REPORT TO MAYOR AND COUNCIL NO. 96-444

TO THE HONORABLE MAYOR AND COUNCIL

DATE November 26, 1996

SUBJECT: **8783 - City of Sunnyvale: Identify and Promote Knowledge of Historical Technological Events Which Have Taken Place in Sunnyvale**

Report in Brief:

The issue was introduced by a member of the public and forwarded to the City Council for consideration by the Heritage Preservation Commission. This study issue was ranked #5T of 9 items for Community Development during the Council Study Workshop in December, 1995.

The purpose of the study is to identify historic electronic developments which have occurred in Sunnyvale and to recommend the means by which to acknowledge and celebrate these events. The Council Study Issue paper is attached (Exhibit A).

Staff completed a number of fact finding steps, including sending out "Request for Information" letters to major Sunnyvale companies and other contacts recommended through the Economic Development Division. Staff also made follow-up phone calls, conducted library research, interviews, and placed a request for information on a web page at the patent library. Overall, the results of the study to date have been disappointing. Very few companies have responded to the request for information.

It is apparent that existing information at the library and other research sources is not focused enough on Sunnyvale but rather on the greater geographic area of Silicon Valley. The patent data bases are also not developed to the detail necessary to filter out significant events from "building block" improvements in the electronics or other high-tech industries.

The result of the effort thus far is an outline on how the Council could proceed with this study if it still considers it to be of value. If Council decides to continue with this project, staff considers the following to be key elements necessary to make this project a success:

- Industry will most likely only participate actively if invited to do so directly by the Mayor and City Council, with the understanding that the Council will also be participating in the study.

- A task force consisting of committed industry leaders (current or retired) or their designated representatives would be the most successful format for

conducting this study.

- The study should be lead by a person with significant technical knowledge, preferably someone who has been associated with the high-tech industry for a number of years.

- The end product of the study would ultimately have to be determined by the task force, but would most likely need to consist of something more far reaching than a plaque or local exhibit.

- A high level study of this type could easily require up to half or two thirds time of a staff member or a compensated task force leader for a period of one year.

Background:

This item was originally suggested by a Sunnyvale citizen and supported by the Heritage Preservation Commission, which forwarded this issue for City Council consideration. This study issue was adopted by the City Council at the Legislative Study Issue Workshop in 1995.

General Plan Policies:

When adopted, the study was supported by the Heritage Preservation Sub-Element prior to its revision in 1995:

Goal A. To know and safeguard the significant heritage from Sunnyvale's past -- natural and man-made.

This study is still supported by the new 1995 Heritage Preservation Sub-Element:

Goal 6.3A. To promote knowledge of, and appreciation of Sunnyvale's Heritage and to encourage broad community participation in heritage programs.

The study has two purposes:

1. To identify historic electronic developments which have occurred in Sunnyvale.

2. Recommend means by which to acknowledge and celebrate these events.

As discussed in the Council Study Issue Paper, it is important to provide relevant documentation and recognition of historical technological events that have taken place in Sunnyvale. The identification of these events is an important part of Sunnyvale history.

Discussion:

Staff completed a number of fact finding steps trying to identify historic resources and identify technological events specific to Sunnyvale. The research methodology consisted of several elements: study design, library research, patent library information, web page request, request for information letters, telephone calls, and interviews.

Study Design

A scoping session was held with members of the Planning, Library, Economic Development and Patent Library staff in order to develop a study plan which would yield appropriate results. Recognizing that there is a significant amount of written information on technological history, especially on the Silicon Valley, staff placed a twenty five year time frame on this study in an effort to focus the evaluation mainly on electronic developments within the given one year study period.

Library Research

Sunnyvale Library

Library research was conducted at the Sunnyvale Library. A number of resources are available about general Sunnyvale history; particularly the Murphy family era, the agricultural era, and the contribution made by the Hendy Iron Works. There is also significant information available about the high-tech industries, but these books and other written resources are not focused on Sunnyvale, but rather on the larger geographical area of Silicon Valley. It was not possible to determine Sunnyvale-specific technological events from the material available in the Sunnyvale library.

Center For California History/De Anza College

Staff also reviewed research papers at the Center for California History at De Anza College. Since these were student papers, quality tended to vary. Unfortunately, there were no papers which identified significant technological events in Sunnyvale during the last 25 years. Again, most papers were written on the Hendy Iron Works or cannery operations prior to the high-tech era. There were some papers on early Lockheed and NASA projects, but not with detailed information on significant events as called for in the study.

Patent Library Information

The patent library ran a data base of Sunnyvale residents owning patents and Sunnyvale companies owning trademarks. Indicative of Sunnyvale's innovative high-tech history, there are over 5,000 individual patents assigned to Sunnyvale residents. These were sorted by company, however, staff had no ability to further sort patents into areas such as product design, processes/or and quality improvements. Staff does not have the expertise to determine which patents are truly significant and which are simply building blocks leading up to a major technological break through.

Web Page Request

Staff also placed a request for information on the World Wide Web at the patent library (Exhibit B). There were no responses to the web page ad.

Request For Information Letters

Based on a list of contacts selected by the Economic Development Manager, staff mailed approximatley 20 letters requesting historical information from major Sunnyvale companies and other selected contacts (Exhibit C). The letter explained the purpose of the study and asked for help in identifying significant technological events.

Very few responses were received. Some companies stated that they simply could not release proprietary information on significant advances. Other companies and individuals did respond. Some of these responses were not pertinent to this study. Some were too general. Others reported impressive individual success stories or improvements to product design and processing. However, staff did not have the technical expertise, or a body of comparable information sufficient to make judgements about the significance of these events.

For example, one potential "break-through" company in Sunnyvale is Trimble Navigation. In 1984, Trimble Navigation became the first company to utilize signals from the U.S. Department of Defense Global Positioning System which consists of 24 satellites. The company was started in Sunnyvale and proclaims enthusiastically that Sunnyvale is the only place where they would do business. Trimble was very helpful in sending information to the City. However, City staff did not have the technological background to judge the significance of Trimble's innovations.

NASA was also eager to help with the study in any way possible. Although, not located in Sunnyvale, NASA has contributed in a major way to innovation in the immediate region. NASA mailed an information bulletin and the AMES 50th Anniversary Fact Sheet. These proved to be general documents that would be good "jumping off points" for a technical committee to start from.

Follow-up Phone Calls

For every letter sent, staff conducted a follow-up phone call. Through the phone call process, staff was introduced to a number of historians including representatives at De Anza College. Staff was also introduced by phone to Don Thomas who is currently writing a history about the computer game industry. His study includes Atari, a former Sunnyvale front runner in the computer game industry and the defense industry. At this time, his information is proprietary and could not be shared for the study. Although other phone calls resulted in potentially good leads and resources, overall the exercise of conducting follow-up phone calls did not result in significant information.

Interviews

Staff also conducted two in-person interviews with Scott Runde from the Historical Society, who has worked extensively in the high-tech field; and with Don Liddie, Executive Vice President and Chairman (retired), of Philips Semiconductors. Both interviews were very informative and helped staff put the study into perspective and understand how to make the study more successful. Staff, including the Economic Development Manager, also discussed the study results in detail. The following recommendations were developed from these interviews and discussions:

- Despite the reference to heritage or history, this project is not within the normal involvements of the Community Development Department.

- Industry will most likely participate actively if invited to do so directly by the Mayor and City Council knowing that the Council will also be participating in the study.

- A task force format consisting of committed industry leaders (current or retired) or their designated representatives would be the most successful method of making contacts with key historical persons or gaining a knowledge of and putting perspective on significant events which occurred specifically in Sunnyvale.

- There are a number of different areas to be explored for the recognition of innovations and break-throughs such as 1) product design, 2) quality, 3) processes, and 4) marketing and business management. All of these areas have contributed to making Sunnyvale businesses into industry leaders and have helped put Sunnyvale on the map as the "Heart of Silicon Valley."

- The study should be led by a person with significant technical knowledge due to association with the high-tech industry for a number of years, is knowledgeable about Sunnyvale, and is capable of research and project management.

- It is unlikely that the industry members will commit to the time and effort necessary for this study if recognition will simply consist of a plaque or an exhibit for the local community as conceptualized in the original Council Study Issue Paper. Staff found that offering limited recognition did not create momentum within industry to participate in this study.

- The end product would ultimately have to be determined by the task force, but would most likely consist of something far-reaching like a quality printed document that could be used as an economic development tool as well as for company recognition. This approach would be similar to other self-promoting documents from other cities, which are currently saturating the industry as a form of economic development. They are often pictorial and of significantly higher quality than the current pamphlets and documents available at the City of Sunnyvale. A document of this type, professionally written and designed, would most likely cost between $20,000 - $30,000 ($3 a piece in a quantity for wide distribution).

- A quality study of this type could easily require up to one-half or two-thirds time of a staff member or task force leader for a period of one year. If an outside task force leader is chosen as the best option, it would likely be on a compensated basis.

Staff has no recommendation regarding this study at this time. In order to continue with this study, Council should consider the value of the study as a historical, educational, and an economic development tool. The overall costs associated with achieving an accurate study reflecting industry-recognized break-throughs and developing a quality method for recognition must be considered and compared to the value returned by creating this type of product.

Heritage Preservation Commission Recommendation:

This item will be heard at the Heritage Preservation Commission meeting on November 6, 1996.

Public Contact:

This item was published in the Heritage Preservation Commission agenda for November 6, 1996.

Fiscal Impact:

None at this time. However, if Council moves forward with this study based on the steps outlined by staff, the cost would vary based on choices made about whether to compensate a task force leader, on the type of final product, and the form of recognition. Staff considers $20,000 to be a low estimate for this study depending on the type of recognition, and published result that is chosen. Staff time would be additional.

Alternatives:

1. Direct staff to continue with this study by first developing a detailed project scope 1) based on the concept study steps discussed in the report, 2) including detailed cost estimates, and 3) providing a list of potential task force leaders. Council could delay a final decision whether to continue with this study until the project scope is prepared.

2. Direct staff to prepare a detailed bibliography of available library materials on the history of the high-tech industry in Silicon Valley. This could be printed and exhibited at the library as public educational material.

3. Direct staff to table this study.

4. Any other alternative Council would like to pursue towards this project.

5. Take no action at this time

Recommendation:

If the Council considers continuing with this study issue, staff recommends that the Council adopt Alternative #1.

Gail A. Price for
Trudi Ryan, Planning Officer

David S. Boesch Jr.,
Director of Community Development

Thomas F. Lewcock, City Manager

Exhibits:
A. Council Study Issue Paper
B. Example of Request for Information Letter and List of Contacts
C. Copy of Web Site Ad

EXHIBIT "A"

PROPOSED COUNCIL STUDY ISSUE

No. CD-2N
Continuing_____
Mandatory_____
New X
(check one)

Item: Identify and Promote Public Knowledge of Historic Technological Events Which Have Taken Place in Sunnyvale.

General Plan Element or Sub-Element: Heritage Preservation Sub-Element

Department Responsible: Community Development

1. What are the key elements of the issue?

Many individuals and companies located in Sunnyvale have been instrumental in the development of the Silicon Valley as the place where "cutting edge" high technology programs and products are created. The world is only beginning to understand the economic and cultural changes which have occurred as a result of these developments. Locations where events involving significant technological breakthroughs and/or where new products have been created which continue to profoundly influence the way the world does business, should be recognized as such. One response would be to install commemorative plaques at the appropriate locations. Another would be to develop a portable program, such as a slide show and exhibit which could be presented to schools and to interested community organizations. Such an exhibit could be permanently housed with the Sunnyvale Historical Museum. A study would identify the historic electronic developments which have taken place in Sunnyvale and recommend the means by which this development should be acknowledged and celebrated, including (but not limited to) consideration of the methods described above. Recommendations resulting from the study would be presented to Council for consideration and approval.

2. Is study of the issue called for in the General Plan?

This project is supported by the Heritage Preservation Sub-Element:

Goal A. To know and safeguard the significant heritage from Sunnyvale's past -- natural and man-made.

3. Why should the issue be considered by Council? What precipitated it?

The Heritage Preservation Commission believes that it is important to provide relevant documentation and recognition of this source of Sunnyvale's unique history and identity. This item has also been suggested by a Sunnyvale citizen.

4. **Origin of Issue:** Council:___(Councilmember___) Staff:___
General Plan:___ Board or Commission:_X_ Outside Request:_X_

Arts___	Bicycle Adv.___	Bldg Code Appeals___
CCAB___	Heritage Pres._X_	Library___
H&HS___	Parks & Rec.___	Personnel___
Planning___		

The Heritage Preservation Commission has ranked this item #2 of 4 for 1995 and #1 of 4 for 1996.

5. **Multiple Year Project?** Yes___ No_X_ **Expected completion date:** _____

6. **Estimated work hours and/or cost for consultant to prepare full report to Council:**

Work Hours		Cost
___ Less than 50	_X_ 200-300	
___ 50-100	___ 300-400	$_____
___ 100-150	___ 400-500	
___ 150-200	___ Over 500	

7. **Due Date (for continuing and mandatory issues if known):** _N/A_

8. **Estimated work hours from City Attorney's Office to prepare full Reports to Council:**

10 hours JJM

9. **Preliminary Staff Recommendations:** ___ Recommend Priority for Study
___ Recommend Against Study _X_ No Recommendation At This Time

If recommendation is "priority" or "against", explain below:

H. F. Lewcock
City Manager

10/6/95
Date

Fred Fowler, President/Lakewood Village Neighborhood Assoc.

Mr. Fowler commended staff on report and expressed Council support of proposed ordinances.

The public hearing was declared closed at **p.m.**

Title of Ordinance No. 2552-96:

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF SUNNYVALE ADDING NEW CHAPTERS, CHAPTER 1.05, "ADMINISTRATIVE CITATIONS," AND CHAPTER 1.06, "ADMINISTRATIVE FINES AND REMEDIES" TO THE SUNNYVALE MUNICIPAL CODE

NOLL moved **introduction of Ordinance No. 2552-96,** seconded by PARKER and **carried** with the following roll call vote:

AYES:	WALKER, NOLL, ROBERTS, KAWCZYNSKI, PARKER, VORREITER, VALERIO
NOES:	NONE
ABSENT:	NONE

Title of Ordinance No. 2553-96:

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF SUNNYVALE AMENDING CHAPTER 9.26 OF THE SUNNYVALE MUNICIPAL CODE PERTAINING TO ABATEMENT OF NUISANCES

NOLL moved **introduction of Ordinance No. 2553-96,** seconded by PARKER and **carried** with the following roll call vote:

AYES;	WALKER, NOLL, ROBERTS, KAWCZYSNSKI, PARKER, VORREITER, VALERIO
NOES:	NONE
ABSENT:	NONE

4. IDENTIFY AND PROMOTE KNOWLEDGE OF HISTORIC TECHNOLOGICAL EVENTS IN SUNNYVALE.

REPORT NO. 96-471

STAFF RECOMMENDATION

That Council direct staff to continue with this study by first developing a detailed project scope 1) based on the concept study steps discussed in this report, 2) including detailed cost estimates, and 3) providing a list of potential task force leaders.

David Boesch, the Director of Community Development, presented the staff report.

The public hearing was declared opened at **9:20 p.m.**

Appearances:

Werner Gans, 1015 Lanark Court

Mr. Gans expressed opposition to proposed study and cost estimates.

The public hearing was declared closed at **9:25 p.m.**

VORREITER moved **that this item be tabled and directed staff to conduct a minimal solicitation for interested parties that would like to take responsibility for project (i.e. Sunnyvale Historical Society),** seconded by WALKER and **carried** unanimously.

5. **FEASIBILITY OF TENNIS COURT EXPANSION AT SUNNYVALE MUNICIPAL TENNIS CENTER.**

REPORT NO. 96-475

STAFF RECOMMENDATION

That Council accept this report as submitted and direct staff to implement Option No. 2 in the Fiscal Impact section of this report that includes the Tennis Center expansion with snack bar, a restructured Tennis Center License Agreement, and Resolution approving the related Budget Modification.

Carl Clark, Assistant Director of Leisure Services, presented the staff report.

The public hearing was declared opened at **9:55 p.m.**

NASA

Ames Research Center

Information Bulletin

HIGHLIGHTS OF AMES RESEARCH CENTER'S FIRST 50 YEARS, 1939-89

NASA's Ames Research Center supports the aeronautical and space goals of the nation. It has a tradition of award-winning advances in aeronautical, space and life sciences research. Ames has made significant contributions to U. S. aircraft projects, the Mercury, Gemini, and Apollo programs, planetary exploration, and to the Space Shuttle program.

Here are decade-by-decade highlights of Ames' first 50 years:

1930s

1939 — On August 9, Congress authorizes establishment of a second National Advisory Committee for Aeronautics (NACA) aeronautical research laboratory (the first was in Langley, VA). On September 22, after 54 possible sites were reviewed, Moffett Field, an Army Air Corps base, is selected as the location for the new research laboratory. Key factors in the selection include availability of the Moffett airfield, proximity to the aircraft industry, good year-round flying weather and the area's working and living conditions. Ground is broken for the new laboratory on December 20.

1940s

1940 — Ames' initial staff (23 Langley personnel) arrives in February to April. On April 18, the new laboratory is named for Dr. Joseph Ames, NACA chairman from 1927-39, in honor of his major contributions to aeronautics.

1941 — The first two tunnels at Ames, the 280 mph 7 x 10-foot wind tunnels begin operation, March and August.

1941-1945 — WW-II military aircraft testing and improvements: North American P-51 Mustang, Bell P-39, Lockheed P-38 and P-80, many others.

1941 — De-icing research program begins with Lockheed 12A test craft and later Curtiss C-46. Results used on B-17 and B-24 bombers. Collier trophy awarded 1947 for work.

1942 Completion of 680 mph (Mach .9), 16-foot wind tunnel, 3rd Ames tunnel, then fastest in existence. In April, the Army turned Moffett Field over to the Navy.

1943 "Fire drill" solution of P-51 duct rumble problem. Redesign of belly air scoop of workhorse P-51 Mustang, needed major effort.

1944 40 X 80 foot wind tunnel (world's largest), begun 1941, completed in June; is large enough to test full-scale aircraft with engines running.

1945 R. T. Jones develops swept wing theory (at NACA-Langley). Moves to Ames, August 1946, further develops theory and applications.

1946 NACA establishes base at Muroc Dry Lake in California's Mojave Desert, later to become the NACA High Speed Flight Research Station, and still later, Ames-Dryden Flight Research Facility. Ames did informal flight test at Muroc as early as 1945-46.

1946 12-foot transonic tunnel complete May. In 1981, the 12-foot still highly useful, was undergoing complete rebuilding.

1946-1956 Other high-speed wind tunnels completed at Ames, including the 6-foot and 1 x 3-foot supersonic tunnels, and the 1 x 3.5-foot hypersonic tunnel.

1947 First swept-back wing flies on North American F-86 fighter

1947 Boeing B-47, swept-wing bomber, flies in late 1947.

1947 Capt. Charles Yeager piloted the Bell X-1 to first supersonic flight on October 14.

1949 Flight of first aircraft, Grumman F-6F, to do variable stability flight research (making one plane fly like another for test research); followed by more advanced F-86 fighter aircraft in 1957 and later an F-100.

1950s

1950-1960 Hypervelocity wind tunnel work gets underway at Ames with shock tubes, arc-jets, light gas guns and counter flow devices. The most advanced such facility, the Hypervelocity Free Flight Tunnel reached speeds of 34,000 mph in 1965, 9,000 mph faster than Earth escape speed. Major U. S. spacecraft flew in these tunnels

from: Mercury, Apollo to "most difficult entry" Galileo Probe to Jupiter.

1952 Harvey Allen (later to become Ames Center Director) develops blunt-body theory for space vehicles, solves problem of intense aerodynamic heating during atmosphere re-entry. Had direct application to Mercury, Gemini, and Apollo configurations and heat shields.

1954 Ames' supersonic Unitary wind tunnel completed. Has three test sections: 11-foot - Mach 1.4, 9 x 7-foot - Mach 2.5, 8 x 7-foot - Mach 3.5.

1955 Supersonic area rule developed by R. T. Jones. Minimizes drag of supersonic craft by limiting portions of vehicle cut by Mach cones.

1956 Flight simulator development begins at Ames, later to grow into the very large 5-degree and 6-degree simulators, and still later in 1969 and 1980 into the FSAA and VMS. These giant flight-simulation devices use multi-story motion generating machines to move their three-man cabs, supported U. S. aeronautics and space efforts through Shuttle.

1958 Ames invents the lifting body, wingless craft able to fly back into the atmosphere from space, survive entry heating, and land. Idea develops eventually into the Space Shuttle. Ames M-2, the first lifting body, flew at Dryden in 1963.

1958 NACA becomes NASA and Ames becomes a NASA Center.

1960s

1960 Beginning of V/STOL (Vertical/Short Take-off and Landing) research using X-14 jet-lift research aircraft.

1960 Powered-lift research begins at Ames with: Ryan VZ-3, deflected slip stream and Lockheed C-130 boundary-layer control concepts; blown flap wing, and a half dozen other powered lift aircraft and systems studied in succeeding years.

1961 Ames given responsibility for basic research in life sciences in February 1961.

1961 X-15 rocket plane makes first hypersonic (above Mach 5) flight at Dryden in June. X-15 eventually reached 4,500 mph and 350,000 feet. Flights beyond limits of the atmosphere provide data for U. S. space program.

1964 to present Origin of life research, creates "building blocks" of life, charts many steps in chemical evolution of life.

1965 Galileo Convair 990 transport aircraft acquired, missions will include solar eclipse, aurora borealis, and earth resources studies.

1965-1968 Pioneer Project series 6-9 spacecraft launched into solar orbit. The four craft circle the Sun, study solar wind and cosmic rays. In 1989, Pioneer 6, still operating, was history's longest-lived spacecraft.

1966-1969 Biosatellites 1, 2, and 3 flew plants, insects, fertilized eggs, and primate in orbit and returned them to Earth. Found a variety of effects of weightlessness on living systems.

1969 Neil Armstrong, former Ames/Dryden test pilot, becomes the first man to walk on the moon, July 20.

1970s

1970 Life-related amino acids found in Murchison meteorite, believed to originate from Asteroid Belt.

1970 Computational Fluid Dynamics, begins with creation of the CFD branch, and arrival in 1971 of Illiac, then world's fastest supercomputer. "Flying airplanes in computers" thereafter made steady progress, culminating in the world's most advanced supercomputer system at Ames in 1988.

1971 Ames acquires high-altitude U-2 aircraft and uses them for variety of astronomy, atmospheric, and earth resources studies, including some of the first measurements of background radiation left over from the universe-creating "big bang."

1972 First digital fly-by-wire aircraft flight control system developed and demonstrated at Dryden--forerunner of shuttle control system.

1972 Ames begins tilt-rotor program; by 1981 has developed a practical new kind of aircraft, the XV-15, which can take off vertically and then fly 1000 miles at over 300 mph. By 1989, the U.S. had invested $2 billion in a military follow-up, the operational Osprey tilt-rotor, with potential for a variety of military and commercial uses.

1972 Pioneer 10 launched on first trip to Jupiter, made first trip through Asteroid belt. Returned first close-up pictures of the planet. Mapped magnetic field, radiation belts, heat balance, masses of planet-sized moons. Launched in March, it arrived in

December 1973. Used "Jupiter swing-by" to head out of the solar system.

1973 — Pioneer 11 launched to Jupiter in April; confirms Pioneer 10 discoveries; returns more pictures; uses unique pole-to-pole Jupiter swing-by trajectory to cross solar system to make history's first trip to Saturn, arriving in 1979.

1973 — Galileo research aircraft (Convair 990) collides with a Navy P-3 and crashes in April, while both making landing approaches to Moffett Field. Eleven NASA employees killed. Successor Galileo 2 aircraft acquired in 1974.

1974 — Ames begins development of exterior tiles and other materials eventually used to protect Space Shuttle from intense heating when re-entering the atmosphere.

1975 — Dedication of Kuiper Airborne Observatory, May 21. The Kuiper is a converted C-141 transport with a 36-inch infrared telescope. Kuiper discovered Uranus' rings, Venus cloud composition, galactic center phenomena, star formation, and supernova mechanisms.

1975-1989 — Ames space sciences provide a range of major findings about formation and characteristics of stars and planets, including Earth. Some examples: computer studies of galaxy dynamics and collisions, prediction of volcanos on Jupiter's moon Io, Mars circulation model, Venus "wet greenhouse" model of atmosphere and early oceans with lessons for Earth, formation of Jupiter and Saturn, explanation of Earth's ozone hole, evolution of all the major planets.

1976 — First flight of AD-1 oblique wing aircraft, August. Rigid, straight wing of this scissors-like craft can rotate horizontally to 60-degree angle to fuselage for swept-wing efficiency. Has potential for practical, quiet Mach 2 supersonic transport.

1976 — Ames manages development and operations of Viking life detection experiment on Mars. Viking landing on Mars, July and September; life detection efforts begin eight days later.

1977 — Ames announces development of Space Lab life sciences payloads for Shuttle missions of the 1980s. Flew plant growth experiments on STS-3 and Spacelab 2. In 1985, a life sciences laboratory flies on Space Lab 3. By 1989, five more Ames life science payloads have been scheduled on Shuttle.

1977 Scientists aboard the Kuiper Airborne Observatory discover on March 10, that Uranus possesses equatorial rings, composed of rock and ice.

1977 IRAS project approved March 24. Ames to develop the very large, space-borne infrared telescope.

1977 Engineering test model of Pioneer 10 hung in the Smithsonian Museum, Washington,D.C.; Pioneer 10 was first spacecraft to reach Jupiter and the first to exit the Solar System.

1978 NASA rotor-craft (helicopter) research transferred to Ames.

1978 Quiet Short Haul Aircraft (QSRA), first fight in July; its blown-flap design has greatest potential of the various powered- lift concepts studied by Ames.

1978 Pioneer Venus Orbiter launched in May. Pioneer Venus Multi-probe launched in August.

1978 Both spacecraft arrive at Venus in December. Five Pioneer probes thoroughly study the atmosphere in both light and dark hemispheres, characterize it for the first time.

1978-1988 Pioneer Venus Orbiter takes several thousand pictures of cloud-shrouded planet, produces best resolution ever of Venus' clouds.

1979 Pioneer 11 completes man's first trip to Saturn in September, after five-year flight across solar system. Returns first close-up pictures. Charts Saturn rings, magnetic field, radiation belts, heat balance, masses of moons, discovers new moons.

1979 Hi-Mat, super-maneuverable, remotely-piloted test vehicle flies at Dryden in July. Hi-Mat wing is the first to be designed by a computer.

1980s

1980 Pioneer Venus Orbiter completes history's first mapping of Venus' surface, discovers two "continents," huge volcanos, deep lowlands.

1981 Dryden Flight Research Center merged with Ames Research Center.

1981 Construction begins on Galileo Probe spacecraft, scheduled to make the first entry--and then fly 500 miles deep--into the atmosphere of an outer planet (Jupiter).

1981 First high-altitude ER-2 aircraft, higher-payload successor to U-2s, arrives in June.

1983 SETI (Search for Extraterrestrial Intelligence) begins at Ames, plans call for using existing telescopes to listen for radio signals from other intelligent species in our galaxy and beyond.

1983 Pioneer 10 passes beyond all the planets in June, leaves the solar system.

1983 IRAS spacecraft launched in January with Ames-developed telescope; in two years, IRAS makes the first whole-sky survey in the infrared.

1984 Ames selects instruments, investigators, and establishes science team for SIRTF, large, orbiting infrared telescope, 1000 times more sensitive than IRAS. First conceptual and development work on the project began at Ames in 1972.

1985 Cray-2 supercomputer arrives at Ames--at 250 million computations per second (CPS) is the world's fastest.

1986 First version of AX-5 hard space suit, proposed for Space Station, completed in August. First Ames "hard suit," AX-1, built in 1965.

1986 Radical, forward-swept wing aircraft, the highly-maneuverable X-29, begins flight testing at Ames-Dryden. Composite wings aero-elastically tailored for necessary strength.

1987 Ames formalizes ongoing research for Space Station. Contributions made in areas of human factors, expert systems, space robots, space suits, materials research, human and other microgravity studies, closed environment systems.

1987 Completion, in June, of new 80 x 120-foot test section and a four-times-more-powerful, 135,000 hp engine tunnel drive, for the existing 40 x 80-foot, world's largest wind tunnel. New section can test a full-scale medium transport aircraft, and is especially useful for rotor craft.

1987 Full operation--including national access network--of the NAS system, world's most advanced supercomputer system, in March.

1987 Experiments and experimenters aboard ER-2 and DC-8 aircraft measure south polar ozone hole. Confirmed

hole's growth. Multi-agency expedition led by Ames.

1988 Cray Y-MP supercomputer arrives in August; at 1 billion CPS, it quadruples NAS system speed.

1988 Computational re-creation of flow within jet engine using NAS system; made great advance in jet engine design; required 22 trillion computations.

1988 NAS solved a wide variety of difficult problems: well-advanced aerospace plane studies; shuttle engine flow; first 3-dimensional simulations of full aircraft flight, including viscous flow; computational chemistry (basic properties of molecules); colliding galaxies; solar plasma flow; blood flow for artificial heart.

1989 Jan - Feb. Ames led international, multi-agency study of north polar ozone hole. Found ozone-destroying mechanisms similar to those at south pole. Data taken by experimenters and experiments aboard Ames' DC-8 and ER-2 aircraft.

1989 Pioneer 10--4.4 billion miles from the Sun in June, most distant man-made object; continues to chart unexplored space, and to seek limits of solar atmosphere, the beginning of true interstellar space.

1989 Galileo Probe Spacecraft launched on October 18; it is scheduled to reach Jupiter in December 1995.

1989 Aerobraking techniques at fringes of the atmosphere developed for low-orbit maneuvers (in-space orbit-plane changes for aerospace plane) and high-orbit maneuvers (cuts velocity of spacecraft on return from Mars or Moon).

NASA News

National Aeronautics and
Space Administration

Ames Research Center
Moffett Field, California 94035
AC 415 694-5091

Peter W. Waller 415/694-5091

For Release

Immediate

Release No. 89-37

FACT SHEET

AMES 50th ANNIVERSARY

FACT SHEET

AMES 50th ANNIVERSARY

Peter W. Waller 415/694-5091
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Immediate Release

Chronology of Ames Events

NASA's Ames Research Center, the second-founded research laboratory of the National Advisory Committee for Aeronautics (NACA), NASA's predecessor agency, has long been a major asset for the United States. Ames supports the aeronautical and space goals of the nation and has a long tradition of award-winning advances in aeronautical, space, and life science research. Ames made significant contributions to U.S. aircraft projects, to the Mercury, Gemini, and Apollo programs, to planetary exploration, and to the Space shuttle program.

1930s

1939	NACA Moffett Field Laboratory named for Dr. Joseph S. Ames, Chairman of the NACA from 1927-1939, for his major contributions to aeronautics
1939	Ames ground breaking December 20, 1939

- more -

1940s

1940 — Ames initial staff (23 Langley personnel) arrives February to April 1940.

1941 — The first two tunnels at Ames, the 280 mph 7- x 10-foot wind tunnels begin operation, March and August 1941.

1941-1945 — WW-II military aircraft testing and improvements: North American P-51 Mustang, Bell P-39, Lockheed P-38 and P-80, many others.

1941 — De-icing research program begins with Lockheed 12A test craft and later Curtiss C-46. Results used on B-17 and B-24 bombers. Collier trophy awarded 1947 for work.

1942 — Completion of 680 mph (Mach .9), 16-foot wind tunnel, third Ames tunnel, then fastest in existence.

1943 — "Fire drill" solution of P-51 duct rumble problem. Redesign of belly air scoop of workhorse P-51 Mustang, needed for war effort.

1944 — 40- x 80-foot wind tunnel (world's largest), begun 1941, complete June 1944, large enough to test full-scale aircraft with engines running.

1945 — R.T. Jones develops swept-wing theory (at NACA-Langley). Moves to Ames, August 1946, further develops theory and applications.

1946 — NACA establishes base at Muroc Dry Lake in California's Mojave Desert, later to become the NACA High Speed Flight Research Station and, still later,

NASA-Dryden Flight Research Center. In 1981, it merged with Ames as Ames-Dryden Flight Research Facility. Ames did informal flight test at Muroc as early as 1945-46.

1946 — 12-foot transonic tunnel complete May 1946. In 1989, 12-foot, still highly useful, was undergoing complete rebuilding.

1946-1956 — Number of other high-speed wind tunnels completed at Ames, including the 6-foot and 1- x 3-foot supersonic tunnels, and the 1- x 3.5-foot transonic tunnel.

1947 — First sweptback wing flies on North American F-86 fighter.

1947 — Boeing B-47, swept-wing bomber, flies in late 1947.

1947 — Captain Charles Yeager piloted the Bell X-1 to first supersonic flight on October 14, 1947

1949 — Flight of first aircraft, Grumman F-6F, to do variable stability flight research (making one plane fly like another for test research). Followed by more advanced F-86 fighter aircraft in 1957 and later an F-100.

1950s

1950-1960 — Hypervelocity wind tunnel work gets underway at Ames with shock tubes, arc-jets, light gas guns and counter flow devices. The most advanced such facility, the Hypervelocity Free Flight Tunnel, reached speeds of 34,000 mph in 1965, 9,000 mph faster than Earth escape speed. Test models of major U. S. spacecraft flew in these tunnels from Mercury and Apollo to "most difficult entry" Galileo Probe to Jupiter.

1952 Harvey Allen (later to become Ames Center Director) develops blunt body theory for space vehicles, solves problem of intense aerodynamic heating during atmosphere reentry. The discovery covered the entire range of reentering Space vehicles from mooncraft to ballistic missiles. Had direct application to Mercury, Gemini, and Apollo configurations and heat shields

1954 Ames' supersonic Unitary wind tunnel completed. Has three test sections: 11-foot -- Mach 1.4; 9- x 7-foot -- Mach 2.5; 8- x 7-foot -- Mach 3.5.

1955 Supersonic area rule developed by R. T. Jones. Minimizes drag of supersonic craft by limiting portions of vehicle cut by Mach cones.

1956 Flight simulator development begins at Ames, later to grow into the very-large 5-degree and 6-degree simulators and, still later, in 1969 and 1980, into the FSAA and VMS. These giant flight-simulation devices use multi-story motion generating machines to move their three-man cabs, supported U.S. aeronautics and space efforts through Shuttle.

1958 Ames invents the lifting body, wingless craft able to fly back into the atmosphere from space, survive entry heating, and land. Idea develops eventually into the Space Shuttle. Ames M-2, the first lifting body, flew at Dryden in 1963.

1958 NACA becomes NASA, and Ames becomes a NASA Center.

1960s

1960 — Beginning of V/STOL (Vertical/Short Take-off and Landing) research using X-14 jet-lift research aircraft

1960 — Powered-lift research begins at Ames with: Ryan VZ-3, deflected slip stream and Lockheed C-130 boundary-layer control concepts; blown flap wing, and a half dozen other powered lift aircraft and systems studied in succeeding years.

1961 — Ames given responsibility for basic research in life sciences in February 1961.

1961 — X-15 rocket plane makes first hypersonic (above Mach 5) flight at Dryden in June 1961. X-15 eventually reached 4,500 mph and 350,000 feet. Flights beyond limits of the atmosphere provide data for U.S. space program.

1964-now — Origin of life research, creates "building blocks" of life, charts many steps in chemical evolution of life.

1965 — Galileo Convair 990 transport aircraft acquired, missions will include solar eclipse, aurora borealis, and earth resources studies.

1965-68 — Pioneer Project series 6-9 spacecraft launched into solar orbit. The four craft circle the Sun, study solar wind and cosmic rays. In 1989, Pioneer 6, still operating, was history's longest-lived spacecraft.

1966-69 — Biosatellites 1, 2, and 3 flew plants, insects, fertilized eggs, and primate in orbit and returned

them to Earth. Found a variety of effects of weightlessness on living systems.

1966 Medical Facility opened for employees

1969 Neil Armstrong, former Dryden test pilot, becomes the first man to walk on the moon, July 20, 1969.

1970s

1970 Life-related amino acids found in Murchison meteorite, believed to originate from Asteroid Belt

1970 Computational Fluid Dynamics begins with creation of the CFD branch, and arrival in 1971 of Illiac, then world's fastest supercomputer. "Flying airplanes in computers" thereafter made steady progress, culminating in the "world's most advanced" NAS supercomputer system at Ames in 1988.

1971 Ames acquires very-high-altitude U-2 aircraft and uses them for variety of astronomy, atmospheric, and earth resources studies, including some of the first measurements of background radiation left over from the "big bang".

1972 First digital fly-by-wire aircraft flight control system developed and demonstrated at Dryden -- forerunner of Shuttle control system.

1972 Ames begins tilt-rotor program; by 1981 has developed a practical new kind of aircraft, the XV-15, which can take off vertically and then fly 500 miles at speeds up to 300 mph. By 1989, the U.S. had invested $2 billion in a military follow-on, the operational

Osprey tilt rotor. With doubled range and 31 passenger capacity, this craft had potential for a variety of military and commercial uses.

1972 Pioneer 10 launched on first trip to Jupiter, made first trip through Asteroid belt. Returned first close-up pictures of the planet. Mapped magnetic field, radiation belts, heat balance, masses of planet-sized moons. Launched in March 1972, arrival, December 1973. Used "Jupiter swingby" to head out of solar system.

1973 Pioneer 11 launched to Jupiter in April 1973; confirms Pioneer 10 discoveries; returns more pictures; uses unique pole-to-pole Jupiter swing-by trajectory to cross solar system to Saturn, arriving in 1979.

1973 Galileo research aircraft (Convair 990) collides with a Navy P-3 and crashes, while both making landing approaches to Moffett Field. Successor Galileo 2 aircraft acquired in 1974.

1974 Ames begins development of exterior tiles and other materials eventually used to protect Space Shuttle during intense heating of atmosphere entry.

1975 Dedication of Kuiper Airborne Observatory, May 21, 1975. The Kuiper is a converted C-141 transport with a 36-inch infrared telescope. Kuiper discovered Uranus' rings, Venus cloud composition, galactic center phenomena, star formation, and supernova mechanisms.

1975-1989 Ames space sciences, among the world's best, provide a range of major findings about formation and characteristics of stars and planets, including Earth.

Some examples: computer studies of galaxy dynamics and collisions, prediction of volcanos on Jupiter's moon Io, Mars circulation model, Venus "wet greenhouse" model of atmosphere and early oceans with lessons for Earth, formation of Jupiter and Saturn, explanation of Earth's ozone hole, evolution of all the major planets.

1976 First flight of AD-1 oblique wing aircraft, August 1976. Rigid, straight wing of this scissor-like craft can rotate horizontally to 60 degree angle to fuselage for swept-wing efficiency. Has potential for practical, quiet Mach 2 supersonic transport.

1976 Ames manages development and operations of Viking life detection experiment on Mars. Viking landing on Mars, July and September 1976; life detection efforts begin eight days later.

1977 Ames announces development of Space Lab life science payloads for Shuttle missions of the 1980s. Flew plant growth experiments on STS-3 and Spacelab 2. In 1985, a life sciences laboratory flies on Space Lab 3. By 1989, five more Ames life science payloads have been scheduled on Shuttle. Among others, goals are to find if man can tolerate long-term weightlessness, as in Space Station or on a two-year trip to Mars.

1977 Scientists aboard the Kuiper Airborne Observatory discover on March 10, 1977 that Uranus possesses equatorial rings, composed of rock and ice.

1977 IRAS project approved March 24, 1977. Ames to develop the very large, space-borne infrared telescope.

1977 Engineering test model of Pioneer 10 hung in the Smithsonian Museum, Washington, D.C., first to Jupiter and to exit Solar System.

1978 NASA rotorcraft (helicopter) research transferred to Ames.

1978 Quiet Short-Haul Research Aircraft (QSRA), first fight, July 1978; its blown-flap design has greatest potential of the various powered-lift concepts studied by Ames.

1978 Pioneer Venus Orbiter launched May 1978 Pioneer Venus Multiprobe launched August 1978.

1978 Both spacecraft arrive at Venus in December 1978. Five Pioneer probes study atmosphere from top to bottom, planet-wide, characterize it for first time.

1978-1988 Pioneer Venus Orbiter takes several thousand pictures of cloud-shrouded planet, best resolution ever of Venus' clouds.

1979 Pioneer 11 completes man's first trip to Saturn in September 1979, after flight across solar system. Returns first close-up pictures. Charts Saturn rings, magnetic field, radiation belts, heat balance, masses of moons, discovers new moons.

1979 HiMAT, super-maneuverable, remotely-piloted test vehicle flies at Dryden in July 1979. HiMAT wing is the first designed by a computer. A program developed by William F. Ballhaus, Jr., who later became Ames Director, was used.

1980s

1980 Pioneer Venus Orbiter compleces history's first mapping of Venus' surface, discovers two "continents," huge volcanos, deep lowlands.

1981 Dryden Flight Research Center merged with Ames Research Center.

1981 Construction begins on Galileo Probe spacecraft, scheduled to make the first entry -- and then fly 500 miles deep -- into the atmosphere of an outer planet (Jupiter).

1981 First high-altitude ER-2 aircraft, higher-payload successor to U-2s, arrives June 1981.

1983 SETI (Search for Extraterrestrial Intelligence) begins at Ames, five-year program using existing telescopes to listen for radio signals from other intelligent species in our galaxy and beyond.

1983 Pioneer 10 passes beyond all the planets in June 1983, "leaves the solar system."

1983 IRAS spacecraft launch, January 1983, with Ames-developed telescope; in two years, IRAS makes the first whole-sky survey in the infrared.

1984 Ames selects instruments, investigators, and establishes science team for SIRTF, large, orbiting infrared telescope, 1000 times more sensitive than IRAS. First conceptual and development work on the project began at Ames in 1982.

1985 Cray-2 supercomputer arrives at Ames -- at 250 million computations per second (CPS) is the world's fastest.

1986 First version of AX-5 hard space suit, proposed for Space Station, completed August 1986. First Ames "hard suit," AX-1, built in 1965.

1986 Radical, forward-swept-wing aircraft, the highly maneuverable X-29, begins flight testing at Ames-Dryden. Composite wings aero-elastically tailored for necessary strength.

1987 Ames formalizes ongoing research for Space Station. Contributions are in areas of: human factors, expert systems, space robots, space suits, materials research, human and other microgravity studies, closed environment systems, and astrometric telescope.

1987 Completion, in June 1987, of new 80- x 120-foot test section and four times more powerful, 135,000 horsepower tunnel drive, for the existing 40- x 80-foot, "world's largest" wind tunnel. Gives Ames the two largest tunnels. New section can test a full-scale medium transport aircraft; is especially useful for rotorcraft and powered lift.

1987 Full operation -- including national access network -- of the NAS system, world's most advanced supercomputer system; start up in March 1987

1987 First measurements implicating man-made chemicals in stratospheric ozone destruction made over Antarctica. Ames provided project management, science and aircraft support for international expedition. High altitude ER-2 and DC-8 flew missions.

1988 Cray Y-MP supercomputer arrives August 1988; at 1 billion CPS, ups NAS system speed four times.

NAS plans to reach a trillion (1 thousand billion) CPS around the year 2000.

1988 Computational re-creation of flow within jet engine using NAS system; great advance in jet engine design; required 22 trillion computations.

1988 NAS solution of a wide variety of difficulty problems: well-advanced aerospace plane studies; shuttle engine flow; first 3-dimensional simulations of full aircraft flight, including viscous flow; computational chemistry (basic properties of molecules); colliding galaxies; solar plasma flow; blood flow for artificial heart.

1989 Pioneer 10 -- 4.4 billion miles from the Sun in June 1989, most distant man-made object; continues to chart unexplored space, and to seek limits of solar atmosphere, beginning of true interstellar space.

1989 Galileo Probe Spacecraft scheduled for launch to Jupiter, October 1989.

1989 Aerobraking techniques at fringes of the atmosphere: developed: 1) for low-orbit maneuvers (in-space orbit-plane changes for Aerospace Plane); 2) high-orbit maneuvers (cut down velocity of spacecraft on return from Mars or Moon).

CITY OF SUNNYVALE CALIFORNIA

RECEIVED
JUL 31 1996
PLANNING DIVISION

REQUEST FOR INFORMATION

July 24, 1996

Diane Georgies
Maspar
760 N. Mary Avenue
Sunnyvale, California 94086

Dear Ms. Georgies:

Sunnyvale has long been a world-recognized center for technology. There are 6,000 individual patent holders who reside in Sunnyvale.

This year the Sunnyvale City Council adopted a legislative study to research and recognize historic technological events that have occurred in Sunnyvale. The purpose of the study is to determine which events have had a significant effect on industry and to provide recognition for these advances.

The scope has been limited to significant high tech innovations or events from the last 25 years that have shaped Sunnyvale as a home for the computer manufacturing, software development, biotech, defense, or telecommunications industries.

A definition of significance has not been developed yet, and will most likely be left for the City Council to determine. However, I am asking for your expertise in identifying any individuals, inventions, important technological breakthroughs, or the creation of innovative companies (large and small) that have occurred in Sunnyvale and contributed to its reputation. Leads to effective resources or collections of information would be a great help.

I plan to following up with a phone call in about a week. If you would please put some thought into this project over that time it would be greatly appreciated. If you think a personal meeting would be helpful, I would be happy to meet at your convenience. You may also contact me directly at (408) 730-7591.

I am looking forward to working with you.

Sincerely,

Gerri Langtry
Associate Planner

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Gerri,

Here are some comments/feedback on the Sunnyvale High Tech History Study Issue

NASA/Ames: Donald James
Note: Donald James seemed to think that we were trying to describe a complete history of the high tech industry through the limited eyes of Sunnyvale, (I explained that this was not the goal!), and he seemed quite concerned that our scope was much too limited to adequately represent the events and innovations of the industry.

A perspective on the growth of the electronics industry:

- High technology does not have a city specific history. Looking at the technological events in one city really does not tell the story.

- "Silicon Valley" came about because of the dynamics of the greater geographical area and several significant institutions such as Stanford, UC Berkley, HP, NASA, etc. Silicon Valley is not a result of Sunnyvale's "user friendly" attitude toward high tech industries

- There is an awful lot of technological innovation that is patented. Some of the patents may appear to be breakthroughs, however, many other patents pertain to crucial building blocks that supported these breakthroughs.

- Pre-World War II, Berkley and Stanford were already leading the nation in electronics. The first electronics Navy school was at Treasure Island. On the other hand, Silicon Valley did not come to dominate the computer architecture industry for many years. This industry started in Minneapolis, shifted to Boston, and is now focused here.

- The integrated circuit (IC) was invented in Mountain View [illegible].

My comments:

One of the biggest challenges with this project is that companies are not loyal to one city. Many companies have manufacturing plants in several cities and/or geographic areas. Many of Sunnyvale's largest high tech companies are not headquartered here. Thus it is very difficult to pinpoint where innovation occurred. (See the listing of Sunnyvale's largest businesses from the Economic Development Division, copy attached, it notes which companies are headquarters). Companies also go through business transitions, such as acquisitions and mergers which make them difficult to

Obviously many Sunnyvale residents work in high tech and have made important contributions to the industry. Unfortunately, we cannot keep tabs on their career paths or change of residences. I imagine that the most successful innovators are kicking back in Los Altos Hills...

The forward of Sunnyvale: The City of Destiny to the Heart of Silicon Valley is by Mike Malone. It may be the best thing that I have found that relates to actual events in the City limits. Yet, the events are more like eras, i.e. the Cold War period when Lockheed was cranking.

If you do wish to give an example of a specific innovation, I liked the Trimble Navigation Company. In 1984, they became the first company to utilize signals from the US Department of Defense Global Positioning System (GPS) which consists of 24 satellites. This company is particularly easy to deal with. They enthusiastically proclaim that Sunnyvale is the only place where they would do business. Charles Trimble is the founder and president of the company. He is not a Sunnyvale resident.

I look forward to getting started on the Heritage stuff next Thursday

Jill

LARGEST SUNNYVALE COMPANIES

	TOP COMPANIES IN SUNNYVALE	TYPE OF BUSINESS
1	Lockheed Martin	Aerospce
2	TRW	Electronics (Defense)
3	Advanced Micro Devices (Headquarters)	Manufacturing (Semiconductor)
4	National Semiconductor (Headquarters)	Manufacturing (Semiconductor)
5	Amdahl Corp. (Headquarters)	Manufacturing (Computer)
6	Argo Systems, Inc.	Electronics (Defense)
7	Westinghouse Marine	Manufacturing (Defense)
8	Loral Space & Range	Electronics
9	Hewlett Packard	Computer, Electronics
10	Trimble Navigation (Headquarters)	Manufacturing (Instrument)
11	Phillips Semiconductor	Electronic (Manufacturing)
12	Stanford Telecom (Headquarters)	Telecommunications
13	Applied Signal Technology (Headquarters)	Electronics (Defense)
14	Ventritex, Inc. (Headquarters)	Manufacturing (Medical Device R&D)
15	Ann Wells (Headquarters)	Employment
16	Macys	Retail (Department Store)
17	Allied Telesyn International Corp.	Local Area Network
18	Supertex, Inc.	Electronics (Manufacturing)
19	Toshiba	Electronics (Manufacturing)
20	Parcplace-Digitalk	Software
21	Actel Corporation	Electronics
22	Computer Curriculum	Software
23	Pilkington Barnes	Contact lenses
24	Volex, Inc.	Cable manufacturing
25	Montgomery Ward	Retail (Department Stroe)
26	Mitsubishi Electronics	Electronics (Components)
27	Price Club	Retail (Wholesale)
28	Molecular Dynamics	Equipment Manufacturing
29	Orbit Semiconductor	Orbit Installation
30	Oak Technology Inc.	Computer chip design
31	Telebit Corporation	Data communications
32	Micro Lithography	Electronics
33	Ilc Technology, Inc. (Headquarters)	Manufacturing
34	Digital Link Corp.	Electronics
35	Beat Ic Labratories	Electronics
36	Proto Engineering (Headquarters)	Manufacturing (Printed Circuits)
37	Federal Express	Mail Service
38	St. Microwave Corp.	Electronics (Components)
39	Richfield Hotel	Hotel & Restaurant
40	Cylink Corp.	Manufacturing
41	Home Depot	Retail
42	Vander-Bend	Sheet Metal
43	SKC America	Manufacturing (Micrographics)
44	EG&G Reticon (Headquarters)	Manufacturing
45	Maxim Integrated Products (Headquarters)	Electronics
46	JC Penney	Retail
47	Cardiovascular Imaging	Medical Device Manufacturing
48	EP Technologies Inc.	Medical Devices
49	Verbatim	Manufacturing (Magnetics)
50	General Magic (Headquarters)	Software Development

CITY OF SUNNYVALE

MEMORANDUM

DATE: June 5, 1996

TO: Study Scoping Team

FROM: Gerri Langtry, Planning Division

SUBJECT: Legislative Study Issue
Historical Technological Events

On Friday June 14, you have been asked to attend a study scoping session regarding a legislative issue. The meeting will be held at City Hall in the West Conference Room at 9:00 a.m.

The City Council has asked staff to identify the historic electronic developments which have taken place in Sunnyvale and to recommend the means by which these developments would be recognized and celebrated.

I would like to have the study completed in approximately three months, but I am having trouble identifying sources for information. I have started some very preliminary research at the Sunnyvale library and made a visit to the Intel museum in Santa Clara, but I have not come up with much information specific to Sunnyvale.

I have called together a group of managers and staff to meet on June 14 to help determine an efficient research course for this study. I am hoping that representatives from the Sunnyvale Library, the patent library, and Economic Development can help provide direction and assistance so that we can determine the following:

- Which Sunnyvale companies have made significant advances in electronic technology?
- Are there Sunnyvale residents who own patents for advances in electronics or who worked on significant electronic projects even though they may work for companies located elsewhere in Silicon Valley?

- How do we sift through the facts and the folklore (e.g. Wozniak and Jobs - where were they when they really developed the personal computer?)

- Do Sunnyvale companies keep a lot of this information for there own purposes (P.R., history) and is there a way to tap into their information?

If you have any other thoughts prior to the meeting, please let me know (X-7591). I have forwarded this memo to all members of the scoping team and have included a copy of the original Council Study Issue paper.

cc: Bill Powers
Trudi Ryan
Vicky Johnson
Mary Clare Sprott
Geri Cross
Gail Price