

**The Legacy**– A brief history of Downey’s NASA site from 1953



Navaho Missile

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**The “back lot” at Downey Studios**



X-15

**1948-1953** The Downey facility, From the early 1950's to 1964 was officially known as **AFP 16** (Air Force Plant 16). North American, under Air Force contract began to develop a new missile concept- the missile was called **Navaho**. The company was also experimenting with two types of processes. One such power source was atomic energy, and in 1952 a small, low-power research reactor was tested and placed into operation in Downey and was the first nuclear reactor built and operated in California. The Downey plant also pioneered and patented "**chemical milling**." Applied to aluminum, steel, and titanium chemical, the principle advantage of chemical milling is that it can be applied to complex, contoured, and formed parts. Research and development of the chemical milling process was largely conducted in Building 1, the largest and most historic structure on the site. Building 1 has been saved and is now Downey Studios.

**1953-1964**

Russ Murray and other writers and historians who have researched and written articles about the Downey Industrial Plant often refer to it as the "Cradle of the Cosmic Age." It was the yield of the Navaho development that was the primary source of technology for subsequent United States space vehicles and the contributions that the missile made to advanced military weapons systems that sustained America as the dominant power during the early years of the Cold War. So rich were the technical discoveries coming from Navaho development that North American established three new operating divisions to exploit product potential. By 1954, all of these activities were having a significant impact on the community of Downey. Approximately 10, 000 workers were now employed by the plant. The corner of Lakewood and Firestone Blvd was handling 70,000 cars per day. Downey's population grew to 65,000. While the community was growing and prospering, production of the missile at the Downey plant continued- the first launch of the **X-10** began in 1955. Although the Navaho missile program was eventually canceled, the plant won a major new program- the Air Force's **Hound Dog Air-to-Ground (AGM)** missile program. The Hound Dog program was the fore-runner of cruise missile technology. Strategic Air Command (SAC) wanted the missile to carry out strategic bombing offensives . The company was also awarded the contract to produce the **Little Joe Launch Vehicle** to test the Mercury capsules. A variety of Little Joe configurations were produced for testing, and the vehicle was instrumental for the Mercury program. By 1960, **Lee Atwood** began to re-



Little Joe in Downey



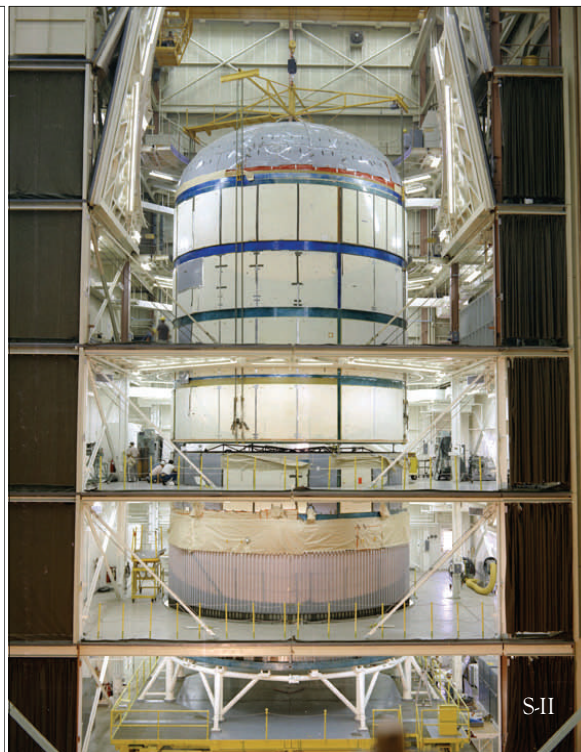
Hound Dog Cruise Missile

direct the Downey Missile Division away from missile production and toward space exploration. This included transferring **X-15** development to Downey.

## The Legacy— A brief history of Downey's NASA site development 1961-1999

### 1961-1972

In 1961, in an attempt to encourage national enthusiasm about space exploration, **President John F. Kennedy** issued a proclamation calling for "...a new American enterprise, that of placing a man on the moon and returning him before the decade is out." In 1961, NASA put out for two separate space program contracts. One was the **Saturn S-II**, the second stage launch vehicle system designed to send multi-ton payloads to space. The second contract was for the **Project Apollo Spacecraft Development Program**. Under the farsighted Lee Atwood (successor to Dutch Kindelberger), North American bid on both contracts, and in an unprecedented award, the company received both contracts. With these awards, Downey became the industrial center for America's lunar mission. By 1964-1965, the plant had more than 35,000 workers. In 1964, AFP 16 was transferred to NASA and the facility was renamed NASA Industrial Plant, Downey.



**1972-1999** In 1967, North American merged with Rockwell Standard Corporation and was renamed North American Rockwell Corporation. **Lee Atwood**, still president of North American, was receptive to the idea of a merger and papers were signed on September 22. Al Rockwell became chairman of the corporation; his 79 year-old father became honorary Chairman and Atwood became President and Chief Executive Officer. William Bergen succeeded **Harrison Storms** as President of the Downey plant.

The Apollo program is recognized as one of man's highest engineering and industrial accomplishments. As such, it is nationally significant and much of the recognition belongs to the Downey Industrial Plant for its contribution to design, production, and testing the Apollo command service modules. The Apollo program was surely the greatest peacetime undertaking in history. To reach and explore the moon...

### 1972-1999

Recovering from the end of the Apollo program, the Downey plant had now been given another historic assignment by NASA: subassembly and component manufacture and testing of the first reusable spacecraft- the **Space Shuttle** orbiters. Over the next 13 years, four space-rated orbiters- The Columbia; Challenger; the Discovery; and the Atlantis- were constructed at the plant. The Enterprise, a test craft used in atmospheric flight to verify aerodynamic and control characteristics of the orbiter design, was also produced, as well as the Space Shuttle Endeavor, which was commissioned as a replacement for challenger, which was destroyed shortly after take off in 1986. The Downey plant was also involved in Skylab and **Apollo-Soyuz** projects. The Space Shuttle is key to America's expanded utilization of space and exploited the unique capabilities of our nations universal space system. Quotes and reference from "Final Historic Buildings and Structures Inventory and Evaluation- NASA industrial Plant Parcels 1 and 2)

Wernher von Braun's trail across America By James M. Busby Part 1 (Exclusive to the Aerospace Legacy Foundation)



I believe that Dr. Wernher von Braun got to see every state in America in the short time he was here. After he developed the V-2 Missile in Germany and came to the U.S. with the other Operation Paperclip scientists at the end of World War II, he was at first kept on a very short leash. Not allowed from the Army's sight and restricted to only White Sands, New Mexico and Fort Bliss, Texas- except under guard. But it is believed by this writer that as America needed to quickly build missile technology, the rocket genius was escorted around quite a bit.

He most likely came to Downey, California for the first time in 1946 as Consolidated – Vultee worked on their first copy of the V-2, the MX-774. He also visited the Rocketdyne plant in Canoga as they were working on early Redstone engines. He also visited the GE plant in New York, as they were re-building the V-2's from Germany. In the late 40's as tensions relaxed about the German rocket team, he traveled wherever there was rocket work being done. In 1950 his team settled in Huntsville, Alabama, at a one-time munitions plant, and he traveled more, giving lectures about space travel. By the mid- 1950's, he was acting as a tour guide to some of his new friends at Walt Disney Studios in Burbank while they were filming the Tomorrowland series-“Men into Space”. He would be working at whatever Los Angeles area rocket plant or University needed him by day then drive to the studios and work there late into the night. Sometimes he would leave the studio in the wee small hours of the morning and come to Long Beach or San Pedro and get on a boat to go diving at dawn. He was a frequent visitor to Santa Catalina Island. As were the F.B.I. agents assigned to tail him, if they could keep up. He occasionally had fun ditching them!

As the 1950's ended, he made more trips to California- especially to Canoga Park and Pasadena. At the Rocketdyne plant in Canoga, he consulted with former team member Dieter Huzel, who came west to manufacture rocket engines for the Redstone, Jupiter, Atlas, and Saturn class launchers. In Pasadena he worked with Dr. William H. Pickering, and his Jet Propulsion Lab team on what spacecraft those rockets could launch. These led to America's first Satellite in 1958. Explorer –1 launched by a Jupiter –C rocket, and Alan Shepard's Mercury flight on a Redstone in 1961. **As Apollo got underway** in 1961, von Braun and his team at NASA's new Marshall Space Flight Center were very annoyed when North American Aviation got the contract for building the S-II second stage of the Saturn –5 Moon rocket. They felt that N.A.A. did not have the experience to build the powerful hydrogen fueled second stage. Their fears grew with the design of a common bulkhead between fuel and oxidizer to save weight. They felt that North American had enough to do building the Apollo Spacecraft for the Moon trip. As problems grew in the mid-sixties and the S-II lagged behind in development- to the point where one ruptured on a test stand, Wernher von Braun meeting in Downey with Lee Atwood- demanded that Harrison “Stormy” Storms, be replaced. This didn't happen at first, but later after congressional hearings following the Apollo-1 fire. Congressmen asked about North American's problems that were mentioned in Gen. Sam Phillips report on Apollo, and Lee Atwood gave in and recalled Stormy to the Los Angeles aircraft plant. Von Braun never had another complaint about North American. Continued on page 4

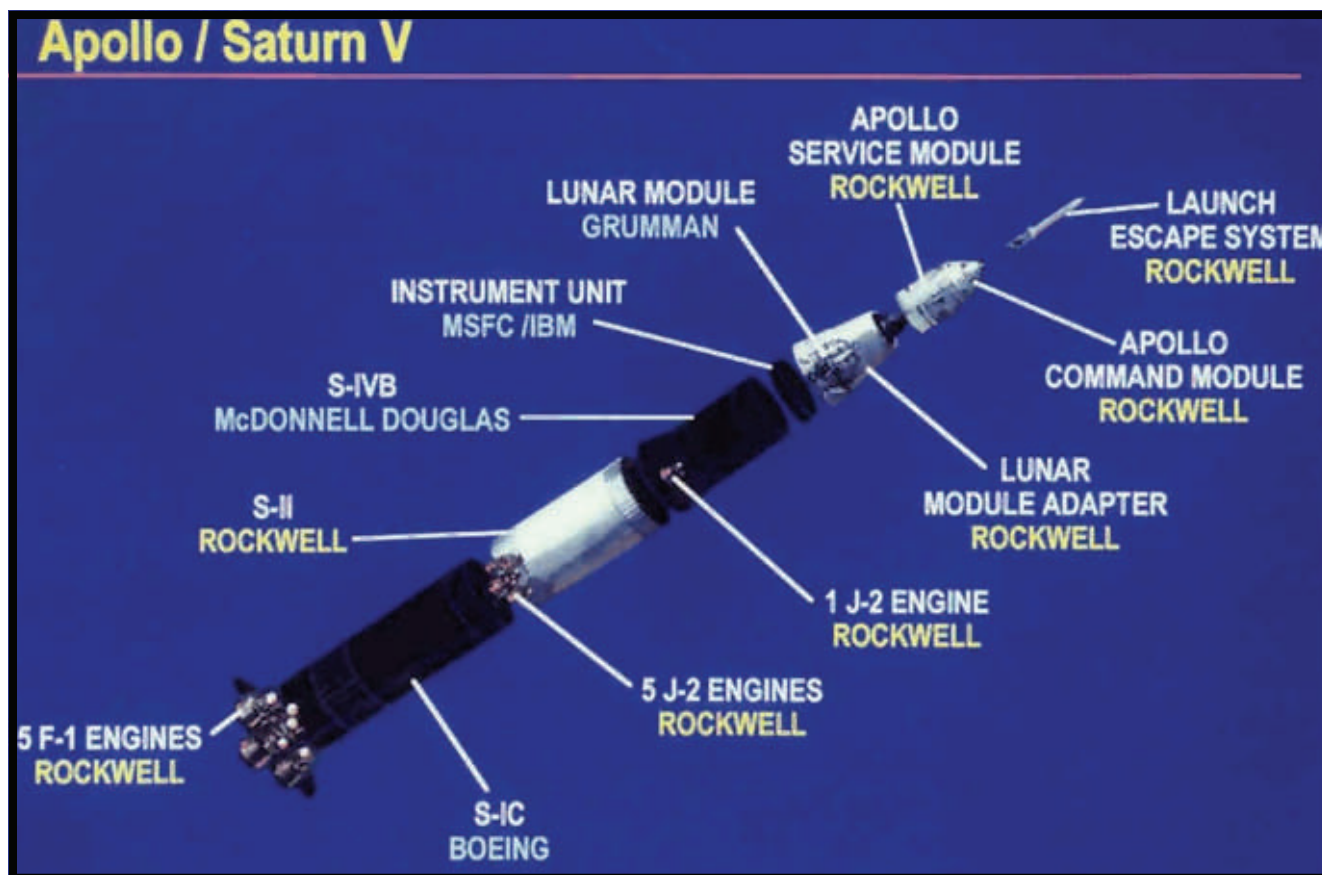


## Wernher von Braun's trail across America

The doctor realized that he needed to get his rockets across the country quickly. He tried to get the Air Force and NASA interested- but failed. Jack Conroy of Aero Space Lines in Van Nuys, Ca., heard of von Braun's plight and with his own money made the "Pregnant Guppy" aircraft out of old Boeing Stratocruiser airliners to carry the stages and spacecraft cross country. Von Braun was so delighted that he worked with Conroy to develop the Guppy Family. We will have more about these later.

Dr. von Braun traveled wherever he could to talk about space and rockets. He lectured across America, and in his travels played the organ at the Mormon Tabernacle in Utah; he hunted for Elk in Alaska, and flew sailplanes over Montana, In 1970, he and his family settled in Virginia, and after leaving NASA, he joined Fairchild Industries. But this just opened the world to him. He continued to travel all over the world. He went around the world- to Iran, India, Sri Lanka (where he visited with his old friend Sir Arthur C. Clarke), and elsewhere.

His travels slowed when he discovered he had cancer, but after surgery they continued until he could travel no more. The cancer had won. He watched the first unmanned landings on Mars as a visitor to NASA headquarters, and died in June 1977, before the first Shuttle, Enterprise was completed. These days his memory lives on in those who remember his accomplishments. Now it was my turn to follow him across America...



Next meeting is on September 18th

## The Shuttle Discovery and Downey (Downey Patriot article)

Larry Latimer

Recently, I read an article from Gene Kranz, author of "Failure Is Not An Option: Mission Control From Mercury to Apollo 13 and Beyond." Kranz, is a former Apollo flight director. Concerning the news coverage of the Shuttle Discovery he said, "All progress involves risk. Risk is essential to fuel the economic engine of our nation. And risk is essential to renew the fundamental spirit of discovery so we remain competitive with the rest of the world". As a Downey resident I am proud to be from the city that was instrumental producing the Space Shuttles. Many in Downey have not yet discovered the history of our famous NASA site. Since 1929, the Downey NASA site has been "the birthplace, homestead and laboratory for much of America's wondrous space technology-- the Space Age's equivalent of Orville and Wilbur's bicycle shop". The plant and its alumni have inspired millions to the dream of space, from early aviation to landing on the moon, and, of some day traveling to the greatest reaches of our universe. The Space Shuttle Program was a crowning moment for the Downey facility. North American Rockwell Space Division, in July 1972, won the NASA contract to develop and build the new Space Shuttle Orbiter vehicle. As with the Apollo contract, the Shuttle program proved to be a blessing for Downey area. Despite the Columbia and Challenger tragedies, the Shuttle Program has been a great success. "The current mission (Discovery) has demonstrated the maturity of the shuttle team that went through the tragedy of Columbia and had the guts to persevere". Are there risks involved in America's Space Program? Definitely, however, we must continue to explore space and be the leader and innovator. Apollo was recognized as man's highest engineering and industrial accomplishment. The Shuttle was the next step for manned space flight. Despite the risks of aviation and space travel, the world has benefited greatly from the thousands of technological advancements & discoveries the Space Program has brought us. To learn more about the Space Shuttle and Downey's new Learning Center visit:

<http://science.ksc.nasa.gov/>

<http://www.columbiaspacescience.org/>

<http://www.aerospacelegacyfoundation.org>



Shuttle Discovery and Crew

**OUR NEXT MEETING IS ON SUNDAY SEPTEMBER 18TH, 1:30 PM**  
FIRST BAPTIST CHURCH- SIDE ENTRANCE ON 2ND ST EAST OF DOWNEY AVE

**Aerospace Legacy Foundation**  
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On the web:  
[www.aerospacelegacyfoundation.org](http://www.aerospacelegacyfoundation.org)

Also, visit the new Downey Historical Society website at:  
<http://www.downeyhistoricalsociety.com/>

The foundation was founded in 1995 by a group of scientists, engineers, business people, educators, retirees, and the public at large. Incorporated as a nonprofit foundation in 1997. The foundation seeks historical integrity and educational use of a reasonable portion of the NASA/Boeing site in Downey, which has been acquired by the City of Downey.

We need your help and support to preserve Southern California's fascinating and innovative aerospace and aviation heritage. Over seventy years of advancements from the Downey NASA Plant have, and will continue, to influence many generations. We need your support to establish a home for Southern California's Aviation and Aerospace history.

## Columbia... We remember our fallen heroes



The crew of Columbia.  
God bless our fallen heroes.  
We will never forget you!

Columbia, the oldest orbiter in the Shuttle fleet, is named after the Boston, Massachusetts based sloop captained by American Robert Gray. On May 11, 1792, Gray and his crew maneuvered the Columbia past the dangerous sandbar at the mouth of a river extending more than 1,000 miles through what is today south-eastern British Columbia, Canada, and the Washington-Oregon border. The river was later named after the ship. Gray also led Columbia and its crew on the first American circumnavigation of the globe, carrying a cargo of otter skins to Canton, China, and then returning to Boston. Other sailing ships have further enhanced the luster of the name Columbia. The first U.S. Navy ship to circle the globe bore that title, as did the command module for [Apollo 11](#), the first lunar landing mission. On a more directly patriotic note, "Columbia" is considered to be the feminine personification of the United States. The name is derived from that of another famous explorer, Christopher Columbus.

Suburban Street, the only limit is your imagination...welcome to the old "Flight Line" area along Bellflower Blvd. Movie: Christmas With The Kranks



Visit: [www.downeystudios.com](http://www.downeystudios.com)