



# The Aerospace Industry in Southern California

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LOS ANGELES COUNTY ECONOMIC DEVELOPMENT CORPORATION



Celebrating Economic Development Leadership

My job today is to provide you with some background and an economic overview of the aerospace industry in Southern California and why it is an important part of the regional economy.

## A Little History...

**1908:** The Aero Club of California organized the first aviation show in the U.S. in Rancho Dominguez

**During WWII:** Southern California's aerospace firms focused on producing aircraft for the war effort, employing thousands of workers

**After WWII:** Technological innovations pioneered by Southern California's aerospace firms made the industry an important driver of economic growth in the region

**End of Cold War:** Defense budget cuts, base closures, firm consolidations; massive job losses, recession, *but* also the Space Shuttle, Satellites, UAVs, SpaceX, Virgin Galactic,

Southern California became a focal point for the U.S. aerospace industry not long after the first powered flight by the Wright brothers at Kitty Hawk in 1903.

Between that time and the start of WWII, names we all recognize today started to appear: Lockheed, Douglas, Northrop, Hughes. Throop Polytechnic Institute in Pasadena, which later became Caltech, built its first wind tunnel.

During WWII, the region's aerospace companies devoted themselves to war-time production, employing thousands of workers, many of whom were able to move up into the ranks of the middle-class.

After the war, technological innovations pioneered by the region's aerospace firms made the industry an important driver of economic growth in the region.

But with the end of the cold war came defense budget cuts and military base closures. Aerospace companies experienced a wave of consolidation, shedding thousands of workers. The last ten years have been marked by retrenchment and stabilization; rising revenues and continuing innovation: Space shuttle, satellites, UAVs, SpaceX and Virgin Galactic

## Why California?

- Weather
- Infrastructure: test fields, universities, research centers
- Abundance of skilled labor
- Strong electronics industry

At the height of the Cold War, **15** of the **25** largest aerospace companies in the United States were located in Southern California

**1** in **4** U.S. aerospace jobs were in California

**1** in **10** U.S. aerospace jobs were in Los Angeles County

In the days before electronic instrumentation, Southern California's clear blue skies attracted early aviation pioneers.

As these early entrepreneurs sought to build planes that could cover longer distances, faster and more safely, an infrastructure of test fields and research centers, supported by university engineering and aeronautics programs developed to support the industry.

Later, as aircraft became more sophisticated, a highly skilled work force evolved as did industries that support aerospace activities such as electronics and engineering services.

The industry's infrastructure, built over the span of over 100 years would be hard to replicate elsewhere. There is an entrenched supplier base producing everything from nuts and bolts to 747 fuselage panels to satellites.

The region's talented workforce would also be difficult to re-create in other parts of the country.

## Why Aerospace is Important

- Provides a significant number of high-skill, high-paying jobs
- Aerospace manufacturing jobs have a wage premium over wages in other manufacturing sectors
- Positive contribution to U.S. trade balance
- Technological innovation spill-over effects

The industry employs a significant number of engineers, scientists, technicians and business professionals that require higher education and often, advanced degrees.

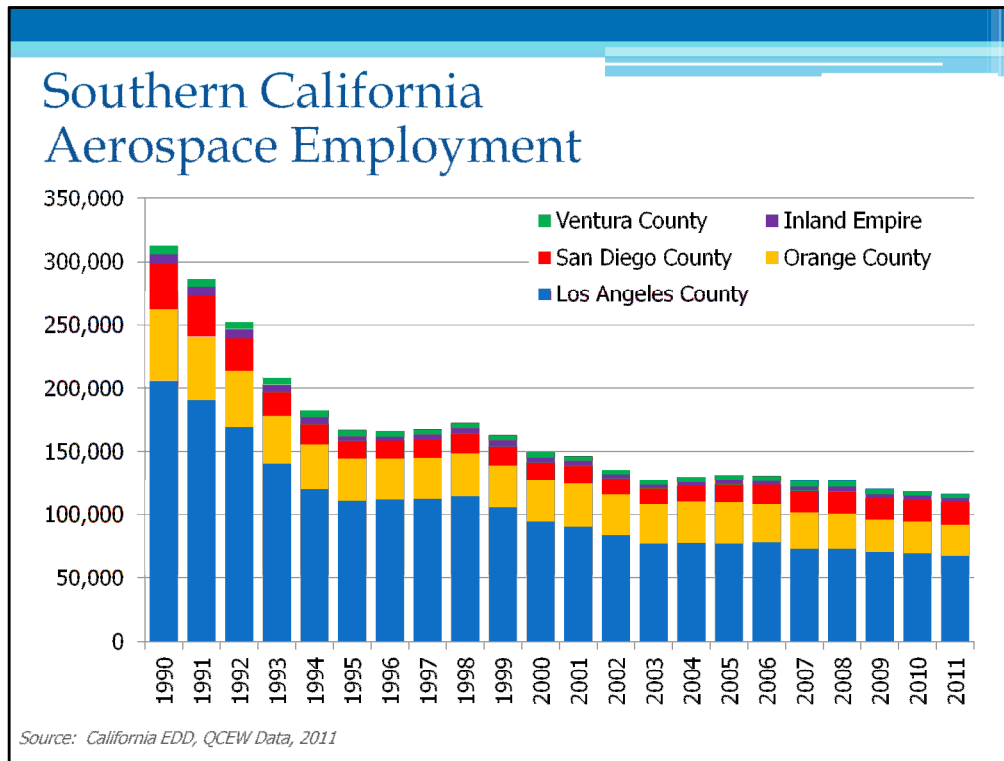
Because of this high skill level, these jobs carry a wage premium.

Also, data from the Dept. of Commerce demonstrate U.S. aerospace manufacturers account for the highest trade surplus of all U.S. manufacturing industries.

And, technology developed by the aerospace industry has spilled over into the wider economy, providing opportunities for growth in a number of other industries.

Spill over effects range from automobile GPS systems to wireless communications, the artificial heart, and robotic arms and hands for amputees.

The main point I want to get across, is that not only does the aerospace industry employ a significant number people, the importance of the industry to the economy is also derived from the quality of those jobs and the spill-over effects that influence economic growth at all levels: local, state and national.

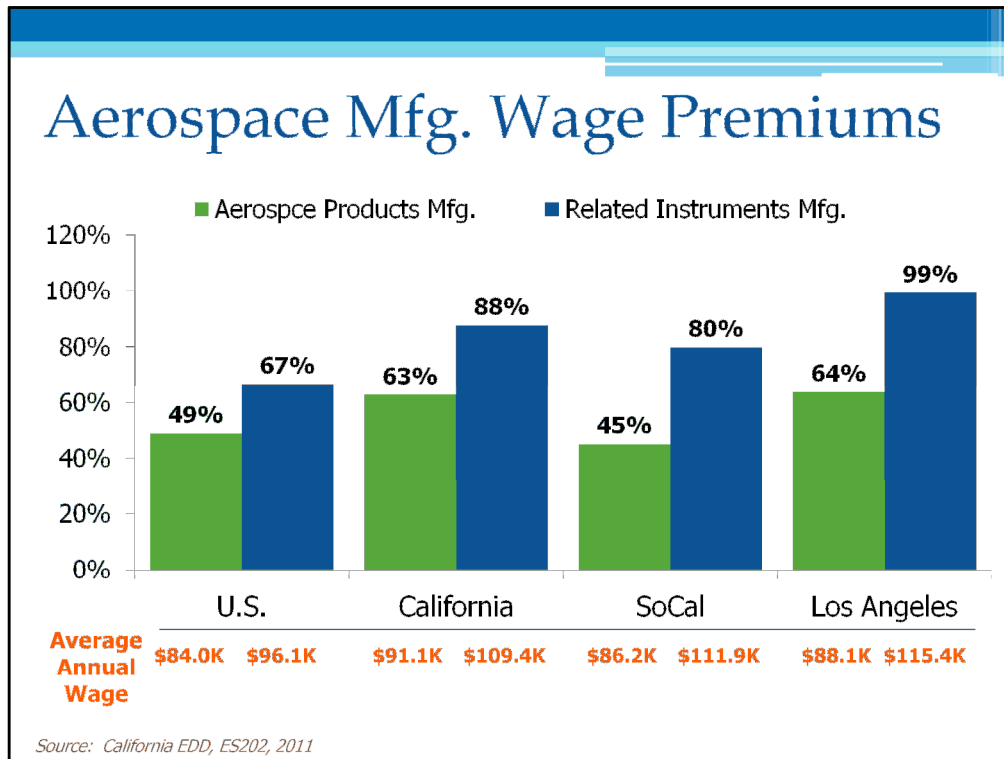


Let's take a look at employment.

Aerospace employment has declined since the end of the Cold War – we are all well aware of that. But, employment has also mostly stabilized since the end of the recession. That bar over the 2011 number represents over 119,000 jobs in the 6-county area – 68,000 of which are located in Los Angeles County.

Keep in mind that part of the decline in employment is due to productivity gains over this period, a trend that has been reshaping the entire manufacturing sector in the United States for the last 20-30 years. Because of technological innovations, manufacturers have been able to increase output while employing fewer workers. (Outsourcing is another factor.)

So, while employment is greatly diminished from where we were 20 years ago, 119,000 is still a significant number of workers.



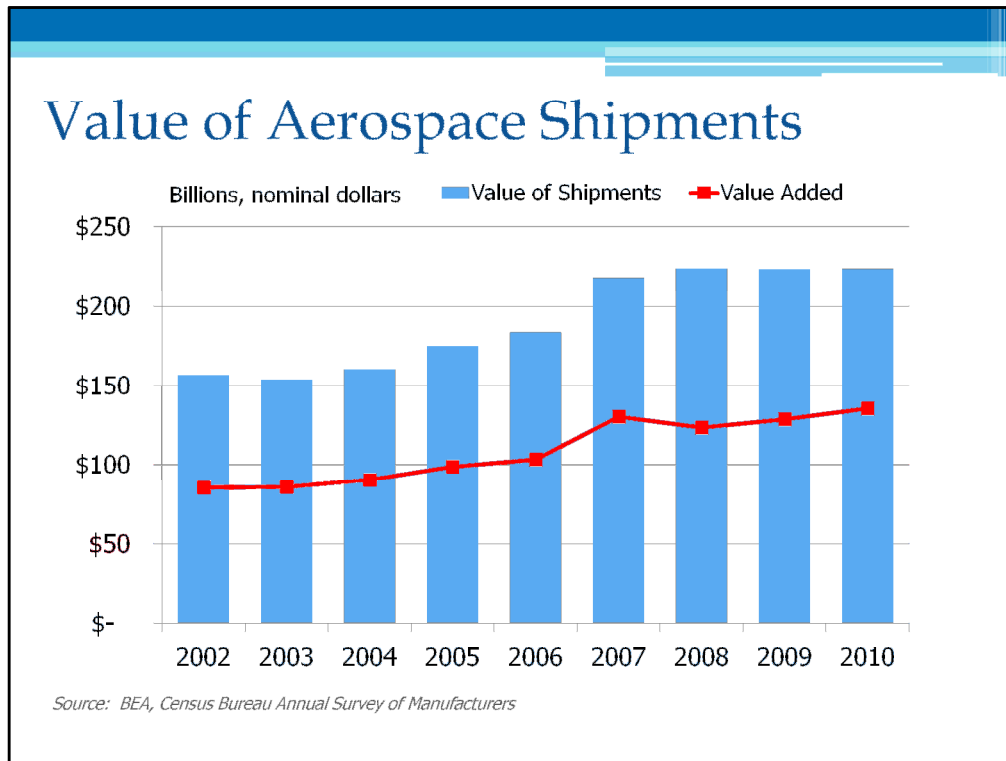
Another reason why aerospace is important is that it provides high-skill, high-wage jobs.

This chart shows the wage premium aerospace jobs have over the average wage for the manufacturing sector as a whole.

In the U.S. ....

In Los Angeles County, the wage premium is even greater....

So once again, the aerospace industry is a source of high-quality jobs. Workers are well compensated, which means a greater propensity to spend, which supports the economy, and they generate more tax revenues.



This chart shows the rising value of aerospace shipments.

Even as the industry was reducing its workforce, revenues increased on a tide of rising productivity.

The value-added component of aerospace activities has also risen -- and by value added, I mean the industry's contribution to GDP -- aerospace and defense manufacturing makes a significant contribution to GDP growth in the United States.

## Value of Aerospace Products shipments

### California

Year	Value of shipments (\$bns)	Value Added (\$bns)
2004	19.1	11.2
2005	27.1	13.8
2006	21.9	13.5
2007	22.1	14.4
2008	23.8	16.8
2009	28.6	20.9
2010	27.5	19.4

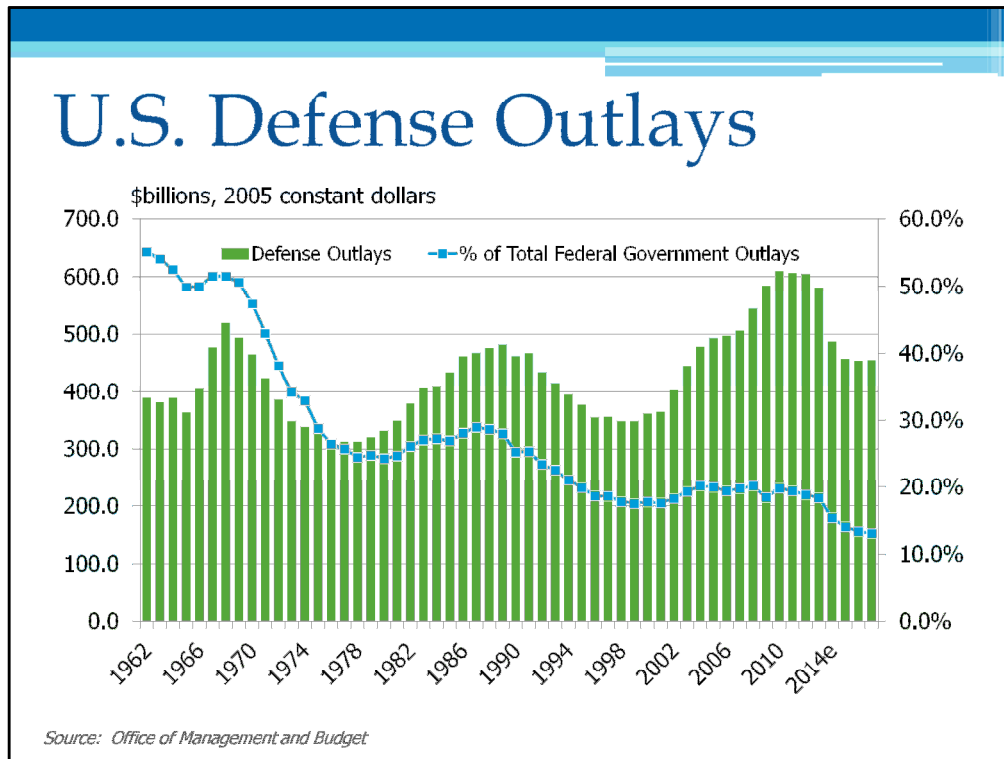
### Southern California

Year	Value of shipments (\$bns)	Value Added (\$bns)
2004	15.5	9.1
2005	22.0	11.2
2006	18.1	11.2
2007	17.7	11.5
2008	19.2	13.5
2009	22.9	16.7
2010	22.1	15.6

Sources: BEA, Census Bureau Annual Survey of Manufacturers  
Southern California estimates by LAEDC; Value of Aerospace  
products and parts manufacturing only (NAICS #3364)

Data for the value of aerospace shipments is harder to come by at the local level than it is at the national level. The California numbers represent only one manufacturing sector (aerospace products & parts: aircraft, satellites, missiles), and the Southern California figures are our estimate, but even so, these are big numbers.

In 2010, AP&P mfg. alone generated \$27.5 billion in revenues for the state's aerospace firms and \$19.4 in value-added, which is nearly 14.5% of the state's gross product of \$1.9 trillion in 2010.



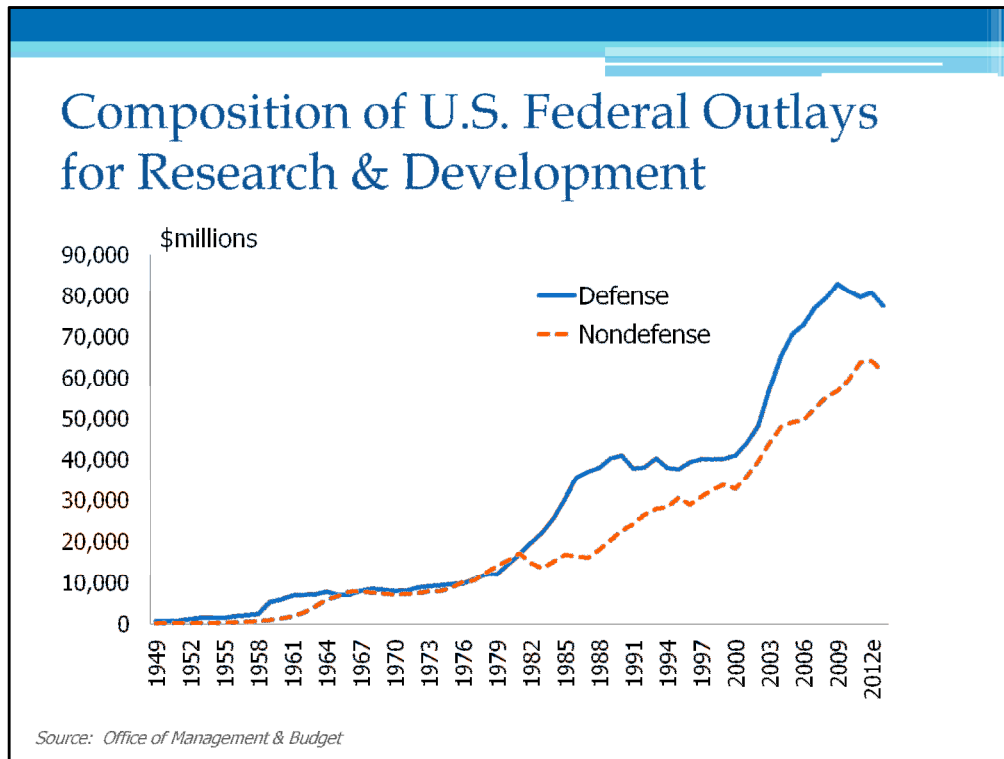
The green bars are total defense outlays and the blue line is defense's share of total federal outlays.

Defense outlays follow increases/decreases in response to national security threats: build up during the Viet Nam war, rising again during the Reagan years, and then building again after 9/11.

Acting on last year's Budget Control Act, the industry is planning for an estimated \$500 billion reduction in defense outlays over the next decade. This is on top of the \$489 billion in Pentagon-related reductions that are already called for in the 2013 proposed budget by the U.S. Senate. Not knowing exactly how the pentagon will impose cuts makes for an uncertain environment which slows investment and hiring.

So, even before these cuts are implemented, just the threat is already having an impact on the economy.

I also want to emphasize that aerospace industries often work on long time horizons, with projects that take years to develop, implement, and deliver, which make it more difficult than to stop and start projects compared to many other industries.



Facilitating the creation of new aerospace technologies is the close relationship that was grown up between aerospace manufacturers (particularly those with a defense component) and the U.S. government.

U.S. federal outlays for defense research outstrip all other areas of federally funded R&D combined: general science, space, technology, energy, health, transportation, agriculture and natural resources.

The impending defense cuts will affect not only procurement budgets but also funding for R&D. The challenge over the next decade will be how to maintain the aerospace industry's base of skilled workers and investment in R&D. After the cut-backs in the 1990s, studies (Rand Corp.) showed that most large aerospace firms were able to protect their scientific and engineering staffs.

Smaller firms, which make up the bulk of the region's aerospace industry had a harder time preserving their base of skilled workers.

Additionally, local aerospace firms are facing greater foreign competition, many of which receive state support. Reduced investment in R&D activities could lead to the U.S. falling behind in the development of new technologies.

