

# Technological Innovation in the City of Sunnyvale

City of Sunnyvale | November 2024 - Public Draft





Technological Innovation in the City of Sunnyvale  
Heritage Resource Inventory Update Report  
Sunnyvale, California

Public Draft – November 2024

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- Appendix A: Heritage Resource Inventory
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- Appendix C: California Department of Parks and Recreation Inventory Forms for Extant Properties



## EXECUTIVE SUMMARY

*Technological Innovation in the City of Sunnyvale* aims to identify properties associated with Sunnyvale's significant technological history that can be considered for nomination to the city's heritage resource inventory. The study provides an overview of the historical patterns that led to significant local achievements in the high technology field and associated sectors during the post-World War II period. It outlines the development of multiple facets of public- and private-sector technological research and production that occurred in Sunnyvale, spanning from the San Francisco Bay Area's early electronics and defense industries to technologies in information networking and other cutting-edge fields at the turn of the twenty-first century. The document then establishes an evaluation framework intended to guide evaluations of the significance and physical integrity of properties in Sunnyvale that were historically associated with technological development. Utilizing this framework, the study has identified several properties that appear to meet the eligibility requirements of local heritage resource designation because they have associations with significant technological innovation and retain sufficient physical integrity. The following properties are recommended for nomination as Sunnyvale heritage resources:

- Amdahl Corporation Headquarters, 1250 E. Arques Avenue;
- Andy Capp's Tavern, 157 W. El Camino Real;
- Computer Literacy Bookshop, 520 Lawrence Expressway, Suite 310;
- Hotmail Offices, 1290 Oakmead Parkway, Suite 218;
- Lockheed Missiles and Space Company Buildings 181N/182N, 1233 N. Mathilda Avenue;
- Sunnyvale Patent Information Clearinghouse, 1500 Partridge Avenue, Building 7;
- Westinghouse Missile Launching & Handling Department, 501 E. Hendy Avenue (previously listed in the Heritage Resource Inventory for other areas of significance); and
- Yahoo Headquarters, 635 Vaqueros Avenue.

The study also has identified the following significant properties that have poor integrity or that have been demolished entirely:

- Advanced Micro Devices, Inc. Headquarters, 915 De Guigne Drive;
- Atari Inc. Headquarters, 1265 Borregas Avenue;
- Calma Company Offices, 707 Kifer Road;
- Catalyst Technologies Venture Capital Group, 1287 Lawrence Station Road;
- Lockheed Missiles and Space Company Plant One Complex, 1111 Lockheed Martin Way;

- Signetics Corporation Headquarters, 680 W. Maude Avenue; and
- Sunnyvale Air Force Station, 1080 Innovation Way.

These properties do not appear to be eligible for heritage resource listing as buildings. However, the City may still consider recognizing them as “sites,” a resource category that reflects the locations of significant events when little or no physical fabric remains. Additional details and photographs on the identified properties are presented in Appendix B.



## 1. INTRODUCTION

For more than 70 years, the city of Sunnyvale, California has been the setting of key contributions to the development of Silicon Valley, the famed technology-focused industrial center in the Santa Clara Valley in the southern San Francisco Bay Area. Along with several other communities in northern Santa Clara County and southern San Mateo County, Sunnyvale became a home to the rapidly evolving advanced electronics sector that ushered in the “Information Age” after the end of World War II. Even though innovation-driven research and production networks spanned the United States and beyond, the Santa Clara Valley has attracted a particularly robust concentration of leading technology companies, educational institutions, and government agencies. Sunnyvale’s development epitomizes the Santa Clara Valley’s transformation from a leader in agricultural production and industrial canning to a dominant hotspot for advanced electronics and telecommunications. The city is referred to as the “Heart of Silicon Valley<sup>SM</sup>,” a moniker that recognizes its central location in the region as well as its dynamic role in Northern California’s history of technological achievement (Figure 1).

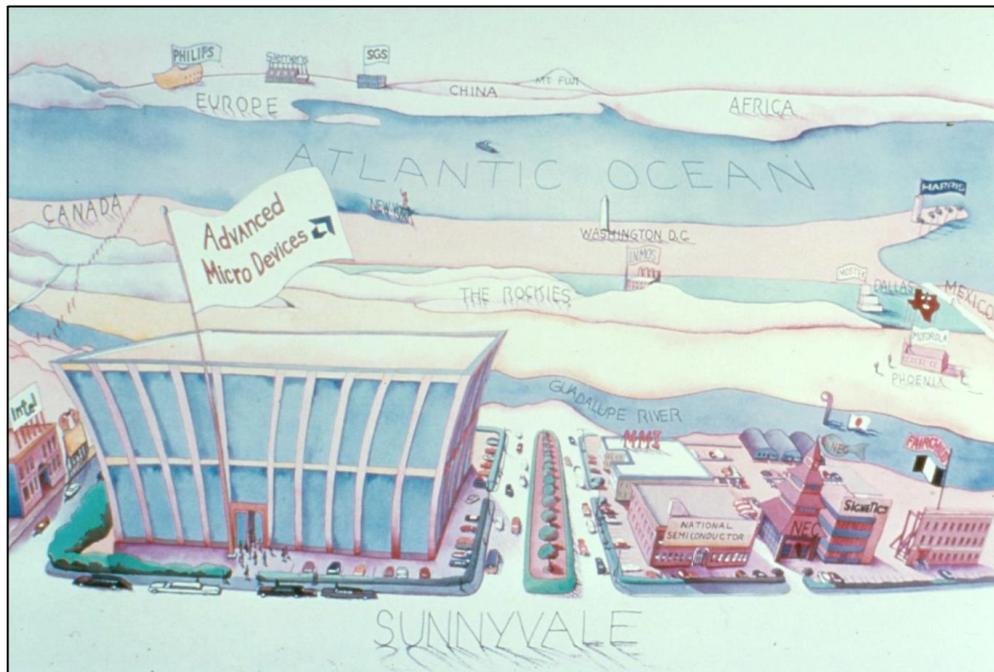


Figure 1. 1980s satirical illustration highlighting the importance of Sunnyvale technology firms within the global electronics industry

Source: Advanced Micro Devices, via San Jose Public Library

### ***Project Background and Purpose***

Even though Sunnyvale’s historical links to the high technology sector are documented relatively well, no large-scale effort has yet been undertaken to identify or ensure protection for the properties most closely connected to this history. The City of Sunnyvale’s Charter and Zoning Ordinance establishes a Heritage

Preservation Commission (HPC), as well as a Heritage Resource Inventory of significant properties in Sunnyvale’s cultural, historical, and architectural heritage. Properties that are designated as heritage resources are subject to a review process before certain proposed exterior changes are permitted by the City. The aim of the designation process and accompanying project review is to ensure that heritage resources are “preserved as living parts of community life and development to build an understanding of the city’s past.”<sup>1</sup>

The principal focus of previous efforts to compile the Heritage Resource Inventory, however, has been properties dating to the initial phases of Sunnyvale’s history in the late nineteenth and early twentieth centuries. Most designated heritage resources are residences, although others represent the commercial contexts that established Sunnyvale as a regionally important agricultural and industrial community in Santa Clara County before World War II, such as the Murphy Station Heritage Landmark District. The Heritage Resource Inventory currently contains no properties associated with the patterns of advanced technological innovation that unfolded in Sunnyvale during the second half of the twentieth century.

In 1996, the City initiated a legislative study issue that proposed to “identify historic electronic developments which have occurred in Sunnyvale and to recommend the means by which to acknowledge and celebrate these events.”<sup>2</sup> City staff conducted several fact-finding steps to identify significant companies and achievements, which included historical research and consultation with Sunnyvale residents and business representatives. However, the study was not completed due to limited available information and staff resources.

In 2019, the HPC introduced a new study issue (CDD 19-05) proposing to identify properties in the city associated with technological innovation that may qualify for listing in the Heritage Resource Inventory.<sup>3</sup> That same year, the City Council approved funds for this effort, and in 2024 the City retained Architectural Resources Group (ARG) to complete the study. The project commenced in March 2024.

The primary purpose of this document is to identify extant properties in Sunnyvale associated with technological innovation that appear to meet the eligibility requirements of the Heritage Resource Inventory and therefore could be considered for formal designation in the future. The document first describes the study’s areas of focus and its methodology, which was informed by professional best practices in the field of heritage preservation as well as by input provided by the HPC. Following this is a detailed historic context narrative that characterizes the broad trends that spurred technological innovation in Sunnyvale in the postwar period. The context narrative both synthesizes and supplements existing research on the history of Silicon Valley and particular technology-oriented firms with a strong

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<sup>1</sup> City of Sunnyvale, Code of Ordinances § 19.96.010(a), accessed October 10, 2024, <https://ecode360.com/SU5020>.

<sup>2</sup> City of Sunnyvale, “Report to Mayor and Council No. 96-444: Identify and Promote Knowledge of Historical Technological Events Which Have Taken Place in Sunnyvale,” File 8783, November 26, 1996, 1, available from the City of Sunnyvale.

<sup>3</sup> City of Sunnyvale, “2019 Council Study Issue CDD 19-05: Update to the Heritage Resource Inventory To Include Potential Resources Associated With Technological Innovation,” March 7, 2019, available from the City of Sunnyvale.

presence in Sunnyvale. It then establishes an evaluation framework for the specific resource types that are most likely to be associated with technological innovation in the city. The framework lays out the thresholds of significance and integrity that a resource should meet to be designated in the Heritage Resource Inventory. Finally, the study identifies the properties from the historic context that appear to meet the significance thresholds of the evaluation framework and therefore are best suited for heritage resource designation.

Beyond identifying the significant properties in Sunnyvale that remain extant, this document also aims to recognize Sunnyvale's connection to technological innovations that have influenced life in the Bay Area, California, and beyond. Given the rapid pace of technological change throughout Silicon Valley during the past several decades, many properties that housed significant events and patterns of innovation have been altered or demolished to accommodate new research programs and new ventures. The historic context establishes a broad overview of Sunnyvale's prominent place within the development of Silicon Valley, which will strengthen residents' knowledge of the city's technological importance over time. This information may also be used to inform potential interpretation efforts or other forms of public recognition that could be planned in the future.

### ***Defining Technological Innovation***

In the broadest sense, "innovation" refers to the process of generating new ideas (or improving upon existing ones), and then developing those ideas into novel goods and services. "Technological innovation" specifically means the development of new or more efficient technologies capable of achieving previously unmet objectives. Technological innovation is sometimes characterized as having as much a social purpose as an economic or commercial one. Such innovation is an area that Silicon Valley has excelled at during the second half of the twentieth century. The region's strong tradition of innovation has resulted in a continuous flow of new technologies available to both specialists and consumers, which have contributed to significant changes in everyday life around the world. Many of these technologies have been complex electronic machines that employ solid-state semiconductors<sup>4</sup> to carry electric currents. Promoted both by private companies and by governmental agencies, the process of technological innovation during the past few decades has given rise to numerous paradigm-shifting technologies, the most far-reaching of which include personal computing machines, the World Wide Web, and mobile telephones.

The process of technological innovation does not necessarily need to result directly in the creation of a new technology. Rather, innovation may relate to changes in the innovation process itself. In other words, it is possible for individuals to improve the methods of research, development, and management so that problems are approached in new ways. This, in turn, could ultimately lead to effective new technologies that were not previously understood to be feasible.

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<sup>4</sup> "Solid-state" means semiconductors that use a solid component, most typically made of the element silicon, that replaced earlier devices such as vacuum tubes.

### ***Where Does Technological Innovation Take Place?***

Because the most important instrument of innovation is the human brain, technological innovation can hypothetically occur anywhere that is accessible to people. An industrial region like Silicon Valley, however, has a concentration of facilities specifically designed and constructed to house the process of innovation. These include research and development (R&D) centers, which are specialized facilities where private companies conduct the research necessary to derive new ideas for goods and services, as well as the processes for implementing them. Administrative headquarters, in contrast, are often the setting of management decisions that influence the future of research programs, marketing campaigns, and other facets of the larger business venture. The landscape of Silicon Valley, including Sunnyvale, contains a great number of properties of this kind. High-tech companies strive to anticipate the needs of the future, meaning that fostering innovation is a vital part of their business model.

Silicon Valley's history, however, includes events whose significance had only an incidental relationship to the places in which they occurred. The residential garage in Palo Alto where David Packard and William Hewlett founded their electronics company Hewlett-Packard (HP) is now a cornerstone of the Silicon Valley origin story. One newspaper article reporting on Northern California's high-tech industry in the 1980s called attention to the region's "log cabin stories"—referring to successful innovations "born in garages and prune sheds and wine cellars to individuals, not marketing departments or board rooms[.]"<sup>5</sup> Stories like this have contributed to the mythology that Silicon Valley may offer unlikely, rags-to-riches successes. There is much lore about the region, but it is indisputable that the roots of some important ideas, relationships, and technological debuts have come from modest and unexpected settings.

Technological innovation is seldom the result of activities occurring in a single place. The development of innovative ideas often involves activities that span multiple properties or even multiple cities or countries. Many high-tech companies have expanded rapidly after receiving venture capital or launching their stock, leading them to set up a headquarters building in one location, a research center in another location, and manufacturing and distribution facilities somewhere else. After only a few years, the company may reconfigure its facilities entirely. One challenge of identifying the sites of technological innovation in a city like Sunnyvale is determining which properties have the strongest significant associations even when a particular innovation touched multiple sites.

### ***Timeframe of Study***

This document primarily focuses on growth of the advanced technology sector in the Santa Clara Valley between 1945 and 2000. This period saw the region develop from a collection of discrete communities, academic and governmental institutions, and defense contractors into an industrial powerhouse. The context narrative includes a brief overview of Sunnyvale's agricultural origins and the conditions that gave birth to Silicon Valley prior to World War II. The inclusion of this information is meant to set the stage for the later developments that defined Sunnyvale's technological preeminence. The bulk of the historic context statement, however, addresses developments in technology and municipal-level planning that occurred between the middle and the end of the twentieth century. This period is bookended by two

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<sup>5</sup> Sid Moody, "Heart of High-Tech," *Los Angeles Times*, July 8, 1984, 3.

consequential events: it begins with the onset of the Cold War following World War II, and it concludes with the stock market peak and ensuing crash that ended the first “dot-com bubble” around the turn of the twenty-first century. This timeframe encompasses several waves of innovation in emerging fields of the defense and electronics industries (Figure 2). The historic context also introduces several developments that have continued into the new millennium, including emerging technological areas that have already had a presence in Sunnyvale.

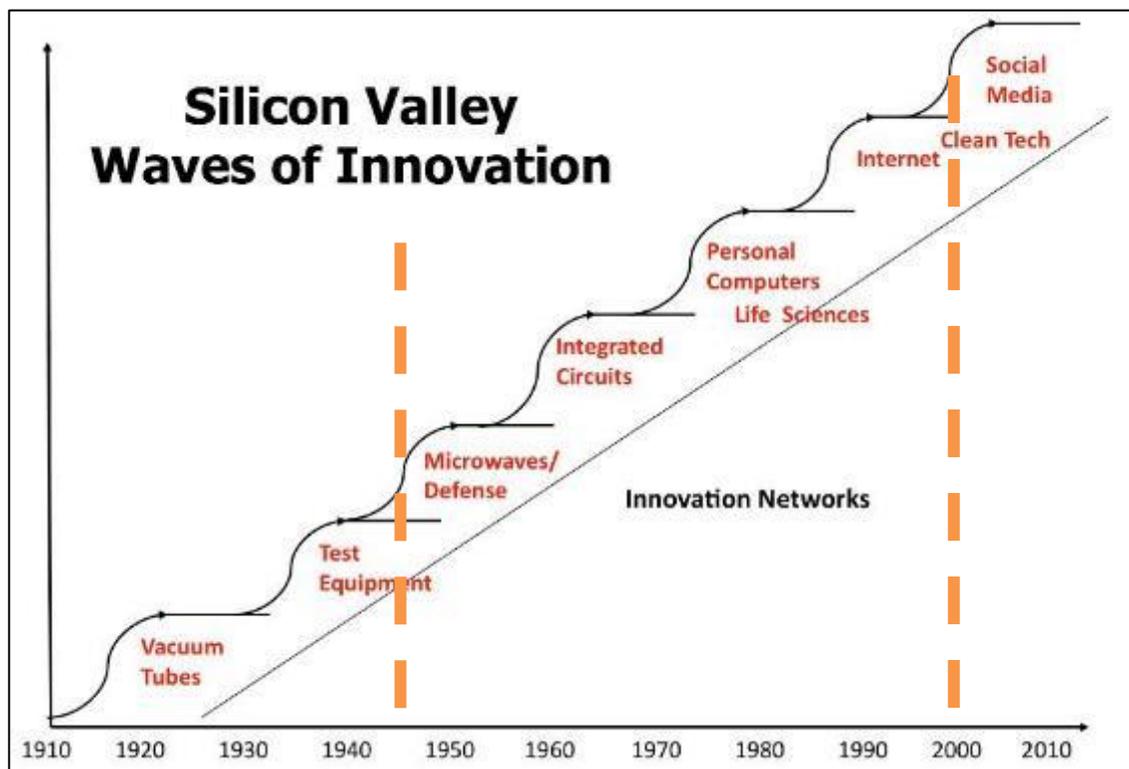


Figure 2. Diagram illustrating several successive phases of technological focus and innovation associated with Silicon Valley’s industrial development; the orange dashed lines represent the beginning and end of the current study.

Source: Steve Blank, edited by ARG

Historic preservation studies often have a limited purview regarding the recent past. Properties listed in the National Register of Historic Places (National Register), which is the federal-level historical inventory administered by the National Park Service (NPS), typically must be more than 50 years old—although properties with “exceptional significance” can also warrant listing. Sunnyvale’s Zoning Ordinance, however, does not include such a provision.

The historic context in this document extends into the past 50 years because abundant information has already been written on the history of Silicon Valley and Sunnyvale-based companies, which supports a strong understanding of the city’s recent historic context. However, ARG also recognizes that the period from 2000 to the present day has received less attention from scholars and other researchers, and fewer details are available in well-researched sources. Efforts to identify potential heritage resources from this more recent period will be better supported once additional time has passed, thereby allowing

investigators to understand the potential industry-wide influence and endurance of innovations from the twenty-first century.

### ***Organization and Methodology***

In order to identify extant properties in Sunnyvale with the greatest likelihood of meeting Heritage Resource Inventory designation criteria, this document generally follows the Multiple Property Documentation (MPD) approach developed by the NPS. The MPD approach is intended to support consistency among evaluations of resources that share associations with a particular geographic area and/or historical themes. MPDs involve the development of narrative historic contexts that identify the foremost historical patterns within a defined area/theme and period of time. The purpose of the MPD approach is to support a reader's understanding of the relative significance of events within the same context.

ARG gained a broad understanding of the twentieth-century technological development of the Bay Area by reviewing several recently published historical accounts of Silicon Valley, which contain useful overviews of the region as well as detailed discussions of several companies that were active in Sunnyvale. ARG created a preliminary inventory of notable Sunnyvale-based firms from numerous additional sources, including company lists maintained by the Computer History Museum and the San Jose Public Library Silicon Valley Company Archive.<sup>6</sup> ARG also reviewed primary-source materials at regional historical repositories with relevant holdings, including the Computer History Museum, the San Jose Public Library, and the Sunnyvale Heritage Park Museum. Additional primary-source materials were collected from online repositories such as the David Rumsey Historical Map Collection, Newspapers.com, NewsBank *San Francisco Chronicle* and *San Jose Mercury News* collections, the San Jose Public Library Historic Photograph Collection, and the University of California, Santa Barbara Library's FrameFinder aerial photograph collection. Furthermore, ARG collected and reviewed a variety of published and unpublished secondary-source studies, including books, academic journal articles, and online journalism.

ARG developed the organization of the historic context statement based on the themes that emerged through research. For instance, video gaming and navigation technologies are two themes that are well represented in Sunnyvale but may not have played as notable a role in surrounding communities. Conversely, the historic context in this study does not cover certain themes for which no corresponding Sunnyvale companies were identified.

Accordingly, the historic context statement is not intended to be comprehensive of all Silicon Valley history, or even exhaustive of most ventures or technologies associated with Sunnyvale. Many hundreds of technology companies have occupied facilities in the city during the time period covered by this report, and it is not possible to include a discussion of each. Rather, this document provides an overview of Sunnyvale's role within the history of the surrounding region, and it describes the technologies and

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<sup>6</sup> Computer History Museum, "Companies," *The Silicon Engine*, accessed May 6, 2024, <https://www.computerhistory.org/siliconengine/companies/>; "Silicon Valley Company Archive (1986-1993)," San Jose Public Library, accessed August 14, 2024, [https://www.sjpl.org/archival\\_post/silicon-valley-company-archive-1986-1993/](https://www.sjpl.org/archival_post/silicon-valley-company-archive-1986-1993/).

companies that are most directly linked with documented technological and economic importance. The historic context introduces companies that represent the range of technology firms that were active in Sunnyvale, but the inclusion of a company's name and associated address in this document is not intended to imply that company produced significant innovations.

The evaluation framework presented in Chapter 7 was developed in accordance with the following reference materials developed by the NPS:

- National Register Bulletin 15: *How to Apply the National Register Criteria for Evaluation*;
- National Register Bulletin 16A: *How to Complete the National Register Registration Form*; and
- National Register Bulletin 16B: *How to Complete the National Register Multiple Property Documentation Form*.

Lastly, ARG conducted a reconnaissance-level survey of identified Sunnyvale properties in August and October 2024. ARG staff selected the properties to survey based on their potential historical significance that was identified through research. The purpose of the reconnaissance survey was to confirm the properties' current physical conditions and generally assess their historical integrity.

### ***Project Team***

This project was completed by a team of ARG architectural historians and historic preservation planners in collaboration with City staff and the Heritage Preservation Commission. The ARG project team includes lead author Jon Rusch, project manager Sarah Hahn, and Principal-in-Charge Katie Horak, all of whom exceed the Secretary of the Interior's Professional Qualification Standards in the fields of history and/or architectural history.

ARG would like to extend particular thanks to individuals who provided assistance during historical research, including Sunnyvale Heritage Park Museum director Laura Babcock and staff, archivist Penny Ahlstrand of the Computer History Museum, and author Michael Malone.

## **2. LOCAL REGULATORY FRAMEWORK**

### ***Sunnyvale Heritage Resource Inventory***

The City of Sunnyvale administers a municipal program for designating historically and architecturally significant heritage resources that merit preservation. As defined in the City's Zoning Ordinance, the Heritage Resource Inventory applies to a wide variety of property types that include "improvements, buildings, portions of buildings, structures, signs, features, sites, scenic areas, views and vistas, places, areas, landscapes, trees, or other natural objects or objects of scientific, aesthetic, educational, political, social, cultural, architectural, or historical significance[.]"<sup>7</sup>

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<sup>7</sup> City of Sunnyvale, Code of Ordinances § 19.96.040.

Although the ordinance does not define each of these property types, it is assumed that several correspond to the following property categories as defined by the NPS:

- Building: a resource that is created principally to shelter any form of human activity;
- Structure: a functional construction made for purposes other than creating human shelter;
- Object: a construction that is primarily artistic in nature or is relatively small in scale and simply constructed; and
- Site: the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure.<sup>8</sup>

The Heritage Resource Inventory currently contains three levels of significance. Local landmarks represent the most significant category, followed by “designated heritage resources” that are designated both locally and at the state and/or federal level (i.e., listed in the National Register or California Register of Historical Resources [California Register]). A third category, “heritage resources,” contains additional resources that are considered to have a lower-level significance. There are specific heritage trees included among the heritage resources. Each of the three levels of designation may also apply to districts comprised of multiple properties. The current list of properties listed in the Heritage Resource Inventory is included in this document as Appendix A.

#### *Designation Criteria*

Section 19.96.050 of the City’s Zoning Ordinance sets out the evaluation criteria for the Heritage Resource Inventory. Designation in the inventory requires a property to meet at least one of the criteria. Although several criteria relate to a resource’s visual character and architectural merit, the following are the most applicable to significant technological innovation:

- (a) It exemplifies special elements of the city's cultural, social, economic, political, aesthetic, engineering, architectural, or natural history;
- (b) Is identified with persons or events significant in local, state, or national history; and
- (j) Is among the few remaining examples in the city, region, or nation possessing distinguishing characteristics of a historic type or specimen.<sup>9</sup>

Designation of a property to the Heritage Resource Inventory requires review and recommendation by the HPC, as well as approval by the City Council.

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<sup>8</sup> National Park Service, *How to Apply the National Register Criteria for Evaluation*, revised 1995, [https://www.nps.gov/subjects/nationalregister/upload/NRB-15\\_web508.pdf](https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf).

<sup>9</sup> City of Sunnyvale, Code of Ordinances § 19.96.050.

### *Historical Integrity*

For the purposes of the National Register program, the NPS established the concept of integrity to assess the degree to which a property retains the physical features that convey its historical and/or architectural significance. As part of this framework, the NPS named seven aspects of integrity: location, setting, design, materials, workmanship, feeling, and association. An eligible property does not need to retain a high degree of integrity in each of the seven aspects. Rather, an eligible property should retain sufficient overall integrity with respect to specific physical features that convey its significance.<sup>10</sup>

The Sunnyvale Zoning Ordinance does not invoke the concept of integrity. However, it is assumed that designated heritage resources should retain some degree of integrity. (“Designated heritage resources” are also listed in or eligible for listing in the National Register or California Register, both of which employ an integrity threshold; such resources logically retain good integrity.) However, it should be noted the property types identified by the ordinance include “sites,” which the NPS defines as “the location of a significant event [...] or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure.” It is possible, therefore, that properties with compromised integrity could still qualify for listing in the Heritage Resource Inventory as sites.

### *Project Review in Sunnyvale*

Alterations proposed to properties with any of the three heritage resource designations are subject to discretionary review. The Heritage Preservation Ordinance outlines separate requirements for landmarks and other heritage resources.

The Zoning Ordinance specifies that select alterations to local landmarks, heritage resources, and properties within districts must be reviewed by the HPC. Such changes include proposed exterior alterations, new construction, relocation, and demolition. The HPC’s review should take into consideration potential changes to the property’s exterior architectural features, visibility of changes seen from the public right-of-way, and compatibility with other buildings within its landmark district, as applicable. Generally, changes to local landmarks and heritage resources should meet the Secretary of the Interior’s Standards for Rehabilitation. These best practices were established by the NPS but have been widely adopted by local municipalities across the country. The treatment “rehabilitation” assumes that at least some repair or alteration of the historic resource will be needed in order to provide for a contemporary use; however, these repairs and alterations should not damage or destroy materials, features, or finishes that define the property’s historic character.

The ten Standards for Rehabilitation are:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

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<sup>10</sup> National Park Service, *How to Apply the National Register Criteria for Evaluation*.

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

### ***Previous Evaluations of Sunnyvale's Technology-Related Properties***

A number of built environment surveys and historical resource investigations have been undertaken in Sunnyvale since the City established its municipal heritage preservation program. Most properties surveyed and evaluated during these efforts contained residential buildings representing Sunnyvale's architectural heritage. These were primarily detached single-family homes. Fewer commercial and industrial buildings have been documented and evaluated, although the 1979 Cultural Resources Inventory survey included several properties associated with Sunnyvale's industrial and commercial development. Non-residential properties that ultimately were designated as local landmarks include the following:

- The Joshua Hendy Iron Works Administration Building (501 E. Hendy Avenue [Figure 3]);

- The Del Monte Building (114 S. Murphy Avenue, relocated from its original location at 195 Evelyn Avenue);
- The Collins-Scott Winery distillery (775 Cascade Drive);
- The Libby, McNeill & Libby cannery water tower (460 W. California Avenue); and
- Murphy Station Landmark District (various addresses; 100 block of South Murphy Avenue).

Additional early-twentieth-century industrial properties that were documented and designated in the Heritage Resource Inventory have subsequently been demolished and redeveloped, which resulted in their removal from the inventory. These include the Cal Cannery complex (182 S. Fair Oaks Avenue), Sunnyside Fruit Products Factory (435 E. McKinley Avenue), and Jubilee Incubator Company (102 Sunnyvale Avenue).<sup>11</sup>

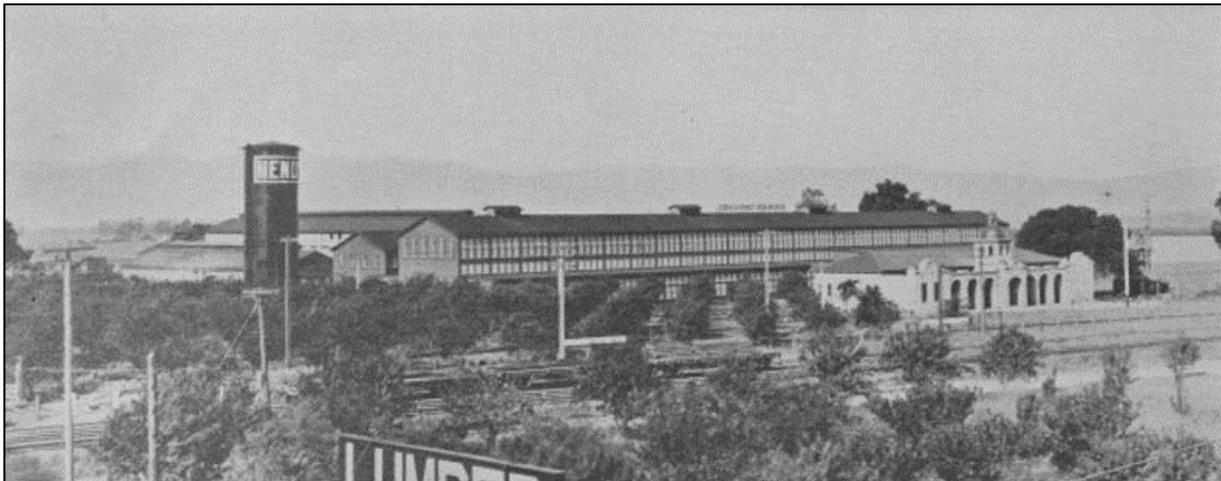


Figure 3. The Joshua Hendy Iron Works photographed in the early twentieth century, shortly after the facility was constructed in Sunnyvale; the administration building at right.  
Source: Sunnyvale Chamber of Commerce, 1907

Although the City has recognized the technological and industrial significance of these properties, they were primarily constructed before World War II. The most recent update to the inventory took place in the mid-1990s, when the beginning of the postwar era was only 50 years in the past. The update effort contemplated the potential significance of several post-World War II properties, including the Lockheed Missiles and Space Company (LMSC) campus and Sunnyvale Air Force Station, but did not document them because of their relatively recent construction dates.<sup>12</sup>

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<sup>11</sup> City of Sunnyvale, *Cultural Resources Inventory*, September 1979; City of Sunnyvale, *City of Sunnyvale Heritage Resources Inventory*, September 2018.

<sup>12</sup> Nancy Elizabeth Stoltz, *City of Sunnyvale Cultural Resources Reconnaissance Survey Update*, prepared for the City of Sunnyvale, August 1996, 8-14. This effort proposed an industrial historic district encompassing the Joshua Hendy Ironworks campus utilized during World War II, but it did not consider the property's potential Cold War significance.

However, several properties in Sunnyvale associated with post-World War II industry and advanced technological research have been evaluated as part of regulatory review processes, separate from the municipal heritage resource preservation program. Federal agencies with properties within Sunnyvale’s municipal boundaries have evaluated their resources in compliance with the National Historic Preservation Act. Evaluated federal properties include buildings within the former Sunnyvale Air Force Station (later known as Onizuka Air Force Station) and the Naval Industrial Reserve Ordnance Plant Sunnyvale, which was located within the LMSC campus. Each of these installations contained properties found to meet the eligibility requirements of the National Register due to their associations with Cold War-era defense missions and aerospace manufacturing.<sup>13</sup> Furthermore, project review under the California Environmental Quality Act has identified buildings in Sunnyvale historically used by the LMSC that appeared to meet the eligibility requirements of the California Register, based on their close associations with the Bay Area’s mid-twentieth-century defense industry.<sup>14</sup>

Although these various properties were evaluated as eligible for national and state historic registers, they were not locally designated as heritage resources and were not subject to the Zoning Ordinance’s review process. Several of these evaluated properties have subsequently been demolished.

### 3. THE ROOTS OF INNOVATION IN “THE CITY OF DESTINY”

This section provides an overview of historical trends before World War II that set the stage for Silicon Valley’s technological preeminence in the later twentieth century. The growth of a local industrial economy, as well as the forging of strong ties between regional institutions and early electronics innovators, primed the young communities of the Santa Clara Valley for a dramatic shift in industry that gained more momentum around the middle of the century.

#### *Sunnyvale’s Industrial Origins*

By the time Sunnyvale incorporated in 1912, the community had been a permanent settlement of European-American residents for more than 50 years. The Santa Clara Valley surrounding Sunnyvale had already developed into an abundant agricultural region—first containing wheat and barley fields before transitioning to a landscape of fruit orchards. Bay Area Ohlone people speaking the Tamien language had been present throughout the area containing present-day Sunnyvale before Spanish colonizers encroached into the later decades of the eighteenth century. After establishing Mission Santa Clara de Asís in 1777 in what is now the city of Santa Clara, the Spanish forced the area’s Native inhabitants from

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<sup>13</sup> Department of the Air Force, *Addendum to the 2004 Historic Building Inventory & Evaluation Report, Onizuka Air Force Station, Sunnyvale, California*, Air Force Center for Engineering and the Environment, December 2009; Victoria Taber, “Initiation of Consultation Regarding Transfer of Naval Industrial Reserve Ordnance Plant Sunnyvale,” letter to Julianne Polanco, August 2, 2018, available from City of Sunnyvale.

<sup>14</sup> City of Sunnyvale, *Moffett Towers II Draft Subsequent Environmental Impact Report*, prepared by Kimley-Horn, December 2015, 4.4-11 through 4.4-12. The evaluation identified that Buildings 150, 151, and 152 of the Lockheed Plant One Complex met the eligibility requirements of the California Register.

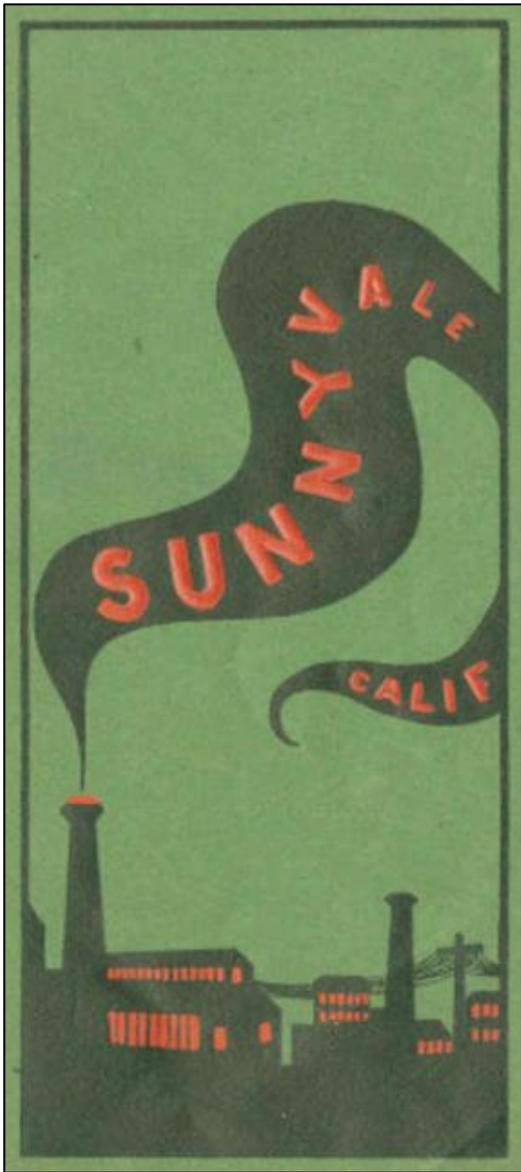


Figure 4. Cover of a 1907 promotional pamphlet illustrating the industrial vision for Sunnyvale  
Source: Sunnyvale Chamber of Commerce, 1907

their villages and claimed the area for the mission’s land holdings. The Mexican government secularized the missions during its control of present-day California between 1821 and 1848. One allotment from Mission Santa Clara de Asís was the Rancho Pastoría de Los Borregas, which covered much of current-day Sunnyvale. Martin Murphy, Jr., an early European-American immigrant settler to the Santa Clara Valley, purchased 4,800 acres of the rancho around the time California became an American state in 1850. Murphy’s family established an agricultural estate but granted a right-of-way to the San Francisco and San Jose Railroad. In 1870, the Southern Pacific Railroad (SPRR) took over the rail corridor, which spurred the growth of communities lying between San Francisco and the Santa Clara Valley.<sup>15</sup>

After Murphy’s death in 1884, his heirs began to sell off portions of the family’s estate. Real estate developer Walter Crossman ultimately acquired a 200-acre parcel from the Murphy family and envisioned a future town founded on industrial production, which he promoted as “The City of Destiny.” The small settlement was officially christened Sunnyvale in 1901 to emphasize its pleasant climate.<sup>16</sup> Crossman’s vision was quickly realized: Sunnyvale attracted industrial firms that were displaced in the devastating San Francisco earthquake in 1906, and city leaders already touted Sunnyvale as “a mighty manufacturing center” in 1907 (Figure 4).<sup>17</sup> The city boasted several significant firms, including the Jubilee Incubator Company (poultry equipment) and Madison & Bonner (fruit and nut drying/packing). The two companies of this period that made the most lasting impact on Sunnyvale arrived in 1906: the Joshua Hendy Iron Works (501 E. Hendy Avenue, extant), which specialized in producing mining equipment; and the regional plant of

<sup>15</sup> Santa Clara University Community Heritage Lab, “Whose Land Is This Anyway?,” accessed July 25, 2024, <https://www.scu.edu/community-heritage-lab/ohlone-heritage-hub/whose-land-is-this-anyway-/>; Kent L. Seavey, *Images: Sunnyvale’s Heritage Resources*, prepared by the California History Center, De Anza College (Sunnyvale: City of Sunnyvale, 1988), 3-5.

<sup>16</sup> Seavey, *Images*, 5-7.

<sup>17</sup> Sunnyvale Chamber of Commerce, *Sunnyvale, California: A Manufacturing and Fruit Raising Section* (Sunnyvale: Sunnyvale Chamber of Commerce, 1907).

Chicago-based Libby, McNeill & Libby Fruit Cannery (460 W. California Avenue, not extant). Each of these companies built their plants near the SPRR corridor and relied on rail spurs to move their goods onto the railroad's main line, and then onward to San Francisco or San Jose.

For Sunnyvale's early-twentieth-century boosters, its manufacturing plants proved that a strong entrepreneurial spirit had taken root in their city. Promotional materials even stated, "Everybody makes money in Sunnyvale, because the people, knowing the value of what they have about them, pull together toward one common end: To make Sunnyvale what it was destined to be—a home city and a great industrial center unequalled on the Pacific Coast."<sup>18</sup>

This first generation of manufacturing, canning, and packing plants continued to support the city's economic stability and growth into the 1930s. During World War I, the Hendy Iron Works received contracts from the U.S. Shipping Board to produce marine engines for cargo ships, pushing the company beyond its initial focus on mining equipment. Libby's cannery became one of the largest fruit canning complexes in the world by the 1920s. The region's agricultural industry and large-scale canneries—including Libby's, Schuckl's, and Del Monte—helped cushion Sunnyvale against the harshest consequences of the Great Depression. The Hendy Iron Works stayed afloat by producing gates, valves, and other components used in the construction of massive dams in the American West.<sup>19</sup>

Sunnyvale's economy during this period depended upon its plants' ability to manufacture equipment and process agricultural goods, but the city was also the home of one of the region's first consumer electronics companies. In 1920, Arthur Bessey and Tom Lambert established the Radio Shop, which made desktop radio receivers later marketed under the brand name Echophone. The company's main office and factory (229 N. Sunnyvale Avenue, not extant) was completed in 1922 and expanded to employ more than 100 people. Although changes in radio technology caused the company to close by 1925, the Radio Shop was an antecedent to the advanced electronics startups that populated Sunnyvale decades later.<sup>20</sup>

### ***Anchors of Innovation: Stanford University and Moffett Field***

In addition to the local factors in Sunnyvale, the formation of Silicon Valley's high technology sector benefited tremendously from two institutions on the San Francisco Peninsula: Stanford University, which produced a pool of talented scientists interested in the commercial applications of their research; and the Naval Air Station Sunnyvale (also known as Moffett Field), a military installation that ultimately became a hub of federal defense funding for innovative technological research.

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<sup>18</sup> Ibid., 38.

<sup>19</sup> American Society of Mechanical Engineers, *The Joshua Hendy Iron Works, 1906-1946, Sunnyvale, California: A National Historic Mechanical Engineering Landmark*, December 14, 1978, 8-9; Seavey, *Images*, 12-13.

<sup>20</sup> Ben Koning, dir., *Echo of the Future: A Tale of Sunnyvale*, 2008, online video, posted August 16, 2013, <https://www.youtube.com/watch?v=tGsR3JlGHjg>; Eugene T. Sawyer, *History of Santa Clara County, California* (Los Angeles: Historic Record Company, 1922), 1358.

Already by the 1910s, Stanford University was drawing scientific innovators to the Bay Area from its location immediately outside Palo Alto (approximately eight miles northwest of Sunnyvale). A Stanford-trained electrical engineer, Cyril Elwell, founded the Federal Telegraph Company in the first decade of the twentieth century and pioneered a method of wireless (radio wave) voice transmission in the early 1910s. One of the company's scientists, Lee de Forest, devised a vacuum tube<sup>21</sup> amplifier for electrical signals in its Palo Alto laboratory, and the innovation had an enormous influence on telecommunications technologies. Charles Litton, another engineer from Stanford, worked at the Federal Telegraph Company before starting his own venture, Litton Engineering Laboratories, that became a leader in vacuum-tube radar equipment during World War II.<sup>22</sup>

Frederick Terman studied at Stanford and joined its engineering faculty in the 1920s. Perhaps more than any individual, Terman has been credited with laying the groundwork of Silicon Valley by tirelessly advocating for stronger relationships among the university, private industry, and federal defense agencies. Terman's influence extended to Russell and Sigurd Varian—inventors of the klystron, a vacuum tube amplifier with research and consumer applications—as well as Bill Hewlett and David Packard, who founded their namesake electronics firm in Palo Alto in 1939. The ventures started by Hewlett, Packard, and the Varian brothers helped establish a template of white-collar R&D that came to define the industrial culture of Silicon Valley.<sup>23</sup>

Moffett Field was a counterweight to Stanford located several miles to the southeast along the Bayshore Freeway (now U.S. Route 101). Moffett Field was constructed in the early 1930s as a base for the USS *Macon*, one of two dirigibles operated by the U.S. Navy (Figure 5). It opened in 1933 and, after the *Macon* crashed at sea, was transferred to the U.S. Army in 1935. Although the installation initially had a limited influence on the Bay Area's industries, it was selected as the site of the National Advisory Committee for Aeronautics' Ames Aeronautical Laboratory, which opened in 1939.

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<sup>21</sup> Vacuum tubes are devices that use vacuums to control the flow of electric currents; they were a key unit of electronic technologies between the late nineteenth and mid-twentieth centuries.

<sup>22</sup> Timothy J. Sturgeon, "How Silicon Valley Came To Be," in *Understanding Silicon Valley: The Anatomy of an Entrepreneurial Region*, ed. Martin Kenney (Stanford: Stanford University Press, 2000), 19-34.

<sup>23</sup> Stuart W. Leslie, "Playing the Education Game To Win: The Military and Interdisciplinary Research at Stanford," *Historical Studies in the Physical and Biological Sciences* 18, no. 1 (1987): 57-61; Margaret O'Mara, *The Code: Silicon Valley and the Remaking of America* (New York: Penguin Books, 2019), 17-21.



Figure 5. Naval Air Station Sunnyvale, photographed shortly after its completion in 1933.  
Source: History San Jose Photographic Collection

Moffett Field supported the United States' defense and reconnaissance missions during World War II, and the installation was the federal government's primary presence in the Santa Clara Valley. During this period, the American armed forces channeled money into the region's industrial firms for home front production, and one of the beneficiaries was Hendy Iron Works. The plant was well-suited to manufacture at an immense scale, and it secured millions of dollars in military contracts. Hendy produced more than 700 Liberty Ship steam engines for the war effort, as well as propulsion turbines, weaponry, and rocket launchers. By the end of the war in 1945, the iron works employed 7,500 people and had expanded to almost one million square feet, more than 10 times the size of its pre-war footprint.<sup>24</sup>

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<sup>24</sup> American Society of Mechanical Engineers, *The Joshua Hendy Iron Works*, 12-14; Mary Jo Ignoffo, *Sunnyvale: From the City of Destiny to the Heart of Silicon Valley* (Cupertino: California History Center & Foundation, 1994), 47-51.

### ***Promoting Postwar Growth***

As tens of thousands of new residents settled in the Bay Area after the war ended, civic and business leaders planned an economic framework for the region that placed San Francisco as a financial services center; the Peninsula would retain its focus on light industry. Due in part to the influence of Frederick Terman, Stanford University strengthened its science and engineering programs and proposed the Stanford Industrial Park, a technology-focused development on university land adjacent to the academic campus. The development was planned to house R&D facilities, which would allow Stanford's growing pool of academic talent to support the needs of private industry and the government. The Stanford Industrial Park created a template for a low-density business and research campus that was later replicated up and down the Peninsula. In the same spirit, the university established an applied research center, the Stanford Research Institute, in 1946 and actively sought federal contracts. (The institute separated from Stanford in 1970 and later was renamed SRI International.) Stanford's ambitions thus supported the region's identity as an economic center rather than a collection of bedroom communities.<sup>25</sup>

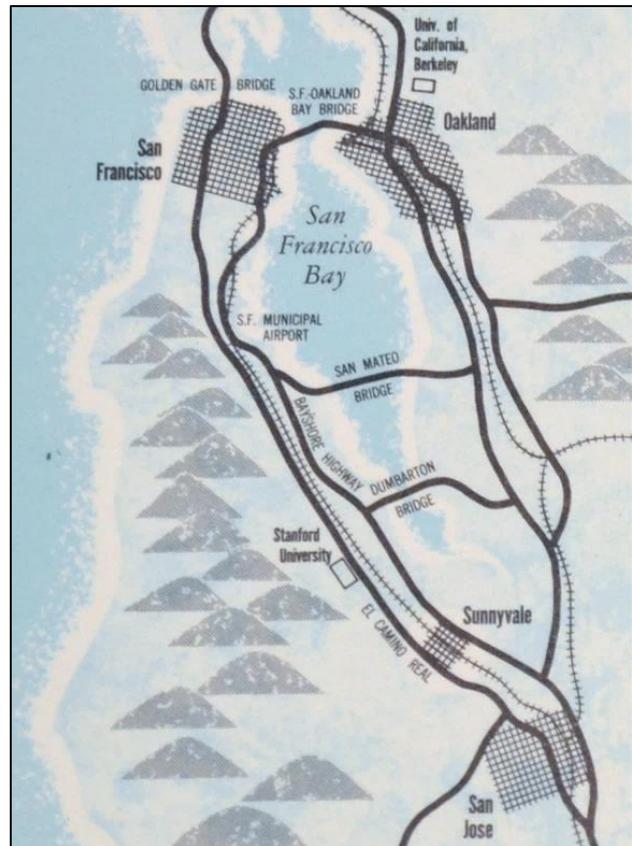


Figure 6. c.1960 Promotional map depicting Sunnyvale's Bay Area location in relation to the region's transportation corridors, cities, and educational institutions  
Source: Sunnyvale Chamber of Commerce, *What Industry Has Discovered About Sunnyvale, California*

Even though defense contracts were abruptly curtailed in 1945 and thousands of Hendy Iron Works employees found themselves unemployed, Sunnyvale's government remained committed to the city's industrial identity. In the late 1940s, city manager Ken Hunter and Chamber of Commerce manager Al Spiers actively promoted Sunnyvale's favorable attributes to industrial firms across the United States that were scouting locations for new West Coast plants. They highlighted the city's level topography, existing utilities, and proximity to rail- and water-based transportation (Figure 6). After Westinghouse Electric Corporation took over the Hendy plant in 1947 and purchased the facility outright in 1948, the company cited Sunnyvale's enthusiasm for industry as one of the primary reasons Westinghouse had chosen to operate in the city.<sup>26</sup>

<sup>25</sup> Margaret O'Mara, *Cities of Knowledge: Cold War Science and the Search for the Next Silicon Valley* (Princeton: Princeton University Press, 2005), 103-115.

<sup>26</sup> Ignoffo, *Sunnyvale*, 53-56.

#### 4. SUNNYVALE IN THE EARLY INFORMATION AGE

Against the backdrop of the first half of the twentieth century, Santa Clara County's electronics industry and related sectors were well situated for expansion. Based on the strong reputations and relationships that had formed leading into and during World War II, the Bay Area's industrial region coalesced into what is now known as Silicon Valley: an interconnected economy of numerous highly skilled firms engaged in a wide range of complementary research, development, and production activities. Innovators in the region harnessed technological breakthroughs to expand the possibilities of what electronic devices could accomplish, which led over time to a flurry of activity that has often been compared to California's gold rush of the mid-nineteenth century.

There became a constant churn of scientists and entrepreneurs who formed new companies, invented, implemented, and then splintered before beginning the innovation process again in new configurations. As the Bay Area's technological reputation grew during the 1950s and 1960s, recognized East Coast and international firms sought to plant roots in Northern California by establishing specialized subsidiaries or by acquiring ownership stakes in Silicon Valley's small, flexible startups. As these trends began to take shape in the 1950s, Sunnyvale had already emerged as one of the primary locations of technological research and innovation in the Bay Area. Gordon Moore, one of the founders of Intel, famously anticipated that the number of transistors fitting on a microchip would increase twofold around every two years. Although a generalization, Moore's forecast did broadly characterize the rapid pace of technological advancement across multiple sectors.

This section addresses major waves of the advanced electronics industry and related historical trends that characterized the first decades of the Cold War (through to 1970). It describes three primary areas of technology, viewed through the case study of Sunnyvale: the influence of defense contracts and Cold War military priorities; the birth of the semiconductor industry; and the emerging importance of large computing machines. Intertwined with these technological advancements were Sunnyvale's efforts to house the new electronics and defense firms and to become a hub of the region's industrial economy.

##### ***The Military Presence in the Early Cold War (1947-1970)***

The first driving force for technological innovation in the postwar Bay Area was American national security during the Cold War—the global geopolitical situation that extended from the immediate post-World War II period until the early 1990s. The United States was the most powerful member of the Western Bloc, and the American government invested heavily in technological research and development in a constant effort to keep the nation's defense and intelligence capabilities above those of its primary adversary, the Soviet Union. The immense need for technologically sophisticated weapons, reconnaissance and surveillance systems, and other forms of military-grade electronics outstripped the capacity of the federal government on its own. Therefore, substantial funding flowed to private-sector companies and research centers that offered the technical specialists and manufacturing capabilities to produce a wide range of defense technologies.

The foremost defense-oriented company active in the Bay Area after World War II was the Lockheed Corporation, an aerospace manufacturer that had operated in Southern California since the 1920s. In 1955, Lockheed acquired 275 acres of agricultural land in northern Sunnyvale (immediately east of Moffett Field) and announced its plans to move its Missile Systems Division (later known as the Lockheed Missiles and Space Company, or LMSC) to Northern California. Frederick Terman had initially persuaded Lockheed to occupy space in the Stanford Industrial Park in Palo Alto, but the company sought a far greater footprint so that it could better support the federal government's aerospace and defense needs. (LMSC continued to maintain a research laboratory in the Stanford Industrial Park.) Sunnyvale offered LMSC several key features that would help the company secure new contracts and build a strong employee base in the region. Critically, Sunnyvale enjoyed a close geographic proximity to Moffett Field and Ames Research Center (taken over by the newly formed National Aeronautics and Space Administration, or NASA, in 1958). Equally as important, the region also offered a pool of highly trained engineering talent and a good quality of life for middle-class professionals and their families. The company's employee recruitment materials later praised the virtues of the area, noting that most company employees and their families made their homes within 10 miles of either Sunnyvale or Palo Alto. In those places "in the northern part of the Santa Clara Valley—near Lockheed—the acres of broad, green, inviting. Here you may build, buy or rent whatever your fancy dictates."<sup>27</sup>

The first facility that the Lockheed Corporation constructed in Sunnyvale, known as the Plant One Complex, comprised several sprawling industrial buildings that housed administration, research, and manufacturing functions. The earliest to be constructed were two massive production buildings (Buildings 102 and 103) as well as smaller facilities housing a cafeteria and administration functions near the center of the campus. Surface parking lots covered the rest of LMSC's site (Figure 7).<sup>28</sup>

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<sup>27</sup> Lockheed Missiles and Space Company, *Your Place in Space...With Lockheed in California*, n.d., 34; Thomas Heinrich, "Cold War Armory: Military Contracting in Silicon Valley," *Enterprise & Society* 3, no. 2 (2002): 258-259.

<sup>28</sup> Garavaglia Architecture, *Historic American Engineering Record: Lockheed Martin Space Systems Company, Plant One Complex*, HAER No. CA-2322, March 2016, 3-4; "Lockheed Buys 275 Acres for Sunnyvale Missile Plant," *Peninsula Times Tribune*, November 5, 1955, 1; "Lockheed Plant Changing Shape of Sunnyvale Skyline," *San Jose Mercury News*, April 21, 1957, 31.



Figure 7. View of Lockheed's original plant in the late 1950s, photographed facing north; the interchange of Highway 101 and State Route 237 is in the foreground. The original four buildings are at center; Building 181N/182N lies in the background.  
Source: Sourisseau Academy for State and Local History, San Jose State University

Intense activity began throughout the plant as the company commenced work on its contracts—the largest of which was the design, testing, and production of the Polaris Fleet Ballistic Missile for the U.S. Navy's Special Projects Office. In the mid-1950s, the Eisenhower administration had begun to shift the United States' nuclear warhead delivery strategy away from long-range bombers and in favor of ballistic missiles. The aim of the program was to produce a solid-propellant deterrent missile that could be launched from submarines as well as from land, which posed several significant engineering challenges. LMSC specifically had to develop a design that allowed the weapons to be propelled through water as effectively as through air, and then travel more than 1,000 nautical miles to a programmed target.<sup>29</sup>

The program began in Building 102 while construction was still underway. In 1958, LMSC constructed two new buildings on its campus specifically to support the Polaris program: Building 181N, the Engineering Design Lab, and Building 182N, the Manufacturing Building (1233 N. Mathilda Avenue, extant). The

<sup>29</sup> Lockheed Martin, "The Long View: Fleet Ballistic Missiles," October 1, 2020, <https://www.lockheedmartin.com/en-us/news/features/history/fbm.html>; Lockheed Missiles and Space Company, *Your Place in Space*, 15-16. LMSC and the federal government described missile arsenals such as the Polaris as primarily deterrent in nature, meaning they were intended primarily for retaliation in the event of an attack against the United States.

company described the facility as containing the “nerve centers of Polaris development,” including testing, engineering, and civilian and Navy administration.<sup>30</sup> These conjoined buildings covered an entire city block: Building 181 featured a highbay that accommodated upright assembly, and Building 182 contained facilities where missile bodies were manufactured. Scale-model testing was performed in a purpose-built underwater tank on the Sunnyvale campus. As a result of the steadfast work on the project by LMSC, as well as by countless subcontractors who provided system components, the United States test-launched a Polaris missile successfully for the first time in July 1960, three years ahead of schedule. The company went on to produce almost 500 Polaris missiles.<sup>31</sup>

LMSC’s successful completion of the Polaris missile contract solidified its partnership with the U.S. Navy, and the company built a healthy pipeline of new federal defense and intelligence contracts. Its Sunnyvale plant employed almost 20,000 people by 1960, and over the next few years the company expanded its facilities to the west toward Moffett Field. Beginning in 1965, LMSC continued its support role for the Navy when it received contracts to develop the Poseidon C-3, the next generation of Fleet Ballistic Missiles with improved accuracy and range from the earlier Polaris family. This effort again utilized Buildings 181N and 182N on the Sunnyvale campus, although a greater focus was shifted to computerized simulations and testing conducted in other locations. The U.S. Navy first deployed the Poseidon missiles in 1971.<sup>32</sup>

Simultaneous with LMSC’s support of the naval missile programs, the company became closely involved in the U.S. government’s deepening investment in space rockets and satellite intelligence. Such concepts became far more critical after the Soviet Union launched its Sputnik 1 satellite in 1957. This led to LMSC securing American government contracts in the realm of spaceflight, which were overseen by the company’s Space Systems Division. The most important program was the U.S. Air Force’s highly classified WS-117L reconnaissance satellite program, which ultimately encompassed the CORONA and SAMOS photographic intelligence satellites as well as the MIDAS missile detection satellite. The process of designing the CORONA satellite was a particularly significant challenge because, accordingly to a LMSC scientist, the project team “had no knowledge of the environment or physics of space, no satellite engineering methodology and no program management processes to draw from.”<sup>33</sup>

All three types of satellites utilized the Agena vehicle (or satellite body), a significant milestone in spacecraft technology developed at LMSC that became a workhorse for American reconnaissance satellite and scientific spaceflight programs over the next two decades. The company constructed

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<sup>30</sup> Lockheed Martin, *A Chronology of LMSC History, 1950-1990*, 2019, 8.

<sup>31</sup> Garavaglia Architecture, *Historic American Engineering Record*, 3-4; HDR, Inc., *Special Areas Historic Resources Survey and Evaluation, Naval Support Activity Monterey, California*, prepared for Naval Facilities Engineering Command Southwest, 2013, available from the City of Sunnyvale; Heinrich, “Cold War Armory,” 258-259; Lockheed Martin, *A Chronology of LMSC History*, 10.

<sup>32</sup> HDR, *Special Areas Historic Resources Survey and Evaluation*.

<sup>33</sup> Lockheed Martin, *Innovation With Purpose: Lockheed Martin’s First 100 Years* (Bethesda: Lockheed Martin Corporation, 2013), 121.

specialized facilities on the Sunnyvale campus for the satellite program (likely Building 151/152, not extant), although the CORONA satellites were assembled at the plant of Hiller Aircraft, a then-classified location in Menlo Park. The first CORONA satellite, Discoverer I, was launched successfully in 1959. The versatile Agena vehicle was designed for space as well as orbiting missions and could accommodate various payloads, and it was proposed to support NASA lunar landing and manned space travel. Ultimately, NASA employed the Agena for unmanned missions of the Gemini spaceflight program that tested spacecraft docking.<sup>34</sup>

During the reconnaissance satellite program, LMSC became closely integrated with its key federal clients, the National Reconnaissance Office and the U.S. Air Force. Reflecting the close and necessary relationship among these partners, the Lockheed Corporation transferred approximately 11 acres of its Sunnyvale property to the Air Force in 1959 for an installation that became known as the Satellite Test Annex (also frequently referred to as the Satellite Test Center). Air Force staff were temporarily stationed on the LMSC campus while the Satellite Test Annex was built, and they worked alongside LMSC employees (and likely staff from the Central Intelligence Agency) to monitor and control reconnaissance satellites such as the CORONA while they were in orbit. During this early phase of the CORONA program, Air Force staff in the interim satellite control facility in Sunnyvale directed the Discoverer XIII reconnaissance satellite, which involved the first successful ground recovery of a human-made object from space. (General Electric was responsible for designing the satellite's recovery vehicle, or "bucket," that was capable of safely reentering the atmosphere with a parachute while protecting its exposed film stock for interception or later recovery.)<sup>35</sup>

In early 1961, the Air Force completed its first building within the Satellite Test Annex: the windowless Building 1001 (not extant). This building contained the Satellite Control Room, where a series of consoles facilitated radio tracking and communication (Figure 8). From these consoles, staff were able to monitor the status of a satellite and issue commands to it. One of the early missions overseen in the facility was the Discoverer XIV, a CORONA satellite that photographed Soviet military installations—vital intelligence that confirmed the Soviet Union lacked a stockpile of intercontinental ballistic missiles. The Discoverer XIV flight is also noted as the first time an object from space was successfully recovered mid-air.<sup>36</sup>

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<sup>34</sup> Department of the Air Force, *Addendum to the 2004 Historic Building Inventory & Evaluation Report*, 2-1 through 2-4; Lockheed Martin, *A Chronology of LMSC History*, 10; Lockheed Missiles and Space Company, *Your Place in Space*, 9-10.

<sup>35</sup> Department of the Air Force, *Addendum to the 2004 Historic Building Inventory & Evaluation Report*, 2-2 through 2-7; Roger A. Jernigan, *Air Force Satellite Control Facility Historical Brief and Chronology, 1954-Present*, U.S. Air Force Satellite Control Facility History Office, 1983, 5-7.

<sup>36</sup> Department of the Air Force, *Addendum to the 2004 Historic Building Inventory & Evaluation Report*, 2-4 through 2-7.



Figure 8. The Satellite Control Room in Building 1001, photographed c.1965  
Source: U.S. Air Force, via Sunnyvale Heritage Park Museum

The Air Force continued to expand and improve the Satellite Test Annex during the 1960s to enhance its satellite control and communications capabilities. In addition to upgrading Building 1001, the Air Force erected Building 1002 in 1962 to house administrative functions of the satellite program. (Building 1002, located at 1080 Innovation Way, is the only component of the installation that remains extant.) In order to support the new Manned Orbiting Laboratory program, the Air Force acquired several more acres acquired from Lockheed and constructed an \$8 million support facility: the landmark Building 1003 (popularly known as the “Blue Cube” [Figure 9]; not extant). Although the Manned Orbiting Laboratory program was later cancelled, the Air Force completed Building 1003 in anticipation of future satellite programs.<sup>37</sup>

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<sup>37</sup> Ibid., 2-8 through 2-14.



Figure 9. The Satellite Test Annex, including the landmark Building 1003 (the Blue Cube) at left  
Source: National Reconnaissance Office

In 1971, the Air Force redesignated the Satellite Test Annex as the Sunnyvale Air Force Station, which continued to facilitate communications with spacecraft in intelligence and scientific missions. Among these was the HEXAGON photographic reconnaissance satellite, which improved upon the film carrying capacity and image resolution of the CORONA. LMSC was responsible for the basic assembly of HEXAGON and was able to lower the satellite’s failure rate down to zero.<sup>38</sup> By this time, the Sunnyvale installation and its neighboring LMSC campus were among the best manifestations of the Cold War military-industrial complex in the entire Bay Area. (Many of the buildings that existed within LMSC’s Sunnyvale campus and Sunnyvale Air Force Station during the first half of the Cold War—including most located south of current-day 5th Avenue—have been demolished for redevelopment.)

LMSC was by no means the only recipient of Cold War-era federal contracts in Sunnyvale, however. Westinghouse Electric Corporation (Figure 10) retained its focus on manufacturing heavy equipment—which extended into specialized goods for military and scientific research applications. These types of projects relied on the company’s expansive plant (the former Hendy Iron Works), precision machining equipment, large engineering staff, and custom production capabilities. Within a scientific context, the company was responsible for developing components of advanced radio and optical telescope equipment, including solar telescopes installed in advanced research facilities in Colorado and New Mexico. One division of the company, the Westinghouse Missile Launching & Handling Department (later the Westinghouse Marine Division), received contracts from American defense agencies to design and manufacture anti-aircraft weaponry. Notably, Westinghouse also contributed to some of the same missile systems designed by LMSC in its plant just two miles to the north (such as the Poseidon). For these

<sup>38</sup> Ibid., 2-14; Lockheed Martin, *Innovation With Purpose*, 121, 154;

defense programs, Westinghouse developed missile launch tubes and “cold launch” technologies that were integral to the performance of that missile system.<sup>39</sup>



Figure 10. The Westinghouse Electric Corporation plant, formerly the Hendy Iron Works, photographed in the 1960s  
Source: Westinghouse Electric Corporation

Near the end of the 1960s, *Newsweek* published an article on Sunnyvale that characterized the city as a model of the Cold War military-industrial complex. LMSC had 21,000 employees in the city by this time; Westinghouse employed 3,000 more. Defense-related funding flowed to many other local companies that provided the auxiliary components and support services necessary to keep the larger government programs running as intended. (One new aspect of this was the semiconductor device, a new area of Santa Clara County’s technology sector that would soon be booming.) Sunnyvale’s political and business circles seemed to accept the importance of the defense industry, and apart from orcharding there was not yet a viable alternative.<sup>40</sup>

### ***Planning for Innovation***

Given the abundance of defense spending streaming into Sunnyvale and the surrounding region during the 1950s and 1960s, the city was ideally positioned for technically-advanced companies that either had outgrown existing Bay Area plants or were seeking to establish themselves in the region for the first time. Despite Sunnyvale’s enthusiasm for new industry after World War II, the city’s geographic footprint remained somewhat limited at first. Consequently, the city began to annex agricultural land around 1950

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<sup>39</sup> American Society of Mechanical Engineers, *The Joshua Hendy Iron Works*, 13; Heinrich, “Cold War Armory,” 258, 261; Westinghouse Electric Corporation, *Sunnyvale: Another Westinghouse Capacity To Serve the Nation*, n.d.

<sup>40</sup> “Sunnyvale: Prunes to Missiles,” *Newsweek*, June 9, 1969, 77.

to accommodate firms that were interested in relocating.<sup>41</sup> This process rapidly expanded the municipal boundaries by thousands of acres, much of which was then zoned for industrial uses. The results on the city were striking. In 1952, an average of almost \$12 million was invested annually in new industrial development in the city. The jobs created by employers in Sunnyvale attracted scores of residents, and by 1956 the city's population reached almost 30,000 residents—more than four times what it had been a decade earlier. The figure surpassed 50,000 by 1960 and reached nearly 100,000 in 1970.<sup>42</sup>

The new industrial developments generally followed the model of the Stanford Industrial Park, although sponsored by private developers rather than by educational institutions. Typically, real estate firms acquired recently annexed agricultural lands and subdivided them into smaller parcels; utilities and new streets were laid out. Parcels were then sold or leased—often to private companies who constructed administrative offices, research labs, and production plants. In Sunnyvale, more than \$100 million was invested in new industrial plants between 1953 and 1966—almost twice as much as in any other community in Santa Clara County.<sup>43</sup> A map published by the Sunnyvale Chamber of Commerce in the late 1960s showed that private real estate developers had established eight substantial (more than 30 acres) industrial parks in the city, totaling almost 1,700 acres of land.<sup>44</sup>

Among the earliest and most notable of Sunnyvale's industrial developments was the International Science Center, which was sponsored by a not-for-profit entity named the International Science Foundation. In the late 1950s, the foundation proposed an economically integrated development containing industrial, commercial, and office facilities. Similar to companies like LMSC, the foundation was drawn to Sunnyvale because of its proximity to Peninsula communities where graduates of Stanford University tended to settle. The foundation acquired 130 acres (generally bounded by Britton Avenue, E. Arques Avenue, Lawrence Expressway, and E. Duane Avenue), and it planned to construct its own administrative buildings on a portion of that. The remainder, then, was sold to private firms. Companies that built in the International Science Center included Western Electric and General Electric, whose regional office at 310 De Guigne Drive (not extant) created a modern visual anchor along the park's southern boundary (Figure 11). Plans for the park also called for a University of California extension office,

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<sup>41</sup> Santa Clara County regulations allowed cities to annex land directly adjoining their boundaries. Because Sunnyvale had a narrow corridor leading north to San Francisco Bay, the city had the ability to absorb large areas of agricultural land to the north of the original town site. See Ignoffo, *Sunnyvale*, 57-58.

<sup>42</sup> "Factories Lured by Planning to Sunnyvale Area," *Solano-Napa News Chronicle*, April 12, 1956, 13; Ignoffo, *Sunnyvale*, 56-60; Sunnyvale Chamber of Commerce, *Community Economic Profile for Sunnyvale*, January 1979, 1.

<sup>43</sup> Sunnyvale Chamber of Commerce, "Sunnyvale, California," May 1972, 1-6, 9-1. For more information on the regional and national influence of the Stanford Industrial Park, see Louise Mazingo, *Pastoral Capitalism: A History of Suburban Corporate Landscapes* (Cambridge: The MIT Press, 2011), 166-177.

<sup>44</sup> Ignoffo, *Sunnyvale*, 78; Myron K. Myers, "Moffett Industrial Park Growth Spurts," *Palo Alto Times*, February 2, 1977, 24; Sunnyvale Chamber of Commerce, *Industrial Map of Sunnyvale, California*, n.d.

a federal patent library, and a military documentation center that would allow defense contractors to access research data.<sup>45</sup>

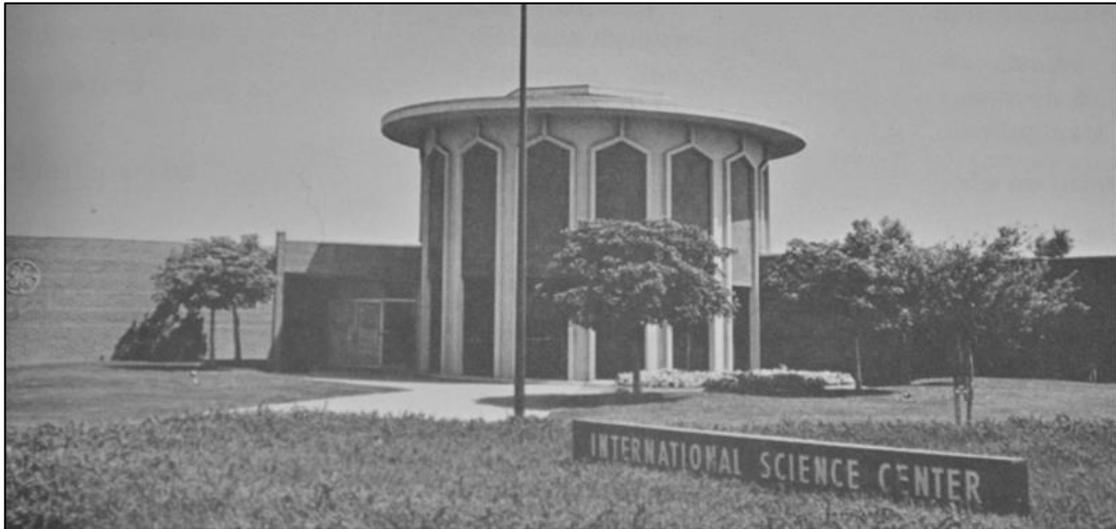


Figure 11. The General Electric building at 310 De Guigne Drive within the International Science Center, photographed during the 1960s

Source: Sunnyvale Chamber of Commerce, 1972

Within just a few years, a developer transformed an area almost five times the size of the International Science Center into an industrial development that reinforced Sunnyvale’s identity as a nucleus of defense contracting in the Bay Area. This venture—named Moffett Industrial Park—lay across a 620-acre site immediately east of the LMSC campus and the Air Force’s Satellite Test Annex. Much like the International Science Center, Moffett Industrial Park was modeled closely on the Stanford Industrial Park and offered electronics and aeronautics firms a home literally in the same neighborhood as their government clients and industry partners. When it was proposed, Moffett Industrial Park was the largest development of its kind in the country planned specifically for high-technology companies.<sup>46</sup>

The first company to construct a plant in Moffett Industrial Park was Electromagnetic Systems Laboratories, Inc. (ESL), a 200-person technology firm that specialized in cutting-edge digital signal processing (495 Java Drive; not extant [Figure 12]). The company produced technologies that processed visual (photographic) and sound (radio) data for reconnaissance applications. Previously based in Palo Alto, ESL exemplified the contractors that were drawn in by Sunnyvale’s strong defense presence. ESL’s systems for military and intelligence reconnaissance brought in millions of dollars each year during the 1960s and 1970s, and the company later began to manufacture computer hardware. By the 1980s it had

<sup>45</sup> “Business and Finance,” *Palo Alto Times*, July 19, 1960, 9; “New Science Center at Sunnyvale,” *San Francisco Examiner*, February 10, 1959, 12; “Vault for Scientific Data To Be Built at Sunnyvale,” *San Jose Mercury*, September 25, 1963, 53.

<sup>46</sup> Ignoffo, *Sunnyvale*, 70-72.

expanded its Sunnyvale plant to 400,000 square feet (Figure 13). (The company merged with a larger aerospace and electronics company, TRW Incorporated, in the late 1970s.) Moffett Industrial Park filled more slowly than expected despite its location, and it was built out only in the second half of the 1970s.<sup>47</sup>



Figure 12. 1968 aerial photograph of the mostly undeveloped Moffett Industrial Park, viewed facing northwest; the first ESL building, known as M-1, stood alone near its center.

Source: ESL Incorporated, *A Photographic History of ESL Incorporated*



Figure 13. The expanded ESL campus within Moffett Industrial Park, photographed in 1986 facing north; M-1 is in the foreground. All have been demolished.

Source: ESL Incorporated, *A Photographic History of ESL Incorporated*

In addition to the International Science Center and Moffett Industrial Park, Sunnyvale's industrial parks included the 80-acre Peery Industrial Park (located along Pastoria Avenue between Maude Avenue and the Bayshore Freeway) as well as several separate sites east of Lawrence Expressway that amounted to more than 600 acres.<sup>48</sup> Although the vast scale of this development pattern attracted many companies to Sunnyvale, the resulting low-scale industrial parks were filled with modest tilt-up concrete buildings that were not typically recognized for architectural merit. As one journalist described the city's industrial landscape after visiting in 1969, a visitor "could drive through Sunnyvale completely unaware of its principal activity [defense-related production]. No huge factories are belching smoke. Missiles and rockets are put together in bland, sanitized buildings almost indistinguishable from cafeterias and insurance-company offices."<sup>49</sup>

As a counterpoint to Sunnyvale's industrial development, the city's sustained economic growth created a need for more and more housing for workers and their families. This caused an explosion in speculative housing development in other parts of the city, largely but not exclusively south of the original town site and the SPRR corridor. The new tracts generally followed the trends that pervaded American suburbs after World War II and somewhat resembled the development of Sunnyvale's industrial parks: real estate

<sup>47</sup> Heinrich, "Cold War Armory," 257; "Work Starts on New Electronics Plant," *Palo Alto Times*, October 5, 1966, 6.

<sup>48</sup> Sunnyvale Chamber of Commerce, *Industrial Map of Sunnyvale, California*, n.d.

<sup>49</sup> "Sunnyvale: Prunes to Missiles," 77.

companies purchased and subdivided the land (often newly annexed), built similarly-sized and appointed single-family houses throughout the tract, and put them on the market. Several thousand houses were built in the city in the first decade after 1945, forming brand new neighborhoods with bucolic names like “Bayview Haven,” “Holiday Manor,” and “Orchard Gardens.” Relatively modest homes lined the irregular pattern of gently curving streets and cul-de-sacs packed among larger arterial roads (Figure 14). Sunnyvale contains some of famed Bay Area builder Joseph Eichler’s earliest tracts, which were characterized by a progressive architectural character and simple construction methods. Apple founder Steve Wozniak’s childhood home at 1618 Edmonton Avenue (extant) was within one of the city’s Eichler tracts.<sup>50</sup>



Figure 14. A representative residential tract development in western Sunnyvale, 1965, intermixed with some remaining orchards. Near the center is the former Libby plant, adjacent to the crossing of S. Mathilda Avenue over the SPRR corridor.

Source: University of California, Santa Barbara Library

### ***Semiconductors Define a Region***

At the same time that the military presence was reshaping Sunnyvale during the 1950s and 1960s, a major technological revolution was underway in the greater Santa Clara Valley: the development of the silicon-based semiconductor device. William Shockley, a physicist and educator who had conducted revolutionary research in transistor technologies in the 1940s, moved to Mountain View the following decade and established Shockley Semiconductor Laboratory in 1957.<sup>51</sup> Shockley’s volatile management style, however, caused eight engineers to defect and establish a new electronics company in Palo Alto, Fairchild Semiconductor Corporation. The Fairchild founders quickly launched their own R&D efforts, and

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<sup>50</sup> Ignoffo, *Sunnyvale*, 58-59.

<sup>51</sup> Transistors are one of the building blocks of modern electronic devices and rely on a solid-state medium to convey electrical currents.

by 1960 the company had refined existing production techniques to develop the first planar silicon-based integrated circuit—the device popularly known as the microchip. The integrated circuit could perform multiple processes that previously were accomplished by discrete components such as transistors, resistors, and diodes. This breakthrough allowed sophisticated processes to fit on a single piece of silicon, and the efficiency and small size of integrated circuits created new possibilities for electronic devices.<sup>52</sup> Journalist Tom Wolfe later wrote that the innovation “made it possible to create miniature computers, to put all the functions of the mighty ENIAC [the earliest digital, programmable computer] on a panel the size of a playing card. Thereby the integrated circuit opened up every field of engineering imaginable, from voyages to the moon to robots, and many fields that had never been imagined[.]”<sup>53</sup>

Although the integrated circuit ultimately supported major developments in the private electronics industry, Fairchild initially locked in step with Santa Clara County’s defense contracting gold rush. The reliability of silicon-based devices was well suited to military applications, and the company counted government agencies among its early clients. NASA, for instance, used Fairchild’s silicon microchips in the guidance systems of Apollo space rockets, and the growing demand from government contracts allowed the company to improve efficiency and lower manufacturing costs. The company grew steadily in the 1960s and attracted a raft of skilled engineers, many of whom then spun off new ventures that went on to make up Silicon Valley’s dense field of microelectronics companies. Such descendant firms were sometimes known as “Fairchildren.” Among the most consequential was Intel Corporation, which was formed in 1968 by two of Fairchild’s eight founders, Robert Noyce and Gordon Moore.<sup>54</sup>

The first phase of silicon microchip development in the Bay Area was most closely rooted in the cities of Palo Alto and Mountain View, but the fledgling industry soon extended into nearby Sunnyvale. A competitor to Fairchild Semiconductors named Siliconix was founded in the city in 1962 (1140 W. Evelyn Avenue, extant) and attracted employees from several major electronics companies; the following year the Siliconix founders created a new semiconductor company, Stewart-Warner Microcircuits, that was also based in Sunnyvale (730 E. Evelyn Avenue, not extant). Both companies were relatively early arrivals in the region’s microchip boom era and produced noteworthy chips, but neither one appears to have exerted a strong influence on the electronics industry. Instead, they were representative of the many firms in the region that jumped into the rapidly advancing microchip industry and identified niches for themselves during the 1960s and 1970s.<sup>55</sup>

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<sup>52</sup> Christophe Lécuyer, *Making Silicon Valley: Innovation and the Growth of High Tech, 1930-1970* (Cambridge: The MIT Press, 2007), 154-156; Michael S. Malone, *The Big Score: The Billion Dollar Story of Silicon Valley*, revised edition (San Francisco: Stripe Press, 2021), 113-118; O’Mara, *The Code*, 50.

<sup>53</sup> Tom Wolfe, “The Tinkerings of Robert Noyce: How the Sun Rose on the Silicon Valley,” *Esquire*, December 1983, accessed electronically, [https://web.stanford.edu/class/e145/2007\\_fall/materials/noyce.html](https://web.stanford.edu/class/e145/2007_fall/materials/noyce.html).

<sup>54</sup> O’Mara, *The Code*, 51.

<sup>55</sup> Steven Leibson, “The Semiconductor Company From Another World,” *Electronic Engineering Journal*, June 7, 2023, <https://www.eejournal.com/article/the-semiconductor-company-from-another-world-the-siliconix-story-part-4-siliconix-and-stewart-warner-microcircuits/>; Malone, *The Big Score*, 119-120.

A more consequential early microchip company established in Sunnyvale was Signetics Corporation, which a group of ambitious former Fairchild engineers established in 1961 as the world's first commercial venture that developed and manufactured integrated circuits exclusively. (Despite the innovative nature of integrated circuits, other microelectronics companies viewed their potential market as too small.) Signetics built a fairly modest 20,000-square-foot headquarters and manufacturing plant at 680 W. Maude Avenue (not extant) within months of its founding (Figure 15 and Figure 16). Signetics sought to produce custom circuits for clients and first specialized in diode transistor logic (DTL) integrated circuits, which distinguished the company from competitors like Fairchild and Texas Instruments. Signetics tackled a host of engineering challenges to develop novel prototypes of complex circuits, and the company's early activities attracted the attention of a national firm, Corning Glass Works. Corning acquired a majority stake and made Signetics its subsidiary in 1962.<sup>56</sup>



Figure 15. The first Signetics office at 680 W. Maude Avenue  
Source: Signetics Corporation, via Computer History Museum

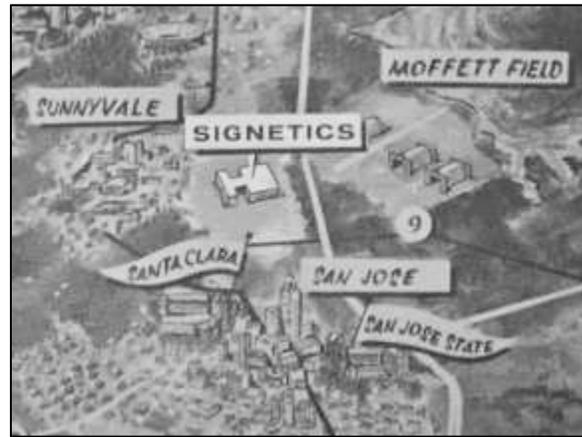


Figure 16. 1960s graphic showing Signetics's regional amenities  
Source: Signetics Corporation, via Computer History Museum

After the Department of Defense pivoted towards microelectronics in 1963, defense contractors prioritized incorporating integrated circuits into their electronic system designs. This shift put Signetics in a strong position to supply DTL circuits. During the same period, the company's engineers developed a technique to manufacture silicon wafers that lowered the occurrence of device failure considerably. The integrated circuits made by Signetics became industry standard, and the company surpassed Fairchild as the region's top circuit manufacturer (although only temporarily). Signetics's early achievements contributed to the growing market popularity of integrated circuits (particularly DTL devices), and competitors like Fairchild scrambled to catch up. Signetics's early success allowed it to announce plans in 1964 to construct a new \$5 million headquarters and semiconductor fabrication plant, or "fab," in Sunnyvale (811 E. Arques Avenue [Figure 17], not extant).<sup>57</sup>

<sup>56</sup> Lécuyer, *Making Silicon Valley*, 229-235; Signetics Corporation, *Signetics Corporation: A Subsidiary of Corning Glass Works*, n.d., available in Don Liddie Papers on Signetics, Computer History Museum.

<sup>57</sup> Lécuyer, *Making Silicon Valley*, 212, 235-240; Signetics Corporation, *Signetics Corporation*.



Figure 17. Signetics’s purpose-built headquarters at 811 E. Arques Avenue  
Source: Sunnyvale Heritage Park Museum

Despite facing intense competition from Fairchild, Signetics continued to fill federal contracts with its microchips, and it remained an important player in the Bay Area’s young but expanding semiconductor industry. During the second half of the 1960s, the company built new distribution and sales facilities in Sunnyvale—but it also expanded outside of the Bay Area for the first time by opening plants in Utah and South Korea. (Signetics was an early adopter in offshoring production, which became a common pattern among American semiconductor companies seeking non-unionized workforces.) Signetics also diversified its circuit offerings (including transistor logic circuits, metal oxide semiconductors, random access memories, and read only memories) that had applications outside of the defense and aerospace industries. A particularly notable innovation for the company was the 555 timer integrated circuit, which it commercialized in the early 1970s. This chip has been recognized as one of the most popular integrated circuits of all time, and it remains in wide use for timer and related applications.<sup>58</sup>

An important but often underrecognized aspect of the semiconductor industry was component testing—i.e., ensuring that a company’s highly complex electronic devices would perform as advertised. Although Fairchild Semiconductor never had a major presence in Sunnyvale, for several years the city was home to the company’s testing division: Fairchild Instrumentation (later Fairchild Systems Technology). Semiconductor testing required its own forms of specialized technical expertise and computers, and Fairchild Instrumentation developed large pieces of testing equipment that could be marketed to

<sup>58</sup> Brian Fuller, “Hans Camenzind, 555 Timer Inventory, Dies,” *EE Times*, August 15, 2012, <https://www.eetimes.com/hans-camenzind-555-timer-inventor-dies/>; Cyrus C.M. Mody, *The Squares: US Physical and Engineering Scientists in the Long 1970s* (Cambridge: The MIT Press, 2022), 237; Signetics Corporation, “History,” April 23, 1991, available in Don Liddie Papers on Signetics, Computer History Museum, 1-2.

competitors as well as used internally. Before moving to Sunnyvale, Fairchild had already developed a standard-bearing computer-controlled integrated circuit testing machine, the model 4000M Automatic Test System, in 1964. The explosion of the semiconductor industry during the same period led the company to invest in new generations of testing machines, and in 1967 Fairchild Instrumentation constructed a 150,000-square-foot plant in Sunnyvale (974 E. Arques Avenue, extant). This immense facility accommodated R&D and engineering functions and significantly expanded Fairchild Instrumentation's facilities from earlier buildings in Palo Alto and Mountain View. The company released its Sentry line of third-generation testing machines in 1971, which were adopted by hundreds of companies to test integrated circuits and printed circuit boards.<sup>59</sup>

Signetics, Fairchild, and peers in the Bay Area's early semiconductor industry established themselves by supplying a range of industrial and commercial customers. These pioneering companies made way for a microelectronics heyday from the late 1960s to the middle of the 1970s, when countless semiconductor startups appeared throughout the Santa Clara Valley. The number of workers employed in the semiconductor field increased from 6,000 to almost 20,000, and journalist Don Hoefler published articles that popularized the term "Silicon Valley" in 1971. The newer companies that eclipsed stalwarts like Fairchild and Signetics included Intel and National Semiconductor, both of which established their long-term headquarters in Santa Clara. (The National Semiconductor campus on Kifer Road lay within a narrow arm of Santa Clara that encroached past Sunnyvale's eastern boundary, and it has sometimes been identified as a Sunnyvale company.)<sup>60</sup>

The most prominent Sunnyvale-based semiconductor company that arrived in the late 1960s was Advanced Micro Devices, typically shortened to AMD. The company was led by another former Fairchild employee, Jerry Sanders (Figure 18), who earned AMD considerable success through his colorful personality and salesmanship—despite that the company was initially not known for producing cutting-edge microchips. Rather, AMD's focus was fabricating second-source and reverse-engineered integrated circuits originally designed by Fairchild, National Semiconductor, and ultimately Intel.<sup>61</sup> AMD's products did not require the same type of R&D as some of Silicon Valley's more technologically significant companies, but the company built a strong track record for manufacturing chips to a high-quality control standard that met the strict requirements of defense agencies.

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<sup>59</sup> Chip History Center, "Fairchild Instrumentation Model 4000M Automatic Test System," accessed October 11, 2024, <https://www.chiphistory.org/77-fairchild-instrumentation-model-4000m-automatic-test-system>; "Fairchild Starting New Plant," *Palo Alto Times*, February 8, 1967, 6; Fairchild Systems Technology, "A Profile of Fairchild Systems Technology," 1975.

<sup>60</sup> Lécuyer, *Making Silicon Valley*, 251-253.

<sup>61</sup> "Second source" refers to an arrangement by which one company licenses another to manufacture its proprietary technology. It can be advantageous because it ensures a more reliable supply.



Figure 18. Jerry Sanders posing at the original AMD headquarters on Thompson Place in Sunnyvale  
Source: Advanced Micro Devices

Several months after it was founded, AMD established its first headquarters in Sunnyvale (901 Thompson Place, not extant) and quickly expanded. AMD announced its first overseas plant in 1972, and the following year it increased its net earnings from under \$200,000 to \$1.3 million. AMD went on to develop and commercialize a range of proprietary microchips, and in 1975 the company began to manufacture a reverse-engineered version of a powerful Intel microprocessor. Within 15 years, AMD had grown dramatically, employing 20,000 workers and boasting \$400 million in annual sales. By the mid-1980s, the company had an expansive footprint in eastern Sunnyvale (Figure 19), mostly in the industrial park first known as the International Science Center. Many of the company's facilities were grouped near its 1970s headquarters at 915 De Guigne Drive (Figure 20; not extant), as well as along nearby Stewart Drive and Thompson Place. (Among the AMD buildings that remain extant are 850 Stewart Drive, 910, 920, 930 Thompson Place, and 925-927 Thompson Place.) In 1987, AMD acquired another Sunnyvale chip manufacturer, Monolithic Memories (1165 E. Arques Avenue, not extant), which made it the largest company in the world that produced integrated circuits exclusively.<sup>62</sup>

<sup>62</sup> "Advanced Micro Devices To Build Plant in Malaysia," *Peninsula Times Tribune*, August 30, 1972, 12; Nancy Rivera Brooks, "Big Silicon Valley Chipmakers To Merge," *Oakland Tribune*, May 1, 1987, D1; Malone, *The Big Score*, 212; "Profits Up for Firm," *Peninsula Times Tribune*, May 17, 1973, 8; Graham Singer, "The Rise and Fall of AMD," TechSpot, November 21, 2012, <https://www.techspot.com/article/599-amd-rise-and-fall/>.

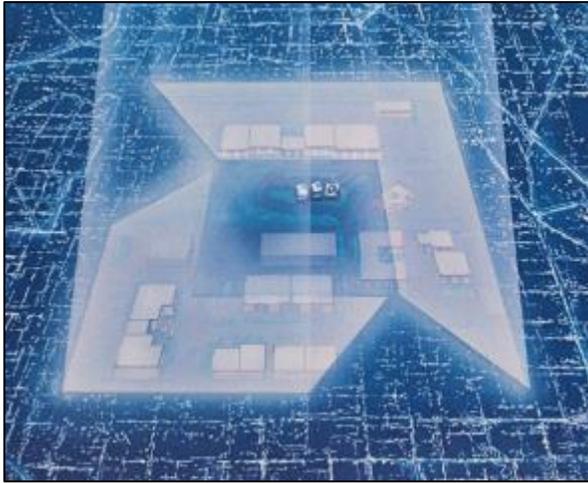


Figure 19. A 1982 company graphic showing AMD's logo cast over the company's facilities in Sunnyvale; the original headquarters at 901 Thompson Place is in the lower left.  
Source: David Rumsey Historical Map Collection



Figure 20. AMD's second headquarters building, located at 915 De Guigne Drive, photographed in the 1980s  
Source: Silicon Valley Company Archive, San Jose Public Library

AMD continued its healthy business in the 1980s, in part because its second-source Intel microprocessors were incorporated into the popular personal computers then being rolled out by IBM and its competitors. Strong competition from Japanese manufacturers caused an industry-wide slump in the mid-1980s, and semiconductor companies pivoted away from its traditionally reliable chips (specifically Dynamic Random Access Memory and Erasable Programmable Read-Only Memory). Among AMD's more important launches of that decade was a more powerful version of the Intel 80286 microprocessor, which one journalist later described as the "first truly significant desktop PC processor."<sup>63</sup> The relationship between AMD and Intel, which had previously been mutually beneficial, evolved into an acrimonious rivalry and resulted in a processor race that extended into the 1990s. Toward the turn of the twenty-first century, AMD finally launched proprietary processors that were viable against Intel after years of fierce competition. AMD moved into a large new headquarters at 1 AMD Place, which was demolished after the company relocated to Santa Clara in 2016 after almost half a century in Sunnyvale. Unlike many semiconductor companies of its generation, AMD remains in operation.<sup>64</sup>

Signetics also remained a reliable presence in Sunnyvale for many years, although it never fully regained its market power of the 1960s. The company's primary focus remained circuits that supported military applications, even though many peer firms had moved to metal oxide semiconductor (MOS) devices better suited to consumer devices. In the mid-1970s, Corning soured on the semiconductor industry and sold Signetics to the Dutch conglomerate Philips, which retained it as a branded American subsidiary. Signetics remained in the top 10 largest American semiconductor makers through the early 1980s; under Philips, the company kept its headquarters in Sunnyvale and employed 5,000 workers there.<sup>65</sup>

<sup>63</sup> Singer, "The Rise and Fall of AMD."

<sup>64</sup> Ibid.

<sup>65</sup> Mody, *The Squares*, 239; Signetics Corporation, "Signetics at a Glance," 1981.

The company invested \$50 million to construct the Advanced Technology Center (ATC) at 440 N. Wolfe Road (extant), an immense R&D facility devoted to advanced research in integrated circuit technologies (Figure 21). The center's purpose was supporting research in semiconductor materials, design, and production. The facility also housed the Philips Research Laboratories Sunnyvale, one of two research facilities in the United States run by Signetics's parent company. Signetics and Philips envisioned the center as one of the most cutting-edge research labs in the industry. Technology historian Cyrus Mody has written that researchers "seem to have had two main priorities for their process innovations: ensuring that Signetics and Philips kept pace with the industry in steadily moving to ever larger wafer sizes, and developing automation techniques to eliminate human workers on the fabrication line."<sup>66</sup> However, Signetics began to lose money for Philips around the same time its state-of-the-art research facility opened in 1984. The company did not successfully expand into MOS technology or identify innovative market opportunities as a result of the R&D that was conducted there, and Philips effectively phased out the Signetics name in the early 1990s.<sup>67</sup>

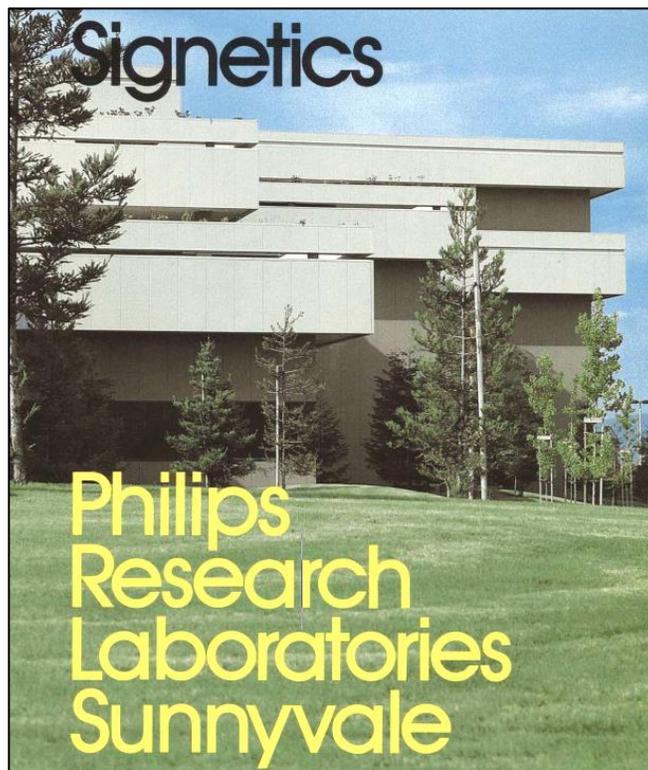


Figure 21. Signetics's Advanced Technology Center and Philips Research Laboratories Sunnyvale from a company brochure, c.1984

Source: Signetics Corporation, via Computer History Museum

<sup>66</sup> Mody, *The Squares*, 424.

<sup>67</sup> *Ibid.*, 222, 253-255; Signetics Corporation, "Philips Research Laboratories Sunnyvale," 1984; Signetics Corporation, "Technology Center Visitor Information," 1984.

### ***The Growth of Computing***

Developments in the semiconductor industry were integrally tied to advances in computing technology, and the evolution of both industries in parallel propelled Santa Clara County's reputation for technological advancement in the second half of the twentieth century. Modern computing—that is, the use of electronic, programmable machines to automate a range of logic and mathematical processes—has defined the Information Age through rapid advancements in several interrelated areas. Hardware encompasses the physical components of a computer that facilitate data processing, memory, and data storage—which ultimately incorporated many types of silicon-based semiconductor devices, among other components. Software broadly refers to the programs that instruct a computer how to perform its processing functions. Peripherals are supplemental hardware components that support computer use (input and output), for instance display monitors, keyboards, speakers, and external storage devices. Technological developments in all these areas after the end of World War II vastly improved the data processing, text, graphic, and sound capabilities of computers, which made them essential tools for the complex data processing needs of business, scientific and mathematical research, and the aerospace and defense industries. (The many technical applications that progressed as a result of digital computing technology included census data processing, aircraft and automobile design, and missile guidance systems such those developed for the Polaris program.) By the late 1970s and 1980s, computing technology had evolved so dramatically that computers were commercially available for home use, and they ultimately became the “networked information appliances” that are widely familiar today.<sup>68</sup>

The earliest generations of American computers, however, were enormous machines typically developed by technology companies and federal agencies in the eastern United States—in some instances collaborating with researchers at universities like the University of Pennsylvania and the Massachusetts Institute of Technology. The first major player in modern computing to establish a presence in Santa Clara County was the eminent International Business Machines Corporation (widely known as IBM), which had its headquarters in New York City. The company started a punch card plant in San Jose during World War II and then constructed a large research and manufacturing campus along Cottle Road in the mid-1950s, with hopes of drawing skilled workers and a spirit of innovation from the Bay Area's still-young electronics industry. Research at the IBM plant produced the 305 Random Access Memory Accounting Computer, or RAMAC, the first commercially available computer with a magnetic disk hard drive.<sup>69</sup>

Computers in production at this time were typically very large, so-called “mainframe” machines that relied on vacuum tubes to convey electrical currents, although before long these would be replaced with silicon-based components like microchips. (Note that HP, which became closely associated with the personal computer market in the late twentieth century, still specialized in audio instruments in the 1950s.) Mainframe computers produced by IBM and its peers found cash-flush markets in the Bay Area's

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<sup>68</sup> Paul E. Ceruzzi, *A History of Modern Computing*, second edition (Cambridge: The MIT Press, 2003), 1.

<sup>69</sup> *Ibid.*, 69-71; International Business Machines Corporation, “IBM San Jose,” n.d.

aerospace and defense industries: the Satellite Control Room at the Sunnyvale Air Force Station, for instance, first installed computers made by the Control Data Corporation.<sup>70</sup>

As with semiconductors, companies specializing in computer hardware gradually suffused Sunnyvale and surrounding cities. In 1965, IBM selected a former warehouse in Sunnyvale (1020 Kifer Road, not extant) as a temporary laboratory for its ambitious Advanced Computing Systems (ACS) project, which the company created to develop a powerful new “prestige” supercomputer that could meet the intense demands of military and federal research applications. Project staff began their work developing the hardware and software of the machine while occupying the Sunnyvale building, although the laboratory relocated in late 1966 and conducted significant later phases of development in a purpose-built facility on Sand Hill Road in Menlo Park. Although IBM ultimately terminated this project before completing any prototypes, some technology historians have argued that innovations developed for the ACS project went on to have a broad influence on computer architecture: many of the project’s staff members remained in the Bay Area and took concepts to other projects at IBM or at other companies.<sup>71</sup>

One of those staff members was Gene Amdahl, a computer architect with a doctorate in physics. Amdahl had contributed to the architecture of several IBM machines during the 1950s and 1960s (including the influential Series 360) and directed the ACS project from 1968 to 1969. After ACS folded, Amdahl departed IBM and established his own company based in Sunnyvale, Amdahl Corporation. The company constructed a small headquarters building (1160 Kern Avenue, extant) and began its efforts to develop mainframe computers directly compatible with IBM’s software and peripheral equipment. This approach was newly possible because IBM was beginning to release its software separately from its computer systems. Amdahl recognized that his company could improve upon aspects of existing IBM hardware to produce highly reliable, top-of-the-line computers that used IBM operating systems, programs, and peripherals instead of requiring the development of proprietary components. The company did just that: backed by almost \$50 million in venture capital, Amdahl released its first 470 V/6 mainframe (Figure 22) in 1975, which offered better performance than the analogous IBM System/370 at a lower price. Author Michael Malone described the computer as “an engineering marvel, one of the greatest electronic inventions of the 1970s. It was one-third the size of its IBM counterpart, the Model 168, half as heavy, about one and a half times as powerful and cost at least 10 percent less.”<sup>72</sup>

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<sup>70</sup> Department of the Air Force, *Addendum to the 2004 Historic Building Inventory & Evaluation Report*, 2-5, 2-8.

<sup>71</sup> “Lockheed, IBM Lease More Space,” *San Jose Mercury News*, July 16, 1965, 63; Mark Smotherman, Edward H. Sussenguth, and Russell J. Robelen, “The IBM ACS Project,” *IEEE Annals of the History of Computing*, 38, no. 1 (2016): 60-74.

<sup>72</sup> Malone, *The Big Score*, 297.



Figure 22. Image from a 1975 Amdahl Corporation brochure illustrating its 470V/6 mainframe computer  
 Source: Computer History Museum

Within two years, major IBM clients like NASA and General Motors had acquired Amdahl mainframes, representing a rare and serious challenge to IBM’s dominance in the computer industry during the 1970s. Amdahl expressed confidence in its future success by constructing a 200,000-square-foot landscaped campus at 1250 E. Arques Avenue (Figure 23, extant), within the Oakmead Industrial Park near Sunnyvale’s eastern border with Santa Clara.<sup>73</sup>

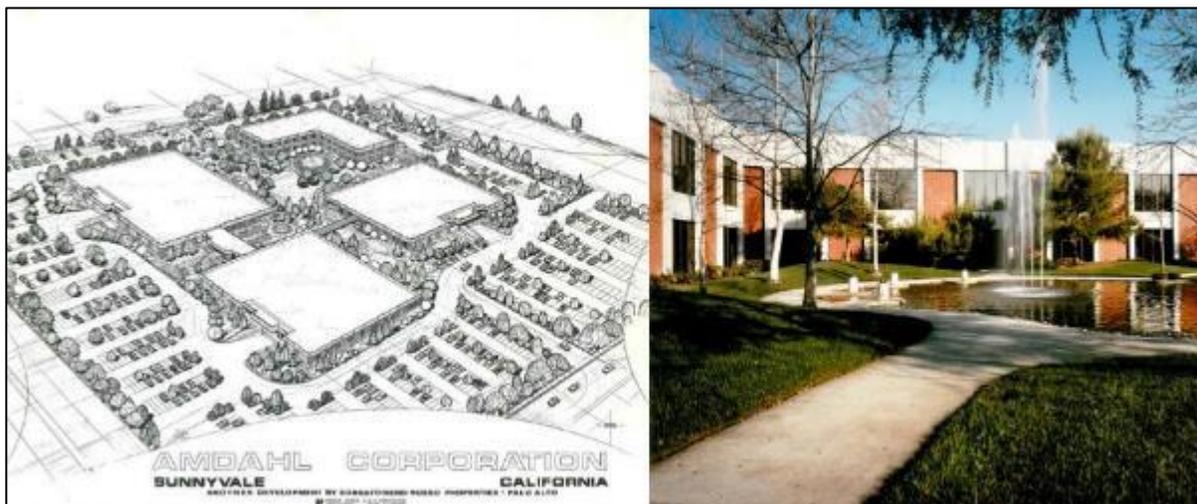


Figure 23. Amdahl’s 1970s headquarters on E. Arques Ave. in Sunnyvale, which first comprised four buildings.  
 Source: The Sobrato Organization

<sup>73</sup> The Sobrato Organization, “Timeline,” 2023, <https://www.sobrato.com/our-organization/timeline/>; Bro Uttal, “Gene Amdahl Takes Aim at I.B.M.,” *Fortune*, September 1977, 106-107.

Amdahl Corporation remained committed to developing systems for the mainframe computer market through the 1980s, but the company ultimately struggled due to its lack of diversification. Although perhaps no longer a household name, Amdahl left a significant legacy proving that “plug-compatibility” could be as sound a business strategy as traditional R&D innovation. The company inspired others to adopt the same approach, and Gene Amdahl himself departed his namesake company in 1979 to start a new venture, Trilogy Systems in Cupertino—which attempted to improve upon the earlier plug-compatibility model. Following Amdahl’s exit, Japanese electronics company Fujitsu managed Amdahl Corporation with occasional technological and financial success before fully absorbing the company in the 1990s.<sup>74</sup>

Although Amdahl Corporation was the foremost Sunnyvale company associated with mainframe computing, the city’s copious office and industrial facilities near the geographic center of Silicon Valley attracted other firms that supported the development of computing technologies. Less influential but still notable companies included hard disk drive manufacturer Data Disc (686 W. Maude Avenue, not extant) during the 1970s and graphics supercomputer company Dana Computer (880 W. Maude Avenue, extant) during the 1980s, which later evolved into Ardent Computer and Stardent Computer. The company’s Titan supercomputer and corresponding software package received attention for its high performance capabilities: it promised to “give scientists, researchers and engineers an interactive tool for visualizing data from complex mathematical and scientific applications.”<sup>75</sup> However, the company failed to make a significant dent in the market due to its high production costs.

## 5. THE HIGH-TECH INDUSTRY EVOLVES

At the start of the 1970s, technology companies could be found in about any corner of the region that was just then becoming known as Silicon Valley. Although the defense industry remained a significant patron of technological research and development, the semiconductor and computer industries were already entrenched in the region—and engineers and businesspeople alike identified the ever-greater potential of products that appealed to the general consumer rather than to technical specialists and the government. Sunnyvale’s population stood at just below 100,000 in 1970, but by 1990 that figure neared 120,000. Continued residential development filled in the pockets of agricultural land that remained throughout the city, and neighborhoods were largely built out by the beginning of the 1980s. The population also diversified as it grew during this period. This reflected the larger pattern of non-Western migration into Silicon Valley that followed the passage of the Immigration and Nationality Act of 1965. Racial minorities comprised approximately 5% of Sunnyvale’s population in 1970, but that number grew to almost 20% in 1980 and to nearly 30% in 1990. Asian and Pacific Islander residents accounted for most of this increase.<sup>76</sup>

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<sup>74</sup> Malone, *The Big Score*, 297-304.

<sup>75</sup> Ardent Computer Corporation, “Ardent Computer Corp. Background Information,” March 1988.

<sup>76</sup> Note that this data does not include residents of Hispanic origin. “City of Sunnyvale Decennial Census Data, 1970-1990,” Bay Area Census, accessed October 4, 2024,

The following section covers the broad trends that expanded the already wide reach of Silicon Valley beginning in the 1970s, which brought highly advanced electronic devices into the homes of many millions of people worldwide. Even though Sunnyvale lacked deep connections to the most influential companies in the emerging realm of personal computers, the city could boast a concentration of video gaming firms and other niche areas of technology. Additionally, Sunnyvale continued to be the setting of significant technological research and development that supported federal agencies during the later Cold War. These trends further entrenched Sunnyvale's status as an innovation hub, leading to the establishment of several notable institutions and retailers that supported the local culture of innovation.

### ***Atari and the Video Gaming Wave in Sunnyvale***

Sunnyvale has the rare distinction as a proving ground for the nascent American video gaming industry of the 1970s. While some histories of Silicon Valley treat video games as a footnote,<sup>77</sup> the field was a particular niche of the electronics sector that relied on feats of imagination and innovative energy. Even though the technologies for the very first video games and home consoles were not developed in the Bay Area, regional firm Atari Inc. became a powerful force in video arcade and home gaming as well as one of Silicon Valley's most unconventional successes.

In 1971, electrical engineers Nolan Bushnell and Ted Dabney formed Syzygy Engineering after meeting at Bay Area electronics and video company Ampex. Their goal was to develop arcade games that mimicked the experience of *Spacewar!*, an early-1960s game that was run on mainframe computers. However, they wished to manufacture the games affordably: instead of complex computing machines, they employed the circuitry of consumer televisions installed in freestanding cabinets. Bushnell and Dabney teamed with a Mountain View arcade game manufacturer to assemble the first ever video gaming console: *Computer Space*. The game's hardware did not incorporate a microprocessor or complex memory functions, but its simple graphic elements still proved to be an engaging experience for users. The game enjoyed moderate success.<sup>78</sup>

Bushnell and Dabney recruited engineer Al Alcorn away from Ampex to join Syzygy, which they renamed Atari. In 1972, the scrappy startup began to operate out of a business park on Scott Boulevard in Santa Clara, where Bushnell directed Alcorn to develop a new two-player video game that simulated the

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<http://www.bayareacensus.ca.gov/cities/Sunnyvale70.htm>; AnnaLee Saxenian, *Silicon Valley's New Entrepreneurs*, The Center for Comparative Immigration Studies, University of California, San Diego, May 2000, 3-5; "Sunnyvale: Prunes to Missiles," 77.

<sup>77</sup> See Lécuyer, *Making Silicon Valley*, 302.

<sup>78</sup> Leslie Berlin, *Troublemakers: Silicon Valley's Coming of Age* (New York: Simon & Schuster, 2017), 108-109.

experience of table tennis.<sup>79</sup> Alcorn devised the circuitry and display for *Pong*, relying on a simple yet engaging scheme of two opposing paddles that scrolled up and down and passed a pixelated “ball” back and forth across a “net.” The display was a black and white television with manipulated circuitry, which was able to produce satisfying, quasi-realistic sounds. Dabney built a cabinet out of wood, painted it orange, and added a coin-activation mechanism—thus bringing to life Atari’s first prototype (Figure 24). Still without a licensing deal with a manufacturer, the Atari team looked for ways to drum up interest in the game. They thought it might work to place their prototype in a casual Sunnyvale drinking hole and hangout joint, Andy Capp’s Tavern (157 W. El Camino Real, extant), where Atari already had an agreement to service the bar’s collection of pinball machines.<sup>80</sup>



Figure 24. The Pong game prototype originally installed in Andy Capp’s Tavern in 1972  
Source: Computer History Museum

*Pong* became an immediate hit. A popular Silicon Valley origin story describes how Alcorn was called back to the tavern about a week later because the *Pong* game had stopped working, and he discovered that so many quarters had been inserted that the game no longer started up. Understanding *Pong*’s financial potential for the first time, Bushnell planned for Atari to produce the games itself rather than relying on a separate manufacturer. The company assembled a new set of full-size *Pong* consoles for Bay Area bars; when it saw the game’s popularity continue, Atari made more units and distributed them widely. By the end of 1972, Atari had sold 7,000 game consoles at more than \$1,000 apiece. Seemingly overnight, Atari emerged as a major presence in Silicon Valley, and the company expanded to Santa Clara and then into

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<sup>79</sup> Bushnell assigned this task as a test for Alcorn without having plans to market the game. The concept was based closely on an existing game developed for the Magnavox Odyssey, the very first commercially marketed home video gaming console.

<sup>80</sup> Berlin, *Troublemakers*, 110-113

facilities in Los Gatos. Similar to some other Silicon Valley startups, Atari experienced an awkward transition when its leaders tried to balance sudden financial success with a freewheeling management style rooted in the Bay Area's counterculture movement of the period.<sup>81</sup>

Once *Pong* demonstrated the promise of video arcade game consoles, several other South Bay companies were inspired to move in the same direction. One example was Ramtek Corporation, a spin-off from Data Disc that was based in Sunnyvale (292 Commercial Street, not extant) that initially pioneered high-performance imaging equipment for medical and aerospace applications. Ramtek engineers inspected *Pong* while it was installed at Andy Capp's Tavern and began to leverage their company's existing technology to develop their own pixelated ball-and-paddle game, *Volly*. Ramtek released the game in 1973 and followed it up that same year with two more video arcade games, *Hockey* and *Soccer*.<sup>82</sup> Ramtek was just one of a cluster of Sunnyvale companies that attempted to replicate the success of Atari, including Project Support Engineering (750 N. Mary Avenue, not extant) and Meadows Games (181 Commercial Street, not extant).

With competition from *Pong* copycats, Atari faced bankruptcy while it attempted to develop a worthy follow-up to its original hit. In the mid-1970s, Al Alcorn began the development effort that ultimately reinvented the company: developing a consumer version of *Pong* that would allow the game to be played on home consoles hooked up to a family's television. (The circuitry of this console would allow it to play *Pong* and no other game.) Buoyed by ever smaller integrated circuits on the market, new venture capital funding, and a licensing deal with Sears, Atari delivered the at-home version of *Pong* by the 1975 Christmas season, when it was marketed under the name Tele-Games. It became a best-seller, and Sears helped Atari sell several millions of dollars' worth of the console.<sup>83</sup>

Atari's next major technological advance of the 1970s brought the company to Sunnyvale. Staff of the company's experimental research center in Grass Valley had been able to integrate an inexpensive but novel microprocessor into the hardware of a home console, allowing it to play multiple game cartridges. This became known as the Video Computer System, which was shortened to VCS and later marketed under the name Atari 2600 (Figure 25). To bring the system to market, however, the company's CEO at the time, Nolan Bushnell, determined it was necessary to sell Atari to the entertainment conglomerate Warner Communications in 1976. Subsequently flooded with Warner funding, Atari constructed a new \$2.5 million, two-story headquarters at 1265 Borregas Avenue (not extant) in Sunnyvale's Moffett Industrial Park.<sup>84</sup>

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<sup>81</sup> Ibid., 113-120; O'Mara, *The Code*, 107.

<sup>82</sup> Keith Smith, "The Ultimate (So Far) History of Exidy – Part 1," *The Golden Age Arcade Historian* (blog), May 19, 2013, <https://allincolorforaquarter.blogspot.com/2013/05/the-ultimate-so-far-history-of-exidy.html>.

<sup>83</sup> Berlin, *Troublemakers*, 124-130, 169-170.

<sup>84</sup> Ibid., 168-175; "Atari, Inc., Electronic Game Maker, Will Move," *Palo Alto Times*, June 10, 1976, 7; Myers, "Moffett Industrial Park."



Figure 25. The VCS (Atari 2600) home console system advertisement c.1977, featuring the company's famous tagline for the product

Source: Atari Corporation

Although Atari's early product development milestones occurred while the company was based in communities surrounding Sunnyvale, the company's new headquarters was its hub during a major growth period. During the late 1970s and early 1980s, the company launched the VCS, continued arcade and home game development, and expanded into the relatively new PC market. The change in management led to Bushnell's departure, and he went on to create and lead Pizza Time Theatre, a family-friendly dining and animatronic entertainment concept that evolved into the Chuck E. Cheese franchise. (Its early headquarters was located at 1213 Innsbruck Drive in Sunnyvale, extant.) Atari experienced mixed fortunes while based in Sunnyvale, but the company's technological contributions made arcade and home video gaming astoundingly popular during the company's heyday. The company was responsible for several major coups in the industry—in particular its release of the vector graphics<sup>85</sup> arcade game *Asteroids* and the VCS versions of arcade hits *Space Invaders* and *Pac-Man*. By the early 1980s, 80% of home video gaming systems in the country had been manufactured by Atari; the company employed upwards of 10,000 people, approximately half of whom were based in Sunnyvale. Only Lockheed was a larger employer in the city. The company had grown so much that it was occupying more than 20

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<sup>85</sup> Whereas the earliest video games utilized raster imaging with pixels, vector imaging relied on mathematical formulas to represent graphics through relationships between points.

buildings in Moffett Industrial Park—including facilities for product engineering, assembly, storage and distribution, marketing, and customer service.<sup>86</sup>

Despite its major successes, Atari had not innovated in its core markets or controlled spending enough to withstand 1983's crash in the home video game sector due to oversaturation. This occurred shortly after the company established a promising R&D facility in Sunnyvale (the Sunnyvale Research Center or Sunnyvale Research Laboratory, 1196 Borregas Avenue, not extant) and staffed it with industry bigwigs—including Atari's new chief scientist, Alan Kay, whom the company had recruited from Xerox's Palo Alto Research Center.<sup>87</sup> Research teams at the laboratory were tasked with exploring and developing the technologies of the future: Kay described the facility as a well-funded "sandbox." Projects spanned an impressive range of then-visionary ideas, from handheld computers to virtual reality arcade consoles. Some of these may have become tremendously novel products, but Atari suffered major losses beginning in late 1982 that continued through the next year. Warner sold off the home video gaming and home computer divisions of Atari in 1984; the arcade division followed the next year. The downfall of Atari represented a remarkable change in fortunes within the span of only a few years.<sup>88</sup>

### ***Personal Computers and Software***

Even by the time Sunnyvale's Amdahl Corporation launched its first machine in the mid-1970s, technological trends in the computer industry were making possible computers that were far smaller than the massive and powerful mainframes that IBM and Amdahl were best known for. The proliferation of microchips in the 1960s and Intel's development of the single-chip microprocessor in 1971 made it possible for companies to design and produce so-called "minicomputers" that, while still meant to support complex business and scientific data processing tasks, could fit on a desktop rather than fill an entire wall. The trend towards smaller and smaller computers eventually launched the earliest generation of "microcomputers" or "personal computers" (PCs), a type of small and relatively inexpensive machine with peripherals that could be operated by laypeople in a variety of settings—typically for recreational, business, and educational purposes. Some models were designed with integrated monitors, while others were intended to connect to televisions for their displays.

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<sup>86</sup> "Occupied Buildings in Sunnyvale, CA (1978)," Atari Historical Society, 2001, <http://kickass.ddnss.org/html/atari/sunnyvale.htm>; Berlin, *Troublemakers*, 269-277; Bruce Entin, "Atari Inc. Plans To Stay Put in Sunnyvale," *San Jose Mercury News*, September 1, 1982, 11D.

<sup>87</sup> This facility, typically shortened to Xerox PARC, was among the most consequential research facilities in Silicon Valley. Its experimental approach to innovation influenced the development of a wide range of technologies that later came to define modern electronics and computing.

<sup>88</sup> Adam Fisher, *Valley of Genius* (New York: Twelve, 2018), 94-99; John Hil Kirk, "Atari Sets Sights on Handheld Computer," *The Salinas Californian*, March 29, 1983, 13; Berlin, *Troublemakers*, 347-348; Jason Johnson, "Atari's Secret VR Experiments of the 1980s," Versions, accessed October 11, 2024, <https://killscreen.com/versions/atari-secret-vr-experiments-of-the-1980s/>.

The rise of microcomputers through the 1980s had important roots in the Bay Area, particularly the landmark Apple II machine launched by Apple Computer in 1977. Its two founders, Steve Jobs and Steve Wozniak—who grew up in an Eichler house on Edmonton Avenue in Sunnyvale and whose father was a Lockheed engineer—developed plans for their company in the garage of the Jobs family home on Crist Drive in Los Altos, only a few blocks past Sunnyvale’s southwest corner. Michael Malone has written that Jobs, Wozniak, and their employee Bill Fernandez shopped for parts for the company’s first commercial product, the Apple I, at Owen Whetzel’s Hobby Shop in the Westmoor Shopping Center (1211 S. Mary Avenue, extant). The Apple I demonstrated the potential of small and relatively simple microcomputers, and the launch of the Apple II series in 1977 helped make off-the-shelf “home computers” standard consumer goods for recreational and business users.<sup>89</sup>

For as much energy related to microcomputers swirled around Silicon Valley during the 1970s, Sunnyvale never became as closely associated with the Bay Area’s major PC companies as it had with semiconductor and computer mainframe manufacturers. Apple placed its headquarters in neighboring Cupertino; Osborne Computer Corporation, IBM, Xerox, and Grid Systems also developed important early technologies for portable computers elsewhere in the Bay Area. However, some established Sunnyvale technology companies made confident moves into the PC realm. Atari parlayed its name recognition and technological acumen into other markets, and home computers became one of the company’s three divisions in the late 1970s. Atari released its first Home Computer System machines—the 8-bit Atari 400 and Atari 800—in 1979 as a natural progression from the games-only VCS. These machines combined the capabilities of Atari’s home gaming system with a user-friendly console and peripherals, high-quality graphics and sound, and practical software. Atari also expanded into desktop publishing programs, as well as software and games for rival home computer makers like Apple.<sup>90</sup>

Atari’s expansion was not unique among gaming companies: Sunnyvale-based Exidy, for instance, launched its own home computer, known as Sorcerer, in 1978. Sunnyvale chipmaker AMD developed its own line of home computers, and it boasted that its competitive relationship with Intel helped drive down the costs of microprocessors, thus supporting innovation in the PC industry. AMD even secured a second-source arrangement with Intel to supply microprocessors for the central processing unit used in IBM’s original Personal Computer line in 1981. Additionally, HP had become a leader in PC peripherals by the early 1980s. Although the company kept its headquarters in the Stanford Industrial Park (by then known as the Stanford Research Park), it chose Sunnyvale for its Personal Office Computer Division (in the former Fairchild Instrumentation facility at 974 E. Arques Avenue, extant).<sup>91</sup>

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<sup>89</sup> Michael S. Malone, *Infinite Loop: How Apple, the World’s Most Insanely Great Computer Company, Went Insane* (New York: Currency, 1999), 82; Steve Wozniak, *iWoz: Computer Geek to Cult Icon* (New York: W.W. Norton, 2006).

<sup>90</sup> Benj Edwards, “How Atari Took on Apple in the 1980s Home PC Wars,” *Fast Company*, December 21, 2019, <https://www.fastcompany.com/90432140/how-atari-took-on-apple-in-the-1980s-home-pc-wars>.

<sup>91</sup> Advanced Micro Devices, *Advanced Micro Devices and the Personal Computer Industry*, n.d., 1-2; “H-P Changes in Sunnyvale, Roseville,” *The Press Democrat*, October 14, 1982, 9C; “HP Computer Museum,”

Home computers had limited value to nontechnical users without purposeful software, an area of the technology sector that increased its market share as the twentieth century progressed. Software often reached the hands of consumers and store shelves through software houses. These companies were responsible for developing and distributing computer programs with a wide range of applications, and by the early 1980s over 1,000 such houses existed in the United States. One of the best established in the industry at that time was Sunnyvale's Personal Software Inc. (1330 Bordeaux Drive, not extant), which achieved prominence in 1979 by marketing VisiCalc, a pathbreaking business program first available for the Apple II (Figure 26). This "electronic ledger book" facilitated automated calculations within a grid of cells, thus becoming the first spreadsheet application available for any computer. (Note that the program was developed in Boston by a separate entity, Software Arts, and then licensed to Personal Software.) Even though spreadsheets are now often taken for granted, the novelty of VisiCalc was striking. It was one of the first "killer apps"<sup>92</sup> in the computer industry, and it both propped up sales of the Apple II and demonstrated to computer makers that home machines were as appropriate for office applications as they were for gaming. Following up VisiCalc, Personal Software developed a new suite of programs, renamed itself VisiCorp, and relocated to San Jose. The most consequential of the company's later software programs was Visi On, a graphic user interface for the IBM Personal Computer that influenced Bill Gates and the graphical scheme of Microsoft Windows.<sup>93</sup>

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accessed October 3, 2024, <https://www.hpmuseum.net/index.php>; "Sorcerer: Business, Personal Computer," *Palo Alto Times*, August 18, 1978, 35.

<sup>92</sup> A "killer app" is an application that becomes the primary reason for adopting its larger technology.

<sup>93</sup> Mark Blackburn, "Demand for Software Is Anything but Soft," *Oakland Tribune*, September 20, 1981, B1, B8; Malone, *Infinite Loop*, 160-161; O'Mara, *The Code*, 188, 235.



Figure 26. An Apple II home computer running the best-selling VisiCalc program  
Source: Apple Computer, Inc. via Computer History Museum

### ***Resources for Innovation: Patents and Spare Parts***

The preceding sections illustrate that Silicon Valley’s innovation-driven spirit arose through a tangled network of institutions (particularly defense agencies and Stanford University), private technology firms, and a highly skilled labor force. These entities, however, were also aided by a host of auxiliary resources and services that emerged between the 1960s and 1980s in communities like Sunnyvale. Such resources supported the forms of entrepreneurship and technological innovation that was already defining the region’s economy and culture—although their role was less direct than, for instance, a governmental contract for a particular high-performing microchip.

Among the most far-reaching of these resources to appear in Sunnyvale—and the one that truly confirmed the city’s importance as a hub of technological innovation in Northern California—was the Sunnyvale Patent Library. First pitched to the local government by Jack Bohan, a patent attorney for Lockheed, the library was proposed as a critical resource for individuals and firms who filed their own patent applications.<sup>94</sup> After first occupying temporary space in the International Science Center, the library formally opened to the public in 1965 in a fire station (275 N. Fair Oaks Avenue, not extant). It was administered by the Sunnyvale Public Library in partnership with the U.S. Patent Office. At this time, Sunnyvale’s was one of 22 patent libraries in the United States. It was the only such facility in Northern California, however, and—as a result of Bohan’s advocacy—was the only one outside of Washington, D.C. that arranged patents by the subject of the patent rather than by the filing number. Such a scheme made

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<sup>94</sup> Issuance of a patent affirms an individual’s intellectual property associated with a particular invention, which prevents others from capitalizing on that invention for a number of years.

searching the records considerably easier and cheaper, which was a terrific advantage to local patent seekers, attorneys, and others who found reason to comb through the many tens of thousands of existing patent records and bound copies of the Official Patent Gazette. Patrons of the patent library might have multiple goals: confirming their idea had not previously been patented; reviewing a competitor's ideas; or deriving inspiration for new inventions. At the library's dedication, Sunnyvale's congressional representative boasted the facility "should be the most powerful deciding factor Sunnyvale has ever built for the attraction of new industry to town."<sup>95</sup>

The library moved several times over the next few decades—first to the Sunnyvale Public Library (665 W. Olive Avenue, extant) in 1971 and then to Building 7 of Raynor School in 1980 (1500 Partridge Avenue, extant). At that point it was renamed the Sunnyvale Patent Information Clearinghouse. In late 1994, it moved again into a building at 465 S. Mathilda Avenue (not extant), where it operated as the Sunnyvale Center for Innovation, Invention and Ideas, or SCI<sup>3</sup>. In this location, SCI<sup>3</sup> had enhanced amenities: it housed microfilm copies of every patent ever issued by the U.S. Patent Office, a direct computer connection to federal patent and trademark files, and video conference equipment allowing patent seekers to meet with federal patent examiners on the East Coast. Demand for the library flagged in the 2000s, however, after some of its resources became available online. Once one of Silicon Valley's most in-demand facilities, the patent library saw its influence diminish and was finally closed in 2006.<sup>96</sup>

A different and far flashier type of player in Silicon Valley's history has been its constellation of venture capital firms. Characterized broadly, venture capital provides high-risk funding to startups, allowing them to remain in operation before they can produce revenue selling their innovations. Therefore, venture capital has been a critical ingredient in the formation of startups, and such arrangements existed in Silicon Valley even in the years that followed World War II. Positive returns in the early electronics industry led to a period of significant expansion in venture capital during the first half of the 1970s, when two of the most significant Silicon Valley venture capital firms were formed: Kleiner Perkins and Sequoia Capital. They, along with numerous others, set up offices on Sand Hill Road in Menlo Park.<sup>97</sup>

Sunnyvale was home to at least one notable venture capital firm: the Catalyst Technologies Venture Capital Group. Devised by Atari's Nolan Bushnell in 1980, Catalyst was something of an outlier in Silicon Valley, however. Firstly, its offices were not on Sand Hill Road but rather in Sunnyvale (1287 Lawrence

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<sup>95</sup> City of Sunnyvale, "News Release: Sunnyvale Patent Library Dedicated," 1965; Leonard Sime, "Patent Library in Business," November 4, 1965, clipping available in Sunnyvale Heritage Park Museum; "Sunnyvale Considers Patent Library," *Palo Alto Times*, February 14, 1962, 6.

<sup>96</sup> Leland Joachim, "Patent Library Gets New Name, Location," *San Jose Mercury News*, December 7, 1994, 2; Pam Marino, "House of Ideas," *Sunnyvale Sun*, September 30, 1998; Julie Patel, "City Council Votes To Close Library for Patent Materials," *San Jose Mercury News*, March 29, 2006, 3B; Susan Yoachum, "Sunnyvale's Patent Library Moves to Bigger Quarters," *San Jose Mercury News*, September 1, 1980.

<sup>97</sup> Martin Kenney and Richard Florida, "Venture Capital in Silicon Valley: Fueling New Firm Formation," in *Understanding Silicon Valley: The Anatomy of an Entrepreneurial Region*, ed. Martin Kenney (Stanford: Stanford University Press, 2000), 105-116.

Station Road, not extant). Secondly, and more importantly, the firm pioneered an incubator model that did not yet exist for Silicon Valley technology companies. Catalyst Technologies' purview was more than simply funding startups; it also provided them with physical workspace, office equipment, health insurance plans, and accounting assistance. The companies that were nurtured in the incubator—including several with close ties to Bushnell or other former Atari associates—reflected seemingly fanciful ideas that included robotics, high-definition televisions, remote shopping, rewritable video game cartridges, video phones, and in-car mapping and navigation. (The last of these was devised by Etak, which is discussed in greater detail in a later section). In its five years of existence, Catalyst Technologies supported relatively few startups that found financial success or immediate influence. Even so, the companies nurtured by Catalyst proposed numerous concepts that were well ahead of their time (Figure 27); it is likely that their success was impeded at least partly because they required technological infrastructure that did not yet exist. Only a decade or more afterwards did some of the same concepts become technologically feasible and then were successfully brought to market by other companies.<sup>98</sup>

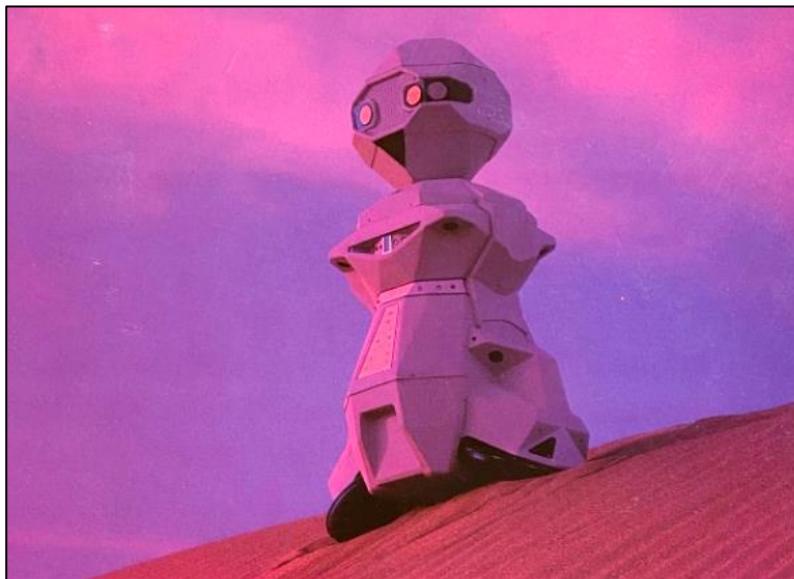


Figure 27. Promotional photograph of a Topo robot manufactured by Androbot, one of several companies nurtured by Catalyst Technologies; the Topo was an early “personal robot” available on the market.

Source: Androbot Inc.

Beyond the formal services that supported the innovation process, Silicon Valley's large population of tech workers and home hobbyists patronized a commercial landscape that reflected their tastes. Perhaps because of its central location in Silicon Valley, Sunnyvale was the location of several commercial retail establishments that sold computer parts and other goods that increased access to technological

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<sup>98</sup> Benj Edwards, “The Untold Story of Atari Founder Nolan Bushnell’s Visionary 1980s Tech Incubator,” *Fast Company*, February 17, 2017, <https://www.fastcompany.com/3068135/the-untold-story-of-atari-founder-nolan-bushnells-visionary-1980s-tech-incubator>; C.W. Miranker, “Atari Founder Returns With New Arcade Games,” *Santa Cruz Sentinel*, November 11, 1983, 36.

knowledge as much as to consumer hardware and software. Some of these establishments were equally valuable as social spaces for members of an emerging Silicon Valley subculture—so-called “tech nerds” who populated Sunnyvale and surrounding communities.

One of these was the aforementioned hobby shop where Apple founders sourced components for their first home computer. Halted Specialties Company, a wholesale component retailer founded in the 1960s, was another store where Steve Jobs, Steve Wozniak, and other Bay Area computer tinkerers browsed the shelves (827 E. Evelyn Avenue, not extant). A larger outlet that appeared the next decade was Fry’s Electronics, a popular regional chain whose first retail location opened in 1985 in Sunnyvale (541 Lakeside Drive, extant). Applying a grocery store model to electronics, the immense store’s shelves were crowded with circuits, cheap microprocessors, peripherals, and myriad other components alongside magazines and snack foods. It was a novel but not a unique model, and it helped do-it-yourself techies build their own computers and other devices. Fry’s was described in the 1980s as a “computer junkie’s dream” and Silicon Valley’s “premier nerd hangout.”<sup>99</sup>

The chain was also widely known for imbuing its stores with eccentric thematic decorations dreamed up by a former staff member of Lucas Films. The second and third Fry’s stores were in Sunnyvale, and both had computer and technology themes. Fry’s expanded to other states but struggled in the era of online retailing before it closed all of its remaining locations in 2021. WeirdStuff Warehouse, founded in 1986 by a former engineer, filled a related niche by collecting used technological components cast off by the region’s technology companies and selling them secondhand from a crowded 27,000-square-foot space (384 W. Caribbean Drive, not extant). It may be impossible to know whether the store provided equipment that later helped produce innovative technologies, but by the twenty-first century it had established a reputation as an unconventional living museum of Silicon Valley’s technological history.<sup>100</sup>

A particularly notable landmark in Sunnyvale’s tech-oriented commercial landscape was Computer Literacy Bookshop, which was founded by Rachel Unkefer and Dan Doernberg in early 1983—reportedly the world’s first specialized bookstore that was devoted entirely to computer topics. The store’s first location (520 Lawrence Expressway, extant) attracted buyers from Silicon Valley’s hi-tech workforce who sought niche titles, and several national industry media outlets reported on the store’s novel premise.

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<sup>99</sup> Stephen G. Bloom, “Nerds Are Blessed as Computer-Best in Silicon Valley,” *The Sacramento Bee*, February 25, 1988, A2; “Kroger To Sell Fry’s,” *San Francisco Examiner*, September 26, 1988, C7; Ashlee Vance, “A Haven for Spare Parts Lives On in Silicon Valley,” *The New York Times*, February 4, 2009.

<sup>100</sup> Ann Marsh and Scott Woolley, “The Customer Is Always Right? Not at Fry’s,” *Forbes Magazine*, November 3, 1997, <https://www.forbes.com/forbes/1997/1103/6010086a.html>; “So Long, Fry’s Electronics,” *The History of Computing Podcast*, February 27, 2021, online audio, <https://music.amazon.com/podcasts/3c15351e-9a59-49b0-a11f-56e2c38e2d0a/episodes/df4ad11c-ed0b-42dd-a76c-08348f1df77b/the-history-of-computing-so-long-fry-s-electronics>; Lisa Wong, “Why Sunnyvale’s WeirdStuff Warehouse May Be the Heart of Silicon Valley,” *The Almanac Online*, February 6, 2017, <https://www.almanacnews.com/business/2017/02/06/why-sunnyvales-weirdstuff-warehouse-may-be-the-heart-of-silicon-valley/>.

(The store's proximity to a tech-industry watering hole, St. John's Bar and Grill, did not hurt its popularity.) It expanded to stock thousands of titles, which included technical manuals, management how-to books, industry periodicals, and specialized pamphlets that were not typically available in bookstores. The owners worked carefully to stock cutting-edge materials on their shelves, and the store became known as a peerless resource for publications on computer and electronics technologies, programming languages, and many other topics.<sup>101</sup>

Similar to electronics stores like Fry's, the role of Computer Literacy Bookshop went beyond the products it sold: the store created a space that facilitated interaction and knowledge sharing among its likeminded customers. Unkefer and Doernberg hosted author talks and panel discussions on technology subjects, and the store eventually maintained an email list with 60,000 members. Within a few years of its start, the store opened additional locations in Santa Clara County (including one on the Apple campus in Cupertino) and could fulfill email orders in the 1990s. The store also operated a small publishing wing that released computer history books. The store was acquired in the late 1990s after nearly 15 years in operation and subsequently operated primarily as an online bookseller, ComputerLiteracy.com, that was one of many similar websites that fizzled in the dot-com bust of the early twenty-first century.<sup>102</sup>

### ***New Technological Frontiers***

An intense spirit of entrepreneurship flourished in and around Sunnyvale during the 1970s and 1980s. The city's patent library was the busiest facility of its kind in the country, and in 1982 the business resource *Rich's Guide to Santa Clara County's Silicon Valley* documented almost 300 separate electronics firms in Sunnyvale—more than 250 of which were company headquarters rather than branch offices.<sup>103</sup> Many of these represented semiconductor manufacturing and other established Silicon Valley fields, but inventors across the region were taking the building blocks of electronics and devising entirely new—and potentially very niche—applications. It may be difficult to characterize the breadth of new ideas that arose in a place like Sunnyvale, and this study does not attempt to provide a comprehensive look at each of the city's firms at any given time. However, the following ventures deserve special attention because each was able to accomplish two things: first, they identified valid consumer or industry needs; and second, they developed corresponding technologies that gained a broad influence in their respective market sectors. None of these companies has become a widely known name, but each one earned a level of success and influence that was hardly guaranteed for companies on the edges of innovation.

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<sup>101</sup> "Computer Literacy Bookstore Serves Exclusive Market," *InfoWorld*, October 8, 1984, 30; Daniel Doernberg and Rachel Unkefer, "Oral History of Computer Literacy Bookshops, Inc.," oral history conducted by Dag Spicer, March 26, 2021, Computer History Museum; Sean Murphy, "Remembering Computer Literacy Bookshops in Silicon Valley," *SKMurphy* (blog), August 4, 2019, <https://www.skmurphy.com/blog/2019/08/04/remembering-computer-literacy-bookshops-in-silicon-valley/>.

<sup>102</sup> Doernberg and Unkefer, "Oral History of Computer Literacy Bookshops, Inc."

<sup>103</sup> Richard E. Schmeider, *Rich's Guide to Santa Clara County's Silicon Valley* (Palo Alto: Rich's Enterprises, 1982), 52-65.

### *Calma Company*

Established in 1964, Calma developed graphical digitizers and directly influenced the production of semiconductors in the field of computer aided design (CAD). In the 1960s, electronic components such as semiconductors were designed through a laborious and risk-prone process of manually drawing system diagrams on vellum paper—which were then transferred to large-scale masks and then reduced to the size of the actual microchip. Calma devised a graphic digitizer and associated software system that utilized a table and cursor; the system could plot a digital design based on the cursor’s movement, similar to tracing. After first serving clients in the defense and oil and gas industries, Calma integrated its earlier digitizing equipment with a minicomputer, allowing the digitized data to be edited at a terminal. Calma released the influential GDS, or Graphic Design System, in 1971. The movements of the cursor exclusively on the X- and Y-axes made the GDS well suited to semiconductor design, and the system transformed the process of semiconductor design at the same time that ever more complex microchips were becoming technically feasible to produce. Calma sold its very first machine to Intel, and subsequently the company expanded from its first Sunnyvale location (707 Kifer Road, extant) to a larger building (527 Lakeside Drive, extant) by the time it released the follow-up GDS II in 1978 (Figure 28). In that time, Calma had improved the capabilities of its digitizers and database file formats to the extent that they became fundamental systems for modern chipmakers.<sup>104</sup>



Figure 28. The GDS II in the demo room in Calma’s Sunnyvale office; the system components included a minicomputer, hard drive, plotter, and layout station  
Source: Calma Company

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<sup>104</sup> Steven Leibson, “A Brief and Personal history of EDA, Part 2,” *Electronic Engineering Journal*, April 3, 2024, <https://www.eejournal.com/article/a-brief-and-personal-history-of-eda-part-2-calma-applicon-computervision-and-the-cad-era/>; David Weisberg, “Calma,” *Shapr3D Blog* (blog), March 27, 2023, <https://www.shapr3d.com/history-of-cad/calma>.

### *Faroudja Laboratories*

Inventor Yves Faroudja built a reputation as a pioneer in video picture quality enhancement, initially focusing on areas such as broadcast television in the early 1970s. The innovations developed by Faroudja Laboratories may not be well known today due to the obsolescence of earlier generations of video-based technologies such as videocassette recorders (VCR) and Video Home System tapes. However, the company was an acknowledged leader at the height of the television and VCR era of the 1980s, when it was housed at 946 Benicia Avenue (not extant). Faroudja devices were incorporated into major brands of consumer VCR systems to correct skin tone, sharpen visual detail, and filter out irregularities. The company also developed circuitry for high-quality video recording devices and was contributed to the Super VHS high-resolution video format. A local newspaper described Yves Faroudja as “the Dolby of video,”<sup>105</sup> and the numerous patented technologies associated with him have continued to influence later types of video media such as DVDs. Faroudja was awarded a technical division lifetime achievement award from the National Academy of Television Arts and Sciences.<sup>106</sup>

### *Trimble Navigation Limited*

Significant consumer technologies emerged from the Department of Defense’s Global Positioning System (GPS, also known as NAVSTAR) in the 1970s. This network of orbiting satellites was capable of providing geolocational data autonomously to receivers around the globe, and its original priority was to support the missions of the armed forces. However, geoposition data from the system was freely available to those with the technology to receive it, and the American government gradually improved civilians’ access to accurate geolocational data from the GPS during the 1980s and 1990s. These developments gradually nurtured a consumer market for positioning and navigation equipment.

One of Silicon Valley’s early adopters of the GPS was Trimble Navigation. The company was founded in 1978 by former HP engineer Charles Trimble and two colleagues in Los Altos, and sought to develop consumer devices that received data from the GPS satellites. In 1985, the company released its first device, which was intended for commercial use in offshore oil surveying. Trimble expanded its positioning and navigation products to include device hardware and software for a range of users: aviators, surveyors, hikers, and military personnel. Trimble moved its headquarters to Sunnyvale (645 North Mary Avenue, extant) in the mid-1980s, and it remained in the city until 2022.<sup>107</sup>

During the second half of the 1980s, Trimble explored potential military applications for its proprietary technology and devised portable and relatively inexpensive handheld GPS receivers. This proved to be a major boon to the company: during Operation Desert Storm, the company received contracts to supply

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<sup>105</sup> Rob Hof, “The Dolby of Video,” *Times Tribune*, November 2, 1987, C-1.

<sup>106</sup> Paul Freiberger, “Sunnyvale Inventor Sharpens the VCR’s Image,” *San Francisco Examiner*, June 7, 1987, D-3; “Yves Faroudja Honored With Lifetime Achievement Emmy,” *Sound & Vision*, June 21, 1998, <https://www.soundandvision.com/content/yves-faroudja-honored-lifetime-achievement-emmy>.

<sup>107</sup> Tekla S. Perry, “Charles Trimble Bet His Company on GPS—and Won,” *IEEE Spectrum*, April 19, 2018, <https://spectrum.ieee.org/charles-trimble-bet-his-company-on-gps>; Trimble Navigation Limited, *Trimble Navigation Limited*, September 1991, 2-4.

the American military with around 10,000 devices—the first time such technology appeared in an armed conflict. By the early 1990s, the company had sold almost 25,000 of its GPS receivers and was a global leader in geopositioning technology. After the last GPS satellites were put into orbit in 1993, the company had positioned itself well. In the civilian consumer marketplace, the company is now closely associated with surveying and data gathering equipment, which has found a wide range of applications in the spheres of scientific research, industry, and defense.<sup>108</sup>

#### *Etak, Inc.*

Etak was another Sunnyvale-based leader in navigation and positioning devices, although its products did not rely on GPS at all. Etak was among the several startups reared by Catalyst Technologies, Nolan Bushnell's venture capital firm and incubator in Sunnyvale. The company was inspired by a sailing race, when Bushnell hired engineer Stan Honey to navigate his yacht. Honey employed traditional methods of navigation alongside some electronic ones: for instance, he used sensors and computers to calculate the distance and direction the yacht had traveled. Bushnell and Honey hatched the idea for a similar portable system that could operate on land—potentially from the inside of a moving automobile. Working with Bushnell, Honey and several other former colleagues set up shop in the Catalyst Technologies office space and devised a consumer electronic navigation tool that could be installed in a car. The system would include several components: a computer, a compass, wheel sensors, and a vector-based screen to display the location of the vehicle and the street network surrounding it. The system would allow a driver to program in their destination, receive directions, and see their progress on the map. Because the technological infrastructure for downloading map data wirelessly was still years away, the Etak team came up with an alternate method: sets of maps were digitized manually and loaded onto insertable drives that resembled cassette tapes. The data for a geographic area like the Bay Area was large enough that it was split among several tapes, meaning a driver would need to switch them while they travelled.<sup>109</sup>

The company released its first product, the Etak Navigator, in 1985. It was the first automobile navigation device ever introduced onto the consumer market (Figure 29 and Figure 30). The astonishing novelty of the product attracted immediate attention, and the Navigator was the subject of a *Popular Science* cover story upon its release. The Navigator introduced several pathbreaking aspects that are now standard in navigation software. For instance, it utilized a “driver-centric” map display that kept the driver's position at the center of the screen while the map moved around it. The Navigator's software also introduced an approach to “map matching” that updated a vehicle's location on the map in real time based on its movements. The company's highly accurate digitized maps and map-matching methods also remained in use for later generations of navigation software.<sup>110</sup>

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<sup>108</sup> Perry, “Charles Trimble;” Sexton, *Silicon Valley*, 334-335.

<sup>109</sup> Benj Edwards, “Who Needs GPS? The Forgotten Story of Etak's Amazing 1985 Car Navigation System,” *Fast Company*, June 26, 2015, <https://www.fastcompany.com/3047828/who-needs-gps-the-forgotten-story-of-etaks-amazing-1985-car-navigation-system>.

<sup>110</sup> *Ibid.*; Herbert Shuldiner, “Here Now: Computerized Navigator for Your Car,” *Popular Science*, June 1985, 65-66.

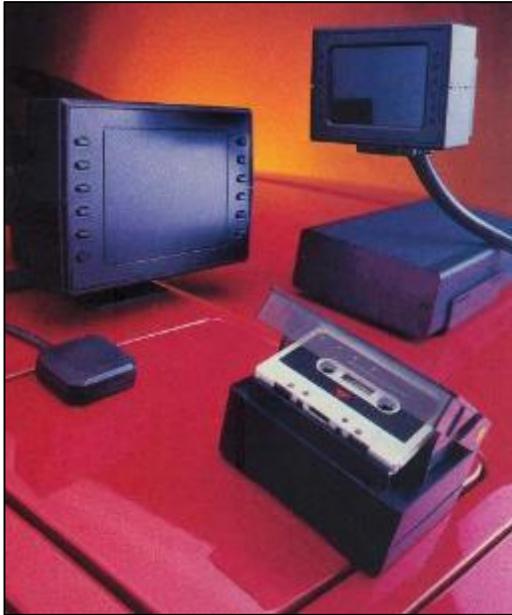


Figure 29. The various components of the Etak Navigator  
Source: Etak, Inc. via Fast Company

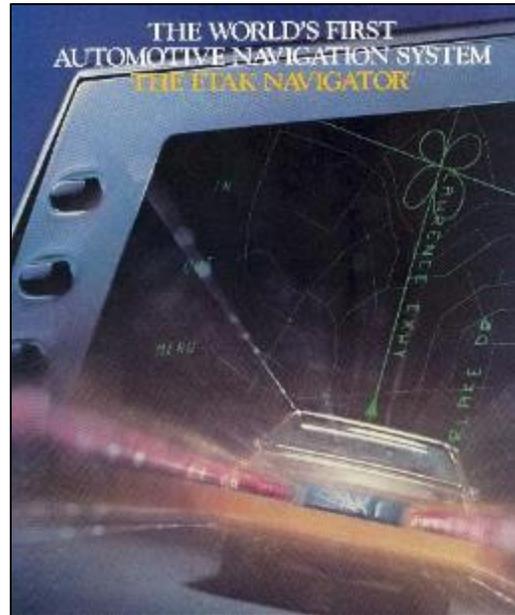


Figure 30. The Navigator pictured on a product brochure  
Source: Etak, Inc. via Fast Company

The Navigator retailed for around \$1,500 and sold several thousand units; Honey later recalled that the Navigator “was hard to sell, because people had no expectation that there was something like that that was available.”<sup>111</sup> Within a few years, Etak began to license its hardware to other companies and pivoted towards map digitalization, database development, and navigation software. In the late 1980s, the company moved to Menlo Park and was acquired by Rupert Murdoch’s News Corporation. Etak’s technology subsequently found a wider commercial market for companies with large fleets of vehicles such as freight and delivery trucks. Although Etak does not appear in many histories of Silicon Valley, the company has been recognized as among the most successful of Bushnell’s startup ventures (possibly the single most successful). The company’s technologies were truly ahead of the time and presaged the mobile navigation platforms that are taken for granted 40 years after the Navigator was first released.<sup>112</sup>

### ***Changes in Sunnyvale’s Federal Presence***

Throughout Silicon Valley’s dramatic evolution after 1970, federal agencies present in Santa Clara County continued to exert a strong influence. There were shifts as new consumer markets opened up for the region’s electronics: 1967 marked the first year, for instance, that private industries acquired more integrated circuits from the region’s manufacturers than did defense agencies. However, the United States’ nuclear arms race with the Soviet Union continued, which led the U.S. Navy to develop new generations of submarine-launched ballistic missiles. LMSC in Sunnyvale continued its role from the earlier Polaris and Poseidon classes and, in 1973, received a multi-billion-dollar contract to develop the

<sup>111</sup> Quoted in Edwards, “Who Needs GPS?”

<sup>112</sup> Edwards, “The Untold Story;” Edwards, “Who Needs GPS?”; Shuldiner, “Here Now,” 66-67.

Trident C4 missile. This missile class was intended to retain the size of the Poseidon but improve its range, and the Sunnyvale engineering team developed several adjustments to its propulsion and computer systems. The company retrofitted its existing Sunnyvale production facilities during this project. LMSC's other major military contracts in the final decades of the Cold War included the first generation in a new jam-resistant defense communications satellite known as Milstar, military transport vehicles, munitions, and remotely piloted vehicles. The funding from missile and satellite contracts flowed to a host of other firms throughout Sunnyvale: defense contracts allowed Westinghouse to employ 2,400 people by the early 1990s (missile launcher systems) and supported local firms such as United Technologies Corporation (solid propellant rockets), Ampex Corporation (satellite data recorders), and Applied Technology (optical equipment).<sup>113</sup>

LCSM's vast field of contracts included those from numerous non-defense agencies, though likely the most important of these was NASA during its development of groundbreaking spaceflight and research missions. The Agena satellite vehicle was studied for its suitability for NASA's emerging Space Shuttle program—and LMSC ultimately was contracted to develop a form of reusable ceramic insulation tile, known as LI-900, that was installed on Space Shuttle orbiters. The technology was a significant aspect of the Shuttle Thermal Protection System, which facilitated the reentry of Space Shuttle vehicles into Earth's atmosphere.<sup>114</sup>

However, the most profoundly significant federal NASA contract awarded to LMSC during this period was the design, assembly, and operation of the low-orbit space telescope ultimately named the Hubble Space Telescope. The program was first funded in 1977, creating the possibility of imaging deep space digital unimpeded by the earth's atmosphere. The telescope promised astronomers the opportunity of peering seven times as deep into space as they had been able to up to that time. LMSC's previous experience with classified federal satellites was a key reason the company received the telescope contract, which at first exceeded \$70 million and encompassed the design and production of the spacecraft structure and internal telescope module. LMSC would also assemble and test the complete telescope. (A separate company, the Perkin-Elmer Corporation, was responsible for the telescope's optical equipment.) The precise integration of this complex scientific instrument required exceptional care during the production process, and LMSC constructed a massive and technically advanced high-bay facility that utilized vacuum ventilation to eliminate particles that could interfere with the telescope in orbit (Figure 31).<sup>115</sup>

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<sup>113</sup> Heinrich, "Cold War Armory," 260-262; Stuart W. Leslie, "The Biggest 'Angel' of Them All: The Military and the Making of Silicon Valley," in *Understanding Silicon Valley: The Anatomy of an Entrepreneurial Region*, ed. Martin Kenney (Stanford: Stanford University Press, 2000), 49; Lockheed Martin, *A Chronology of LMSC History*, 31-44; Jean Deitz Sexton, *Silicon Valley: Inventing the Future* (Chatsworth: Windsor Publications, 1992), 350-351.

<sup>114</sup> Lockheed Martin, *A Chronology of LMSC History*.

<sup>115</sup> Heinrich, "Cold War Armory," 263; "Lockheed To Build Space Platform," *Palo Alto Times*, July 23, 1977, 1.



Figure 31. The Hubble Space Telescope under assembly on the LMSC campus in Sunnyvale, c.1980s  
Source: National Aeronautics and Space Administration

NASA finally put the Hubble Space Telescope into space in 1990. Despite early image quality issues caused by a flawed mirror, the launch of Hubble was a major technological achievement for NASA that opened new pathways in astronomical research. In its more than 30 years in operation, Hubble has recorded a tremendous body of images that have vastly improved humans' understanding of the universe. Its images have supported tens of thousands of scientific studies and research leading to one Nobel prize. The location of the Sunnyvale facility used in the Hubble Space Telescope assembly remains formally classified.<sup>116</sup>

As a result of LMSC's role on the space telescope, national security rocketry, and many other complex federal programs, the company's Sunnyvale campus employed more than 20,000 people by the end of the 1980s and was the single largest employer in Silicon Valley. By the 1980s, the company occupied over 50 buildings in Sunnyvale, primarily concentrated within its original campus east of Moffett Field.<sup>117</sup>

The boom in federal defense spending during the presidency of Ronald Reagan also led to substantial improvements at the Sunnyvale Air Force Station. During the 1980s, the U.S. Air Force expanded the installation and upgraded hardware and software systems to support the United States' growing cadre of intelligence and defense satellites. Its most significant support program of the 1980s was the Strategic Defense Initiative, commonly known as "Star Wars," which reinforced the United States' network of missile defense satellites. In 1985, the Air Force established an additional satellite control center at Falcon

<sup>116</sup> Christopher Gainor, *Not Yet Imagined: A Study of Hubble Space Telescope Operations* (Washington, D.C.: NASA History Division, 2020), 19-20.

<sup>117</sup> Lockheed Missiles and Space Company, *Building for the Future*, May 1984; Sexton, *Silicon Valley*, 29.

Air Force Base in Colorado Springs, meaning that the Sunnyvale installation no longer contained the only such facility in the country. In 1986, the site was renamed Onizuka Air Force Station to memorialize astronaut Ellison S. Onizuka, one of seven crew members killed in the explosion of the space shuttle *Challenger* earlier that year. Facilities at Onizuka provided tracking and communication support to space research vessels during the 1980s and 1990s, including Space Shuttles and the Hubble Space Telescope following its launch.<sup>118</sup>

The influence of federal agencies in Silicon Valley, however, began to shift as the Soviet Union weakened during the 1980s; the superpower's ultimate dissolution in 1991 effectively marked the close of the Cold War. With the loss of the United States' principal political rival since the end of World War II, the Department of Defense created the Base Realignment and Closure Commission to recommend the closure or transferring of military bases across the country. In 1994, the Navy curtailed its military programs at Moffett Field and passed its land and facilities there to NASA. Onizuka Air Force Station was also identified for closure, although it continued to operate for more than 10 years after the end of the Cold War. Some of the installation's missions were transferred to Falcon Air Force Base in the mid-1990s, and Onizuka became the back-up installation for satellite control and communications. More than 1,000 positions were reassigned from Onizuka, and it was decommissioned in 2007.<sup>119</sup> Most of its buildings, including the Blue Cube, were later demolished.

The end of the Cold War led to fundamental changes at LMSC. Its parent company, Lockheed Corporation, merged with competitor Martin Marietta in 1995. Although Lockheed Martin remains a major employer in Sunnyvale, it has shrunk from its Cold War peak and pivoted towards producing satellites for commercial entities and foreign governments. The city's second major defense contractor, Westinghouse Marine Division, was acquired by Northrop Grumman in 1996 and continued its established streams of federal business in missile launch technologies and propulsion systems for naval submarines and surface ships.<sup>120</sup>

## 6. NETWORKING AND THE TWENTY-FIRST CENTURY

Silicon Valley's technological preeminence in the United States was not in dispute at the end of the Cold War. In areas such as semiconductor manufacturing and computing, the Bay Area had edged out other regions of the country (such as Boston) that had seemed just as likely to prosper in the 1960s. Sunnyvale, near the geographic center of the region, still exemplified the character of Silicon Valley as well as any city in the region. The 1992 edition of *Rich's Guide to Santa Clara County's Silicon Valley* listed around 350 high-tech firms there, many with vaguely high-tech names such as Intellitron and Telebit.<sup>121</sup>

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<sup>118</sup> Department of the Air Force, *Addendum to the 2004 Historic Building Inventory & Evaluation Report*, 2-15 through 2-19.

<sup>119</sup> *Ibid.*, 2-17 through 2-19.

<sup>120</sup> Northrop Grumman Marine Systems, "Northrop Grumman Marine Systems," n.d.

<sup>121</sup> Richard E. Schmeider, *Rich's Hi-Tech Business Guide to Silicon Valley & Northern California* (Palo Alto: Rich's Business Directories, 1992), G-133 through G-149.

Yet, of all the technological milestones that changed the contours of daily life in the United States after the end of World War II, few reached as far as the “Internet Revolution” in the last decade of the twentieth century. The new networking and communication possibilities that accompanied the World Wide Web’s arrival released even greater energy into Silicon Valley’s innovation-focused startup culture. As the new century dawned, the range of newly possible technologies only expanded towards greater networking and greater automation.

### ***The Internet Revolution Arrives***

In the simplest terms, the Internet is a global information network among various smaller networks that facilitates rapid information exchange. The early evolution of the Internet between the 1960s and the 1990s has connected people around the world in a way that prioritizes their access to technology over their geographic proximity. This reorientation of the information landscape has made online environments nearly ubiquitous across much of the world, leading to profound changes in communication, commerce, and leisure activities.

The development of the Internet is global, but it was built upon specific innovations in the Bay Area. The most significant of these was the Advanced Research Projects Agency Network (ARPANET), a computer network developed for the Department of Defense that facilitated communication and research sharing among mainframe computers in different locations, regardless of their hardware and software. Based in part on research conducted at the Stanford Research Institute in Menlo Park, the ARPANET introduced some of the communications technologies and protocols that undergirded the modern Internet. SRI housed one ARPANET terminal when the network launched in 1969.<sup>122</sup>

Other information networks were introduced, often in governmental and academic research settings. Computer scientists devised protocols of interlinking them, typically over telephone lines accessed with modems. The greatest single breakthrough that brought the power of the Internet to non-technical members of the public was the invention of the World Wide Web in 1989, an intuitive information network that could display text, graphics, and other content on “pages.” In 1991, staff members from the Stanford Linear Accelerator Center, a research facility outside of Menlo Park, imported the World Wide Web software and were able to establish the first web server in North America.<sup>123</sup>

During the first half of the 1990s, a series of significant developments led to the birth of the commercial Internet: the removal of restrictions on commercial use of the World Wide Web, the development of web browser applications, and the increased availability of dial-up services such as America Online, MSN, and CompuServe. The release of Microsoft’s Windows 95 personal computer operating system and its standard web browser, Internet Explorer, spurred private companies to develop websites, which

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<sup>122</sup> Berlin, *Troublemakers*, 15-17; O’Mara, *The Code*, 61-66.

<sup>123</sup> O’Mara, *The Code*, 287-290; Page & Turnbull, *SLAC National Accelerator Laboratory Historic Resource Study*, prepared for SLAC National Accelerator Laboratory, December 22, 2010, A-53.

jumpstarted the Web-based world. Because the advanced electronics industry was firmly established in Silicon Valley by this time, the region’s entrepreneurial spirit fueled a new gold rush. New web-based startups dreamt up novel concepts for websites and then coded them into existence.

One of the most emblematic success stories of this period was Yahoo, which was founded after two Stanford Ph.D. students, Jerry Yang and Dave Filo, created a categorized guide (or web directory) with links to their favorite websites. “Jerry’s Guide to the World Wide Web” immediately attracted a following of curious web users in 1994. Sensing opportunity, the founders paused their studies and followed the Silicon Valley playbook: they incorporated, expanded their staff, and secured venture capital funding. Their casual culture was evident in their new name, the Yahoo Directory (stylized as Yahoo!). The site featured a straightforward and free function that allowed users to search the directory entries, which the company’s staff continued to add to manually. (The company made money by selling banner ads on the site although eventually introduced several paid services.) This element of the site (Figure 32) introduced web surfers to the experience of typing in a search term and seeing hits appear on the screen in a flash.<sup>124</sup> By early 1995, the website had hundreds of thousands of daily visitors and was described by one technology journalist as “the starting block for ambitious web surfers.”<sup>125</sup>



Figure 32. The early design of the Yahoo landing page c.1996, featuring its famous search field  
Source: Yahoo

The Yahoo founders graduated out of their original Stanford campus digs and set up a formal company office in Mountain View—but then relocated to a larger but still nondescript building in Sunnyvale’s Peery

<sup>124</sup> Julian Guthrie, “Yahoo Turns Pro,” *San Francisco Examiner*, April 24, 1995, B1-B2; O’Mara, *The Code*, 307-309; Sonia Reyes, “Yahoo! ‘Yahoos’ Hit Jackpot,” *Daily News*, March 21, 1996, 70.

<sup>125</sup> John Byczkowski, “Yahoo List a Big Favorite of Web Surfers,” *The Cincinnati Enquirer*, February 28, 1995, C7.

Industrial Park (635 Vaqueros Avenue, extant) before the company's closely watched public offering in 1996. By this time, Yahoo had added 30 million pages to its directory and was still growing. In the Sunnyvale offices, company leaders updated Yahoo's brand image and tried to convince potential investors of its value. They succeeded at casting Yahoo as an essential web portal rather than simply a search function: the company enjoyed one of the best initial public offerings of its era and suddenly increased its market value to more than \$800 million. The company subsequently launched new features, including a customizable home page and the city guide function that compiled local news, commercial listings, and other content from several American cities. These features were some of the earliest on the World Wide Web that compiled detailed data on the activities of users—which posed a major advertising threat to traditional print media like newspapers.<sup>126</sup>

Yahoo expanded rapidly after its successful stock launch, and by the end of 1996 (after a brief spell in Sunnyvale) the company began moving its staff to a larger building on Central Expressway in Santa Clara. The company aimed to offer considerably more than a web searching tool: helped in part by strategic acquisitions, yahoo.com evolved into a diversified web portal featuring email, news, weather, personal ads, reviews, and more—all available to web users free of charge. Yahoo secured its place as one of the biggest titans of the late-1990s dot-com boom. At its height around the turn of the twenty-first century, was valued at more than \$1 billion and was one of the most heavily trafficked sites on the World Wide Web.<sup>127</sup>

In Silicon Valley, the final few years of the twentieth century saw a frenzy of entrepreneurial activity and market interest known as the “dot-com boom” or the “dot-com bubble.” Many of the most hyped ventures made public offerings, and/or they were bought up by larger and more established web companies that were attempting to expand their services and stay fresh. Sunnyvale's location and ample stock of offices allowed the city to draw in small companies that hoped to reap even a fraction of Yahoo's success. One was Infoseek (1399 Moffett Park Drive, not extant), one of a raft of early search engines that competed against Yahoo. Like others in its cohort—Lycos, AltaVista, Excite!, WebCrawler, and Magellan—Infoseek never truly challenged Yahoo's dominance. However, it was among several respected search engines that had a promising public offering, and it was selected as a default search engine for Netscape Navigator, one of the most popular web browsers in the late 1990s. Infoseek became the third-most-used search engine in 1998, when Disney acquired a large stake in the company with plans to launch a dynamic

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<sup>126</sup> Karen Angel, *Inside Yahoo!: Reinvention and the Road Ahead* (New York: Wiley, 2002), 50-64; Janet Rae-Dupree, “Wall Street Frantic To Get Yahoo Stock,” *San Jose Mercury News*, April 13, 1996, 1A.

<sup>127</sup> *Ibid.*, 51-53, 83; Jim Hu, “Yahoo Tacks Fees Onto E-mail, Storage,” CNET, April 3, 2002, <https://www.cnet.com/tech/services-and-software/yahoo-tacks-fees-onto-e-mail-storage/>; David A. Kaplan, “From Dorms to Riches,” *USA Weekend*, May 12, 1996, 4-5; Daniel S. Levine, “The Search Is On,” *San Francisco Business Times*, September 22, 1996; Dan Tynan, “The History of Yahoo, and How It Went From Phenom to Has-Been,” *Fast Company*, March 21, 2018, <https://www.fastcompany.com/40544277/the-glory-that-was-yahoo>.

new web portal. Disney never was able to enter the web sector successfully in the 1990s, however, and the Infoseek name and its site were phased out in 2001.<sup>128</sup>

Sunnyvale's technological strengths also contributed to web-based electronic mail (webmail), another once-novel facet of the World Wide Web. By the 1990s, different forms of electronic mailing systems had been available for decades on non-commercial information networks like ARPANET. But subscription- and software-based email clients gained popularity in the 1990s as Internet access was expanding quickly in the United States. Many Americans first received their first email address through a dial-up subscription service such as America Online.

However, *free* webmail remained an untested service concept in the mid-1990s. A Sunnyvale startup, Hotmail (originally HoTMaiL, emphasizing the letters "HTML"), was touted as the first web company in the world to develop an ad-supported website offering free email without the need for software. Both Hotmail and its close contemporary Rocketmail, created by Menlo Park startup Four11 Corporation, represented a milestone in web-based communications. A user could simply sign up for an account and receive an email address without downloading proprietary email software to a computer and without making a payment. The only cost to users was viewing advertisements on the website.<sup>129</sup>

After Hotmail debuted in 1996 (Figure 33), some analysts saw webmail as a niche service for individuals who lacked home computers, and they were far from certain whether Hotmail would continue to attract subscribers. But by the end of that year, after Hotmail had been in operation for several months, the company reported it was gaining 10,000 new users every day. Its small team of fewer than 30 staff members moved into a new Sunnyvale office in 1996 (1290 Oakmead Parkway, extant). By the end of 1997, less than two years after its launch, the startup boasted more than 9 million subscribers. Hotmail's immense popularity and broad appeal helped shift the public's attitudes towards webmail: within a relatively short span of time in the second half of the 1990s, the Internet came to expect free email as a part of their online experience. Over time, this helped chip away at the popularity of once-mighty services like America Online. Seattle area software juggernaut Microsoft was looking to buttress its existing portfolio of web services when it acquired Hotmail for \$450 million in late 1997. It has been claimed this was the largest price paid for a startup in the early dot-com years. (Yahoo considered acquiring Hotmail for its own webmail service but passed on its high asking price and bought out Rocketmail instead.) Microsoft incorporated Hotmail into its MSN service (Figure 34) and repeatedly rebranded the webmail platform over several years. Hotmail remains the foundation of Microsoft's Outlook.com.<sup>130</sup>

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<sup>128</sup> Zachary Coile, "Looking for a Fight," *San Francisco Examiner*, August 17, 1997, B5, B10; David Einstein, "Disney To Buy 43% Stake in Infoseek Corp.," *San Francisco Chronicle*, June 19, 1998, E1-E2; Vern Kopytoff, "Disney To Phase Out Its Go.com Web Site," *San Francisco Chronicle*, January 30, 2001, B1.

<sup>129</sup> Rae-Dupree, "Everlasting E-Mail Will Help Pitch Products," *San Jose Mercury News*, August 26, 1996, 1E.

<sup>130</sup> Angel, *Inside Yahoo!*, 92-94; Sean Gallagher, "How Hotmail Changed Microsoft (and Email) Forever," *Ars Technica*, December 29, 2017, <https://arstechnica.com/information-technology/2017/12/how->



Figure 33. The layout of the original Hotmail site, c.1996  
Source: Hotmail, via Ars Technica



Figure 34. Hotmail's site following its acquisition by Microsoft  
Source: Microsoft, via Ars Technica

After a few intense years of venture funding that seemed to flow freely into tech startups, the stock market lurched in the early twenty-first century after reaching an all-time high in 2000. Investors had put in too much money without seeing startups generate profits. The end of the dot-com boom led to an abrupt cool-off in funding, and waves of layoffs swept through Silicon Valley's tech companies. The market meltdown of the early 2000s symbolized the end of Silicon Valley's first era of web expansion.<sup>131</sup>

The rise of the World Wide Web in the 1990s, however, firmly entrenched it as a fixture of everyday life. Like some other established companies, Yahoo was able to ride out the era's financial uncertainty. In 2001, it even moved into a new headquarters campus (701 First Avenue, extant) in Sunnyvale near Lockheed Martin in the Moffett Industrial Park. However, the company's preeminence of the 1990s was gradually eclipsed by emerging Silicon Valley powerhouses like Google (founded in a Menlo Park garage and headquartered in Mountain View) and Facebook (at first housed in Stanford Research Park before it relocated to Menlo Park). Google's algorithmic search function and array of user-friendly Web products (including webmail) improved upon some related concepts introduced during the 1990s dot-com boom; Facebook was the most emblematic new social network that reflected a major shift towards giving users creative control on the World Wide Web. Yahoo continued to expand its offerings to meet new trends—such as streaming services—but was not known for strong success in its acquisitions (GeoCities and flickr are just two examples.) In 2017, Verizon Communications acquired the company, and it exists in a newer incarnation, Yahoo! Inc.<sup>132</sup>

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hotmail-changed-microsoft-and-email-forever/; Michelle Rafter, "Freemark Gone, But Free E-Mail Lives On," *San Francisco Examiner*, December 22, 1996, B8; Jon Swarz, "Microsoft Acquires Hotmail," *San Francisco Chronicle*, January 1, 1998, D5.

<sup>131</sup> O'Mara, *The Code*, 359-362.

<sup>132</sup> *Ibid.*, 353, 368-370; Tynan, "The History of Yahoo."

Like all Silicon Valley cities in the twenty-first century, Sunnyvale is home to myriad companies focused on web products and related services, such as cybersecurity and cloud storage. The best known with its headquarters in the city is LinkedIn, a professional social media web platform that moved into a campus in Sunnyvale in the 2010s. (The company's primary corporate headquarters building is at 1000 W. Maude Avenue, extant). Both Google and Apple maintain major presences throughout the office parks in northern Sunnyvale.

### ***Computers Become Handheld***

The movement to shrink the sizes of personal computers for home use, as described earlier, led to smaller and smaller devices over time. The earliest portable computers had become available in the 1970s, but Atari Corporation—Atari Inc.'s successor that remained headquartered in Sunnyvale (1196 Borregas Avenue, not extant)—entered this space only in 1989 when it released the Atari STacy portable computer. This folding computer with built-in keyboard and monitor display was an adapted version of the company's ST computer system released in the mid-1980s; like its contemporaries, the STacy was considerably more bulky than modern laptop computers that became available in the 1990s. Also in 1989, Atari released the Portfolio, an even smaller folding handheld (or "palmtop") computer that the company had licensed for the American market from a U.K. firm. These types of small and mobile computers influenced the development of a related product class of light-weight portable devices often referred to as personal digital assistants, or PDAs. Years before the widespread use of smartphones, PDAs acclimated customers to relatively low-cost palmtop computers with varied functions—including games, calendars, financial programs, and in some cases telecommunications. Home computer companies were responsible for some of the most notable early PDAs in the first half of the 1990s, such as the Apple Newton and the IBM Simon (often identified as the first smartphone).<sup>133</sup>

Palm Computing Inc., a startup founded in Los Altos by Jeff Hawkins, entered the fray in 1992 when it began to create software for the Zoomer, a device under development by Tandy Corporation and Casio Computer. (Casio had a strong track record of producing calculators and other small electronic devices with computing capabilities.) The Tandy Zoomer failed to sell, but Palm began to develop its own PDA hardware, the PalmPilot 1000, which it released in 1996 after being acquired by U.S. Robotics. The PalmPilot (Figure 35) used a stylus, similar to other devices arriving on shelves during the same period, and it proved surprisingly popular among consumers because of its small size, low cost (under \$300), and relatively limited functions. Unlike competitors such as the Apple Newton, which attempted to replicate the functions of an entire personal computer, the PalmPilot was a simple personal organizing tool with scheduling, calculating, address book, and note-taking functions. Palm sold around one million units

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<sup>133</sup> "Mobile Computing," Computer History Museum, accessed September 30, 2024, <https://www.computerhistory.org/revolution/mobile-computing/18>;

during its first year on the consumer market, which walloped the struggling Newton and several PDAs produced by far more established companies.<sup>134</sup>



Figure 35. The original PalmPilot, with its stylus tucked into the side  
Source: Palm Computing Inc., via Computer History Museum

3Com bought out U.S. Robotics in 1997, and despite the PalmPilot's market dominance the original company's founders departed the following year to establish a competing firm named Handspring. Palm moved its headquarters from Mountain View to Sunnyvale in 1999 (950 W. Maude Ave., extant), the same year it released the Palm VII. This was the first generation of the company's PDAs that offered wireless connectivity through a proprietary subscription data service. By providing basic email and web browsing capabilities, the Palm VII was one of the first wireless data devices available to consumers. During the early 2000s, Palm was among the Sunnyvale companies with the best household name recognition, and it remained in the city through a series of ownership changes until it was finally acquired and absorbed by HP. The company also entered the emerging smartphone market with lines such as the Centro and Pre. Palm's later technologies were never as groundbreaking as the original PalmPilot or the Palm VII, and new cutting-edge PDAs from competitors chipped away at Palm's market share. However, the company's legacy remained its earlier PDAs, which demonstrated the broad appeal of handheld devices during the 1990s.<sup>135</sup>

<sup>134</sup> Michelle Slatalla, "Embedded Software puts Power in Your Palm," *Los Angeles Times*, May 5, 1997, D6; Gina Smith, "Tandy, Casio Show Hand-Held Computer," *San Francisco Examiner*, January 8, 1993, B1; Jonathan Weber, "They're Small, Cheap and Gaining on PCs," *Los Angeles Times*, January 11, 1992, D1.

<sup>135</sup> N'Gai Croal, "The World in Your Hand," *Newsweek*, May 31, 1999, 59; Donna Dubinsky, "Palm's Innovations Will Carry On," *San Jose Mercury News*, July 4, 2010, 19A; "Mobile Computing," Computer History Museum.

### ***Silicon Valley in the New Millenium***

The unstable markets for technology companies in the early twenty-first century gave way to a period of powerful economic growth in Silicon Valley, fueled in good part by the ever greater influence of personal electronic devices and online environments in daily life. Santa Clara County's established roots in semiconductors and computer technology have remained reliable, and developments like the CHIPS and Science Act of 2022 promised to bolster Bay Area microchip manufacturers. Additionally, mobile technologies, web-based services, e-commerce, and associated software have all emerged as significant areas of expansion. The forward-thinking mindset that is shared among many of the region's residents and members of the tech workforce has pushed them to conceive of new areas of innovation, growth, and potential profits. In 2023, four Santa Clara County municipalities ranked in the top 10 patent generating cities in the United States. Sunnyvale—with a population now hovering just above 150,000—placed fourth behind only cities several times its size.<sup>136</sup>

Unsurprisingly, the economic and innovation engine of modern Silicon Valley has caused rapid transformation in certain regards. One way to measure the degree of change in Sunnyvale is the high number of technology-related properties noted in this document that are no longer standing, most of them demolished to make way for new commercial and industrial developments. The city and its neighbors have experienced a general trend away from the low-scale industrial parks constructed between the 1950s and the 1970s, in favor of complexes of mid-rise glass towers. Buildings housing the current generation of Silicon Valley's high-tech firms stand where the original LMCS campus and late-1970s Atari headquarters once did. Some newer arrivals to Sunnyvale have also reused facilities from the earlier waves of development that created the city's tech landscape after World War II. Applied Materials, which develops equipment for manufacturing semiconductors, now occupies the former Fairchild Instrumentation plant on E. Arques Avenue—in addition to numerous other buildings in Sunnyvale. Since 2007, the original Signetics Technology Center and Philips Research Laboratories facility on N. Wolfe Road has housed the Plug and Play Tech Center, a venture capital firm and startup incubator that continues a model related to the one established in Sunnyvale by Nolan Bushnell's Catalyst Technologies in the 1980s. The firm provides funding to startups, and hundreds of small ventures can occupy office space in the building at any given time.<sup>137</sup>

The new avenues for innovation in Sunnyvale and its neighboring cities are considerable. Detailed histories of this era of Silicon Valley are yet to be written, but new sectors of research and product development with a broad reach have already clearly emerged in the early twenty-first century. Biotechnology, for instance, has gained a strong influence in Sunnyvale through the headquarters of robotic surgical equipment company Intuitive Surgical (1020 Kifer Road). Genomics company 23andMe,

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<sup>136</sup> "Silicon Valley Indicators," Silicon Valley Institute for Regional Studies, accessed October 15, 2024, <https://siliconvalleyindicators.org/data/economy/innovation-entrepreneurship/patent-registrations/>. The top three patent generating cities were San Jose, San Diego, and San Francisco.

<sup>137</sup> Miguel Helft, "Rental Building's Good Karma Nurtures Success," *The New York Times*, September 14, 2007.

which launched a well-known and easy-to-use genomic testing service in the first decade of the new millennium, operated its headquarters in Sunnyvale from 2019 until 2022 (223 N. Mathilda Avenue). New social media platforms, augmented reality, cryptocurrency, autonomous vehicles, private-sector spacecraft, and artificial intelligence are additional areas that have fueled intense interest worldwide in the past decade and now have an established presence in Silicon Valley. It is likely that companies working in some or all of these fields will continue to occupy properties in Sunnyvale, potentially in ecologically resilient “innovation districts” like the one that has been envisioned for the former Moffett Industrial Park. The longstanding culture of innovation that supported the region’s global technological preeminence can only be expected to continue shaping the growth of Sunnyvale.

## 7. ASSOCIATED PROPERTY TYPES

As noted in the introduction of this document, technological innovation can occur at any type of property. Certainly, some innovations in the high technology field are dependent upon specialized facilities and stationary equipment. Other forms of innovation, however, could potentially take place anywhere that accommodates World Wide Web access, consumer-grade computers, or even a pencil and scrap paper. An added complication is that innovation is a process that can unfold over multiple sites and draw on different types of resources.

However, the preceding historic context illustrates that large sections of Sunnyvale were built specifically to accommodate innovative activities. The postwar defense- and technology-focused economy of Santa Clara County brought about a landscape of large, low-scale industrial and business parks throughout the region that followed the template first set by Stanford Industrial Park in Palo Alto. Developments of this nature were often—although not exclusively—the settings of technological innovation in Sunnyvale and surrounding cities because they were intended to house companies that made innovation their business.

Land use zoning and corresponding building types have varied from park to park, and different corners of the technology industry have required different types of facilities. Furthermore, several functions involved in the research, development, and/or production process might be combined into a single building. Generally, though, the associated buildings fall into at least one of the following categories:

- *Office facilities* contain spaces that support administrative functions, which may include business management, marketing, accounting, and human resources. They are especially concentrated in a company’s headquarters. Offices may also be appropriate spaces to house the primary “production” processes that rely on desk workstations rather than highly specialized equipment, such as software and web-based services.
- *Research and development facilities* are the primary spaces where innovation occurs. These types of facilities—also known as research centers, research laboratories, or similar terms—are intended to facilitate the development of new product prototypes. A company invests in R&D in order to anticipate future product opportunities without an immediate marketable product.

- *Engineering and testing facilities* accommodate the activities required to develop a prototype into a marketable product.
- *Manufacturing and quality control facilities* contain the processes required to fabricate, assemble, and/or test products. The type of manufacturing facility specific to the semiconductor industry is the fabrication plant, or “fab,” that requires highly specialized equipment and physical spaces like clean rooms. Many companies based in Silicon Valley have located some of their manufacturing facilities elsewhere in the United States or overseas, but local facilities may still retain manufacturing/fabrication functions.
- *Storage and distribution facilities* are used to warehouse products and then to ship them to customers and to retailers.

A company may construct a campus containing several or all of these facility types—for instance, Amdahl Corporation’s late-1970s campus in Sunnyvale. As firms grow and their facility needs evolve, they may also lease and occupy existing buildings on an ad-hoc basis.

In addition to purpose-built innovation facilities, it should be stressed that many other property types could become strongly associated with a particular technological innovation. The following three categories reflect broad relationships to the process of innovation rather than specific physical or functional attributes:

- *Proving grounds* refer not to where innovations were first devised and engineered, but rather where innovations were first placed into use in a public or institutional setting. A property of this type might have demonstrated for the first time how truly innovative or relevant a technology might become. The installation of Atari’s *Pong* prototype in Andy Capp’s Tavern is an example of this scenario. In other cases, the successful premiere and continued performance of the innovation was its most important facet—illustrated by the operation of the Satellite Test Annex at the Sunnyvale Air Force Station.
- *Support facilities* are properties that indirectly supported innovation by providing essential resources, whether in the form of services, physical spaces, funding, or component goods. Examples include the Sunnyvale Patent Library or the city’s various hobby shops and electronics retailers that were scoured by computer tinkerers. Such facilities sustained a connection to many would-be innovators rather than to only a few.
- *Ad hoc sites* reflect that innovation may not be tied to facilities with proper business or industrial functions. Properties in this category are the points of origin for some of Silicon Valley’s most successful companies, and they include garages, personal residences, dorm rooms, and other unexpected sites. Such places have wound up being appropriate sites of innovation because they were available to individuals with worthwhile ideas and technical skills, who may not have yet had the resources to work in more formal settings.

## 8. EVALUATION CRITERIA

For a property in Sunnyvale to be listed in the Heritage Resource Inventory for its associations with technological innovation, it must meet at least one of the criteria listed in Section 19.96.050 of the Zoning Ordinance. As noted previously, most of the criteria relate to a property's architectural merit and visual continuity, although a few allow for listing to recognize the property's associations with significant events and individuals. These criteria are the focus of this section.

There are two primary challenges with identifying the technological properties that warrant listing in the Heritage Resource Inventory. The first challenge is determining which properties meet the threshold of significance. Innovation has occurred constantly in the city across multiple industrial sectors, and many thousands of patents have been issued to the city's residents and to employees of its high-tech firms. How can an evaluator determine which of these innovations are truly worthy of recognition? The second challenge relates to properties' integrity. Several properties that appear to meet the significance requirements of the Heritage Resource Inventory have been substantially altered, and many more have been partly or entirely demolished. What are the essential physical characteristics that a property should retain to be considered for designation as a heritage resource? Each of these is considered in the following discussion.

### *Significance*

#### *Association with Significant Events*

Properties associated with significant technological innovation in Sunnyvale are most likely to be designated as heritage resources under Section 19.96.050(a) and (b):

- (a) Exemplify special elements of the city's cultural, social, economic, political, aesthetic, engineering, architectural, or natural history;
- (b) Are identified with persons or events significant in local, state, or national history.

For each of these criteria, it is imperative to develop a comparative understanding of an innovation and its associated property or properties to understand their potential significance. Countless innovations have been developed by individuals and firms in Sunnyvale over several decades. However, a technological innovation viewed in isolation—as a new invention that did not previously exist—is not a sufficient basis for historical significance. Rather, the influence of the innovation and its connection to a particular property must be closely considered.

Often, significant technologies and companies ultimately gained a wide influence and adoption outside of the technological sphere. Such an innovation would not necessarily need to be the very first in its respective technological field or have caused an immediate technological paradigm shift. However, an evaluation of innovations should consider their influence beyond the boundaries of the high-tech industry, as supported by a review of primary and secondary historical sources. A significant innovation

should have had a measurable impact on wider society, culture, and policy, even if that influence occurred well after an idea or prototype was first devised.

Although the innovation process can take place over a long period of time or potentially in numerous locations, important innovations are often linked to a particular property: a research facility, a proving ground like Andy Capp’s Tavern in Sunnyvale, or an “ad hoc site” where an innovator struck upon a novel idea and dove into developing it as a real technology. The most significant event associated with a technology could also be its public unveiling or another milestone that contributed meaningfully to its wide public recognition and adoption. It is less likely for this type of innovation to be conveyed by a standalone administration facility, manufacturing plant, or other auxiliary property. Regardless of the property type, the innovation’s direct connection to the property should be substantiated through historical research.

A broader area of potential significance represents a more sustained contribution to the innovation process. Companies in Silicon Valley may have been responsible for developing significant technologies on an incremental basis that were respected among technical specialists and were widely adopted in industry and the government. Such companies may not have become household names among laypeople but still became firmly established in the Bay Area over an extended period. Even if the innovative technologies devised by these firms were components (for instance, semiconductor devices) of products or services developed by others, they would have still contributed directly and meaningfully to the improved performance and/or the widespread adoption of larger technologies and systems.

The types of facilities that are likely to relate to these types of innovative companies are administrative offices and research and development facilities; auxiliary properties such as manufacturing plants and warehouses are still unlikely to convey the significance of the innovation unless it can be shown that the production process was an important facet of the technology’s innovation. This guidance also recognizes the potential significance of support facilities, such as the Sunnyvale Patent Library, if such properties can be clearly linked to specific important innovations over a prolonged period of time.

#### *Association with Significant Persons*

Section 19.96.050(b) of the Zoning Ordinance also states that properties can be designated as heritage resources if they are identified with persons significant in local, state, or national history.

Given the current study’s area of focus, the most likely individuals to be recognized are the particular inventors, engineers, and scientists who contributed research and technical expertise to the development of a particular technological innovation. In certain scenarios, one or two significant individuals are well documented as primarily responsible for a particular technology—for instance, Steve Wozniak’s and Steve Jobs’s formation of Apple Computer and development of the Apple I and Apple II home computers. A nontechnical business leader in the technology sphere could also be associated with innovative activities, but only if an evaluator can demonstrate their management acumen and foresight directly supported the development of the innovation.

It should be noted that innovation often derives from the contributions of several or many skilled individuals. Depending on the situation, the significance of an innovation might be more clearly understood through its association with significant events, as discussed above, rather than its association with multiple contributors through multiple phases of innovation and product development.

Private residences are unlikely to meet the significance threshold for heritage resource status unless it can be shown that the residence was a primary site of the individual's innovations. (One illustration of this scenario, for instance, could be the "HP garage" in Palo Alto, where David Packard and Bill Hewlett formed their influential electronics company.) A person's having resided in a property is generally not a sufficient connection to warrant listing if other properties with strong associations still exist. Guidance for the National Register clarifies that resource listing is typically limited to those properties that have the ability to illustrate a person's important achievements. Eligibility usually applies to properties that are "associated with a person's *productive* life, reflecting the time period when the person achieved significance. In some instances this may be the person's home; in other cases, a person's business, office, laboratory, or studio" may best represent that person's accomplishments.<sup>138</sup>

One example of this situation is James (Jimmy) Treybig, who founded a pioneering fault-tolerant computer company, Tandem Computers, in 1974.<sup>139</sup> At this time, Treybig and his family lived at 525 Inverness Way (extant) in southern Sunnyvale, although the company first occupied office space in Santa Clara and then moved into facilities in northern Cupertino (20605 Valley Green Drive and 19333 Vallco Parkway, both extant)—just over the municipal border from Sunnyvale. Unless historical research supports that activities Treybig conducted in the residence made a direct and meaningful contribution to his establishment and management of Tandem Computers, it is unlikely his family's residence would meet the eligibility requirements for heritage resource status.

#### *Association with Significant Architecture and Design*

Although architectural, design, and engineering significance is not the focus of this study, it is possible that a facility associated with technological innovation may also have significant architecture or construction value that is integrally related to its functional role. This could be the case if a highly specialized, sophisticated physical facility were purpose-designed for the research, assembly, and/or testing of a particular technology. In such a scenario, the physical space could represent a technological innovation in its own right. One theoretical example is a building where clean rooms were first established before becoming the standard facility for modern semiconductor fabrication.

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<sup>138</sup> National Park Service, *How to Apply the National Register Criteria for Evaluation*.

<sup>139</sup> "Fault-tolerant" refers to a computer system with numerous processors that could continue operating without interruption if one component were to fail. This technology proved very popular for a variety of applications in finance and telecommunications. Treybig is also known for a supportive management style that fostered a healthy, non-hierarchical corporate culture. See Gaye Clemson, "What Makes a Sustainable Culture!," LinkedIn, September 9, 2021, <https://www.linkedin.com/pulse/what-makes-sustainable-culture-gaye-clemson/>.

## ***Integrity***

The integrity evaluation framework developed by the NPS requires that a property should retain its ability to convey its significance, supported by historical location, setting, design, materials, workmanship, feeling, and association. Not each of these seven aspects of integrity needs to be highly intact for a property to have overall integrity, but it should express enough of its essential physical features from the time of its significance so that its earlier character can still be broadly understood. Accordingly to the NPS's guidance, "A basic integrity test for a property associated with an important event or person is whether a historical contemporary would recognize the property as it exists today."<sup>140</sup>

Many technological properties in Sunnyvale have undergone some extent of alteration because of their continued use and adaptation for new research and manufacturing programs. Despite changes, a property eligible for listing in the Heritage Resource Inventory should still generally be recognizable to someone who was familiar with the property at the time of its significant events. This should be assessed regarding the exterior character of the building (form, scale, materials, windows and doors) as well as any publicly accessible interior spaces that have a particularly strong association with the property's innovative activities.

Section 19.96.050(j) of the Zoning Ordinance also allows for the designation of properties that are "among the few remaining examples in the city, region, or nation possessing distinguishing characteristics of a historic type or specimen." This suggests that a property with diminished integrity can still be listed in the Heritage Resource Inventory if it is a rare property type locally that still possesses some degree of significant physical fabric.

Significant technological properties that are heavily altered and could not be recognized—or that have been demolished altogether—may still qualify for heritage resource listing as "sites." This resource type does not rely upon intact physical characteristics, although the local regulatory review for such resources is not clearly defined in the Zoning Ordinance. Heritage resource designation using the "site" category may be most appropriate for the most significant technological innovations in Sunnyvale where little or no physical fabric of the earlier property still remains.

## **9. RECOMMENDATIONS**

Based on the information compiled for the historic context and the evaluation criteria presented in the previous section, ARG has identified the following extant properties in Sunnyvale that appear to meet the eligibility requirements of heritage resource designation and have moderate to good historical integrity:

- Amdahl Corporation Headquarters, 1250 E. Arques Avenue;\*
- Andy Capp's Tavern, 157 W. El Camino Real;

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<sup>140</sup> National Park Service, *How to Apply the National Register Criteria for Evaluation*.

- Computer Literacy Bookshop, 520 Lawrence Expressway, Suite 310;
- Hotmail Offices, 1290 Oakmead Parkway, Suite 218;\*
- Lockheed Missiles and Space Company Buildings 181N/182N, 1233 N. Mathilda Avenue;
- Sunnyvale Patent Information Clearinghouse, 1500 Partridge Avenue, Building 7;
- Westinghouse Missile Launching & Handling Department, 501 E. Hendy Avenue (previously listed in the Heritage Resource Inventory); and
- Yahoo Headquarters (635 Vaqueros Avenue).

Each property is recommended for listing as a heritage resource rather than as a local landmark, which requires an elevated degree of local historical significance and integrity. An asterisk in the list above signifies that a development project has been proposed on that property. Therefore, it is possible that the property may soon be altered or demolished and may no longer retain sufficient integrity.

Two significant properties identified in the study remain fully or partially extant but appear to have poor integrity:

- Calma Company Offices, 707 Kifer Road; and
- Sunnyvale Air Force Station, 1080 Innovation Way.

Furthermore, this study has identified several additional properties that have been demolished but likely would meet the requirements of heritage resource designation, were they still standing:

- Advanced Micro Devices, Inc. Headquarters, 915 De Guigne Drive;
- Atari Inc. Headquarters, 1265 Borregas Avenue;
- Catalyst Technologies Venture Capital Group, 1287 Lawrence Station Road;
- Lockheed Missiles and Space Company Plant One Complex, 1111 Lockheed Martin Way; and
- Signetics Corporation Headquarters, 680 W. Maude Avenue.

Although properties that have diminished integrity or have been demolished do not appear to be eligible for heritage resource listing as buildings or structures, the City may still consider designating them as “sites.”

Additional details on the significance and physical characteristics of the identified properties are included in Appendix B, organized as a table. This table also includes ARG’s preliminary opinion regarding which of

the properties may be eligible for listing in the California Register and National Register.<sup>141</sup> Appendix C contains California Department of Parks and Recreation inventory forms for identified properties that remain extant.

As a result of this study, ARG also recommends that the City consider the following recommendations for future steps in order to recognize sites of technological innovation. These measures would help protect extant properties associated with technological innovation, as well as promote the public's appreciation of Sunnyvale's fundamental contributions to the development of the Silicon Valley region.

- Advance with formal nomination of the properties recommended as eligible for heritage resource listing, pending further input from property owners, the HPC, and the City Council;
- Identify the location of the Lockheed Missiles and Space Company Hubble Telescope Assembly Facility and consider nominating it in consultation with the property owner;
- Clarify the historic review requirements for heritage resources designated as "sites" due to their diminished physical integrity;
- Develop project review requirements tailored to technological properties that balance historic character with continued technological use, and update the Zoning Ordinance as necessary;
- Develop and enact strategies for dynamic interpretation and education about Sunnyvale's technological history and associated properties, which could include partnerships with existing cultural and educational institutions, development of interactive online interpretive resources, and promotion of on-site historical displays and public art;
- Conduct outreach to technology-related groups in order to identify additional properties in Sunnyvale that meet the heritage resource evaluation criteria; and
- Expand this study in the future with additional information on emerging technological themes and later periods of innovation.

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<sup>141</sup> The National Register and California Register, which involve review by Office of Historic Preservation staff and the State Historical Resources Commission, have significance and integrity thresholds that are slightly different from Sunnyvale's heritage resource inventory. Properties' eligibility for state and national register listing would be dependent on additional comparative analysis and consultation with state review staff.

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*The Salinas Californian*

*San Francisco Business Times*

*San Francisco Chronicle*

*San Francisco Examiner*

*San Jose Mercury*

*San Jose Mercury News*

*Santa Cruz Sentinel*

*Solano-Napa News Chronicle*

*Sunnyvale Sun*

*Times Tribune*

*USA Weekend*

***Archival Collections***

David Rumsey Historical Map Collection

Don Liddie Papers on Signetics, Computer History Museum

Gene M. Amdahl Collection, Computer History Museum

Silicon Valley Company Archive, San Jose Public Library

Sunnyvale Heritage Park Museum (various collections)

**APPENDIX A: HERITAGE RESOURCE INVENTORY**





# CITY OF SUNNYVALE

## HERITAGE RESOURCES INVENTORY

### HERITAGE RESOURCES

Sunnyvale's original Heritage Resources Inventory was adopted in 1979, recognizing properties which have architectural or historic significance. Since that time, the City has added over twenty additional Heritage Resources (adoption date in parentheses). Major exterior changes or demolitions must be approved by the Heritage Preservation Commission through a Resource Alteration Permit. For more information, please contact the Planning Division.

<p><b>BAYVIEW AVENUE</b> 252 S. Bayview</p> <p><b>BORREGAS AVENUE</b> 655 Borregas (3/22/83)</p> <p><b>CHARLES STREET</b> 297 Charles</p> <p><b>COOLIDGE AVENUE</b> 802 Coolidge</p> <p><b>CRESCENT AVENUE</b> Crescent Avenue Streetscape 148 Crescent 156 Crescent 434 Crescent 448 Crescent</p> <p><b>FLORA VISTA AVENUE</b> 321 Flora Vista (8/21/90)</p> <p><b>FRANCES STREET</b> Frances Street Streetscape (400-500 Blocks) 432 S. Frances 454 S. Frances 464 S. Frances 471 S. Frances 498 S. Frances 500 S. Frances 505 S. Frances 575 S. Frances 580 S. Frances</p> <p><b>GALLOWAY COURT</b> 1409 Galloway</p>	<p><b>MARY AVENUE</b> 113 S. Mary (2/24/81)</p> <p><b>MATHILDA AVENUE</b> 221 N. Mathilda 235 S. Mathilda</p> <p><b>MCKINLEY AVENUE</b> 322 E. McKinley (9/11/84) 384 E. McKinley (8/21/90) 398 E. McKinley (8/21/90)</p> <p><b>MORSE AVENUE</b> 635 Morse (1/15/85)</p> <p><b>MURPHY AVENUE</b> Murphy Avenue Streetscape (400-500 Blocks) 161 N. Murphy 445 S. Murphy 519 S. Murphy 523-525 S. Murphy 529 S. Murphy 533-535 S. Murphy 585 S. Murphy 591 S. Murphy</p> <p><b>OAK COURT</b> 6 Oak Court Oak Court - Hendy Ironworks Lamppost (6/30/87)</p> <p><b>PASTORIA AVENUE</b> 274 S. Pastoria (moved from Mary/Central Ex.)</p> <p><b>RAMON DRIVE</b> 1358 Ramon (moved from 1535 Sunnyvale-Saratoga Rd.)</p>	<p><b>RANERE COURT</b> 1029 Ranere (7/28/81)</p> <p><b>REMINGTON DRIVE</b> 550 E. Remington - Bianchi Barn (2003)</p> <p><b>SARA AVENUE</b> 325 Sara (10/4/83)</p> <p><b>SUNNYVALE AVENUE</b> N. Sunnyvale Avenue Streetscape (100 Block) 184 N. Sunnyvale 229 N. Sunnyvale 506 S. Sunnyvale (1/12/82) 525 S. Sunnyvale (1/12/82)</p> <p><b>SUNNYVALE-SARATOGA ROAD</b> 1039 Sunnyvale-Saratoga Sunnyvale-Saratoga/Fremont (Fremont High School)</p> <p><b>TAAFFE STREET</b> Taaffe Streetscape (500 Block) 571 S. Taaffe</p> <p><b>WASHINGTON AVENUE</b> 306 E. Washington 368 E. Washington (3/22/83) 384 E. Washington (8/24/82) 388 E. Washington (8/24/82) 480 E. Washington</p> <p><b>WAVERLY STREET</b> 225 Waverly 279 Waverly 381 Waverly</p> <p><b>WRIGHT AVENUE</b> 1325 Wright</p>
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## HERITAGE TREES

The following trees are listed in Sunnyvale's Heritage Resources Inventory. Removal of a Heritage Tree must be approved by the Heritage Preservation Commission. For more information, please contact the Planning Division.

<p><b>BERNARDO AVENUE</b> 1650 S. Bernardo <i>Coast Live Oak</i></p> <p><b>CALGARY DRIVE</b> 1748 Calgary Drive <i>Coast Live Oak</i></p> <p><b>CALIFORNIA AVENUE</b> 130 E. California (Site of Murphy Homestead) <i>Palm Trees</i></p> <p><b>DARTSHIRE WAY</b> 814 Dartshire <i>Dawn Redwood</i></p> <p><b>FREMONT AVENUE</b> 871 E. Fremont (Former Butcher's Corner) <i>3 Coast Live Oak and 1 Valley Oak</i></p> <p><b>HENDY AVENUE</b> 501 E. Hendy <i>American Chestnut</i></p>	<p><b>HENDY AVENUE</b> 501 E. Hendy <i>American Chestnut</i></p> <p><b>HOLLENBECK AVENUE</b> 880-882 Hollenbeck (Bocks Ranch) <i>Sycamores</i></p> <p><b>IVES TERRACE</b> <i>Valley Oak</i></p> <p><b>MANZANITA AVENUE</b> 755 Manzanita <i>Coast Redwood</i></p> <p><b>PASTORIA AVENUE</b> 467 S. Pastoria <i>Coast Redwood</i></p> <p><b>PICASSO TERRACE</b> 674 Picasso <i>Coast Live Oaks</i></p>	<p><b>REMINGTON DRIVE</b> 550 E. Remington (Community Center) <i>California Live Oak</i></p> <p><b>SHERATON DRIVE</b> 696 Sheraton Drive <i>Coast Live Oak</i></p> <p><b>SUNNYVALE AVENUE</b> 545 S. Sunnyvale <i>Monkey Puzzle</i></p> <p><b>TOWN CENTER LANE</b> 2502 Town Center Lane (Town Center Trees) <i>Variety Tree Grove</i></p> <p><b>TIFFANY COURT</b> 679 Tiffany Court <i>Coast Live Oak</i></p>
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## RESOURCES AND TREES REMOVED FROM THE INVENTORY

The following structures and trees have been removed since the inception of the inventory. Removal date of structures is indicated in parentheses. Properties removed since 2004 have undergone special review by the Heritage Preservation Commission.

<p><b>ALBERTA AVENUE</b> 666 Alberta (Not Available)</p> <p><b>BAYVIEW AVENUE</b> 305 S. Bayview (8/21//90)</p> <p><b>CALIFORNIA AVENUE</b> 444 California (Libby's) (1998)</p> <p><b>CASCADE DRIVE</b> 1043 Cascade (1994)</p> <p><b>CHARLES STREET</b> 335 Charles (2018)*</p> <p><b>CRESCENT AVENUE</b> 120 Crescent (1984) 125 Crescent (1981) 138 Crescent (1984) 410 Crescent (1982) 418 Crescent (1982) 428 Crescent (2002) 454 Crescent (1999)</p> <p><b>EL CAMINO REAL</b> 140 W. El Camino Real (Olson)(1999) 870 E. El Camino Real (Butcher Farmhouse)(1980) 1111 W. El Camino Real <i>Valley Oak</i></p>	<p><b>EVELYN AVENUE</b> 185 E. Evelyn (1986) 394 E. Evelyn (Sunnyvale/Ryan Hotel)(2006)*</p> <p><b>FAIR OAKS AVENUE</b> 182 Fair Oaks (Cal Cannery) (1986)</p> <p><b>FLORA VISTA AVENUE</b> 329 Flora Vista (2010)</p> <p><b>FLORENCE AVENUE</b> 353 Florence (1998) 373 Florence (1999)</p> <p><b>FRANCES STREET</b> 479 Frances (1994)</p> <p><b>FREMONT AVENUE</b> 534 W. Fremont (1980)</p> <p><b>HEATHERSTONE AVENUE</b> 960 Heatherstone <i>Casa Delmas Magnolia</i></p> <p><b>MACARA AVENUE</b> 437 Macara (Evulich House) (1984)</p>	<p><b>MATHILDA AVENUE</b> 212 N. Mathilda (1990) 562 S. Mathilda (2018)*</p> <p><b>MAUDE AVENUE</b> 333 W. Maude (1980)</p> <p><b>MCKINLEY AVENUE</b> 435 E. McKinley (2018)* 437-439 E. McKinley (1998) 693 W. McKinley (2009)*</p> <p><b>MORSE AVENUE</b> 316 Morse (2017)*</p> <p><b>MURPHY AVENUE</b> 461 S. Murphy (2005)* 529 S. Murphy <i>California Black Walnut</i></p> <p><b>OLD SAN FRANCISCO ROAD</b> 585 Old San Francisco (2005)*</p> <p><b>SUNNYVALE AVENUE</b> 102 S. Sunnyvale (Brandt Building) (1983) 199 N. Sunnyvale (2005)*</p> <p><b>SUNNYVALE-SARATOGA ROAD</b> 1545 Sunnyvale-Saratoga (1992)</p>
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\* Removed by determination of the Heritage Preservation Commission



# CITY OF SUNNYVALE

## LOCAL LANDMARKS

Sunnyvale's Local Landmarks were adopted in 1979, recognizing properties and trees which are particularly important reminders of the community's heritage. Since that time, the City has added additional landmark properties. Major exterior changes must be approved by the Heritage Preservation Commission through a Landmark Alteration Permit. For more information, please contact the Planning Division.

**BRIGGS-STELLING HOUSE**  
822 Springfield Terrace

Originally constructed in the 1870's for George H. Briggs and extensively reconstructed in the 1920's for the Henry S. Stelling family, the mansion recounts the history of Sunnyvale. Briggs was one of the earliest pioneers who came from Boston in 1854. Stelling, the son of one of San Jose's first orchardists, grew pears and award winning cherries. Under his wife's care, the gardens surrounding the mansion became a showcase.

**COLLINS-SCOTT WINERY**  
775 Cascade Drive

Built in 1881 by the Collins brothers, the Collins-Scott Winery is the oldest brick building in Sunnyvale. In 1889 a private railroad was built on the property and more than 300 gallons of wine were shipped daily. In 1927 all of the buildings except the brick distillery were destroyed by fire. In 1965 the present owners, the Duane Heinlen family, remodeled the structure as it stands today.

**DEL MONTE BUILDING**  
114 S. Murphy Avenue

Built in 1904 by the Madison & Bonner packing Company, the building was used for processing dried fruit from nearby orchards. Cannery mergers in 1916 formed the California Packing Corporation now know as "Del Monte." From 1930 to 1986 the building was used for seed processing and research. In 1993, the building was moved to the northeast corner of the 100 block of S. Murphy Avenue (the Murphy Station Heritage Landmark District) to avoid demolition. The building has since been renovated for commercial use.

**HENDY IRON WORKS**  
(Northrop Grumman)  
501 E. Hendy Avenue

Constructed in 1906, Hendy Iron Works was an industrial pioneer in Sunnyvale. Originally producing equipment for mining gold and silver, the Company supplied Marine Engines in both World War I and World War II. In continuous operation from 1906 to 1946, the company was purchased by Westinghouse Electric in 1947. The water tower stored Sunnyvale's emergency water supply in the early 1900's.

**LIBBY WATER TOWER**  
460 W. California Avenue

McNeill & Libby opened in 1907 and by 1922 became the world's largest cannery. The original tower supplied water to the cannery and its workers and was replaced in 1965 by the present structure.

**505 S. MURPHY AVENUE**

The residence was built in 1939 by the Homer Pfeiffer family and remained in the family until it was sold in the mid-1980's. It is an excellent example of the Tudor Revival style as applied to the suburban house and embodies distinctive characteristics of homes constructed during this period of architecture.

**MURPHY STATION  
LANDMARK DISTRICT**  
100 Block of South Murphy  
Avenue

"Murphy Station" was established when Martin Murphy Jr., a California Pioneer, granted the railroad the right- of-way through his land in 1864. The stop saw the arrival and departure of important dignitaries who visited Murphy's Bayview Ranch, a focal point of political and social activity in the Santa Clara Valley.

In 1898 William Crossman, a real estate developer, purchased 200 acres from Murphy and named the town Encinal, "Place where the live oak grows." The first post office and general store were built on this street near the site of Murphy Station. The town was renamed Sunnyvale in 1901 and incorporated in 1912. The railroad and industrial buildings ran east and west and the business district ran north and south, providing the base from which Sunnyvale grew. The 100 block of South Murphy Avenue is the original downtown commercial district. Most of the structures were built between 1900 and 1940.

**SPALDING HOUSE**  
1385 Ramon Drive

Built in the early 1920's by C.C. Spalding, the mansion served as his family residence. Spalding was the first treasurer of the City of Sunnyvale and is best remembered for his contributions to the development of Murphy Avenue. He organized and established the Bank of Sunnyvale in 1906 and later became a State Legislator.

**STOWELL HOUSE**  
901 Sunnyvale/Saratoga  
Road

The Stowell House is so named because until 1999, when Dolly Stowell died, it had been the family residence of Sunnyvale pioneer Charles Stowell and his descendents. Stowell bought the home from F. C. Fry in 1899, who had built the home circa 1890. Stowell and his brother-in-law Charles Spaulding were prominent businessmen in the community. They built the S & S building on the corner of Murphy Avenue and Washington Avenue. They also were involved in the construction of several other prominent buildings, including the First Baptist Church and the U.S. Post Office.

**VARGAS REDWOOD TREES**  
1004 Carson Drive

These Coast Redwoods were planted in 1900 by Manuel Vargas, "Mr. Sunnyvale." The saplings were gathered during a family outing to Pescadero, and planted at the entrance to the Vargas family home.

**WRIGHT RANCH**  
1234 Cranberry Avenue

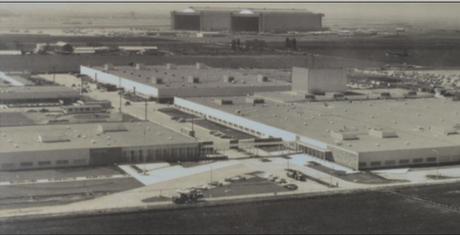
Originally part of a 320 acre ranch, this is Sunnyvale's oldest remaining ranch house. It was built circa 1870 by William Wright, a 49'er who left the gold fields to raise grain and stock.

**APPENDIX B: RECOMMENDED HERITAGE RESOURCES ASSOCIATED WITH  
TECHNOLOGICAL INNOVATION**



Associated Company or Institution	Property Name	Address	Assessor's Parcel Number	Date Built	Historical Use	Current Use	Property Type	Brief Description	Integrity Level and Visible Alterations	Significance Statement	Potentially Eligible for California/National Register Listing?	Historical Image (if available)	Current Image
<b>Recommended Eligible for Heritage Resource Status</b>													
Amdahl Corporation	Amdahl Corporation Headquarters	1250 E. Arques Avenue	216-35-026	1974	Computer company headquarters campus	Electronics company headquarters	Building	The original Amdahl Corporation headquarters campus is comprised of four generally rectangular buildings arranged around a designed landscape (central courtyard with a curvilinear path network). The four original buildings are one to two stories tall and have flat roofs; they share a consistent architectural character comprised of brick veneer walls, regularly spaced windows with concrete spandrel panels and pilasters, and concrete parapets.	Integrity is fair to good. Apparent alterations include the addition of mechanical equipment to the exteriors of the buildings. An original water feature has been filled in, and the designed landscape contains trees that have matured. Additional buildings have been constructed within the campus to the west of the original cluster of four buildings.	This campus of four buildings and associated landscaping housed the Amdahl Corporation beginning in 1974, shortly before the company released its 470 V/6 mainframe computer that became the first true challenger to IBM's mainframe dominance during the mid-twentieth century. The company's approach to developing "plug-compatible" computing machines had not yet been undertaken with such success. Amdahl Corporation experienced considerable success while occupying this campus due to its products' improved performance and lower cost than comparable IBM machines.	Yes		
Atari Inc.	Andy Capp's Tavern	157 W. El Camino Real	209-30-014	1920	Tavern	Comedy club	Building	The former Andy Capp's Tavern is a one-story entertainment venue with a flat roof; its primary facade at El Camino Real is clad in stucco. A shaped parapet crowns the primary facade and features a non-original belt course below the roofline. The building features three non-original fixed windows and two non-original glazed doors facing El Camino Real, all featuring canvas awnings. Brick bulkheads are located underneath each of the front windows.	Integrity is fair to poor. Photographs of Andy Capp's Tavern have not been located, but it appears the general form of the building remains intact. However, the addition of stucco, alterations to openings at the front facade, and changes to signage lower the building's resemblance to its earlier tenant.	Andy Capp's Tavern was the location where Atari staff installed the prototype of the Pong video arcade game. Although not the first video arcade console, Pong proved to be popular immediately after its premiere and inspired other engineers in the region to expand into arcade video games. The story of Pong and Andy Capp's Tavern is now a part of Silicon Valley legend.	Yes		
City of Sunnyvale/U.S. Patent Office	Sunnyvale Patent Information Clearinghouse/Raynor Activity Center	1500 Patridge Avenue, Building 7	313-24-033	c.1955-1960	Community center; public patent library	Private school	Building	This mid-century modern educational complex comprises a series of seven elongated rectangular volumes integrated with a central, unenclosed breezeway. Each building is one story in height and features a low-slope gabled roof. Classrooms open directly to the exterior via doors surrounded by large banks of windows. One volume facing Patridge Avenue has a larger footprint and features brick cladding.	The integrity of the complex appears generally good. No major alterations are discernible besides changes to the overall site's landscaping and vehicular circulation.	This property was occupied by the Sunnyvale Patent Information Clearinghouse, formerly the Sunnyvale Patent Library, from 1980-1994. This institution had existed in Sunnyvale since the 1960s, but the former Raynor Activity Center was its longest-term home of any extant property. The institution was the patent research office for Northern California and facilitated the innovation process for thousands of inventors in the region. Its location in the Raynor Activity Center doubled the institution's size and expressed a greater commitment to its role in the community.	Yes	N/A	
Computer Literacy Bookshop	Computer Literacy Bookshop	520 Lawrence Expressway, Suite 310	216-44-119	1978	Book retailer and other commercial	Restaurant and other commercial	Building	The building is one story in height and has an elongated rectangular plan and a flat roof. The roof projects over the primary facade, which faces a sidewalk and surface parking lot. The primary facade features a series of approximately 10 retail tenant spaces with fully glazed storefronts; these are interrupted by solid areas of T1-11 composite wood cladding.	The integrity of the building appears to be good. No evidence changes have occurred to its plan, although the storefronts have likely been reconfigured during the turnover of tenants.	The Computer Literacy Bookshop was founded in this location in 1983 and operated here until the late 1990s. It was among the first, and possibly the very first, bookstores in the world to stock computer-related topics exclusively. Beyond its commercial retail role, the store functioned as a landmark and community space for workers in the tech industry during the 1980s and 1990s.	Yes	N/A	
Hotmail	Hotmail Offices	1290 Oakmead Parkway, Suite 218	216-44-124	1978	Offices	Offices	Building	This property forms the easternmost end of an elongated, three-story building complex. The primary facade facing Oakmead Parkway has a continuous band of ground-story windows and an angled, glazed wall at the two upper stories. The rear facade features full-length balconies at all stories. Entrances and projecting stairways spaced regularly down the length of the entire complex and mark the divisions between different buildings.	Integrity appears fair to good. No documentation of the building's original design has been located, but its form and exterior materials generally appear intact. New exterior cladding panels may have been added to the building's entrances.	This building housed startup Hotmail in 1996 and 1997 while the company's service-free email on the World Wide Web—exploded in popularity. Hotmail was the first such service available without a user needing to download software to their computer. Hotmail's contribution to the early dot-com era helped web users everywhere become comfortable with the idea of webmail. By the time the company was acquired by Microsoft in 1997, its innovative webmail concept was becoming a standard service offered by all major internet service companies.	Yes	N/A	
Lockheed Missiles and Space Company	Building 181N (Engineering Design Lab)/Building 182N (Manufacturing Building)	1233 N. Mathilda Avenue	110-02-015	1958	Missile design, engineering, and assembly	Unknown	Building	Buildings 181N and 182N are expansive, conjoined one-story buildings with a combined rectangular footprint measuring approximately 1,125 feet long and 500 feet wide. The property has a utilitarian appearance, although it incorporates an area of stone veneer and a projecting roof canopy at its east facade that suggest a midcentury modern character. A highway along the north facade projects above the otherwise flat roof.	The integrity of the property appears to be fair to good. Changes have likely occurred to mechanical systems and openings, but the overall industrial appearance of the building remains intact. The original LMSC facilities located to the south of 5th Avenue have been demolished.	This expansive property is the earliest remaining facility on the LMSC campus in Sunnyvale and was constructed specifically to house the design, manufacturing, and assembly aspects of the U.S. Navy's Polaris ballistic missile program in the late 1950s and early 1960s. This missile program represented a significant advancement in American military policy relative to its Cold War antagonism with the Soviet Union, and LMSC was responsible for engineering a missile meeting stringent performance standards (i.e., could be launched from a submerged submarine). The facility was also used for subsequent Poseidon and Trident ballistic missile programs.	Yes		

Associated Company or Institution	Property Name	Address	Assessor's Parcel Number	Date Built	Historical Use	Current Use	Property Type	Brief Description	Integrity Level and Visible Alterations	Significance Statement	Potentially Eligible for California/National Register Listing?	Historical Image (if available)	Current Image
Westinghouse Missile Launching & Handling Department/Westinghouse Electric Corporation	Jacob Hendy Iron Works	501 E. Hendy Avenue	204-47-001	1906-c.1980s	Industrial design, engineering, and manufacturing	Industrial design, engineering, and manufacturing	District	The former Westinghouse plant is a large, multiple-building property containing administrative and industrial production buildings constructed between the early and mid-to-late twentieth century. The complex features many utilitarian-style manufacturing buildings with elongated, rectangular footprints arranged throughout a paved site; landscaped areas are present along E. Hendy Avenue.	The integrity of the complex appears fair to good. It was not possible to inspect the property closely, and it has surely undergone alterations to update its manufacturing capabilities. However, the overall layout and major buildings present in the mid-twentieth century appear intact.	Although the Joshua Hendy Iron Works/Westinghouse complex has already been listed in the Heritage Resource Inventory, the complex continued to serve a historically significant role during the Cold War. The company was responsible for the industrial manufacturing of many types of components for marine propulsion and scientific instruments. The Westinghouse Missile Launching & Handling Department was specifically tasked with designing submarine launching systems for the same ballistic missile programs that involved LMSC. Without the launching technologies from Westinghouse, the missile programs would not have been possible.	Yes		
Yahoo	Yahoo Headquarters	635 Vaqueros Avenue	165-43-012	1967	Offices	Offices	Building	This one-story, square-plan office building has a utilitarian architectural character that features concrete exterior walls, regularly spaced bays with large windows, a central glazed entrance, and a projecting concrete pent roof that shelters an exterior walkway at the primary facade facing Vaqueros Avenue. Square concrete columns support the outer edge of the projecting roof. Secondary facades feature few openings and incised vertical grooves.	The integrity of the building appears good. No documentation of its earlier appearance has been located, but no major changes are evident.	Yahoo occupied this small office building for a relatively short period of time (1996-1997) after it was formed at Stanford University and occupied preliminary offices elsewhere. However, in this location the company expanded the Yahoo web directory and built the Yahoo web portal presence that remains known today. This building was the company's primary location when it had its initial public offering in 1996, which was one of the most successful of the first dot-com boom during the 1990s.	Yes	N/A	
<b>Significant Properties With Diminished Integrity</b>													
Calma Company	Calma Company Offices	707 Kifer Road	205-44-023	1972	Technology company office	Unknown	Building/Site	The building is one story tall with a flat roof; it appears constructed of tilt-up concrete wall panels. The primary facade at Kifer Road has been remodeled with a contemporary configuration of metal panels and aluminum-framed windows. Secondary facades appear to retain the original exterior appearance of the building, comprising a repeating grid of concrete panels that incorporate narrow windows and secondary entrances.	Integrity of the building is poor. Although documentation of the building's original design has not been located, the primary facade appears to have been entirely re-clad with metal panels, and the entryway has been reconfigured. As a result, the building's date of construction is not evident. Secondary facades retain their original appearance.	Calma Company is not well known, but its pioneering technology in computer-aided design technologies (including minicomputer-equipped digitizers) widely influenced the process of designing and manufacturing semiconductors at a time when such devices were becoming ever more complex. Calma occupied offices in this property during the development of their Graphic Design System II equipment and GDSII file format, which still exerts a strong influence on the semiconductor industry.	No	N/A	
United States Air Force/National Reconnaissance Office	Sunnyvale Air Force Station	1080 Innovation Way	110-27-039	c.1961-1969	Federal defense satellite communication programs	U.S. Department of Veterans Affairs research center	Building/Site	This property currently only contains Building 1002, a two-story building with a generally square footprint. It has a substantially altered exterior, featuring contemporary metal panels and banks of gridded windows. A secondary volume at the building's northeast corner now features an off-axis entrance feature. The remainder of the former military installation contains a contemporary educational building and expansive surface parking lots.	The integrity of the Sunnyvale Air Force Station is poor due to the demolition of the majority of its original buildings and other characteristic features, such as large satellite dishes. Moreover, the only remaining building has been substantially remodeled so that its original construction date and function are no longer evidence.	The Sunnyvale Air Force Station was constructed as the primary U.S. Air Force facility responsible for ground-to-space radio communication with numerous historically significant reconnaissance and research spacecraft missions. Constructed during the 1960s, the facility contained the Satellite Control Room, which facilitated the tracking and control of spacecraft while in flight.	No		
<b>Significant Properties That Have Been Demolished</b>													
Advanced Micro Devices, Inc.	Advanced Micro Devices 915 Complex	915 De Guigne Drive	N/A	1970s	Integrated circuit manufacturing	N/A	Site	N/A (demolished)	N/A (demolished)	Advanced Micro Device's headquarters building constructed during the 1970s was the company's administrative hub during a period of strong market performance. The company became the world's largest manufacturer of integrated circuits in the 1980s, which largely built on its success producing more powerful second-source versions of Intel microprocessors.	No		N/A
Atari, Inc.	Atari Headquarters	1265 Borregas Avenue	110-35-031	1976	Video game and computer company headquarters	N/A	Site	N/A (demolished)	N/A (demolished)	Although Atari's early significant accomplishments (like the launch of Pong arcade and home consoles) occurred before the company moved to Sunnyvale, its headquarters constructed in 1976 represents the company's powerful presence in the high technology field during the late 1970s and early 1980s. During this time, Atari was one of the most recognizable brands in gaming and computing, and the building housed the company when it released its VCS home gaming console and a series of exceptionally popular video games.	No		N/A

Associated Company or Institution	Property Name	Address	Assessor's Parcel Number	Date Built	Historical Use	Current Use	Property Type	Brief Description	Integrity Level and Visible Alterations	Significance Statement	Potentially Eligible for California/National Register Listing?	Historical Image (if available)	Current Image
Catalyst Technologies Venture Capital Group; Etak, Inc.	Catalyst Technologies and Etak Offices	1287 Lawrence Station Road	110-15-072	c.1970s	Technology company incubation	N/A	Site	N/A (demolished)	N/A (demolished)	Founded by Atari's Nolan Bushnell, Catalyst Technologies appears to have been one of the first technology incubators. Beyond providing funding to startups, the firm offered various amenities such as office space and equipment. The companies that had their starts at Catalyst included many with novel concepts that were technologically ahead of their time. One of these, Etak, produced the first consumer-grade car navigation system, which involved map matching and map digitization systems that continue to influence navigation technologies.	No	N/A	N/A
Lockheed Missiles and Space Company	Plant One Complex	1111 Lockheed Martin Way	N/A	1956-1965	Aeronautics and defense systems research, development, and administration	N/A	Site	N/A (demolished)	N/A (demolished)	This complex of buildings represents the first facilities constructed by Lockheed Missiles and Space Company in Sunnyvale. The complex was later expanded to accommodate the company's rapid growth under federal contracts. Numerous programs were supported out of the complex, including significant Space Systems projects that included the CORONA intelligence reconnaissance satellite program. Notably, generations of spacecraft utilized (including CORONA, SAMOS, and MIDAS satellites) Agena rocket body, which was produced in the Lockheed plant.	No		N/A
Signetics Corporation	Signetics Corporation Headquarters	680 W. Maude Avenue	165-28-017	1961	Integrated circuit manufacturing	N/A	Site	N/A (demolished)	N/A (demolished)	Signetics was the first microchip company in the world to focus exclusively on integrated circuits. The company was based in its early headquarters building on W. Maude Avenue during its early ascendance in the first half of the 1960s, when it developed significant innovations in manufacturing silicon wafers and temporarily became the region's top circuit manufacturer (surpassing pioneering competitors like Fairchild Semiconductor).	No		N/A

**APPENDIX C: CALIFORNIA DEPARTMENT OF PARKS AND RECREATION INVENTORY FORMS FOR  
EXTANT PROPERTIES**



Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_  
Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

**P1. Other Identifier:** Fujitsu America, Inc.

**\*P2. Location:**  Not for Publication  Unrestricted

- \*a. **County:** Santa Clara
- \*b. **USGS 7.5' Quad** Milpitas, CA **Date:** 2021 **Township:** 6S; **Range:** 1W
- c. **Address:** 1250 E. Arques Avenue **City:** Sunnyvale **Zip:** 94085
- d. **UTM:** Zone 10 S, 589334 mE / 4137435 mN
- e. **Other Locational Data:** APN 216-35-026

**\*P3a. Description:**

The original Amdahl Corporation headquarters campus is comprised of four generally rectangular buildings arranged around a designed landscape (central courtyard with a curvilinear path network). The four original buildings are one to two stories tall and have flat roofs; they share a consistent architectural character comprised of brick veneer walls, regularly spaced windows with concrete spandrel panels and pilasters, and concrete parapets.

**Integrity and Visible Alterations:** Integrity is fair to good. Apparent alterations include the addition of mechanical equipment to the exteriors of the buildings. An original water feature has been filled in, and the designed landscape contains trees that have matured. Additional buildings have been constructed within the campus to the west of the original cluster of four buildings.

**\*P3b. Resource Attributes:** HP6. 1-3 story commercial building; HP29. Landscape architecture

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

Aerial view of the original four buildings in the Amdahl Corporation headquarters complex, viewed facing southeast (Google, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
1974

**\*P7. Owner and Address:**

1200 Arques Propco LLC  
1250 E. Arques Avenue  
Sunnyvale, CA 94085

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

**\*P3a. Description (continued):**

Significance Statement: This campus of four buildings and associated landscaping housed the Amdahl Corporation beginning in 1974, shortly before the company released its 470 V/6 mainframe computer that became the first true challenger to IBM's mainframe dominance during the mid-twentieth century. The company's approach to developing "plug-compatible" computing machines had not yet been undertaken with such success. Amdahl Corporation experienced considerable success while occupying this campus due to its products' improved performance and lower cost than comparable IBM machines.

**Additional Images:**



Figure 1. Amdahl Corporation headquarters complex, viewed facing northwest  
Source: Google, 2024

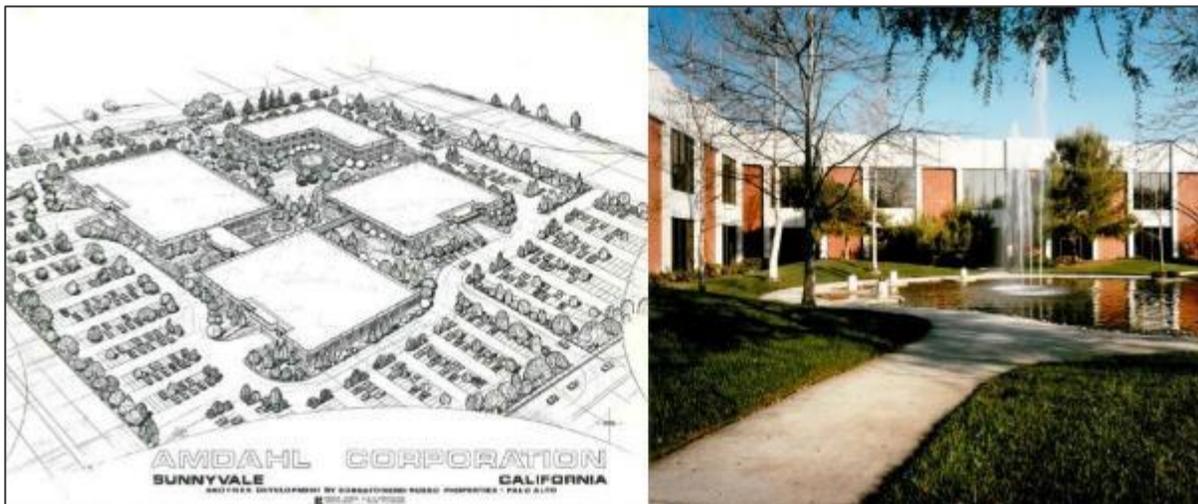


Figure 2. Rendering and photograph depicting the Amdahl Corporation headquarters at the time of its construction, c.1974.  
Source: The Sobrato Organization

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_  
Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

**P1. Other Identifier:** Rooster T. Feathers

**\*P2. Location:**  Not for Publication  Unrestricted

**\*a. County:** Santa Clara

**\*b. USGS 7.5' Quad:** Cupertino, CA **Date:** 2021 **Township:** 1S **Range:** 2W

**c. Address:** 157 W. El Camino Real **City:** Sunnyvale **Zip:** 94087

**d. UTM:** Zone 10 S, 585572 mE / 4136219 mN

**e. Other Locational Data:** APN 209-30-014

**\*P3a. Description:**

The former Andy Capp's Tavern is a one-story entertainment venue with a flat roof; its primary façade at El Camino Real is clad in stucco. A shaped parapet crowns the primary façade and features a non-original belt course below the roofline. The building features three non-original fixed windows and two non-original glazed doors facing El Camino Real, all featuring canvas awnings. Brick bulkheads are located underneath each of the front windows.

Integrity and Visible Alterations: Integrity is fair to poor. Photographs of Andy Capp's Tavern have not been located, but it appears the general form of the building remains intact. However, the addition of stucco, alterations to openings at the front façade, and changes to signage lower the building's resemblance to its earlier tenant.

**\*P3b. Resource Attributes:** HP6. 1-3 story commercial building

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

The former Andy Capp's Tavern, front (south) façade, viewed facing north from W. El Camino Real (ARG, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
1920

**\*P7. Owner and Address:**

Thomas R. Burdette Trustee & Et Al  
157 W. El Camino Real  
Sunnyvale, CA 94087

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

Page 2 of 2

\*Recorded by: Architectural Resources Group

\*Date: November 22, 2024

Resource Name or # Andy Capp's Tavern

Continuation  Update

**\*P3a. Description (continued):**

Significance Statement: Andy Capp's Tavern was the location where Atari staff installed the prototype of the *Pong* video arcade game. Although not the first video arcade console, *Pong* proved to be popular immediately after its premiere and inspired other engineers in the region to expand into arcade video games. The story of *Pong* and Andy Capp's Tavern is now a part of Silicon Valley legend.

**Additional Images:**



Figure 1. The *Pong* game prototype originally installed in Andy Capp's Tavern in 1972  
Source: Computer History Museum



Figure 2. Photograph of the Country Store, c.1980s, which occupied the subject building after Andy Capp's Tavern.  
Source: Arcadepreservation Wiki

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

**P1. Other Identifier:** N/A

**\*P2. Location:**  Not for Publication  Unrestricted

**\*a. County:** Santa Clara

**\*b. USGS 7.5' Quad:** Mountain View, CA **Date:** 2021 **Township:** 1S; **Range:** 1W

**c. Address:** 707 Kifer Road **City:** Sunnyvale **Zip:** 94086

**d. UTM:** Zone 10 S, 587115 mE / 4137053 mN

**e. Other Locational Data:** APN 205-44-023

**\*P3a. Description:**

The building is one story tall with a flat roof; it appears constructed of tilt-up concrete wall panels. The primary façade at Kifer Road has been remodeled with a contemporary configuration of metal panels and aluminum-framed windows. Secondary facades appear to retain the original exterior appearance of the building, comprising a repeating grid of concrete panels that incorporate narrow windows and secondary entrances.

Integrity and Visible Alterations: Integrity of the building is poor. Although documentation of the building's original design has not been located, the primary façade appears to have been entirely re clad with metal panels, and the entryway has been reconfigured. As a result, the building's date of construction is not evident. Secondary facades retain their original appearance.

**\*P3b. Resource Attributes:** HP6. 1-3 story commercial building; HP29. Landscape architecture

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

Primary (south) façade of the building at 708 Kifer Road, viewed facing north (Google, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
1972

**\*P7. Owner and Address:**

CPUS Sunnyvale LP  
707 Kifer Road  
Sunnyvale, CA 94086

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

Page 2 of 2

\*Recorded by: Architectural Resources Group

\*Date: November 22, 2024

Resource Name or # Calma Company  
 Continuation    Update

**\*P3a. Description (continued):**

Significance Statement: Calma Company is not well known, but its pioneering technology in computer-aided design technologies (including minicomputer-equipped digitizers) widely influenced the process of designing and manufacturing semiconductors at a time when such devices were becoming ever more complex. Calma occupied offices in this property during the development of their Graphic Design System II equipment and GDSII file format, which still exerts a strong influence on the semiconductor industry.

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_  
Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

**P1. Other Identifier:** N/A

**\*P2. Location:**  Not for Publication  Unrestricted

- \*a. **County:** Santa Clara
- \*b. **USGS 7.5' Quad:** Milpitas, CA **Date:** 2021 **Township:** 6S; **Range:** 1W
- c. **Address:** 520 Lawrence Expressway **City:** Sunnyvale **Zip:** 94085
- d. **UTM:** Zone 10 S, 588938 mE / 4137838 mN
- e. **Other Locational Data:** APN 216-44-119

**\*P3a. Description:**

The building is one story in height and has an elongated rectangular plan and a flat roof. The roof projects over the primary façade, which faces a sidewalk and surface parking lot. The primary façade features a series of approximately 10 retail tenant spaces with fully glazed storefronts; these are interrupted by solid areas of T1-11 composite wood cladding.

Integrity and Visible Alterations: The integrity of the building appears to be good. No evidence changes have occurred to its plan, although the storefronts have likely been reconfigured during the turnover of tenants.

**\*P3b. Resource Attributes:** HP6. 1-3 story commercial building

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

520 Lawrence Expressway, viewed facing southwest, (ARG, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
1978

**\*P7. Owner and Address:**

Lawrence Commercial Center LLC  
520 Lawrence Expressway  
Sunnyvale, CA 94085

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources

Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

Page 2 of 2

\*Recorded by: Architectural Resources Group

\*Date: November 22, 2024

Resource Name or # Computer Literacy Bookshop

Continuation  Update

**\*P3a. Description (continued):**

Significance Statement: The Computer Literacy Bookshop was founded in this location in 1983 and operated in Suite 310 of the subject building until the late 1990s. It was among the first, and possibly the very first, bookstores in the world to stock computer-related topics exclusively. Beyond its commercial retail role, the store functioned as a landmark and community space for workers in the tech industry during the 1980s and 1990s.

**Additional Images:**

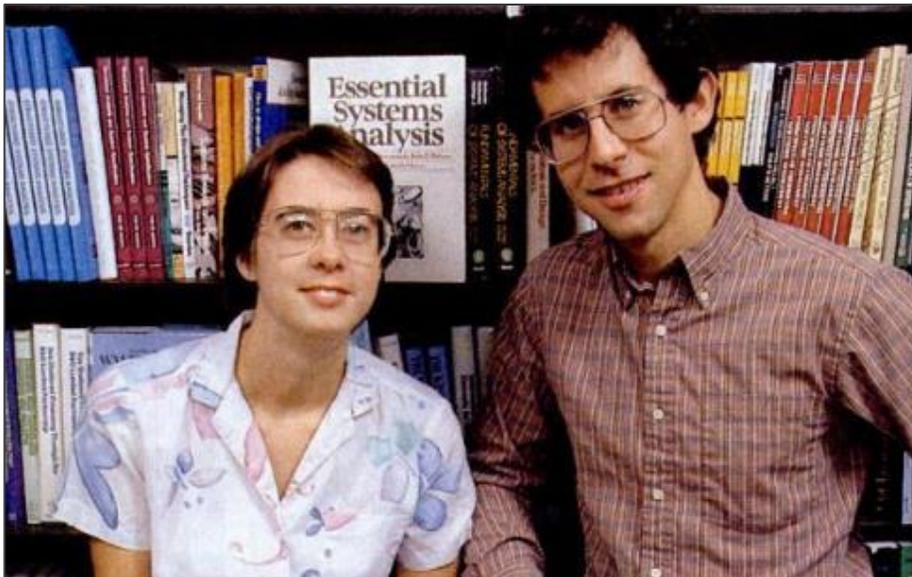


Figure 1. Rachel Unkefer and Dan Doernberg, founders of Computer Literacy Bookshop, photographed in 1984  
Source: *InfoWorld*, October 8, 1984, via Google Books

State of California – The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_  
Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 2

\*Resource Name or #: Hotmail Offices

**\*P1. Other Identifier:** Horizon Sunnyvale

**\*P2. Location:**  Not for Publication  Unrestricted

- \*a. County:** Santa Clara
- \*b. USGS 7.5' Quad:** Milpitas, CA **Date:** 2021 **Township:** 6S; **Range:** 1W
- c. Address: 1290 Oakmead Parkway City: Sunnyvale Zip: 94085
- d. UTM: Zone 10 S, 589423 mE / 4138221 mN
- e. Other Locational Data: APN 216-44-124

**\*P3a. Description:**

This property forms the easternmost end of an elongated, three-story building complex. The primary façade facing Oakmead Parkway has a continuous band of ground-story windows and an angled, glazed wall at the two upper stories. The rear facade features full-length balconies at all stories. Entrances and projecting stairways spaced regularly down the length of the entire complex and mark the divisions between different buildings.

**Integrity and Visible Alterations:** Integrity appears fair to good. No documentation of the building's original design has been located, but its form and exterior materials generally appear intact. New exterior cladding panels may have been added to the building's entrances.

**\*P3b. Resource Attributes:** HP6. 1-3 story commercial building

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

1290 Oakmead Parkway, viewed facing southwest (ARG, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
1978

**\*P7. Owner and Address:**

Eci Four Oakmead LLC  
1290 Oakmead Parkway  
Sunnyvale, CA 94085

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

Page 2 of 2

\*Recorded by: Architectural Resources Group

\*Date: November 22, 2024

Resource Name or # Hotmail Offices

Continuation    Update

**\*P3a. Description (continued):**

Significance Statement: This building housed startup Hotmail in 1996 and 1997 while the company's service--free email on the World Wide Web--exploded in popularity. Hotmail was the first such service available without a user needing to download software to their computer. Hotmail's contribution to the early dot-com era helped web users everywhere become comfortable with the idea of webmail. By the time the company was acquired by Microsoft in 1997, its innovative webmail concept was becoming a standard service offered by all major internet service companies.

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

**P1. Other Identifier:** Engineering Design Lab (181N); Manufacturing Building (182N)

**\*P2. Location:**  Not for Publication  Unrestricted

**\*a. County:** Santa Clara

**\*b. USGS 7.5' Quad:** Mountain View, CA **Date:** 2021 **Township:** 6S; **Range:** 2W

c. Address: 1233 N. Mathilda Avenue City: Sunnyvale Zip: 94089

d. UTM: Zone 10 S, 585972 mE / 4141028 mN

e. Other Locational Data: APN 110-02-015

**\*P3a. Description:**

Buildings 181N and 182N are expansive, conjoined one-story buildings with a combined rectangular footprint measuring approximately 1,125 feet long and 500 feet wide. The property has a utilitarian appearance, although it incorporates an area of stone veneer and a projecting roof canopy at its east facade that suggest a midcentury modern character. A highbay along the north facade projects above the otherwise flat roof.

Integrity and Visible Alterations: The integrity of the property appears to be fair to good. Changes have likely occurred to mechanical systems and openings, but the overall industrial appearance of the building remains intact. The original LMSC facilities located to the south of 5th Avenue have been demolished.

**\*P3b. Resource Attributes:** HP8. Industrial building

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

Aerial view of Buildings 181N and 182N, viewed facing north (Google, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
1958

**\*P7. Owner and Address:**

United States of America  
1233 N. Mathilda Avenue  
Sunnyvale, CA 94089

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

**\*P3a. Description (continued):**

Significance Statement: This expansive property is the earliest remaining facility on the LMSC campus in Sunnyvale and was constructed specifically to house the design, manufacturing, and assembly aspects of the U.S. Navy's Polaris ballistic missile program in the late 1950s and early 1960s. This missile program represented a significant advancement in American military policy relative to its Cold War antagonism with the Soviet Union, and LMSC was responsible for engineering a missile meeting stringent performance standards (i.e., could be launched from a submerged submarine). The facility was also used for subsequent Poseidon and Trident ballistic missile programs.

**Additional Images:**



Figure 1. View of Buildings 181N (at right) and 182N (at left) in the late 1950s, photographed facing north  
Source: Sourisseau Academy for State and Local History, San Jose State University



Figure 2. East façade of Building 181N, viewed facing northwest

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_  
Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

**P1. Other Identifier:** Onizuka Air Force Station; Satellite Test Annex

**\*P2. Location:**  Not for Publication  Unrestricted

- \*a. County:** Santa Clara
- \*b. USGS 7.5' Quad:** Mountain View, CA **Date:** 2021 **Township:** 6S; **Range:** 2W
- c. Address:** 1080 Innovation Way **City:** Sunnyvale **Zip:** 94086
- d. UTM:** Zone 10 S, 586025 mE / 4140214 mN
- e. Other Locational Data:** APN 110-27-039

**\*P3a. Description:**

This property currently only contains Building 1002, a two-story building with a generally square footprint. It has a substantially altered exterior, featuring contemporary metal panels and banks of gridded windows. A secondary volume at the building's northeast corner now features an off-axis entrance feature. The remainder of the former military installation contains a contemporary educational building and expansive surface parking lots.

**Integrity and Visible Alterations:** The integrity of the Sunnyvale Air Force Station is poor due to the demolition of the majority of its original buildings and other characteristic features, such as large satellite dishes. Moreover, the only remaining building has been substantially remodeled so that its original construction date and function are no longer evidence.

**\*P3b. Resource Attributes:** HP14. Government building

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

Aerial view of the former Sunnyvale Air Force Station site, viewed facing north; Building 1002 is right of center. (Google, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
c.1961-1969

**\*P7. Owner and Address:**

United States of America  
1080 Innovation Way  
Sunnyvale, CA 94086

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

Page 2 of 2

\*Recorded by: Architectural Resources Group

\*Date: November 22, 2024

Resource Name or # Sunnyvale Air Force Station

Continuation  Update

**\*P3a. Description (continued):**

Significance Statement: The Sunnyvale Air Force Station was constructed as the primary U.S. Air Force facility responsible for ground-to-space radio communication with numerous historically significant reconnaissance and research spacecraft missions. Constructed during the 1960s, the facility contained the Satellite Control Room, which facilitated the tracking and control of spacecraft while in flight.

**Additional Images:**



Figure 1. Building 1002, viewed facing south  
Source: ARG, 2024



Figure 2. Aerial photograph of the complete Sunnyvale Air Force Station, viewed facing north, c.1980s  
Source: United States Air Force

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_  
Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

**P1. Other Identifier:** Raynor Activity Center; BASIS Independent Silicon Valley Lower School

**\*P2. Location:**  Not for Publication  Unrestricted

- \*a. **County:** Santa Clara
- \*b. **USGS 7.5' Quad** Cupertino, CA **Date:** 2021 **Township:** 7S; **Range:** 1W
- c. **Address:** 1500 Partridge Avenue, Building 7 City: Sunnyvale Zip: 94087
- d. **UTM:** Zone 10 S, 587894 mE / 4133594 mN
- e. **Other Locational Data:** APN 313-24-033

**\*P3a. Description:**

This mid-century modern educational complex comprises a series of seven elongated rectangular volumes integrated with a central, unenclosed breezeway. Each building is one story in height and features a low-slope gabled roof. Classrooms open directly to the exterior via doors surrounded by large banks of windows. One volume facing Partridge Avenue has a larger footprint and features brick cladding.

Integrity and Visible Alterations: The integrity of the complex appears generally good. No major alterations are discernible besides changes to the overall site's landscaping and vehicular circulation.

**\*P3b. Resource Attributes:** HP14. Government building; HP15. Educational building

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

Aerial view of the subject building, viewed facing northwest from Partridge Avenue (ARG, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
c.1955-1966

**\*P7. Owner and Address:**

Store Master Funding X LLC  
1500 Partridge Avenue  
Sunnyvale, CA 94087

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

Page 2 of 2

\*Recorded by: Architectural Resources Group

Resource Name or # Sunnyvale Patent Information Clearinghouse

\*Date: November 22, 2024

Continuation    Update

**\*P3a. Description (continued):**

Significance Statement: Building 7 of this property was occupied by the Sunnyvale Patent Information Clearinghouse, formerly the Sunnyvale Patent Library, from 1980-1994. This institution had existed in Sunnyvale since the 1960s, but the former Raynor Activity Center was its longest-term home of any extant property. The institution was the patent research office for Northern California and facilitated the innovation process for thousands of inventors in the region. Its location in the Raynor Activity Center doubled the institution's size and expressed a greater commitment to its role in the community.

**Additional Images:**



Figure 1. Aerial view of the subject property, viewed facing northeast  
Source: Google, 2024



Figure 2. Mary-Jo DiMuccio, librarian at the Sunnyvale Patent Information Clearinghouse, photographed in 1984  
Source: *Valley Journal*

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

**P1. Other Identifier:** Westinghouse Electric Corporation; Jacob Hendy Iron Works; Northrop Grumman Marine Systems

**\*P2. Location:**  Not for Publication  Unrestricted

**\*a. County:** Santa Clara

**\*b. USGS 7.5' Quad:** Mountain View, CA **Date:** 2021 **Township:** 6S; **Range:** 2W

c. Address: 501 E. Hendy Avenue City: Sunnyvale Zip: 94086

d. UTM: Zone 10 S, 586548 mE / 4137301 mN

e. Other Locational Data: APN 204-47-001

**\*P3a. Description:**

The former Westinghouse plant is a large, multiple-building property containing administrative and industrial production buildings constructed between the early and mid-to-late twentieth century. The complex features many utilitarian-style manufacturing buildings with elongated, rectangular footprints arranged throughout a paved site; landscaped areas are present along E. Hendy Avenue.

**Integrity and Visible Alterations:** The integrity of the complex appears fair to good. It was not possible to inspect the property closely, and it has surely undergone alterations to update its manufacturing capabilities. However, the overall layout and major buildings present in the mid-twentieth century appear intact.

**\*P3b. Resource Attributes:** HP8. Industrial building

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

Aerial view of the former Westinghouse Electric Corporation complex, viewed facing north (Google, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
1906-c.1980s

**\*P7. Owner and Address:**

Northrop Grumman Systems Corporation  
501 E. Hendy Avenue  
Sunnyvale, CA 94086

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

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\*Recorded by: Architectural Resources Group

Resource Name or # Westinghouse Missile Launching & Handling Department

\*Date: November 22, 2024

Continuation  Update

**\*P3a. Description (continued):**

Significance Statement: Although the Joshua Hendy Iron Works/Westinghouse complex has already been listed in the Heritage Resource Inventory, the complex continued to serve a historically significant role during the Cold War. The company was responsible for the industrial manufacturing of many types of components for marine propulsion and scientific instruments. The Westinghouse Missile Launching & Handling Department was specifically tasked with designing submarine launching systems for the same ballistic missile programs that involved LMSC. Without the launching technologies from Westinghouse, the missile programs would not have been possible.

**Additional Images:**



Figure 1. The Westinghouse complex in the former Jacob Hendy Iron Works, photographed c.1960s  
Source: Westinghouse Electric Corporation

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_  
Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

**P1. Other Identifier:** N/A

**\*P2. Location:**  Not for Publication  Unrestricted

**\*a. County:** Santa Clara

**\*b. USGS 7.5' Quad:** Mountain View, CA **Date:** 2021 **Township:** 6S; **Range:** 2W

c. Address: 635 Vaqueros Avenue City: Sunnyvale Zip: 94085

d. UTM: Zone 10 S, 585648 mE / 4138983 mN

e. Other Locational Data: APN 165-43-012

**\*P3a. Description:**

This one-story, square-plan office building has a utilitarian architectural character that features concrete exterior walls, regularly spaced bays with large windows, a central glazed entrance, and a projecting concrete pent roof that shelters an exterior walkway at the primary facade facing Vaqueros Avenue. Square concrete columns support the outer edge of the projecting roof. Secondary facades feature few openings and incised vertical grooves.

Integrity and Visible Alterations: The integrity of the building appears good. No documentation of its earlier appearance has been located, but no major changes are evident.

**\*P3b. Resource Attributes:** HP6. 1-3 story commercial building

**\*P4. Resources Present:**  Building  Structure  Object  Site  District  Element of District  Other

**P5a. Photograph or Drawing**



**P5b. Description of Photo:**

The primary façade of 635 Vaqueros Avenue, viewed facing southwest (ARG, 2024)

**\*P6. Date Constructed/Age and Source:**

Historic  Prehistoric  Both  
1967

**\*P7. Owner and Address:**

Mid Pen LLC  
635 Vaqueros Avenue  
Sunnyvale, CA 94085

**\*P8. Recorded by:**

Architectural Resources Group  
Pier 9, The Embarcadero, Suite 107  
San Francisco, CA, 94111

**\*P9. Date Recorded:** August-October, 2024

**\*P10. Survey Type:** Intensive

**\*P11. Report Citation:** Architectural Resources Group, *Technological Innovation in the City of Sunnyvale: Heritage Resource Inventory Update Report*, Public Draft, November 2024, prepared for the City of Sunnyvale.

**\*Attachments:**  NONE  Location Map  Continuation Sheet  Building, Structure, and Object Record  
 Archaeological Record  District Record  Linear Feature Record  Milling Station Record  Rock Art Record  
 Artifact Record  Photograph Record  Other (List): Sketch Map

Page 2 of 2

\*Recorded by: Architectural Resources Group

\*Date: November 22, 2024

Resource Name or # Yahoo Headquarters

Continuation  Update

**\*P3a. Description (continued):**

Significance Statement: Yahoo occupied this small office building for a relatively short period of time (1996-1997) after it was formed at Stanford University and occupied preliminary offices elsewhere. However, in this location the company expanded the Yahoo web directory and built the Yahoo web portal presence that remains known today. This building was the company's primary location when it had its initial public offering in 1996, which was one of the most successful of the first dot-com boom during the 1990s.

**Additional Images:**



Figure 1. Interior of the Yahoo office at 635 Vaqueros Avenue, c.1996  
Source: Yahoo, via flickr.com

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