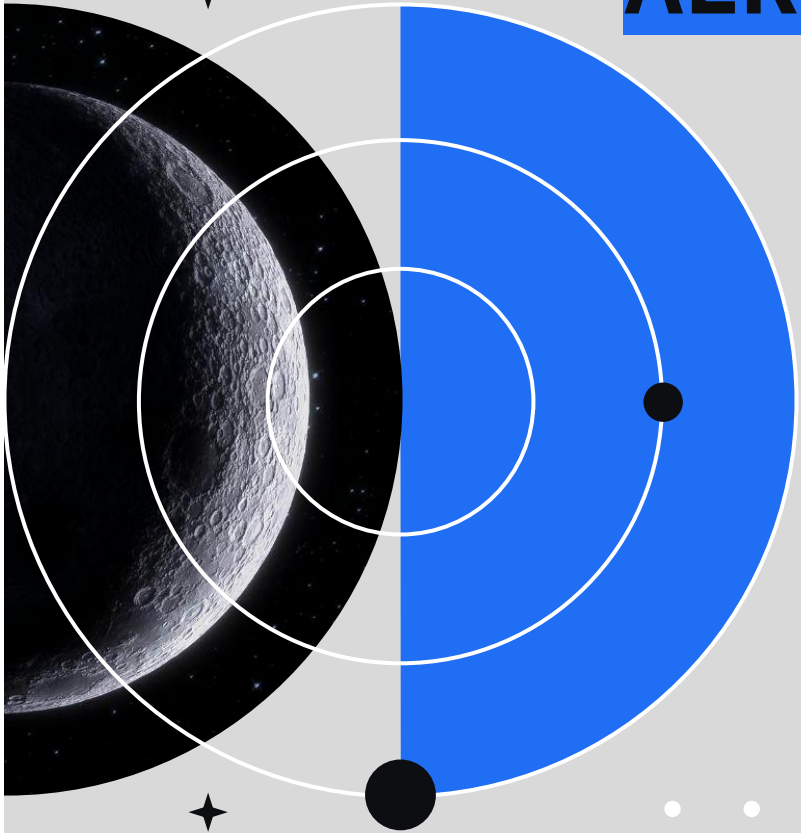


# AEROSPACE ENGINEERING



**By: Wesley Marshall**



# TABLE OF CONTENTS



## 01 Introduction

Introduction to Aerospace Engineering

## 02 Job Description




What an Aerospace Engineer Does

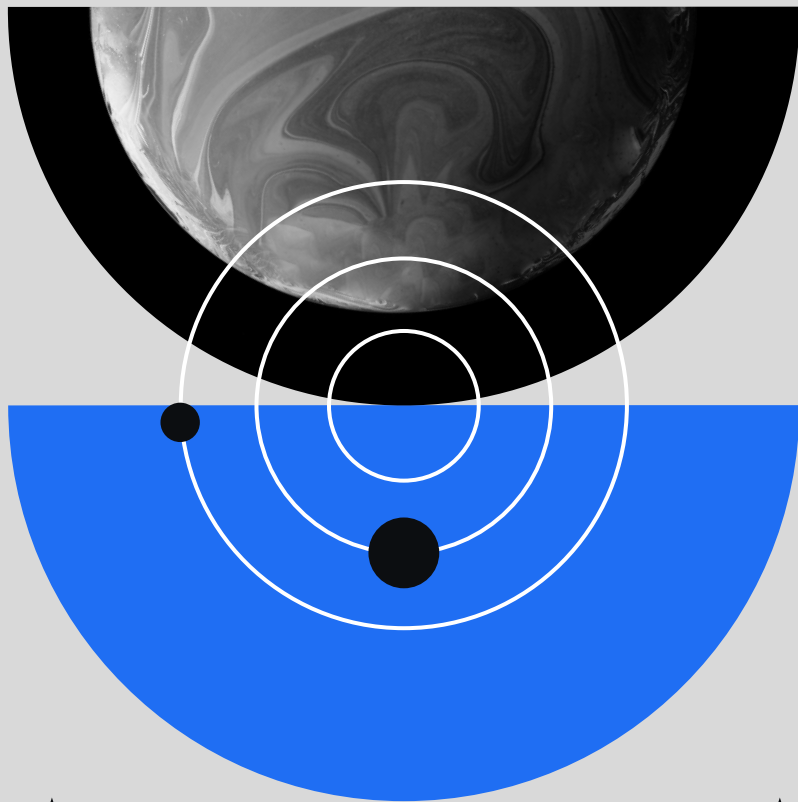
## 03 College Degrees

Colleges that offer Aerospace Engineering & transferring to UCLA

## 04 Aerospace Careers

Job opportunities and salaries





# 01

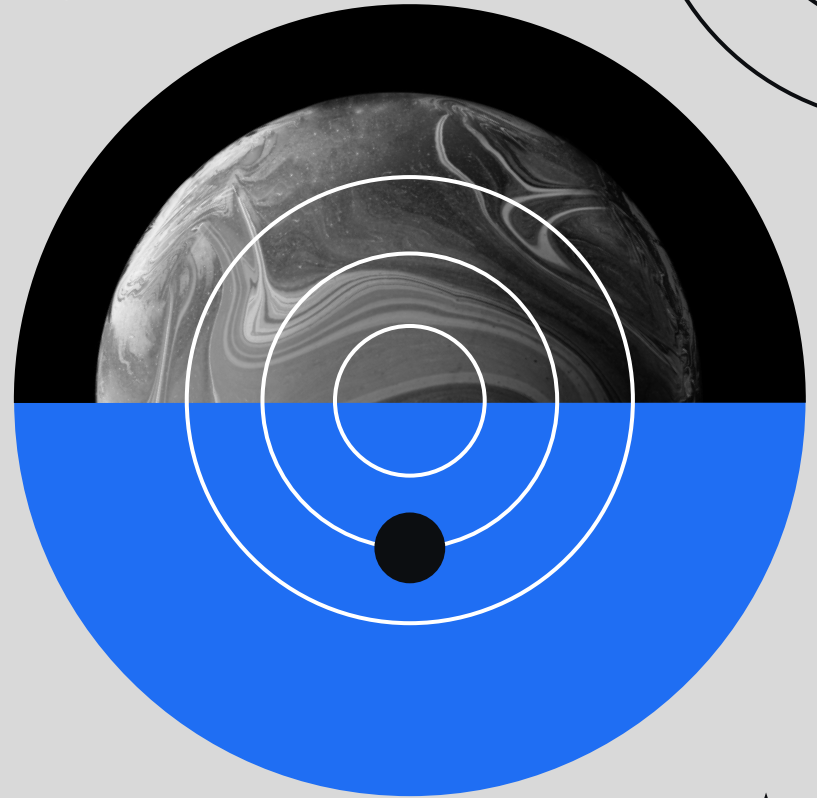
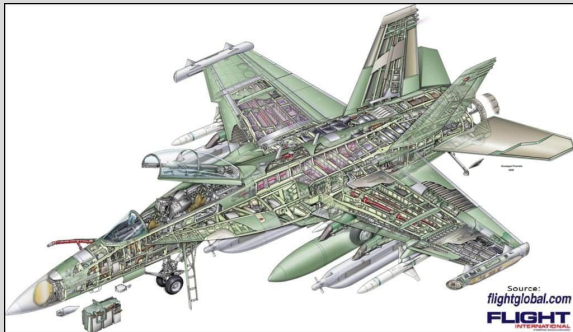
## Introduction

To Aerospace Engineering



# Aerospace Engineering

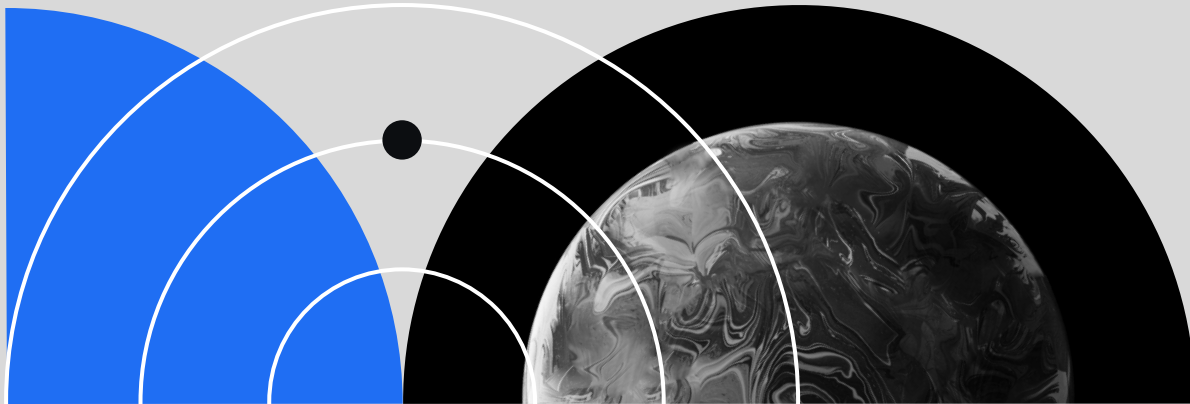
✦ Aerospace Engineering is a branch of Mechanical Engineering that uses physics and advanced math to create new aircraft, spacecraft, satellites, and other related inventions.



02

# Job Description

What Aerospace Engineers do



# Branches of Aerospace Engineering

## Aeronautical

Aeronautical Engineers focus on flight technology within the Earth's atmosphere.

Examples:

- Airplanes
- Jets
- Missiles

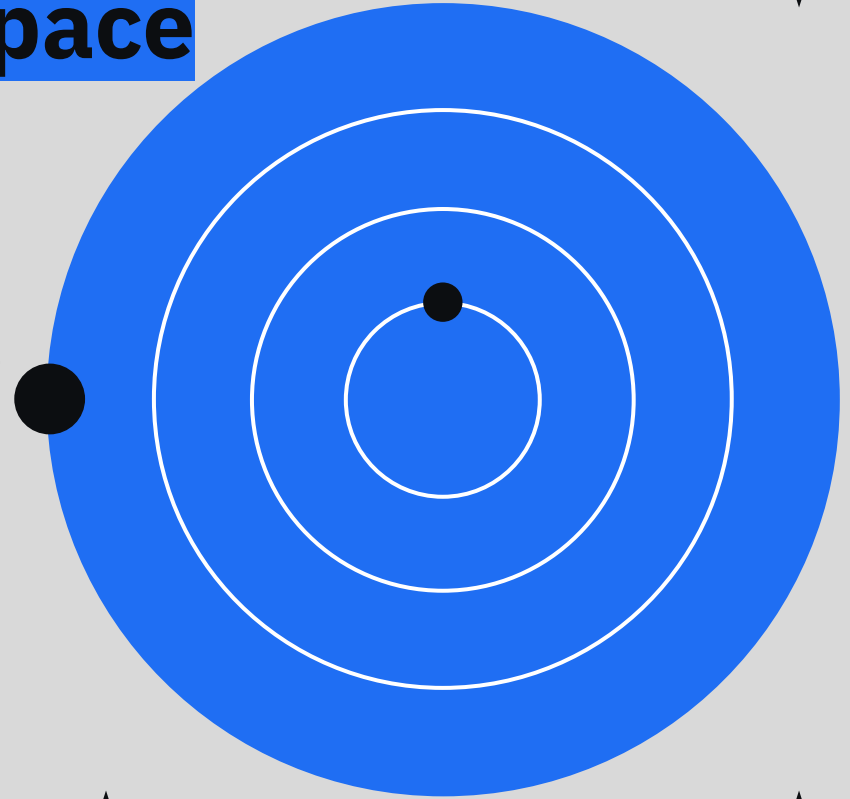
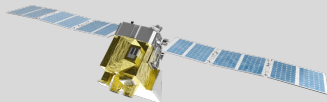


## Astronautical

Astronautical Engineers focus on technology that goes beyond Earth's atmosphere.

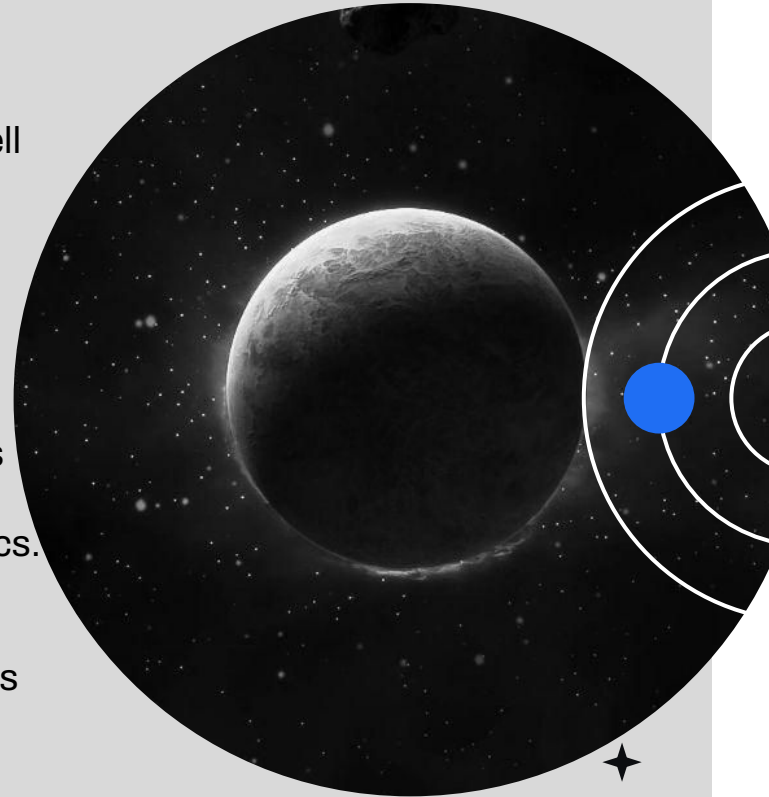
Examples:

- Space Shuttles
- Satellites
- Rovers



# Aerospace Engineering Inventions

- **Spacecraft and Aircraft**
  - By designing new space and aircrafts, engineers make these vehicles more efficient and faster as well as going to new places in the galaxy.
- **Propulsion Systems**
  - Propulsion designs for rockets and other similar vehicles to maximize fuel efficiency and thrust to assist in making air and spacecrafts more efficient.
- **Rovers**
  - Engineers create rovers to explore unknown places that humans cannot reach by themselves to gain more information about other planets' characteristics.
- **Satellites**
  - By creating satellites, engineers allow people to predict the weather, use Global Positioning Systems (GPS), use the internet, and study the universe



# Aerospace Engineering Inventions Contd.

- **Missiles**

- Missiles are made to defend countries from their enemies. These missiles are created by Government Agencies or defense contractors.

- **Control Systems**

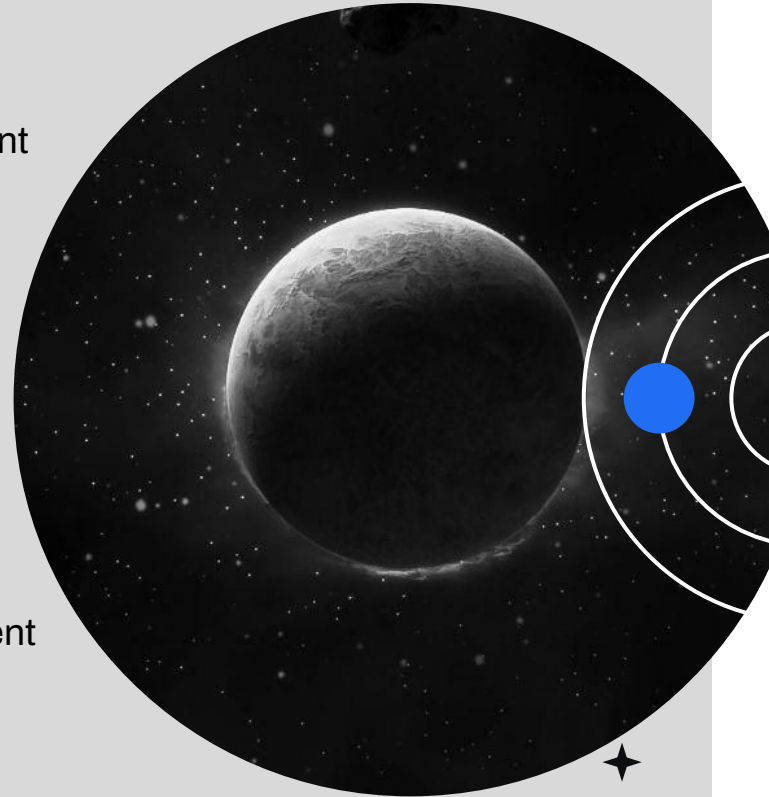
- ✦ ○ Control systems are created for different crafts depending on their needs. These systems include navigation, flight control, sensors and software.

- **Drones**

- Drones are created to allow people visuals for surveillance or photography or even deliveries to places that are difficult to reach.

- **Launch Systems**

- Launch systems are a crucial part of sending different things into the sky or into space so engineers are tasked with optimizing these launching systems.

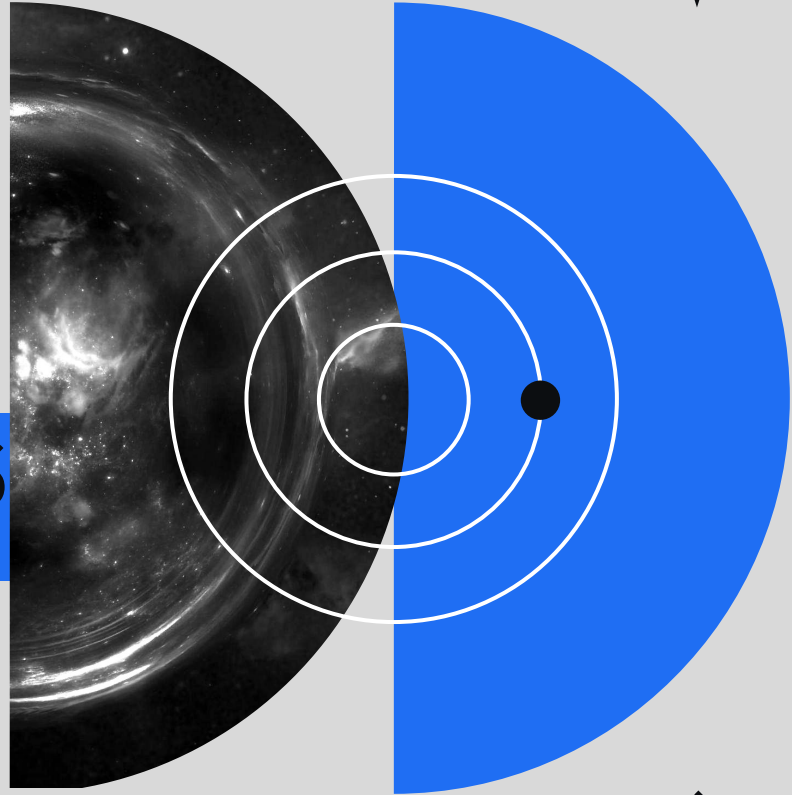




03

## COLLEGE DEGREES

Colleges that offer Aerospace  
Engineering & transferring to UCLA



5/9

University of California  
Schools offer Aerospace  
Engineering as a  
Bachelor's Degree



UC Los Angeles  
UC Berkeley  
UC Davis  
UC Irvine  
UC San Diego

5/23

California State  
Universities offer  
Aerospace Engineering  
as a Bachelor's Degree



Cal Poly San Luis Obispo  
Cal Poly Pomona  
Cal State Long Beach  
San Diego State University  
San Jose State University

Some

Private California  
Universities offer  
Aerospace Engineering  
or related Degrees



Examples:  
University of Southern California  
Stanford University [Aeronautics & Astronautics]  
California Institute of Technology [Minor]

# From El Camino College to UC Los Angeles



# Important Notes for Transferring

## IGETC

UCLA requires the following course pattern. UCLA Samueli School of Engineering does not require IGETC's completion for entrance however, the courses are required to graduate.

- English Communication
- Mathematical Concepts and Quantitative Reasoning
- Arts and Humanities
- Social and Behavioral Sciences
- Physical and Biological Sciences
- Language Other than English

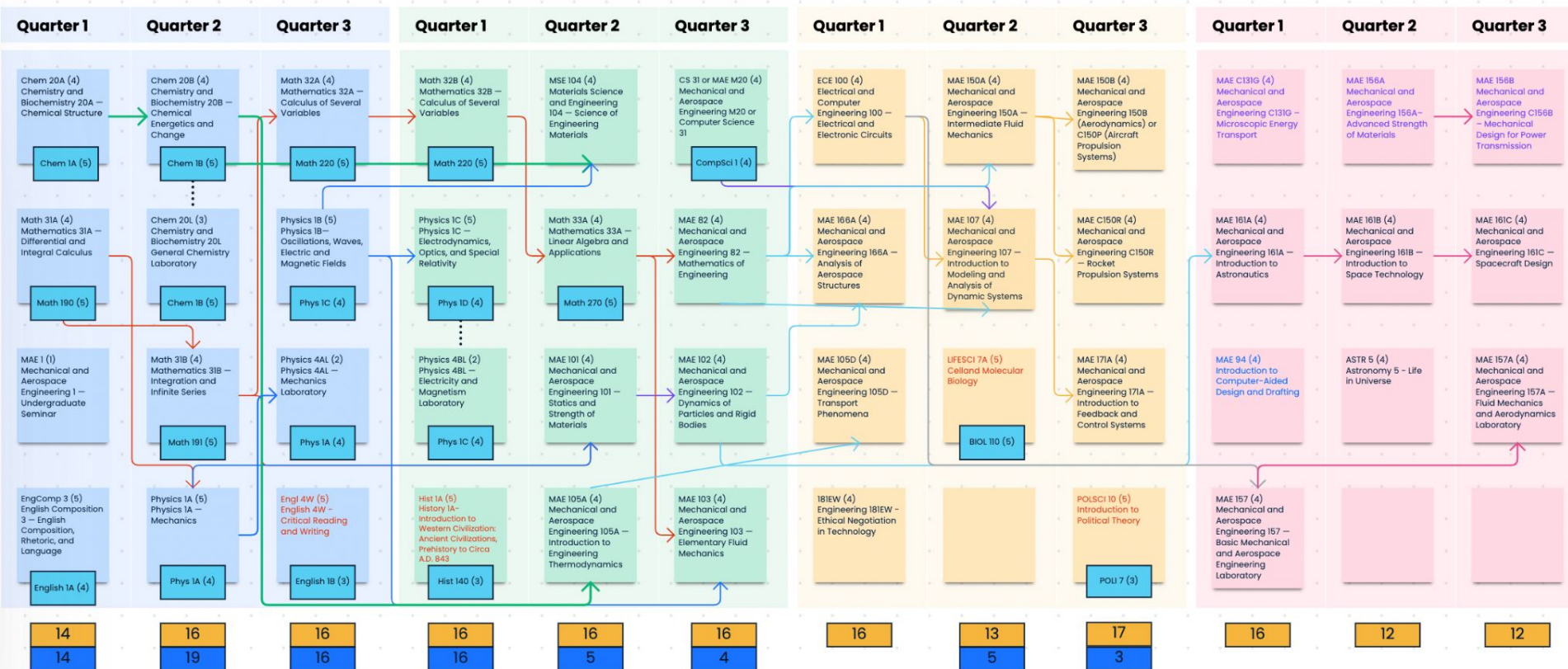


# Freshman Year

# Sophomore Year

# Junior Year

# Senior Year

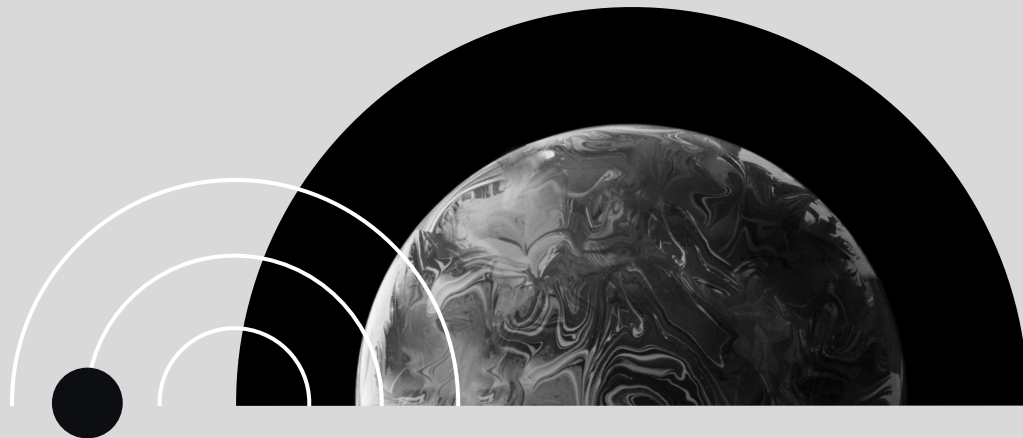


### Key

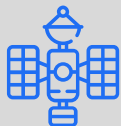
- Prerequisite
- ..... Corequisite
- Samueli GE Elective
- Aerospace Engineering Elective
- Technical Breadth Course
- El Camino Course offered at El Camino
- UCLA Units Units completed at UCLA
- EiCo Units Units completed at El Camino College

# Aerospace Careers

# 04



# Salaries

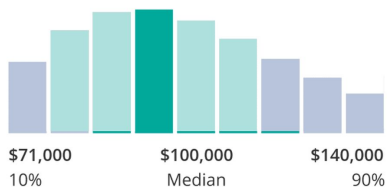


## AEROSPACE ENGINEER

Average Salary

**\$100,000** yearly

\$48.27 hourly



ZIPPIA  
THE CAREER EXPERT

Updated August 18, 2021

Junior Level 25th Percentile

**\$84,000**

Yearly Salary

**\$40.38**

Hourly Salary

Mid Level 50th Percentile

**\$100,401**

Yearly Salary

**\$48.27**

Hourly Salary

Senior Level 75th Percentile

**\$119,000**

Yearly Salary

**\$57.21**

Hourly Salary

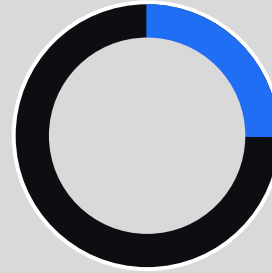
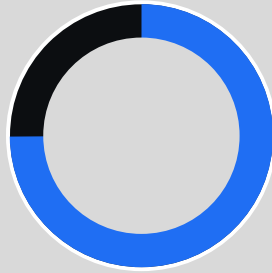
## Starting Salary

The starting salary for an Aerospace Engineer is around \$71,000.

## Salary After 5 Years

The salary for an Aerospace Engineer with some experience is around \$80,000-\$100,000.

# Current Job Postings





# Aerospace Engineer/Data Analysis

## Sequoia Research Corporation

### Job description

We are hiring at Sequoia Research Corporation! We are a small aerospace engineering company in the Los Angeles, South Bay Area, that has been in business for over 50 years. The problems we solve address important challenges in vehicle navigation and aircraft safety as well as fundamental space weather research. We take pride in the difficulty of the problems assigned to us by our customers, as they are often challenging to frame, let alone solve. In the past, we have designed and prototyped automated algorithmic analysis and integrity monitoring for the Wide Area Augmentation System (WAAS), constructed the integrity architecture for a Ground Based Augmentation System (GBAS) and written papers on ionospheric threats and the modelling thereof.

We are actively recruiting engineers with an interest in applying math and physics in a computational setting. We use Python, MatLab, C/C++, and some FORTRAN to develop algorithms, perform simulations, and analyze interesting data sets. The candidate should have strong analytical skills, be able to program, and must be a US citizen. We have found that people with an educational background in physics, chemistry, mathematics or engineering enjoy and thrive on our work. Our problems are uniquely challenging and require a diverse skillset. We are looking for all levels of education: Masters, Ph.D., as well as people with years of experience in their respective fields (with Bachelors).

### Responsibilities and Duties

- Performing computer simulations with in-house satellite navigation software.
- Developing analysis tools in Python and MatLab.
- Developing and testing algorithms that enhance

- Engaging in fundamental space weather research.
- Presenting various findings to academic/industry colleagues and government sponsors.

### Qualifications and Skills

#### Minimum qualifications:

- **Must be a U.S. citizen.**
- Bachelors with 1 years experience.
- Master's in a quantitative discipline such as math, physics, chemistry, engineering, or computer science.
- Experience in a compiled language such as C or FORTRAN or a high-level interpreted language such as Python, MatLab, or Mathematica.

#### Nice-to-have qualifications:

- Experience analyzing Satellite navigation systems.
- Experience in a computational discipline such as computational physics, computational chemistry, engineering, or computer science.
- 5+ years of experience using Linux.
- 5+ years of experience with computer simulations, broadly defined.
- 5+ years developing software and analysis tools adhering to software engineering best practices.
- Hands-on experience with large data sets in a variety of formats.

### Benefits

- Flexible work schedule with 3 weeks paid time in addition to 9 federal holidays.
- Competitive compensation with generous retirement plan, medical, dental, and vision.

- Excellent Location, a few minutes from the Palos Verdes Peninsula and Redondo Beach.

Job Type: Full-time

Salary: \$69,452.00 - \$160,000.00 per year

#### Benefits:

- 401(k)
- Dental insurance
- Flexible schedule
- Health insurance
- Health savings account
- Life insurance
- Paid time off
- Retirement plan
- Vision insurance

#### Schedule:

- 8 hour shift
- Flex Schedule

#### Supplemental pay types:

- Bonus pay

Work Location: In person

Job Type: Full-time

Pay: \$69,452.00 - \$160,000.00 per year

#### Benefits:

- 401(k)
- Dental insurance
- Flexible schedule
- Health insurance

### Benefits:

- 401(k)
- Dental insurance
- Flexible schedule
- Health insurance
- Health savings account
- Life insurance
- Retirement plan
- Vision insurance

### Schedule:

- 8 hour shift

### Supplemental pay types:

- Bonus pay

### Ability to commute/relocate:

- Torrance, CA 90505: Reliably commute or planning to relocate before starting work (Required)

### Experience:

- MATLAB: 1 year (Required)

Work Location: In person

# Mechanical Design Engineer- Aerospace

## Datamatics Global Services Limited

**Position:** Lead Mechanical Design Engineer

**Location:** Torrance, CA 90504

**Duration:** 12+ months

**Job Description:**

Designs, develops, and tests all aspects of mechanical components, equipment, and machinery. Applies knowledge of engineering principles to design products such as engines, instruments, controls, robots, machines, etc. May be involved in fabrication, operation, application, installation, and/or repair of mechanical products. Requires a bachelor's degree in engineering and 6-8 years of experience in the field or in a related area. Familiar with a variety of the field's concepts, practices, and procedures. Relies on extensive experience and judgment to plan and accomplish goals. Performs a variety of tasks. May lead and direct the work of others. A wide degree of creativity and latitude is expected. Typically reports to a manager or head of a unit/department.

**DESIGNER SKILLSET REQUIRED:**

· CAD advanced experience on mechanical test setups. Must be proficient in NX.

· Experience with designing and reverse engineering test equipment(turbo machinery) is a required

· Must be able to work under minimal supervision, Must show individual ownership.

· Able to develop and follow a Statement of Work

· Able to interpret complex drawings and reverse engineer test equipment

· Must be able to read , interpret ATP parameters and conditions with reverse

· engineering experience

· Thermal growth and structural analysis experience

· Proactive and committed

Job Types: Full-time, Contract

Salary: \$65.00 - \$65.01 per hour

Schedule:

- 8 hour shift

Education:

- Bachelor's (Required)

Experience:

- Mechanical Design Engineer: 4 years (Required)
- turbo machinery and NX: 4 years (Required)

Work Location: In person

# Spacecraft Structural Analysis Engineer

## The Aerospace Corporation

The Aerospace Corporation is the trusted partner to the nation's space programs, solving the hardest problems and providing unmatched technical expertise. As the operator of a federally funded research and development center (FFRDC), we are broadly engaged across all aspects of space—delivering innovative solutions that span satellite, launch, ground, and cyber systems for defense, civil and commercial customers. When you join our team, you'll be part of a special collection of problem solvers, thought leaders, and innovators. Join us and take your place in space.

At Aerospace, we are committed to providing an inclusive and diverse workplace for all employees to share in our common passion and aspiration – to carry out a mission much bigger than ourselves.

### Job Summary

The Vehicle Systems Division (VSD) sits at the center of the ideas and data behind current and future systems supplying innovative research and development; technical evaluations during the acquisition process; conceptual and detailed design; assembly, integration, and test; and operational support. Comprised primarily of highly-trained mechanical and aerospace engineers, VSD provides national expertise in the areas of vehicle engineering; guidance, navigation, and controls; robotics; electro-mechanical devices; embedded systems; fluid mechanics; propulsion; thermal control; orbital mechanics; mechanisms; structures; structural dynamics; and dynamic environments.

The Space Structures Section is seeking a Spacecraft Structural Analysis Engineer with a strong foundation in solid mechanics, practical experience in structural

analysis using both hand calculations and finite element analysis techniques, a passion for the space industry, and a desire to apply their expertise and creativity to help solve a variety of technical challenges. The Space Structures Section has insight into the additively manufactured, metallic, and composite structures being developed across the industry for the next generation of spacecraft vehicles and payloads and develops technical assessments to help inform government customer decisions.

This full-time position will be a hybrid work model. Nominally based in El Segundo, CA, this role will combine regular onsite work with remote flexibility as the business needs allow. Additional locations to consider will be Chantilly, VA and Colorado Springs, CO.

### What You'll Be Doing

- Resolve design and test issues/anomalies/challenges via detailed structural analyses of spacecraft and payloads including the core bus structure, bolted or bonded joint concepts, appendages, optical systems, booms, solar arrays, and deployables
- Offer technical consultation to management, customers, contractors, and government organizations in formulating and assessing test plans, procedures, objectives, and success criteria.
- Develop and assess design and analysis criteria, requirements, and specifications for space structures.
- Contribute to the development and execution of test programs for development, qualification,

and acceptance of space structures.

- Improve agility of the mission assurance process in assessing the structural integrity and survivability of space structures.
- Maintain state-of-the-art skills in activities related to design, evaluation, and testing of space structures. Skills include expertise in structural mechanics analysis techniques, failure criteria, composite design criteria, fracture and fatigue, damage tolerance, concept ideation and development, and advanced finite element analysis methods.
- Communicate with both inter-organizational personnel, program offices, and customers when necessary to scope, plan, and resolve technical issues.
- Coordinate with technical experts at contractor facilities to address and resolve concerns.
- Work within interdisciplinary teams to address cross-disciplinary issues.
- Keep management and customers informed of emerging risks.

This position is available as a Senior Member of the Technical Staff or Engineering Specialist

### What You Need to be Successful

#### *Minimum Requirements:*

Senior Member of the Technical Staff

- Bachelor's degree in a STEM field or equivalent
- 5 years of experience in structural engineering
- Experience performing finite element analyses (FEA)

# Spacecraft Structural Analysis Engineer CONTD.

## The Aerospace Corporation

- Experience or coursework in structural mechanics such as composite materials, nonlinear materials, plates and shells, energy and finite element methods, fracture, and fatigue
- Willingness to occasionally travel and to work off-business hours to support customer needs, approximately 10% (as required)
- This position requires ability to obtain and maintain a security clearance, which is issued by the U.S. government. U.S. citizenship is required to obtain a security clearance.

### Engineering Specialist

Same requirements as Senior Member of the Technical Staff noted above, *in addition to:*

- (8) years of experience in structural engineering
- Demonstrated progressive increase in responsibility and scope of work

### How You Can Stand Out

*It would be impressive if you have one or more of these:*

Senior Member of the Technical Staff or Engineering Specialist

- PhD degree in a STEM field or equivalent is preferred
- A current and active TS/SCI security clearance is strongly preferred, which is issued by the U.S. government. U.S. citizenship is required to obtain a security clearance.
- Understanding of flight qualification strategies from a structural perspective
- Proficient in the design, structural analysis, and

- Demonstrated ability to represent the physics of structures during the analysis idealization stage, and to translate results into a conclusive assessment
- Proficient with Nastran, Abaqus, or other commercial finite element tools
- Demonstrated ability to coordinate technical assignments and lead project teams
- Direct experience correlating finite element model predictions with test results
- Demonstrated ability to disposition hardware nonconformance's

We offer a competitive compensation package where you'll be rewarded based on your performance and recognized for the value you bring to our business. The grade-based pay range for this job is listed below. Individual salaries within that range are determined through a wide variety of factors including but not limited to education, experience, knowledge and skills. (Min - Mid - Max)

\$70,000 - \$105,000 - \$185,000

Pay Basis: Annual

Ways We Reward Our Employees

During your interview process, our team will provide details of our industry-leading benefits.

Benefits vary and are applicable based on Job Type. A *few highlights include:*

- Comprehensive health care and wellness plans
- Paid holidays, sick time, and vacation
- Standard and alternate work schedules, including telework options
- 401(k) Plan — Employees receive a total company-paid benefit of 8%, 10%, or 12% of eligible compensation based on years of service

- Flexible spending accounts
- Variable pay program for exceptional contributions
- Relocation assistance
- Professional growth and development programs to help advance your career
- Education assistance programs
- An inclusive work environment built on teamwork, flexibility, and respect

We are all unique, from diverse backgrounds and all walks of life, yet one thing bonds all of us to each other —the belief that we can make a difference. This core belief empowers us to do our best work at The Aerospace Corporation.

Equal Opportunity Commitment

The Aerospace Corporation is an Equal Opportunity/Affirmative Action employer. We believe that a diverse workforce creates an environment in which unique ideas are developed and differing perspectives are valued, producing superior customer solutions. All qualified applicants will receive consideration for employment and will not be discriminated against on the basis of race, age, sex (including pregnancy, childbirth, and related medical conditions), sexual orientation, gender, gender identity or expression, color, religion, genetic information, marital status, ancestry, national origin, protected veteran status, physical disability, medical condition, mental disability, or disability status and any other characteristic protected by state or federal law. If you're an individual with a disability or a disabled veteran who needs assistance using our online job search and application tools or need reasonable accommodation

# Spacecraft Systems Engineer Actalent (part of Allegis Group)

## Equivalent Experience

- **Active U.S. DoD Secret or Top Secret Clearance is required for consideration**

## Description:

The Spacecraft Systems engineer will be responsible for leading a team developing a spacecraft system serving a range of missions and customers. This includes creating, monitoring, and guiding requirements definition, spacecraft design, procurement and fabrication, integration and test, and verification and validation of the overall space vehicle system. You will interact with subsystem and unit engineers, manufacturing and test personnel, and program management. You will manage the technical elements of the space vehicle system.

## Responsibilities:

- Provides systems engineering leadership to a program team.
- Applies an interdisciplinary, collaborative approach to plan, design, develop and verify a lifecycle balanced solution for space systems.
- Familiarity with spacecraft subsystems functions and interfaces. Develops integrated spacecraft system designs and solutions.
- Responsible for all aspects of spacecraft systems engineering including performing preliminary concept development, trade studies, CONOPS definition, requirements decomposition and allocation, interface requirements definition, requirements verification and validation, support to integration and test operations, and anomaly resolution.
- Coordinates and communicates with subsystem

engineering teams to ensure system execution

- Develops the planning organization, implementation and monitoring of requirements management processes, tools, risk, issues, opportunity management and technology readiness assessment processes.
- Applies model-based systems engineering techniques for the definition of the spacecraft system.
- Participates in software integration and test activities to ensure mission functionality prior to deployment into operations.
- Coordinates with management and peers to ensure the integrity of high-quality operational products, including procedures, tools, and system configuration.
- Performs tasks to analyze technical data, verify and sustain specific systems configurations in accordance with defined constraints and operational requirements.
- Performs various analyses to optimize the spacecraft system and/or system architecture.

## Minimum Requirements:

- Bachelor's Degree in Aerospace Engineering or other relevant engineering or science discipline
- Minimum of 5+ years of directly relevant aerospace industry experience with spacecraft/satellite systems
- Demonstrated experience with space systems engineering principles and techniques
- Demonstrated experience with power, mass, and other system budgets
- Demonstrated experience with requirements analysis and flow-down, design verification and validation processes, satellite level integration and test processes

- Familiarity with satellite in-orbit operations
- MBSE experience is a plus

## BENEFITS:

- Medical, dental, and vision insurance
- Six paid legal holidays: New Year's Day, Memorial Day, July Fourth, Labor Day, Thanksgiving Day, and Christmas Day
- Paid time off

## Diversity, Equity & Inclusion

At Actalent, diversity and inclusion are a bridge towards the equity and success of our people. DE&I are embedded into our culture through:

- Hiring diverse talent
- Maintaining an inclusive environment through persistent self-reflection
- Building a culture of care, engagement, and recognition with clear outcomes
- Ensuring growth opportunities for our people

Actalent is an equal opportunity employer.

## About Actalent

Actalent connects passion with purpose. We help visionary companies advance their engineering and science initiatives through access to specialized experts that drive scale, innovation, and speed to market. With a network of almost 30,000 engineering and sciences consultants and more than 4,500 clients across the U.S., Canada, Asia, and Europe, Actalent serves many of the Fortune 500. An operating company of Allegis Group, the global leader in talent solutions, Actalent launched as a new specialized engineering and sciences services and workforce solutions brand in 2021.

# NASA - Manufacturing Engineer Actalent (part of Allegis Group)

## Equivalent Experience

### Description:

• Supports the production floor daily to resolve manufacturing process issues. Serves as a key interface between the Engineering and Production teams at daily Gemba meetings, coordinating efforts to resolve production issues. • Leads efforts to develop and document new manufacturing processes, both for existing products and for New Product Introduction (NPI). Continuously improves existing manufacturing processes. • Analyzes potential process failure modes, then designs tooling to mitigate process risks. Supports design engineering in creating new products which are designed for manufacturing. • Determines root cause analysis for production failure modes, then develops and implements solutions to those problems. • Maintains up-to-date knowledge of trends in manufacturing engineering including process automation and statistical process control. Applies this knowledge to problem solving and continuous improvement resulting in improved manufacturing efficiency, yield, and throughput.

### Skills:

Manufacturing engineering, Lean manufacturing, continuous improvement, kaizen, solidworks, bill of material, kpi, aerospace, Defense, root cause analysis, corrective action plans

### Top Skills Details:

Manufacturing engineering, Lean manufacturing, continuous improvement, kaizen, solidworks, bill of material, kpi, aerospace, Defense

### Additional Skills & Qualifications:

• Bachelor of Science degree in Mechanical, Aerospace, Industrial, or Manufacturing Engineering • Five or more years' experience in a production manufacturing environment • Two or more years' experience in the defense and/or aerospace industries • Lean Manufacturing experience and/or certification • Demonstrated experience leading major continuous improvement initiatives including Kaizen events and/or Lean transformations • CAD software experience (SolidWorks preferred)

### Experience Level:

Intermediate Level

### Diversity, Equity & Inclusion

At Actalent, diversity and inclusion are a bridge towards the equity and success of our people. DE&I are embedded into our culture through:

- Hiring diverse talent
- Maintaining an inclusive environment through persistent self-reflection
- Building a culture of care, engagement, and recognition with clear outcomes
- Ensuring growth opportunities for our people

Actalent is an equal opportunity employer.

### About Actalent

Actalent connects passion with purpose. We help visionary companies advance their engineering and science initiatives through access to specialized experts that drive scale, innovation, and speed to market. With a network of almost 30,000 engineering and sciences consultants and more than 4,500 clients across the U.S., Canada, Asia, and Europe, Actalent serves many of the Fortune 500. An operating company of Allegis Group, the global leader in talent solutions, Actalent launched as a new specialized engineering and sciences services and workforce solutions brand in 2021.

# Bibliography

- Aerospace Engineering Major for College | Google Slides & PPT
- What does an aerospace engineer do? - CareerExplorer
- What does an Aerospace Engineer do and How to become One?
- What is Aerospace Engineering? | Penn State Engineering
- 2023 Best Aerospace & Aeronautical Engineering Schools in California
- Aerospace & Aviation | CSU
- MAE | Mechanical and Aerospace Engineering
- Aerospace Engineer Salary (July 2023) - Zippia
- Aerospace Engineer Salary in 2023 | PayScale
- Aerospace Engineer Jobs, Employment | Indeed.com
- Aerospace Engineer / Data Analysis - Torrance, CA 90505 - Indeed.com
- Mechanical Design Engineer- Aerospace - Torrance, CA 90504 - Indeed.com
- Spacecraft Structural Analysis Engineer - El Segundo, CA - Indeed.com
- Spacecraft Systems Engineer - El Segundo, CA 90245 - Indeed.com
- NASA - Manufacturing Engineer - Los Angeles, CA 90001 - Indeed.com