Southern California as we know it would not exist without aerospace. Over the course of the 20th century, the aerospace industry transformed the region from a land of orange groves into a high-tech metropolis. Millions of people flooded Southern California for aerospace jobs; dozens of airfields dotted the landscape; test-rocket firings flashed and echoed in the foothills; and the local economy became yoked to the boom-and-bust cycles of defense spending. Meanwhile the fun-loving, creative, and dynamic aeronautical community contributed to Southern California culture, including innovations in surfing, hot-rodding, architecture, and design.

Southern California aerospace technologies underpinned U.S. national security, from propeller-driven airplanes in the World Wars to strategic missiles, satellites, and stealth aircraft in the Cold War. The region’s fundamental contributions to the civilian space program, including the Moon landings, have challenged and transformed the human imagination.

“Blue Sky Metropolis: The Aerospace Century in Southern California” presents some of the first fruits of The Huntington Library’s Aerospace History Project, drawing principally on The Huntington’s collections. It traces the evolution of aerospace from the barnstorming days of early flight and the first aircraft builders through the tremendous growth during World War II into the Cold War and space race and on to the present day. Along the way the exhibition addresses two key questions: Why did Southern California become the epicenter of the aerospace industry? And what did this aerospace focus mean for Southern California, the nation, and the world?

Building a Northrop Delta, 1933. In the 1930s metal replaced wood as the main airplane material, changing manufacturing techniques.
Taking Flight: 1900-1920

The Los Angeles Air Meet of 1910, held on an empty field in Dominguez Hills, was the first international air meet to be held in the United States. It attracted 226,000 spectators over 10 days (the city’s population was about 320,000) and launched the aviation business in Los Angeles. City fathers looked to aviation as the region’s future, and famous fliers stuck around after the air meet to build planes. Glenn Martin set up shop in an abandoned church; his protégé Donald Douglas struck out on his own, eventually settling in a vacant movie studio; the Lockheed brothers moved down the coast from Santa Barbara, where their small staff had included a young Jack Northrop. These mostly self-taught pioneers pushed aviation technology from open-frame to fabric-enclosed fuselage designs, and from “pushers” to “tractors” (with the propeller in front instead of behind). California’s early airplane builders capitalized on the area’s sunny weather and lots of open space. They benefited perhaps more from California’s climate of expansive imagination and entrepreneurialism.

The Golden Age of Aviation: 1920–1940

In the 1910s most aviation was recreational or military, but in the 1920s commercial aviation emerged, with airmail contracts under the U.S. Postal Service and airliners carrying passengers alongside sacks of mail. Charles Lindbergh’s famous transatlantic flight in 1927 then sparked a stampede of investment in aviation, and by 1928 Southern California boasted more than 25 aircraft manufacturers. The Great Depression weeded out some of these firms, but the survivors emerged from it even stronger. This aviation hotbed capitalized on open-shop rules in the labor market and the continued support of civic boosters, newspaper publishers, and real-estate developers. It also benefited from local universities, which funneled wind-tunnel research and engineering graduates into an increasingly technical industry.

Female pilots early on had matched skills with men, barnstorming in exhibitions, setting speed and altitude records, and stunt-flying for movies. But aviation’s image of physical danger and mechanical technology preserved flying as a mostly male enterprise. As of 1929, of the 4,690 licensed pilots in the country, 34 were women, and the first

Philip Parmalee, part of the Wright Brothers exhibition team, ascends over Dominguez Field early in 1912. He died in a plane crash later that year.
Women’s Air Derby, held that year, was mocked by men as the “Powder Puff Derby.” By then, however, female aviators such as Amelia Earhart and Florence “Pancho” Barnes were starting to overcome contemporary conventions with a mixture of grit and glamour.

World War II provided the final recovery from the Great Depression and a historical turning point for Southern California, as an already established industry got much bigger. Aircraft became the largest industry in the world, much of it centered on Southern California. Southern California aircraft plants employed 2 million people who built 300,000 planes over the course of the war. Some production lines rolled out a new plane every 15 minutes. The war brought new groups to prominence in Southern California aircraft plants, including Dust Bowl migrants, known as “Aviation Okies,” as well as women, the “Rosie the Riveters” of wartime defense plants. By 1944, women made up more than 40 percent of the aircraft production workforce in Los Angeles.

The Big Chill: The Early Cold War

The Cold War produced a dynamic period of technological development and sparked the production of fearsome new weapons, including the intercontinental ballistic missile (ICBM). California’s aerospace contractors quickly adapted to the challenges, replacing propellers with jet engines and concocting new structures—“think tanks,” systems management—to coordinate the construction of complex technological systems like liquid-fueled rockets. Engineers traded slide rules for computers, pilots supplemented the stick-and-rudder with aircraft electronics, and what was once a profession of tinkerers and craftsmen became, by the mid-1950s, a rigorous mathematical pursuit.

From Aero to Space: The Space Race

With the Soviet Union’s launch of the world’s first artificial Earth satellite, Sputnik 1, in late 1957, the United States found itself engaged in a new competition to explore space. The following year, the Jet Propulsion Laboratory’s Explorer 1 became the first American satellite in orbit. In California, scientists and engineers had been planning for spaceflight ever since the end of World War II. Established at Douglas Aircraft in 1946, Project RAND (Research ANd Development) pursued, as its first project, the design of an Earth satellite. Throughout the 1950s, Southern California defense contractors such as Aerojet, Convair, and Rocketdyne developed rocket propulsion, the California electronics industry perfected the components for miniaturized guidance systems, and imaginative inventors experimented with new kinds of high-altitude pressure suits. The same kinds of technologies Californians had developed for use in modern weapons systems like jet aircraft and ICBMs could be applied to carrying reconnaissance satellites and even humans into space, and throughout the 1960s California contractors developed and built the Apollo spacecraft that would take Americans to the Moon. More numerous and less famous pilotless space vehicles produced in California relayed telephone calls, observed hurricanes, and explored the solar system.
SECRECY AND STEALTH: THE DEEP COLD WAR

For defense contractors, the early 1970s marked a period of crisis, as a declining space program, détente with the Soviets, and an economic recession reduced orders for new technologies. As Douglas and Lockheed rolled out their last attempts at commercial airliners, aerospace firms found themselves reliant on dwindling defense and space contracts. Meanwhile, the arms race, the Vietnam War, and the environmental movement exposed the social and economic costs of the military-industrial complex. In response, some aerospace firms tried to apply their expertise to urban and environmental problems.

Renewed tensions during the late 1970s, however, spurred a new defense buildup. In reconnaissance satellites, film cameras were replaced by video arrays that could transmit live images of people on the ground in real-time. New kinds of aircraft like the B-1, F-117, and B-2 promised to reach Soviet airspace undetected by radar and deliver new precision-guided weapons. And the Soviet threat prompted plans for an invulnerable missile-defense shield over the United States. For America’s national security apparatus, each day brought more secrets to keep and more information to sift.

COMING BACK TO EARTH: POST COLD WAR

The end of the Cold War caught California aerospace, like much of American society, off guard. Southern Californians again learned the perils of reliance on defense spending. Workers who assumed lifetime job security received a rude awakening, as hundreds of thousands of them received pink slips in the early 1990s. The layoffs fostered economic dislocation and resentment, and the end of the Cold War also began a reckoning of the environmental legacy of aerospace, measured in Superfund sites and pollution lawsuits.

By century’s end, it was tempting to see the history of Southern California aerospace as a rise-and-fall story. But the terrorist attacks of 9/11 revived defense contracts, in particular for a new class of unpiloted aircraft known as drones, which played a prominent role in the skies over Afghanistan and Iraq. A new sector known as alternative-space, or alt-space, meanwhile sought to make space travel a private business enterprise. Technological and economic entrepreneurs challenged mainstream aerospace firms from the fringes in Mojave (Burt Rutan’s Scaled Composites) and from the very heart of the industry in Hawthorne (Elon Musk’s SpaceX). These projects engaged a new generation of engineers raised on computers and including more women. Southern California aerospace now had a smaller footprint than in its heyday, but it remained a substantial presence.

—Peter Westwick, director, Aerospace History Project, Huntington-USC Institute on California and the West; and Matthew Hersch, lecturer, department of history and sociology of science, University of Pennsylvania.
PRESCHOOL SERIES: The Sky’s the Limit

Oct. 12, 19 & 26; Nov. 2 (Wednesdays) 10 a.m.–noon
Let your imagination take flight as you explore the world of airplanes, space shuttles, the Moon, and stars with instructor Laura Moede. Each class includes a visit to the gardens or galleries, art projects, stories, and more. Fee includes one accompanying adult. Ages 3–4. Members: $85. Non-Members: $95. Registration: 626-405-2128.

AFTER-SCHOOL ADVENTURES: Up, Up, and Away

Dec. 7 (Wednesday) 3–3:45 p.m.
Three, two, one…blast off! With instructor Laura Moede, we’ll soar through the gardens and the exhibition for inspiration as we explore airplanes, space shuttles, and the Moon and stars. Fee includes one accompanying adult. Ages 5–6. Members: $10. Non-Members: $15. Registration: 626-405-2128.

CHILDREN’S WORKSHOP: ROCKETS ROCK!

Dec. 17 (Saturday) 1–3 p.m.
It doesn’t take a rocket scientist to have fun with rockets! With aerospace instructor Sandra Kaszynski from Jet Propulsion Laboratory, we’ll explore airplanes, space shuttles, and the moon and stars. Fee includes one accompanying adult. Ages 7–12. Members: $25. Non-Members: $30. Registration: 626-405-2128.

RELATED BOOK

An anthology of essays on Southern California aerospace, edited by Peter Westwick and titled Blue Sky Metropolis: The Aerospace Century in Southern California, is forthcoming in early 2012 from University of California Press.

This exhibition is a part of the Aerospace History Project, an initiative of the Huntington-USC Institute on California and the West. It is made possible by the Robert F. Erburu Exhibition Endowment. Additional support is provided by Margaret and Will Hearst, the Allen & Lenabelle Davis Foundation, and Mr. and Mrs. Burton Basney.

This gallery guide is produced with support from Mr. and Mrs. Burton Basney, in loving memory of Harvey and Vera Christen, whose passion for aerospace continues to soar.

On the cover: NASA pilot Bill Dana watches a Boeing NB-52B carrier aircraft fly overhead after a successful test flight of the Northrop HL-10 lifting body at NASA Dryden Flight Research Center, Calif., 1969. Fellow pilot John Reeves can be seen at the cockpit of the lifting body. NASA photo.

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