also ask your permission to have it posted to the VIP Club Legacy website.

Please consider this opportunity to provide some insight to what life was like in the early years of the IT industry from your perspective. Thanks for considering this and please let me know your interest. Regards, John Westergren

8.5 SEPTEMBER – UNISYS REPORT BY RON Q. SMITH

Ron Smith gave a very well received presentation at the August VIP Club meeting to over 60 people on "UNISYS: Then, Now, and the Future". The presentation began with a bit of history of where the commercial side of computing began, moved into the era of mainframes, moved on to computing trends,

and ended with a long question and answer period. There were a number of pictures from the book he coauthored with George T. Gray on "Unisys Computers: An Introductory History" and a fair amount of commentary on why things came to be the way they did. Two copies of the book were given out as door prizes. It was clear that Univac had a number of leading edge technologies that were never fully recognized at the time and are still some of the core areas in mainframe

Do not argue with an idiot. He will drag you down to his level and beat you with experience. computing. In talking about the takeover/merger with Burroughs, he mentioned how Sperry had really set itself up as a target by reducing public debt and having cash on the books. It was also mentioned how many former Sperry employees would say “Unisys” means “UNivac Is Still Your Supplier”. Times have changed. Modern day computers are much faster, smaller, data intensive, and cheaper, but security and reliability are still core attributes. Speed used to be the driving factor in computer design, but with shrinking size and increased heat generation, it is now parallel processors and more function on a chip rather than speed. The 2200 is now being emulated on Intel chips in software rather than designing new hardware, that is where the future lies. As for the operations in Roseville, the lease on the last remaining building runs out in December 2012. It has not yet been decided if a new lease will be made, operations will stay in part of the building, move to another building in the same general area, consolidate in the Eagan building, or do something else. Submitted by Tom Turba.

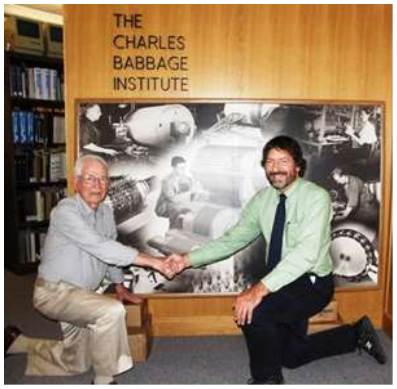
8.6 DECEMBER – LEGACY PROJECT REPORT - DRUM COLLAGE DELIVERY

A July, 1953 newsletter article documented the hanging of a Drum Products mural on the office wall of William C. Norris, director of ERA’s St. Paul Operations. As one of the 1946 ERA founders, William ‘Bill’ Norris, is better known for leaving UNIVAC to start Control Data Corporation in 1957. As the ’57 janitorial staff was cleaning out Mr. Norris’ UNIVAC office, they decided that the mural should be offered to the guy shown in the center, Don Weidenbach. Don accepted, then framed and mounted this collage on his home office wall until 2010 when he moved to a ‘down size’ condo. At that time collage custody was given to the VIP Club Legacy Committee.


the Orbit

Vol. II St. Paul, July 1953 No.

The collage center shows Don as a young engineer holding an experimental airborne drum alongside several other drum products. The periphery of the collage shows many of the drum manufacturing phases. ERA and its engineers had received patents for creation of magnetic drum memories, re-writeable devices which are the ‘grandfather’ of today’s computer hard drives. Don had worked at Engineering Research Associates and its corporate successors from 1946 until retiring in 1976.



On October 5th, 2011 Don Weidenbach presented the 4’x6’ collage of magnetic drum memory photos to the Charles Babbage Institute. Accepting on behalf of CBI was Dr. Tom Misa, Director of CBI at the University of Minnesota. Dr. Misa holds the Engineering Research Associates Land Grant Chair for History of Technology. Lowell Benson, Legacy Committee co-chair, and Quint Heckert facilitated the delivery to CBI.

The rest of the story? Erwin Tomash was an ERA engineer in the late 40s and early 50's designing computers and computer systems using drum memories – Don knew Erwin but didn't work directly with him. Erwin and his wife Adelle are credited with the founding of the Charles Babbage Institute in 1978. In 1980, CBI was located at the University of Minnesota as Mr. Tomash led the funding drive to create and name the ERA land-grant chair to support a CBI directorship.

9 2012, Seventh Year of Articles

9.1 January – Photo Sleuths Wanted – Harvey Taipale

Many of you are aware that there has been an ongoing effort to capture historical material from the Lockheed Eagan facility, which has been the repository for material dating back to ERA, and includes Twin Cities (Defense and Commercial) Univac/Sperry/Unisys info right up to the purchase by Lockheed in 1996.

Lockheed will vacate the building, which has been sold, early in 2013 so 2012 becomes the year when we have to get all the material out of there. Most of it will end up at the Charles Babbage Institute (CBI) at the U of M.

As part of this effort, we have "inherited" a huge (thousands of images) photo archive. CBI is very interested in these photos, but has cautioned us that their value is diminished without some documentation as to what they represent, which is generally missing from our archive. To date, volunteers have been manually looking at photos (all forms - negatives, slides, transparencies and prints), attempting to identify the subject, and entering the data in a database. It is clear that we need to greatly expand this effort if we are to finish in 2012.

We envision a series of work days like we put together for the patent data wherein a group of people would work in the Eagan facility, individually taking a group of photos and entering pertinent data into an Excel database. We need to secure some additional resources (access to PC and light boxes) before we start, but we would like to collect our volunteer pool ASAP, so we can arrange schedules and facility access early on 2012.

So, if you are interested in having a good time doing a some photo detective work, please email Harvey Taipale (hjtaipale@comcast.net) with your interest and availability and we will further coordinate via email early in 2012. Non-VIP club member retirees and employees are very welcome to participate. Submitted by H. Taipale.

9.2 March - An Afternoon Program – History on Display

An opportunity has emerged to put OUR HISTORY ON DISPLAY and tell the story of our Legacy in a venue open to the public. Choosing the proper location was quite a tough decision. . The Dakota County Historical Society's (DCHS) Lawshe Memorial Museum in South St. Paul was by far the most appropriate as it fit with our heritage of more than six decades of operations in Dakota and Ramsey counties. The exhibit, which is currently in the conceptual stage, is the result of cooperation between key figures of the Lawshe Museum, Lockheed Martin and the VIP retiree club. Chad Roberts, the DCHS Executive Director, will be our speaker for March. He will discuss the DCHS Mission, their South St. Paul Museum and his vision of what the future Lockheed Martin/Unisys exhibit at the Museum might look like. A Q&A session will follow; all inputs are welcome. The March 14th afternoon program meeting will be held at 2:00 PM at the Unisys MACS building conference room.

9.3 APRIL – JOHN WESTERGREN, ET AL

9.3.1 The Last Walk Through!

Anyone interested in visiting Eagan Plant 8 before it is closed in April 2013 will have that opportunity on Wednesday, May 9. Lockheed Martin has invited VIP Club members, spouses, and friends to the monthly "What's Brewing" get-together where employees enjoy free coffee and other refreshments. The event starts at 9:00 a.m. in the Atrium/Courtyard. This will give you time to generally renew old friendships from work – share what you've both been doing since you left, and hear about their future plans. Then a guided "walkabout" is planned for around 10:00 a.m., visiting some of the building's remaining open areas including offices, environmental test area, and the development & integration lab. Some of the building has already been vacated and closed, but there will still be plenty to see, and maybe even your old office or work area.

After the building walkabout, you can purchase lunch at the cafeteria before the tour continues at 1:00 p.m. to Villaume Industries, 2926 Lone Oak Circle, Eagan, to see their reconstruction of a WWII CG-4 glider. Villaume provided much of the wooden components for over 1,500 of the gliders that were assembled in the Northwestern Aeronautical Corporation factory on W. Minnehaha in St. Paul, which eventually became ERA/Univac's Plant 2 after the war.

For anyone wishing to visit Plant 8 this one last time, please RSVP to John Westergren at Lockheed Martin (~~john.h.westergren@lmco.com or 651-456-3380~~) by May 1. Visitors must be registered before their visit, and each person must bring proof of U.S. citizenship: either a passport or birth certificate. Parking is available in the Visitor Parking lot at the East entrance, accessible from Pilot Knob Road. John is also compiling the list of individuals interested in seeing the glider reconstruction. Please let him know if you're planning to go to Villaume at 1:00 p.m.

9.3.2 Presentation Report:

On February 9th about 300 people attended the Thursday evening WW II monthly seminar, 'Code Breaking and Beginning of Computers'. For those of you who missed it, Colin Burke* presented quite a few (about 65) photos while talking about the subject. He was followed by Lowell who presented part of our ERA history, finishing with the NTDS functionality which led to our Air Traffic Control systems. Then Bill Igoe and Don Weidenbach talked about their ERA experiences. Bill had been a draftsman in the glider factory during WW II, then later a draftsman for ERA. Don Weidenbach gave a summary of his 30 year career which began in 1946 at ERA. VIP Club members who attended this WWII roundtable were Lowell Benson, Millie Gignac, Bernie Jansen, Jon Kinard, Ken Nelson, Pat Ryan, Tom Turba, Tim Wandersee, and Don Weidenbach.

After the talks - Nick Linsmayer, President of Villaume Industries, invited the VIP Club to visit their facility to see a 'WWII Glider being reconstructed.' In the 40's, Villaume had provided most of the wood that went into the gliders built in the old plant 2 on Minnehaha Avenue. Northern Aeronautical Corporation in old plant 2 was the 2nd largest glider manufacturer in the US at that time. Some of those gliders were probably used on 'D-day' as the allies invaded France. Bernie, Dick, Millie, Tom, Phil and I had had a 'glider' preview on Feb 3rd.

*Colin Burke co-authored The Secret in Building 26: the Untold story of America's Ultra War Against the U-Boat Enigma Codes (New Your, NY: Random House, 2004) If you recognize the names Howard Engstrom, William C. Norris, and Ralph Meader as being three of the four co-founders of ERA; all are part of this WWII history story. I found a copy in the Roseville library. Submitted by LABenson

9.4 MAY

9.4.1 Letter from Nick Linsmayer - President, Villaume Industries.

Dear Lowell: One behalf of the NAC WACO CG-4A glider restoration crew, we welcome your Club visit to Villaume Industries on May 9th - before the glider heads to its final destination at Granite Falls, Minnesota.

Our hope is to connect with anyone who may have been working in glider production, who then became an ERA employee. We would like to learn more about this amazing transition from wood and steel tubing to computers. In addition, we are looking for any copies of "Tow Lines" which was the in-house NAC publication.

We are about to start documenting this amazing company and its journey. Does anyone have a parent who may have worked at NAC?. Any help would be invaluable. Best Regards, Nick Linsmayer - President, Villaume Industries

9.4.2 7,000 Down; 30,000+ to Go

Thanks to the efforts of the Photo Sleuths over the past few months, about 7000 old photos and negatives from the ERA/Univac/Sperry and successors have been identified and cataloged. This leaves us with only about 30-some thousand more currently in our possession to complete all this before we need to turn them over to CBI prior to Lockheed vacating the Eagan facility. The target for completion of our work is the end of 2012. The word "currently" was emphasized because recently we became aware of thousands of additional photos in the Publications department and in some storage areas, many of which are of definite historical value. In addition, we have secured a cartload of old 16mm films to be reviewed. Thus, a huge job has grown even bigger, and more volunteers are needed.

The current group meets the second and fourth Tuesday of every month, but the facility is open anytime during working hours, so after a bit of familiarization, you can make your hours your own. To generate an opportunity for new volunteers to participate, we will have an orientation session on Thursday May 3 in our new work area, just to the east of big indoor courtyard. All sleuthing wannabes are welcome, and we really can use the help. Work consists of looking at old photos and negatives and entering data into an

Excel database, along with a bit of friendly camaraderie. If you're interested, please contact Harvey Taipale at 651 748 5083 or hjtaipale@comcast.net. Prior to entering the plant, John Westergren will need to secure visitor authorization, and upon your first entry, you will need to show a birth certificate or passport, along with a driver's license or state ID.

9.5 JUNE

9.5.1 Web Site Updating – Lowell Benson

The transition of our Universal Resource Locator (URL) vipclubmn.org from Microsoft to the webhostinghub server is complete. However I just haven't had the time to get all of the web pages reformatted from the Microsoft *.aspx to *.html code. If a page selectable by a sub-tab doesn't appear when you click, it hasn't been posted yet. A workman sign on a page means that links or pictures of a page aren't verified yet. LABenson

9.5.2 Last Walk Through– Quick Report – John Westergren

On a gorgeous May 9th, a wave of about 240 former LM/Unisys employees descended on Plant 8 for a last look at their former work "home." The 9:00 LM What's Brewing session in the atrium provided the meeting grounds for coffee, treats and uncountable conversations. Noise levels may have set new records. At 10:00 six separate groups began guided tours. The guides (John Westergren, Jan Raycraft, Steve Karban, Dan Reiman, Lynne. Anderson, and Gary Wandersee) led orchestrated tours through several areas (Metrology, D&I, Environmental Test, Prototype, ATM, offices) and ended up at the cafeteria for the option to stay for lunch. Area docents were Steve Koltes (ATM), Bruce Lucke (Prototype), Greg Gleason (Env. Test) and Ed Conley/Jackie Rehwaldt (Metrology).

In the afternoon a school bus provided shuttle service to Villaume Industries in Eagan who provided space in two buildings for the all-volunteer WWII CG-4A Glider reconstruction. About 110 people made the trip. The narration was historically accurate, technically top notch and entertaining.

The VIP Club proudly acknowledges and is very grateful for the extraordinary efforts of those on the inside to make this day a monumental good time for those of us on the outside. Special thanks to John Westergren for overall planning/organization, Lin Topping for all her support activities, Sue Goolsby and Scott Sauer for creating a photo record of the event, and all those mentioned above for duties way beyond the call. A full report with photos will be in the next newsletter.

9.6 JULY – REPORT, KEN BUSH EMPLOYEE BADGE

This scanned image of a Northwestern Aeronautical Corporation (NAC) BADGE illustrates a true history artifact! It is significant from three aspects:

1) NAC morphed into Engineering Research Associates (ERA) in 1946 as the NAC President, John Parker became the 1st Engineering Research Associates President. John had hired personnel manager Ken W. Bush from Twin Cities Ordnance to be the NAC Industrial Relations manager, then brought him into ERA in 1946 to be their first personnel director.
2) Ken's son Tom, who donated the badge to our IT Legacy Committee, retired from UNIVAC/Sperry/UNISYS in 1992 after a 35-year career as a St. Paul manufacturing product manager in Plant 1 and as Director of the Unisys

Material Management Center in Eagan.

3) Ken's grandson, Tom's son Mark is a current Lockheed Martin employee making them one of a few three generation employees of our Information Technology heritage. Mark has transitioned from Eagan to Clearwater FL.

This BADGE along with significance wording will become part of our Dakota Co. Historical Society Lawshe Museum history display this fall. Thanks to Tom B. for the badge donation.
Fathers, sons, brothers, sisters, husbands, wives, aunts, uncles, nephews, nieces, in-laws – our heritage is more than computer lineages, we were and are family! Submitted by LABenson

9.7 SEPTEMBER

9.7.1 LOCKHEED MARTIN Escorts Curiosity and Leads the Charge into the Martin Atmosphere.

Once again Lockheed Martin has very publicly put its reputation on the line and come through with MISSION CRITICAL Gold Medal success. LM's contribution to the safe landing of the Martian Rover CURIOSITY was the design, test, and build of the aeroshell (heat shield/back shell) which deflected the heat of entry to ensure the safety of the precious rover. You can view a short video with LM personnel at http://www.youtube.com/watch?v=OYsezwD_AIs.

9.7.2 Report: Lawshe Memorial Museum Legacy Exhibit Report: – Bernie Jansen

The future Lockheed Martin and Unisys Legacy Exhibit will be located in the Dakota County Historical Society (DCHS) Lawshe Museum in South St. Paul. The current Lockheed Martin schedule is for shipments to the Museum to begin in early September. Lockheed Martin will donate several items including the large history display sign at the entrance to the auditorium, several computers (an AN/UYK 43, one or more AN/UYK 44's, and a CP 901), a large 3 screen interactive Valiant workstation (possibly two versions), appropriate documentation of all equipment and numerous marketing brochures, plus various artifacts such as cups, ashtrays, etc.

The LM/Unisys Legacy Exhibit will be located in the Northeast corner of the main floor of the Lawshe Museum. The accession of these items into the Museum records, etc. will be done in the display area with help from VIP Club members plus other LM and Unisys retirees! The DCHS Executive Director, Chad Roberts is hoping for a significant volunteer effort from VIP Club members to properly identify and describe all of these items. When you are ready to volunteer your support, please contact me at: bjskj@msn.com or 651-681-9988.

(Also, separate from the ongoing LM/Unisys Legacy Exhibit accession efforts, the current photo and negative identification effort spearheaded by Harvey Taipale could be continued and collocated in this area during 2013.) As a member of the DCHS Board of directors I will coordinate these efforts with LM, the Lawshe Museum, and the VIP Club. Submitted by Bernie Jansen

9.8 OCTOBER

9.8.1 Stories Request from LMCO, i.e. Legacy Coordinator Mickey Clemens:

"A century ago today, a California Superior Court clerk named W.B. Williams signed his name – with a flourish – to the incorporation documents of the Glenn L. Martin Company. That signature marked the official founding of the Martin Company, the first root in the Lockheed Martin family tree. We're commemorating this 100th anniversary by holding events at more than 230 of our sites worldwide, and by

launching a new campaign to collect and share your stories of our history. … Martin's story is one of achievement, purpose, and integrity. And now, we want to hear yours. Today we're launching a Share Your Story | [http://www.lockheedmartin.com/us/100years/share-your-story/share.html] campaign; open to anyone with a connection to Lockheed Martin." I, Lowell, sent in my two-bits (250 words) about CP-901 experiences associated with the P3C.

9.8.2 Innovation Challenge by LMCO via Andrea Greenan –

On Monday, August 6, we launched a worldwide "Innovate the Future") contest with cash awards totaling $50,000. Interested participants are invited to share their ideas on how innovation can enable a more secure future for the planet. Participants can post submissions on a range of topics facing the world community, including the need for sustainable energy, cyber security, and healthcare. Retirees are going to be uniquely qualified to participate. They have tremendous knowledge about the company's products and services. This challenge might be an opportunity to share an idea that they didn't have a chance to pursue while employed with the company. To enter the contest, participants must complete a brief submission online between August 6 [sorry this didn't make our September newsletter deadline] and September 30, 2012 at http://www.lockheedmartin.com/innovatethefuture-contest. Up to five ideas will be selected for cash awards by a committee comprised of Lockheed Martin employees and at least one independent third party. There is one eligibility requirement that I want to note. Retirees that are immediate family members (parent, spouse, sibling or child) of current employees cannot participate. VIP Club members who worked in Roseville are eligible to participate. There will be one $25k award, a $10k award, and three $5k awards.

9.9 DECEMBER

9.9.1 Lockheed Martin Update: by John Westergren

I'd like to share a little of what's happening here in Minnesota with the closure of the Lockheed Martin MS2 Facility in Eagan and how that is influencing the Club's IT Legacy activities.

1. About a 1,050 employees were affected by the closure that was announced two years ago. Some are staying on with LMCO, but others are moving on to retirement or other jobs – some reluctantly. One of the things it has done is caused everyone to clean out their area and the rest of the building since we're moving out. The Legacy Committee has gathered a huge amount of historical and archival information that we have arranged to have protected for the future with two local organizations: the Charles Babbage Institute (CBI) Center of the History of Information Technology at the University of Minnesota and the Dakota County Historical Society (DCHS) Research Library and Museum.

a. We have already provided a number of items to CBI like the entire set of Engineering Log Books from the Sperry Research Center in Sudbury, MA; some of the original disclosures and patent information from the early years (1946-50's) of the digital age documenting the first computing machines; and photographs of technology, employees, and products from the our history. Over the next two months we will be providing them many more boxes of documentation that we've found and is worth saving.

b. Since CBI is only able to receive and store documents, DCHS will be the recipient of some of the "three dimensional" items from marketing trinkets from the past, to a few old and no longer in use computers and products. The Legacy Committee has also been cataloging thousands of photographs from our photo archives and DCHS is providing space for that effort to continue. DCHS's goal is to create a semi-

permanent exhibit depicting the history of Lockheed Martin and its Legacy Companies here in Minnesota with of goal of having that open in 2014.

2. Things we do today will be history to the people of the future. We have made arrangements with Records Management that selected historical items will be able to be retained in Iron Mountain for a designated period and when appropriate, be brought out for disposition to one of the above organizations after final review and approval. We did not want to lose recent history.

3. An additional item. As people have been leaving over the course of closing this facility, at the end of every month some gather at a local establishment with friends for one last "goodbye". In October, since the number of departures was more than usual (65), some of us decided it was still a good idea to gather, but we needed a little larger area. So we made arrangements for dinner, music, dancing, and refreshments at a location and about 325 employees, former employees, retirees, and

significant others came for a gathering of some of the best people you'd ever want to work with. We finally had to ask the last 25 dancers and talkers to leave about 11:45pm. Keith Myhre has provided some snapshots, see pages 6 & 7.

When the Legacy Initiative started, we here didn't realize how important it was going to be to acknowledge our history. Trust me, it is very important to many people – keep it up! Regards, John Westergren

9.9.2 Found in the Archives: by Harvey Taipale

Remington Rand Univac was in all the local papers [remember when we had 4?] in September of 1956 when this photo was taken. The first 1103A computer was being loaded for shipment to the Lockheed Aircraft plant in Palo Alto California, to be used for simulating flight of new aircraft, rocket, and missile designs.

Lockheed Aircraft is one of the key predecessor companies of Lockheed Martin, who is now in the process of dramatically downsizing its Minnesota presence.

The 1103A was an upgrade of the 1103, replacing the Williams memory tubes [a Cathode Ray Tube (CRT)-based electrostatic memory] with the then new core memory technology. Billed as the fastest machine at the time, the 1103A could add 30,000 36 bit words per second, and had a memory fetch and write time of 8 microseconds. This 1.5 million dollar machine, when finally installed with its complement of card readers and punches, tape and drum memory, and printers, was 56 feet long , 10 ½ wide, and weighed 17 tons. Its circuitry included over 5000 vacuum tubes and 9000 diodes. It consumed 100,000 watts, and its air to water cooling system was big enough to handle "eight Texas homes."

Loading is taking place at the Griggs Midway Building on Fairview and University Avenues, then known as plant 4. The semi truck is one of two that were required for the shipment. The newspaper articles were published on Wed, Sept 5, and the units were expected to arrive at Lockheed by Sept 10th and be in operation by October 15th. The articles also mention that a future unit was to be delivered to Ramo-Wooldridge Corp in Los Angeles [one of the predecessors of TRW] for work on the "intercontinental missile effort." A Ramo Wooldridge unit eventually ended up at the University of Minnesota

10 2013, EIGHTTH YEAR OF ARTICLES

10.1 JANUARY – JOHN WESTERGREN

10.1.1 What's Brewing:

John Westergren invited VIP Club participation at the final LMCO monthly employee information session held on November 20th. This session highlighted a formal IT Legacy ARTIFACT turnover ceremony to the Dakota County Historical Society (DCHS). DCHS Lawshe Museum Director Chad Roberts accepted the donations on their behalf. 18 pallets, two truckloads of computers, printed circuit boards, 'antique' components, and photographs made up the shipment subsequently hauled out on 11 December. Eight pallets of documents were also shipped to the Charles Babbage Institute on 12/11/12. The people pictured on page 9 were at the ceremony, many of them have been working with Harvey Taipale doing photo identification over the past year. This photo identification initiative is expected to resume at the Lawshe Museum in the Feb/Mar time frame. ***Thanks*** to DCHS Trustees, Bernie Jansen and Millie Gignac, for convincing the DCHS board to house an IT Legacy display. More volunteers are still needed to plan and set up the exhibit there - contact Bernie, John, Harvey, or Lowell if you are willing to help!

10.1.2 IT Legacy Future: by John Westergren

After Friday, December 28th, 2012 should any present or former Lockheed Martin (or legacy company) employee have items or documents of a historical value, they should contact John Westergren~~,~~ ~~jwestergren@frontiernet.net~~, with a brief description of the item/material and their contact information. I'm retiring on the 28th and have been elected to the VIP Club board as a Director [volunteered] to coordinate our continuing IT Legacy efforts. Some guidelines for items we continue to seek:

- No classified information.
- The item or information should not be Lockheed Martin Proprietary, unless the information is greater than 20 years old and is no longer really proprietary.
- We already have all of the repertoire cards and technical descriptions of all our products except for very recent items.
- We need information on non-engineering functions: finance, manufacturing, purchasing, contracts, personnel, etc.
- We need personal histories from everyone: see http://vipclubmn.org/People.html for examples - we'll edit and get final concurrence from you, the author, before posting on the web.
- We do need non-classified program information for recent Minnesota activities – Air Traffic Management, Joint Strike Fighter, ASW, Desert Hawk, etc.

10.1.3 Continuing Legacy By LABenson:

Our first airborne Anti-Submarine Warfare (ASW) contract was in 1963; systems design, the CP-754/A [type ADD1020], and demonstration software. The next contract, Mod-2, brought a 1206 ground support computer, the CP-823 [type 1830], and initial operational software. Contract Mod-3 was for the CP-901, S/N #1 delivered in September, 1967. Mod-3 also expanded software development at the Naval Air Development Center [Johnsville, PA] and systems test and support at Patuxent River, MD. Production CP-901 computers continued into the early 90's when the final S/N#499 was delivered. In 2012 there were still 40 CP-901s flying in Japanese P3Cs. The early 90's was the start of the CP-2044 replacement for the CP901s aboard the Lockheed P3C aircraft.

Shown here are Gary Reetz, Chuck Hobus, Pat Myhre, Les Nelson, Bob Pagac, and Art Francis – all of them have been part of this 50-years of ASW systems history. They are standing in front of a CP-2044 which will soon be part of our museum display. We celebrate, 45+ years of CP-901 operational life and 50 years of ASW experiences in 2013!

Photo by Joanna Foote, Eagan Communications Coordinator

10.2 March - IT Legacy Committee: by Lowell Benson

After 7+ years [since October 2005] of committee activities, we pause to celebrate! Our legacy collection of donated documents and artifacts are now in permanent storage at CBI and the Lawshe Museum. As we pause, it is appropriate to re-constitute the committee with four major foci:

1. Getting an active display setup at the Lawshe Museum,
2. Finish the photo cataloguing initiative at the Lawshe Museum with selective transfer of photos to CBI,
3. Continue telling our IT Legacy story with web site articles and local 'forum' displays.
4. Continue the acceptance, cataloging, and processing of artifacts from our former co-workers.

John Westergren and I will be reviewing dates for a committee re-constitution meeting in April, stay tuned!

10.3 April – Photo ID Workstations in Place

On February 19th Harvey Taipale, Bernie Jansen, and I set up five workstations at the Lawshe Museum so that the photo identification team could resume their work. The team re-started their identifications on 2/26. We expect to gather a 'Display Setup' team soon. By LABenson

10.4 May - Volunteers Wanted

Contact Harvey Taipale if you can help with the continuing photo identification efforts, now at the Lawshe Museum.

Contact Bernie Jansen if you are willing to help with the Legacy Exhibit planning and setup. Thanks to those of you who have already volunteered.

10.5 June – Bernie Jansen

10.5.1 Program for August

The date of the August Program has been changed to Tuesday, August 13th. It will be a wine & cheese social at the Lawshe Memorial Museum hosted by the Dakota County Historical Society (DCHS) at 7 P.M..

(Last December Lockheed Martin donated 18 palettes of our Legacy Artifacts to the Lawshe Museum in South St. Paul. These Artifacts included computers, displays, other hardware, documentation, miscellaneous items such as projects cup & pins, plus thousands of unidentified photos.)

Since March of this year some of our volunteers have been working on the photo cataloging effort at the Museum each Wednesday. (See photo 2 of the Photo Cataloging area: shown left to right are Les Nelson, Harvey Taipale, Keith Myhre, and Bob Pagac)


Photo 1

In parallel with this effort, Museum staff has been performing the "Accessioning in View" of the Legacy Artifacts into the Museum's data base. (See photo 1, left, of the CP 2044 Computer (Japanese P-3C) in the Display Area: shown left to right are Bob Pagac, Les Nelson, Pat Myhre and Harvey Taipale; also see photo 3, below,. of the "Accessioning In View" effort in the Display Area: shown left to right are Keith Myhre and Andrew Fox (Museum Staff).


Photo 3

The Program at the Lawshe Museum will feature a tour of the Lawshe Museum including the viewing of the temporary exhibit of our Legacy Artifacts.

For planning purposes a head count of attendees is needed – please send an email to me at bjskj@msn.com by August 2nd. Note parking in the Museum area is limited – you are encouraged to car pool. Submitted by Bernie Jansen

10.5.2 Legacy Committee Report:

The Legacy Committee met on May 1st. Lawshe Museum employee Andrew Fox has set up a preliminary exhibit as he continues the accessioning process – unpacking and recording our donated hardware and photo artifacts into their database. Keith Myhre is importing our Excel photo database into an Access database which will be linked with the museum's donated items database. The committee will have a display table at the picnic – give away trinkets and old photos as well as a poster display of our 50 years of airborne ASW history. The next IT Legacy Committee meeting will be at the museum, 1 p.m. on 18 June– driving directions to the Lawshe are on page 8. By LABenson

10.6 JULY/AUGUST - LEGACY COMMITTEE REPORT

The committee under the leadership of Harvey Taipale is helping the Dakota County Historical Society's Lawshe Museum prepare proposals to the state and LMCO for grants to develop our history exhibit.

Club Members are invited to submit their 'Generation Epoch Stories' to fit within exhibit topic areas: a) 55+ years of Navy Command and Control, b) 45+ years of Eagan operations, c) 50+ years of Airborne ASW, d) 50+ years of Air Traffic Control, e) 45 years on Minnehaha avenue, f) 40+ years in Roseville, By LABenson

10.7 SEPTEMBER

10.7.1 Legacy Committee Report:

"From ERA to Lockheed Martin: A Legacy of Technology" is the theme of a new Exhibit at the Dakota County Historical Society's Lawshe Museum opening on August 14th. VIP club members at the reception on August 13th got a "sneak peek" preview.

The museum, assisted by legacy volunteers, is working hard to catalog, conserve and plan future exhibits of the two truckloads of historical material donated by Lockheed Martin in 2012.

This material represents a legacy well beyond Lockheed Martin. Whatever your company – ERA, Remington Rand Univac, Univac, Sperry, Unisys, Loral, or Lockheed Martin, something of work history is very likely in this archive. Volunteers, led by Trish Myhre and Jon Simon, are working every Tuesday to sort and catalog material. The museum's future needs go well beyond the capabilities of the Excel databases we started with, so Keith Myhre is working to convert everything to Access, which will support more robust cross-referencing, look-up and future updating. This activity can still use a number of volunteers, so call Trish or Jon if you are interested, or show up at the museum on any Tuesday.

Finally, the museum is pursuing a Minnesota State Legacy grant to develop a more comprehensive exhibit. We will know if this request is successful in November, and, if approved, we will need input from even more volunteers. Watch the newsletter for more information, and start thinking about just what were the key events in the history of all these companies.

10.7.2 North of the Border:

Many of our members worked with or at the Sperry/UNISYS facility in Winnipeg. Although the Winnipeg facility closed, the 'company' continues in Canada as reported by Ed Pogorzelec: "Back here on the east coast, DND Canada has assigned the 8th ship; HMCS St. John's, to proceed for retrofit, along with Provisional Acceptance slated for HMCS HFX on Sept 15th and First Article Acceptance (FAA) of same on Dec 15th. So we at Lockheed Martin Canada have our work cut out for us. Once we achieve FAA hopefully then we can treat the other ships as a production line and simplify the acceptance criteria.

10.7.3 From Our Other fronts:

1. Tom Wilson has provided insight regarding our AYK-23 digital Computer Processor Memory Unit (CPMU), the last S-3B Viking squadron was decommissioned in 2009, but in June 2010, several S3B Vikings were re-activated to patrol the Pacific Missile Test Center's range areas off the coast of California.

2. For the Marine Air Traffic Control And Landing Systems incorporating our SDB SHINPADS, several MATCALS shelters are still being deployed world-wide in conflict zones, and

3. Lockheed Martin Canada has received extension service contracts to support our Direct Fire Targetry Systems on Canadian weapon ranges.

From the Naval standpoint, Seven Halifax Class frigates are in refit with HMCS Halifax completing three of her weapon certifications with the new Combat Management System. The Multi-Function Workstations and Mission Critical Enclosures developed by LM Eagan and manufactured by LM Kanata are impressive and the new system capabilities are a 1000-fold superior to the legacy SHINPADS. It is almost information overload. But that being said the fleet still has five frigates and three destroyers with the legacy SHINPADS and UYK-507s that continue to play a major role in many cases as Command Task Group. The sustainment plan is to eventually replace all SHINPADS and UYKs by yr 2024. This speaks volumes on the great engineering design, reliability and manufacturing capability developed by the Winnipeg team. Who knows we may see some of our great work in naval museums. I have suggested that HMCS Chippewa receive at least a working SHINPADS system along with UYKs. Regarding MATCALS, it is my understanding that there are MATCALS shelters still being deployed which was the land-based version of SHINPADS. Sure brings back memories.

This speaks volumes on the products that were designed, developed, manufactured and services provided from our Winnipeg plant. All the best and take care! Ed Pogorzelec, P.Eng. - Conseiller Assurance Qualité [Quality Assurance Advisor]

10.8 October - Legacy Committee Report

- Trica Myhre and Jon Simon are coordinating the photo identification sessions at the Lawshe Museum. They are in need of more Tuesday morning help, contact them Harvey T. or Bernie J. to volunteer.
- Harvey Taipale has supported a DCHS grant proposal to further the IT Legacy displays at the Lawshe Museum. Stay tuned for $$s results!
- Some pages of our IT Legacy web site have been recently translated into the German and the Polish languages; see the Announcement section of http://vipclubmn.org.

10.9 November

10.9.1 Legacy Committee Report:

In the September 'Article for the Month' we wrote: If you ever flew in a P-3C or S3A or S3B or CP-140 airplane, let us add your name to the flying programmers list. Feedback from Tom Bayless is: "I have several candidates for the Flying Programmer Club although they didn't fly on ASW aircraft. Lauren Cady, John Bezdicek and Ken Nelson all flew debug missions on the Big Look Aircraft [a modified P-3.] Lauren and John flew on the RIVET JOINT aircraft along the Iron Curtain to test out the radar intercept system capable of measuring the characteristics of very closely guarded radars used by the Soviets when aircraft attempted to enter 'their' airspace. Lauren 'flew' on the PHM-1 to test a radar intercept system used against surface ships and actually got the Soviets 'fishing trawler' to turn on certain surface radars that the US had not seen before. He told us later that the ride would not be for anyone with a weak stomach."

10.9.2 UNIVAC's London Development Center:

494s, 1108s, 1110s, Airline Reservation Systems, AMEX, Exec-8, RTOS (Real Time Operating System), STARS and Minnesotans overseas are all part of a brief history paper [1968-75] written by Arlyn Solberg. Arlyn is a former Airlines Operations and UNISYS, Roseville employee, now retired. We've posted his paper on our web site as the November 'Article for the Month', http://vipclubmn.org/Articles/LondonDevCenter_v13.pdf.

10.9.3 Centennial History Book

Lockheed Martin has published and made available Innovation With Purpose, Lockheed Martin's First 100 Years. It is filled with stories and images that chronicle the company's heritage over its first 100 years. To order from the company, go online to http://lockheedmartinstore.3dcartstores.com/ and pay $8 for shipping & handling.

Or the VIP Club has 400 copies for pickup on a first come, first served basis for any upcoming Club events, lunches, or programs so if you'd like some copies contact John Westergren, 952-358-1174(c) or at ~~jwestergren@pda-engineering.com~~ and he'll work with you to get the necessary copies to you.

The books are going fast; so if you want to save $8, come to a Club event. Once our 400 are gone, they will have to be ordered from the company's website.

10.10 DECEMBER

10.10.1 MSD Geschlosen!

Many of us are a bit saddened as we've heard that in 2014 Lockheed Martin will be closing the Bad Godesberg, Germany office and a few other sites in that country.

10.10.2 Did You Know?

UNIVAC 1004s, 1050s, 1108s, etc. were all part of the Viet Nam War history! Point your browser to: http://www.history.army.mil/search.html then type UNIVAC into their search box to get 21 links to UNIVAC references on this Army site.

10.10.3 Charles Babbage Institute:

Their latest newsletter has an article about our Lawshe Museum exhibit – see http://www.cbi.umn.edu/newsletter/article7.html. Also, CBI Director Thomas Misa's new book Digital State (University of Minnesota Press, 2013) includes parts of our IT Legacy.

11 2014, 9TH YEAR OF ARTICLES

11.1 JANUARY

11.1.1 Be a Historian! Harvey Taipale

Thanks to a recent grant to the Dakota County Historical Society (DCHS), all readers now have a rare opportunity to tell the real history of our company. Based on the proposal submitted last September, DCHS was awarded a State of Minnesota legacy grant to prepare material for a photo exhibit depicting the history of Engineering Research Associates and successor companies' Minnesota operations. A significant part of the research into the best topics to 'snapshot' this history is predicated on securing ideas from the employees and retirees.

Various company publications, newspaper articles, and various videos contain the usual business history. We all understand that these "official" sources tell only part of the story – the rest of what really happened is still kept in the minds of the people [YOU] who lived and worked through the past 67 years. Any truly excellent history project has to include both kinds of information – the official stuff puts things into a setting, but the personal stuff gives it life and interest.

So here is your chance to chime in on what you think should be included in our history. We are asking for candidate history topics to be included in the final exhibit. These can be key events, products, programs, people, behind the scenes stories, or really anything you think should be included to give future generations an idea of what it was like to be part of a pioneering computer and systems company. Remember, you lived this story; thus you are the best existing source to add a key perspective to what was important or memorable.

This is an inclusive invitation – feel free to extend the opportunity to contact others whom you think would like to participate. Nominations from retires and past or present employees of any of the various Minnesota companies that arose from ERA, including Unisys, Lockheed, and affiliated businesses, are welcome.

Topic naming is simple – there is a sample form on page 5 for mailing to the Club PO Box, or you can nominate by email to historian@vipclubmn.org Data is free form; the important thing is to identify the key idea and to provide a follow-up contact. We will begin tabulating and selecting final candidate topics in March; continuing a process that will end with a digital audio/video/photo archive in late fall. Future articles will keep you posted, but if you would like to volunteer to more actively participate in this project, please contact Harvey Taipale (hjtaipale@comcast.net, 651 748 5083).

11.1.2 Two New Web Pages: Lowell Benson

Last fall we added 'They Flew' under the People major tab and 'Winnipeg' under the Locations major tab. The first recognizes many of our programmers and engineers who flew in government planes and the Navy's 'hydrofoil' during systems development and operations. The second recognizes twenty+ years of manufacturing and engineering above Minnesota's northern border. Three 'mini slide shows' by Ed Pogorzelec expand upon their people, the facilities, and the products. Readers are invited to 'weigh in' on an enigma contained on a product slide. Winnipeg built PC cards and chassis for an M-460 computer; but a couple of defense engineering managers claimed that we never built an M-460. One of our commercial computer genealogy charts shows the M-460 as preceding the 490 computer. Send your comments to labenson@q.com.

11.2 MARCH

11.2.1 Be a Historian – part 2.

And the winner is Ed Michaud. We weren't really having a contest, but Ed was the first to send in a nomination for a great topic to be considered for investigation in conjunction with the Minnesota Legacy grant provided to the Dakota County Historical Society. Be like Ed, and get your nomination in: either by US mail (form on page 5) or on the VIP Club website announcement section of http://vipclubmn.org/Exhibit/historian.html

The real history of the company is only partly told in the company newsletters and commemorative documents. The full story of the achievements of the past six decades needs to be given life by your input. Every recollection, anecdote, and reminder of a milestone will help bring this history to life for future visitors to the museum and will aid in capturing a story of innovation that has never been adequately told.

This project is also an opportunity to get involved – we ultimately project a need for almost a person-year of volunteer effort to find, research, and digitize the information for DCHS. Interest is the only requirement to get involved, so please consider becoming a part of this project. It's work guaranteed to bring back memories and reconnect with other retirees.

Speaking of volunteers, you should be aware that a loyal crew of folks has been meeting Tuesdays at the Lawshe Museum to catalog materials received from Lockheed Martin and material that continues to come in. This is a big, ongoing job and they would welcome more help. The work is easy – they will show you how to put the data in the Access database, but retiree's knowledge of the material they are cataloging is a priceless asset. DCHS needs this to be completed to thoroughly understand and use the material they have. If you're interested in either activity, contact Harvey Taipale or Bernie Jansen.

11.2.2 What's in Your Basement/Attic?

Barbara Halverson has donated several items pictured here in addition to her ILAAS technical manual. She had worked with Gary Bosworth as an engineer on that computer development project.

At the right are two 'D' size schematic drawings by/from Barbara's deceased husband, Jim Wright. Most important is a 1954 Type 1102 arithmetic logic drawing, the other is an unidentified 1961 CDC computer logic drawing. In the center is an 1102 logic module, the booklet is a technical description of the 1102 multiply and divide algorithms. Six photos at the right are quite interesting; the back of lower left is stamped "Central Photo Lab ARO, Inc – AEDC Tullahoma Tenn' and 'Neg. No. B54-474." To me, Lowell, this is an 1102 operator console and computer cabinets at the Arnold Engineering Development Center, photo #474 of 1954. The bottom right photo is labeled 'Univac File Computer Proposal – May 1958". The others aren't labeled [I penciled 'from Jim Wright' on the back], are either 1102 or File Computer vintage. The hardware and photos go to the Lawshe Museum, the book and drawings go to CBI. By LABenson.

11.2.3 From an Inquirer:

"I just recently discovered that this computer was built by the Research & Development Department at Sperry Univac in Eagan at the "Plant 8" building. An employee who started there in 1975 found it on a shelf gathering dust and was able to procure it for hobby purposes. I bought it from him at an electronics swap meet in the early 1980's. This elaborate computer was professionally fabricated and built in mid-1972 according to the date codes of the electronic components." If you recognize this item - please send a note to Bernie Jansen or Lowell Benson so that we can help the guy who has contacted us - thanks.

11.3 April

11.3.1 Be a Historian – part 3:

The Legacy History effort still needs your input – only the people (you) that were part of making the history can make sure all the important and interesting events, inventions, decisions, products, etc, are identified for posterity. Please take a minute to submit your nomination(s) so the full history of ERA and its successors can be preserved and told. A nomination form and instructions are at http://vipclubmn.org/Exhibit/historian.html, or you can mail your suggestion to the VIP Club PO Box.A Steering Committee to oversee the activity associated with the State Of Minnesota Legacy grant has been formed; Members are Dr. Lynn Gruber, Executive Director of the Dakota County Historical Society; Bernie Jansen, DCHS Trustee; Harvey Taipale, VIP Club Treasurer; Keith Myhre, representing the archival cataloguing volunteers, and Bob Pagac, VIP Club VP.

11.3.2 Response to an Inquirer:

"The 8-bit micro computer illustrated {right} was identified by Hal Rogers and Jack Metzger, both of whom noted that Dave Kirkwood was the project engineer. This bit of our computer history investigation continues by the non-UNIVAC owner.

My computer system

This system was built with an interface based on plans shown in the June 1972 MCS-8 manual to connect the SIM8-01 to the MP7-02 programmer and a teletype. In the Nov. 1972 release, Intel provided the hardware to interface the system. It was called the MCB8-10 and was shown on the cover of the manual. Nearly all known systems look like these shown below.

Cover of manual

An example

11.3.3 Patent Wall:

A hallway at UNISYS, Roseville is graced with plaques recognizing patents. The Legacy Committee needs a volunteer to generate a spread sheet cataloguing these patents; i.e. who, when, Pat. #, and title. The spreadsheet to become a web site 'Article for the Month', http://vipclubmn.org/documents.html.

Please contact labenson@q.com and he will arrange for your access via our liaison person there.

11.4 May – Be a Historian by Harvey Taipale

The Legacy History team will be meeting at the Lawshe Museum, 10 AM on May 6th. We will discuss exhibit development foci then - only the people (you) that were part of making the history can make sure all the important and interesting events, inventions, decisions, products, etc, are included in the Museum's future exhibits. Please join us in this discussion so that the full history of ERA and its successors can be captured and told - coffee is on.

11.5 June – Harvey Taipale

Be a Historian: The Legacy History team met at the Lawshe Museum May 6th. We discussed exhibit development topics then resolved to make personal contact to fill out our topic candidate listings. The candidates to date are available on a new web site page 19, section 3 of http://vipclubmn.org/Exhibits.html. Only the people (you) that were part of making the history can make sure all the important and interesting events, inventions, decisions, products, etc, are included in the Museum's future exhibits. Please review this listing then send us a note about your project/program which we've missed. Or, if we've already listed your favorite item, please take time to write a paragraph or two about details you recollect. Our intent is to support the Lawshe Museum exhibit grant so that the full history of ERA and its successors can be captured and told.

11.6 JULY- ANOTHER HISTORY BOOK BY LOWELL BENSON

Are you overwhelmed by history? You shouldn't be because we are part of history. I just read a new Nodin Press book: "Generation of Wealth – The rise of Control Data and how it inspired an era of innovation and investment in the Upper Midwest" written by Donald M. Hall. Don put a book timeline before the 'Contents' page, it begins with '1945 – World War II ends' and '1946 – Engineering Research Associates (ERA) formed'. His timeline ends with '2009 – Bear market low and Medtronic and St. Jude are industry leaders.'

Mr. Hall's life is intertwined with his book; some of his research was done at the Charles Babbage Institute.

I've also re-read Dr. Misa's latest book: "DIGITAL STATE – The story of Minnesota's Computing Industry" published by the University of Minnesota Press. Tom's book also includes a Control Data chapter and a chapter about the local medical industry.

Both books are captivating and a wonderful review of how local history fits within ½ century of Minnesota and US history. Respectfully; Lowell A. Benson

11.7 SEPTEMBER

11.7.1 Visiting CBI, an Afternoon Outing

CBI visit by members: Thanks to Arvid Nelson and Tom Misa for hosting our August 13th outing.

A constant 60 degrees Fahrenheit and 50% relative humidity for 250 years. That's what is needed to archive documents to make sure they are available to historians and researchers, now and in the future. Fortunately, The VIP Club is connected with just the place to provide these conditions, and a number of us were given the opportunity to see it in action when we toured the Charles Babbage Institute at the University of Minnesota on Wednesday, August 13th.

Dr Tom Misa, Director of CBI, and Arvid Nelson, Archivist and Curator, provided a thoroughly engaging tour through the CBI facilities in the Anderson Library, followed by an 80 foot elevator ride down into two man-made caves dug between two layers of limestone bedrock on the West Bank of the U of M. These were classy caves – carefully constructed to hold UofM and State of Minnesota archives for posterity, while providing the ability to provide modern day researchers and historians access to the information they need. The Anderson Library storage facility is one of only a handful of similar facilities in the US.

Storage is one thing, retrieval is another. Tom and Arvid were quickly able to point out some of the Lockheed materials volunteers have collected and indexed over the past seven years. (We found some of our famous BB boxes sent to CBI.)

Ultimately, CBI repackages these in acid-free packaging for long term storage, and provides "finding aids" on-line to assist researchers in determining which materials might be of interest. Tom and Arvid complimented the volunteers who cataloged the material, indicating that they were able to immediately use the catalog database as an excellent finding aid.

We were joined on the tour by Lynn Gruber, Director of DCHS and Andrew Fox, Legacy Grant Researcher. Both Lynn and Andrew are heavily involved in the preparation of a photo exhibit regarding the history of the Minnesota Univac/Unisys/Lockheed et al operations.

If you weren't there you missed a great tour, but you still can get involved in a couple of ways:

1.-Come volunteer at the Dakota County Historical Society and help us tell the story of the world's first real computer company. We are there every Tuesday – a good time to get started, but other volunteer times can be accommodated.

2.- Read Tom Misa's book A Digital State. Highly readable, and the best account of our history published.

3.- Join the Dakota County Historical Society - The VIP club is a corporate member, but seniors get an individual membership for only $20 per year. Memberships provide several benefits, including free museum admission and a subscription to the interesting DCHS publication Over the Years.

11.7.2 Lawshe Memorial Museum Info:

We now have an AN/UYK-43 computer, an AN/USQ-69 display, and an ATC IOP among the artifact collection. Thanks to John Westergren, Harvey Taipale, Steve Koltes, et al' for facilitating transfer of these artifacts from the Navy and the LMCO Eagan ATM department.

11.8 OCTOBER

11.8.1 Who Remembers?

Steve Andersen has a pendant but doesn't recall whether it was a 5, 10, or 15 year anniversary award. It has three topaz like stones, my wife has a similar pendant with three emerald like stones – I don't recall whether that was a 15 or 20 year anniversary award. Does anyone have any documentation which would show which anniversary merited a pendant? If yes, email labenson@q.com. Thx

11.8.2 Help Sought:

The volunteers working at the Lawshe Museum are still in need of help with poster board definitions and some photo identification. Although the two small teams alternate between Tuesday mornings, Once a volunteer has had an introduction session; he/she could go there during any of the open hours. Contact Harvey Taipale or Pat Myhre or Jon Simon or Keith Myhre; our dedicated Lawshe volunteers.

Also, Bernie Jansen is seeking speakers for occasional Thursday evening 'computer history' talks at the Lawshe; i.e. NTDS, ATC, Missiles, Airborne, etc.. Contact him at bjsjk@msn.com for specifics.

11.8.3 Sept 10th Program Recap:

Forty-eight people came to the Air Traffic Control (ATC) presentation by Steve Koltes at the LMCO facility in Eagan. Thanks to Steve for the presentation and to his director, Scott Schmidt for the facility access. A highlight of the evening was a look at the live radar feeds on displays in their laboratory, needed by Eagan as they continue software support for the FAA.

Steve also gave the club a token shown here. The side of the token shown here recognizes the first **A**utomated **R**adar **T**erminal **S**ystem (ARTS) that went into operation in Atlanta GA in 1964. The token's obverse side shows 'Common ARTS', celebrating 50 years of advancing terminal automation in 2014. We'll give it to the Lawshe Museum to become a part of the ATC exhibit by an IOP computer. LMCO had presented a plaque to the FAA signifying 50 years of ARTS. By *LABenson*

11.9 NOVEMBER

11.9.1 Who Remembers:

Ron Q. Smith provided the answer to October's question: "I remember for sure that the 3-emerald one was 15 years. That was the last one I got because Burroughs bought the company before I got to 20 years. I believe the 3-topaz color was 10 years." Thx.

11.9.2 Help sought:

Our September issue had asked for feedback about NASA UNIVAC 418IIs for the American Computer & Robotics Museum in Bozeman, MT. Phil Ross provided a listing of all of the Univac computers used in support of the Apollo program. Arlyn Solberg wrote: "***NASA Manned Spacecraft Center - 1964:*** Univac had both 494s at Mission Control Center (Bldg. 30) and 1230s which were being installed at Apollo tracking sites around the world. The 1230s were replacing the Gemini program 1218s which were connected to U494s at Goddard space Center in Greenbelt, MD which in turn was connected to Houston's 494s via three 40.8kbs land lines. There was also a 418 computer in Building 30 which drove all the big screen displays in Mission Control. I believe it interfaced with the 494s receiving satellite tracking data in real time and driving the big wall displays showing the satellite and a couple of track revolutions. I had two programmers and two engineers on a one year contract that got extended several times. The Manned Spacecraft Center was south of Houston about 20 miles; chosen as the best location in the USA by Lyndon Johnson who was President at the time. The 'Campus' consisted of about 20 buildings of various sizes on about 100 acres.

I recall that Vic Benda (subsequently helped start AIC) probably wrote most of the programs for the 418 II and Bob Malnatti helped design interface hardware between the two systems."

11.10 DECEMBER – BILL BERGEN/LOWELL BENSON

New Computer History Article: Bill Bergen sent a link to an IEEE history paper, prepared by Capt. David Boslaugh, USN retired. I spent 45 minutes savoring it! One paragraph is noteworthy: "The CO of the Computing Machine Lab assigned leadership of the Atlas project to the Lab's Technical Officer, Lieutenant Commander Edward C. Svendsen." Lcdr. Svendsen was in the Minnehaha Ave ERA facility for a few years – Legacy Committee member B.N. 'Mike' Svendsen called Ed 'uncle!' By LABenson

12 2015, TENTH YEAR OF ARTICLES

12.1 JANUARY

12.1.1 The Navy in Minnesota – Richard Lundgren

Join us at the LMCO facility in Eagan to hear what the Navy is doing in Minnesota. Do you ever wonder what the Navy is doing in Minnesota? After all, they were by far our biggest customer (UNIVAC->Lockheed Martin) for decades. But we are 1200 miles from the nearest salt water seaport and 150 miles from our annually frozen fresh water port. We used have the NAS (Naval Air Station) Twin Cities during which time P3-C Orion ASW aircraft could be seen in flight. But over time it was transferred to the Air Force Reserve and Minnesota Air National Guard as Minneapolis-Saint Paul Joint Air Reserve Station with Naval Air Reserve Center (now Navy Operational Support Center) Twin Cities as tenant command. The best way to learn about current Twin Cities Naval Ops is to go to the top. CAPT Brent McMurry is the Commanding

Officer, Navy Operational Support Center (NOSC) Minneapolis, and he will present "The United States Navy, why being there matters." His PowerPoint and discussion will center around current events, and current capabilities of the United States Navy as well as touch on future capabilities and future Naval force posturing around the world. This discussion also enlightens the audience on the large population of Sailors that call the twin cities "home" and just what we are doing here to help defend the liberties of all U.S. citizens.

So how did a farm boy from Canton, South Dakota (35 miles from being a Minnesotan) end up in our metropolis? The very short version is that he graduated from the United States Naval Academy class of 1991. Then followed a career of excellence including assignments to the Carrier Airborne Early Warning Squadron (VAW-120 Greyhawks) in Norfolk, VA, VAW-77 Nightwolves at NAS Atlanta, Reserve Tactical Air for Commander Navy Reserve Forces Command. New Orleans, and NOSC Kansas City, Missouri. He also found time to earn his Master of Business Administration degree and was inducted into the Delta-Mu-Delta society for earning high honors with a graduating GPA of 4.0. His well-traveled family includes his wife Suzanne Novotny of Gambrills, Maryland and three sons, Christopher, Jonathan, and Patrick.

12.1.2 New Artifact: By Brian Knilans

My son closed on his 1st home last Monday, December 1. Saturday morning I was looking at things in his basement and noticed a little spacer between a couple of boards in a makeshift closet in his basement. On the next page is a photo of both sides of what I found - it pre-dates my years at Unisys! It's only about 1" x 1.5", with the hole I'd guess it's meant to be a key fob

Above the computer: "while you are reading this a UNIVAC computer could have performed two million arithmetic operations. Etched copper such as this is used in its construction to achieve high reliability."

Don Weidenbach identifies the computer system image as the TACS (Tactical Air Control System). I, Lowell, immediately recognized the fob's building as Plant 1 on Shepard Road. Remington Rand Univac was our local company name from Oct. 55 until January 1962. The UNIVAC logo on the fob began in 1956 so the late 50s was the fob creation time. The words under the logo are "Where dreams today become reality tomorrow." The fob has been donated to the Lawshe Museum in Brian's name. By LABenson

12.2 March – Keith Myhre

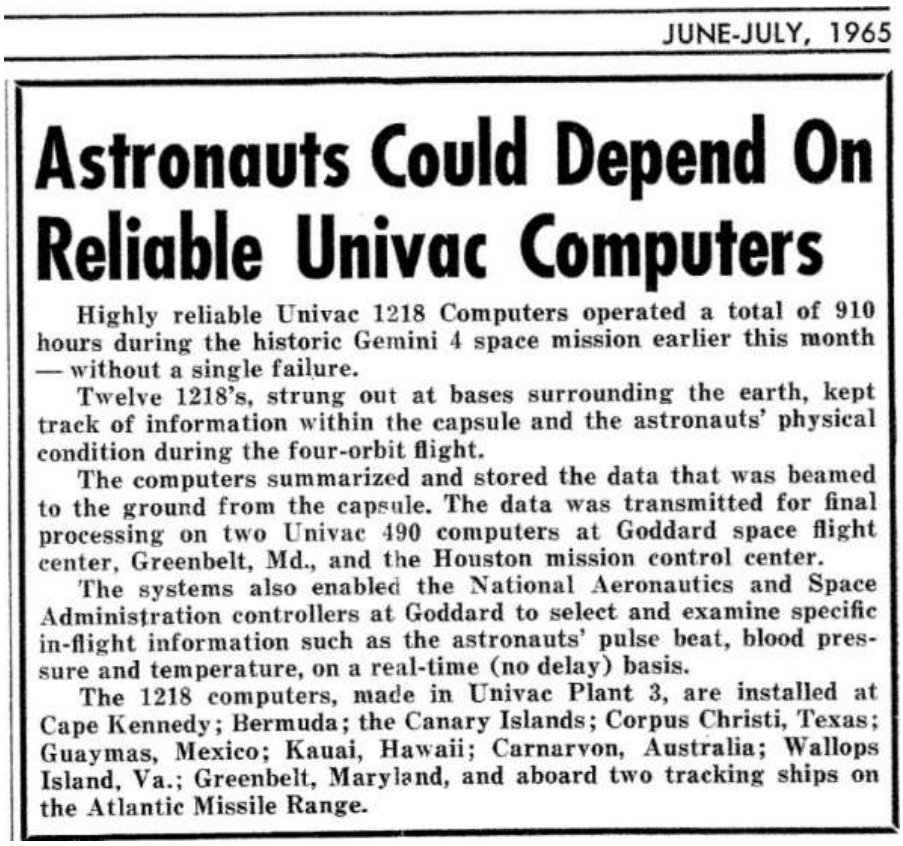
A University of MN Libraries' Video: An interesting Computer History video from CBI! https://www.youtube.com/watch?v=s4tHC4FxxlA. 1102 Project Engineer, Warren Burrell, and Speed Talley engineer Don Weidenbach are shown in the 2nd half of this video about CDC and ERA. From Keith Myhre, our lead Lawshe POSTER coordinator.

12.3 April – Good Bye Plant 8

Demolition videos: Demolition of old plant 8 began the week of 8 February. Crews have salvaged 8 million pounds of steel, 58 tons of copper, and 60 tons of aluminum from the old 620,000 square ft. Lockheed facility. Retiree Tim Johnson has razing status at a mini-blog [http://lm-eagan-pictures.blogspot.com/] No home internet? Try your local library. LABenson

12.4 May - Do you remember the 1218 computer ?

The Instruction Set Architecture (ISA) and basic logic design for the 1218 came from a Computer Unit Tester developed for internal factory use. The first units were built using PC cards from the CP-642 computer. Well over 1,000 computers were delivered with this basic 18-bit ISA including the commercial 418 series. Defense computer ID numbers were the CP-789, CP-848, 1819, and AN/UYK-11. By LABenson



JUNE-JULY, 1965

Astronauts Could Depend On Reliable Univac Computers

Highly reliable Univac 1218 Computers operated a total of 910 hours during the historic Gemini 4 space mission earlier this month — without a single failure.

Twelve 1218's, strung out at bases surrounding the earth, kept track of information within the capsule and the astronauts' physical condition during the four-orbit flight.

The computers summarized and stored the data that was beamed to the ground from the capsule. The data was transmitted for final processing on two Univac 490 computers at Goddard space flight center, Greenbelt, Md., and the Houston mission control center.

The systems also enabled the National Aeronautics and Space Administration controllers at Goddard to select and examine specific in-flight information such as the astronauts' pulse beat, blood pressure and temperature, on a real-time (no delay) basis.

The 1218 computers, made in Univac Plant 3, are installed at Cape Kennedy; Bermuda; the Canary Islands; Corpus Christi, Texas; Guaymas, Mexico; Kauai, Hawaii; Carnarvon, Australia; Wallops Island, Va.; Greenbelt, Maryland, and aboard two tracking ships on the Atlantic Missile Range.

12.5 June - April VIP Club Board Resolution

The VIP Club Board decided to honor Keith Myhre for the work he has been doing for our Legacy. The result is that we created The Annual Jansen 'Volunteer Extraordinaire" Certificate as pictured on the next page. If you have an opportunity, thank the first recipient Keith and all of our volunteers working at the Lawshe Memorial Museum.

The Annual 'Jansen'

Volunteer Extraordinaire

Certificate Is Named For

Bernie and Kathy

in recognition of their many, many years of Volunteer Recognition Event Planning for the VIP Club and for the Dakota County Historical Society plus their avid participation in other VIP Club activities.

April 15, 2015

2015 VIP Club President

This Annual 'Jansen'

Volunteer Extraordinaire

Certificate Is Awarded To

Keith Myhre

in recognition of three years of superlative VIP Club volunteerism and leadership of the IT Legacy Exhibit Development at the Dakota County Historical Society's Lawshe Memorial Museum.

April 15, 2015

2015 VIP Club President

12.6 July – Private Artifact Exhibit

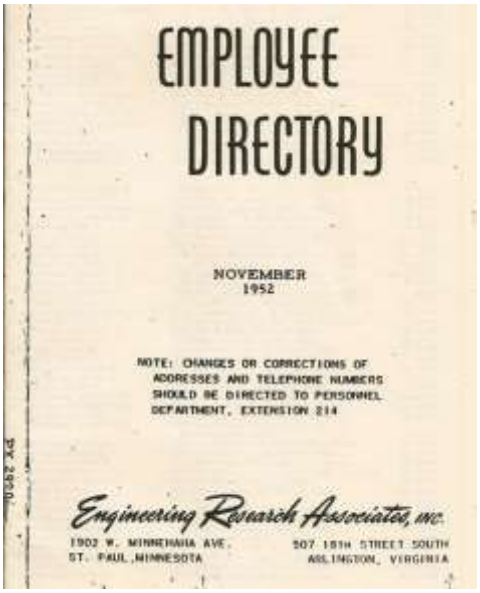
The Board invites our members to the Club's September social gathering. In cooperation with the Lawshe Memorial Museum staff, we are hosting a private function open only to VIP Club members, museum staff, and invited guests. On Tuesday September 8 from 6:30 to 9 PM, we will:

- View a multitude of educational computer history posters developed by museum staff and Club volunteers as part of a recently completed Minnesota Legacy Grant; "The Birth of Minnesota's Computer Industry – A Photo Essay,"
- Observe many of the donated hardware artifacts positioned around the great hall periphery,
- See the workstations' area where Club volunteers continue to identify and catalogue the ~20,000 media donations of the Legacy committee, and
- Enjoy cheese, wine, and light refreshments while mingling with other attendees.

We are delighted to highlight and share these results of our volunteers during the Club's 35th anniversary year. Please RSVP on or before August 27th to Club Treasurer, Harvey Taipale 651-748-5083 or hjtaipale@comcast.net, so that we can order sufficient hors d' oeuvres and refreshments. If your spouse or significant other is attending with you, please include her/his name for a correct nametag ready. Submitted by LABenson

12.7 September Membership Directory from 1952

Roy Hain sent us the ERA directory shown on the next page. It has ~850 people listed at ERA's St. Paul and Washington facilities. People in both the 1952 ERA directory and our May 2015 VIP Club directory are: Curt Anderson, Jack Anfinson, Manny Block, Warren Burrell, Bill Butler, LaVerle Cocchiarella, Joseph Feely, Abe Franck, Harold Grandprey, Roy Hain, John Hartmann, Gale Jallen, Art Johnson, Richard Johnson, Tom Jones, Dick Mullins, Curt Nelson, Ed Nelson, Larry Pinska, Bill Theros, and Don Weidenbach.


EMPLOYEE
DIRECTORY

NOVEMBER
1952

NOTE: CHANGES OR CORRECTIONS OF ADDRESSES AND TELEPHONE NUMBERS SHOULD BE DIRECTED TO PERSONNEL DEPARTMENT, EXTENSION 214

Engineering Research Associates, inc.
1902 W. MINNEHAHA AVE., ST. PAUL, MINNESOTA
507 18TH STREET SOUTH ARLINGTON, VIRGINIA

Most amazing is that LaVerle has the same street address in both directories! In 1952, Seymour Cray lived at 3714 43nd Ave S, Mpls – phone # Pa9144. Bill Norris lived on Pinehurst in St Paul - phone # De8190. Thanks for the directory Roy, it'll go to CBI at the University. LABenson

12.8 October

12.8.1 Unihogs and Women in Computing Presentation

The VIP Club Board invites you to the Annual Unihogs/Uniturkeys' lunch gathering at Casper's in Eagan on November 20th, 11 AM.

No, the Unihogs are not a group of overeaters – They started as a group of old time Univac and spin-off company employees who traditionally got together for lunch and fellowship every year around Groundhogs Day. The Unihog/Uniturkeys' annual gatherings started several years before the VIP Club! Bob Jablonski, an early Unihog, wrote the beginning history:

- "It started as informal evening get together of **ex-employees** who had worked together in Univac Roseville who left to form COMTEN, Weismantel Associates, and Intech.
- Original meetings were at the Canadian on Rice St; we had dinner and I believe played cards in the back room. As it grew, we moved to Parrish's on West 7th, with a nightcap at Casey's for some.
- It was usually held in early February (close to Groundhog Day), hence the UNIHOG name.
- Fortunately or unfortunately, some near retirees and retirees got wind of this group and because some left Minnesota for the winter, they eventually took control and changed the date to the Friday after Thanksgiving Day. This caused some problems for those still working who went out of town for the T' Day weekend to be with family, prompting a switch to a lunch on the Friday before Thanksgiving.
- It was renamed UNITURKEY because of the day/date change, but they also kept the UNIHOG."
  This year the VIP Club is joining in the gathering.

On Friday, November 20th, All VIP Club members, including spouses, are invited to join the Unihog/Uniturkey lunch at **Casper's Cherokee of Eagan -** Back Room. Social hour begins at 11, lunch at 12, and the program starts at 12:45. The speaker will be Dr. Tom Misa, Director of the Charles Babbage Institute at the University of Minnesota. Tom has been a great supporter (and recipient) of the legacy archiving work done by club members, and will speak on his research into the topic of "Women in Computing." For you women who mistakenly thought this was a guy's event, here's a chance to come and hear about some of the great contributions made by the fair sex to our industry.

There are three choices on the lunch menu: Chicken Caesar Salad, Steak Sandwich, or Walleye Fingers, each with appropriate sides. Cost of the lunch is $19 per person. Reservations can be made by November 14th by mailing a check to **Fred Vihovde – 2162 Water Lilly Lane, Eagan, MN *55122.*** Indicate your menu choice(s) on the memo line.

12.8.2 Management Bulletin

Bill Galle gave us an old Management Bulletin, it is now archived at the University's Charles Babbage Institute. In so many old publications, Univac editors rarely used first names. My memory/notes are Julian Bilski, Hubert Humphrey, Wally Miner, Richard 'Dick' Yost, Leo Oxman (why was he bowing?), Donald Pennie, and P(?). Richmond. Submitted by LABenson


manufacturing division

Activities 4 October 1960; Vol. 1, No. 10

Shown greeting Sen. Humphrey during his recent Univac visit are, l. to r.: Joseph E. Karth (Rep., 4th Dist.); J. Bilski; Sen. Humphrey; W. Miner; R. Yost; L. Oxman; D. Pennie; P. Richmond.

12.9 NOVEMBER

12.9.1 More UNIHOGS History

No, the Unihogs are not a group of overeaters – They started as a group of old time Univac and spin-off company employees who traditionally got together every year around Groundhogs Day – later changed to the Friday before Thanksgiving. David E. Lundstrom, a former Univac and CDC employee, wrote A Few Good Men from Univac. His chapter 21 includes discussion about the Unihog's start and includes the 1982 program announcement as figure 24.

"One day I got a phone call from a friend that I had known since my Univac days. He asked if I was going to Unihogs this year. “What’s a Unihog?” I asked. He explained that a growing group of ex-Univac employees had for years arranged an informal get-together once a year on Groundhog Day. The combination of Univac and groundhog suggested the name “Unihog.” Unihogs form a loose non-organization. Originally, to participate, one must have left Univac. Returning to Univac does not disqualify a member once qualified. Some attendees have left Univac three and four times! The requirements were later loosened to include anyone who had even thought of leaving Univac."

12.9.2 No Weak Part – a tribute to Ed Solheim

Someone once said, “The whole is no stronger than its weakest part.” Well, maybe no one said that, but someone should have. When looking back at the S-3A procurement it was apparent right from the beginning that the competition was stiff and the winner was going to have to submit one heck of a proposal…no weak part.

During the writing of the S-3A proposal, the Valencia software group asked for help in writing the software portion. So a cohort and I were sent to help. Ed Solheim was probably “pound for pound” as talented of an individual with whom I have worked in my 35-years at UNIVAC/UNISYS. If you had a thorny problem, he was the “man.” However, he had a penchant for pranks and could not resist instigating a joke. He was of the opinion that while work was not going anywhere, the opportunity for mischief was fleeting, and opportunities for fun and games had to be dealt with immediately.

Anyway, when the two of us arrived at Valencia and found out a software schedule had not been prepared, we decided to gather as much information as we could and then go back to the motel to work on it. Mr. Solheim somehow found a sheet of paper 4 feet by 8 feet on which to do our scheduling. While I wrestled to get it taped to the wall, he was thumbing through the yellow pages of the phone book for no apparent reason. Therefore, I asked him, “Where do we start?” “Well first,” he said, “we start by deciding on a good place to eat dinner.” (Hey, we just ate lunch and we had not done diddlysquat with the schedule!) Okay, so I started laying out a schedule. It looked like excrement! I had a lot of blank spaces with no task links scheduled.

He began paging through the yellow pages again. If a person did not know better, you would think he was shopping for breakfast. I knew better. He was working the problem. Eventually he looked up and said, “In each of those blank spots write in “Test vehicle.” We will explain later in the proposal what that means. Well, all of a sudden the schedule came alive and reeked of credibility. I saw a copy of the software proposal after it was submitted. In it was the schedule, greatly reduced in size, but intact.

I cannot say that the software schedule had anything to do with winning the proposal, but it surely wasn’t a “weak part.” What is a test vehicle? Gee, I do not know. I wish I had asked Ed. (Written in memory of a special and talented co-worker by Ned Hunter.)

12.9.3 IT Legacy Committee update:

The Committee notes that January 2016 will be 70 years since ERA opened their doors in January 1946. A decade ago, Dr. Norberg - then Director of the Charles Babbage Institute - told the fledgling committee that we would have the 'entire' company story if we could garner 200 career summaries from key people. To date we have 170, our opinion is that all people are key - much like a sports team - you as an individual helped to make our systems and products reliable and successful. Our web page #28,

http://vipclubmn.org/PeopleIndx.html, has a page by page summary of who wrote what plus an alphabetic listing of who is mentioned on which page. Check it out! Look to see who wrote about you - if you name is not in the contributor table nor mentioned in the alphabetic table - make a New Year's resolution to contribute your story to our IT Legacy anthology. We do need 30 more People entries and systems or computer or ... stories as people want to share. We'll have a committee accomplishments recap as the December 'Article for the Month.' Submitted by LABenson.

12.9.4 The Speed Tally Machine from the 50s

The 1951 Speed Tally morphed into the 1953 Logistics Computer which preceded the 1956 File computer. We built 95 file computers – used for Air Traffic Control and catalogue ordering systems.
Don Weidenbach is shown in the photo at the right.

12.10 DECEMBER

12.10.1 UYK 43's are still in use

Work horse for Aegis BMD (Ballistic Missile Defense). This is a photo at the left is of San Diego UYK-43s from K. Wander via Jim Rapinac.

12.10.2 Looking Ahead:

January 2016 marks 70-years since Engineering Research Associates (ERA) opened their business doors on Minnehaha Avenue in St. Paul. Perhaps 2016 will give us the insight to predict when the IT Legacy Committee can wrap up 'telling the story' of our heritage companies' innovations. Best Regards, Lowell A. Benson, Club President 2011/14/15.

13 EPILOGUE

Caveat: There is quite likely some duplication of the newsletter texts copied herein and the text of our web site items and/or the text of our Articles for the Month. We do welcome additional stories for our newsletter or for the various sections and pages of our web site.

A special thanks to VIP Club Board Associate Richard Lundgren for his early IT Legacy topics' research, article authoring, and editing. Other Legacy article contributors now captured in this booklet are: Bill Bergen, Micky Clemens, Bill Galle, Andrea Greenan, Roy Hain, Ned Hunter, Bernie Jansen, Ordean Joachim, Brian Knilans, Nick Landsmayer, Ed Michaud, Peggy Mulliken, Keith Myhre, Jim Rapinac, Vern Sandusky, Ron Q. Smith, Harvey Taipale, Tom Turba, K. Wander, and John Westergren. I'm relatively sure that none of us, when writing an item, thought that it would become part of a future book.

A history/Legacy tidbit: Dick Lundgren and Lowell Benson first met in Hengelo, Netherlands the fall of 1970 when we were working on the German Navy's Schnell Boat program. Then we worked as co-instructors at

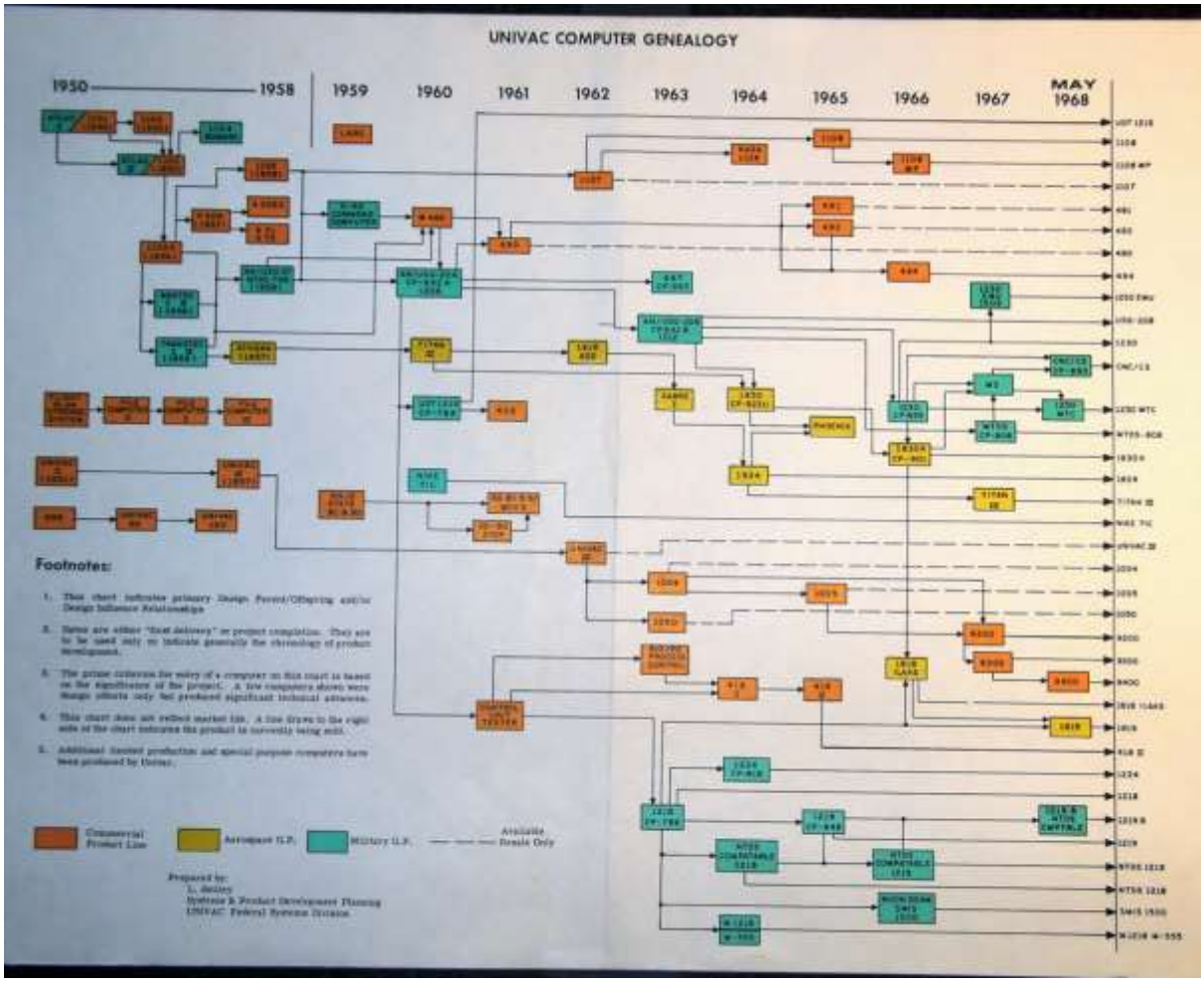
Wilhelmshaven, Germany January => March of 1972 as we taught 1830B, 1232, and 1840 maintenance classes to a dozen German Navy persons. 45-years of friendship!

Thanks to all others who have contributed to all aspects of our committee work – *the future is now!*

Lowell A. Benson

UNIVAC 1960 => UNISYS 1994 BEE, U of MN 1966
IT Legacy Committee Co-Chair since inception in October 2005.
2016 VIP Club Immediate Past President

A 1968 Geneology Chart



In 2015, Millie asked that we find a home for her employee anniversary awards. We put them in the Lawshe Memorial Museum.

A Tribute to the VIP Club Founder and a Great Lady!