



# Introduction to NASA and Early Career Pathways

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# Overview of NASA

## **National Aeronautics and Space Administration**

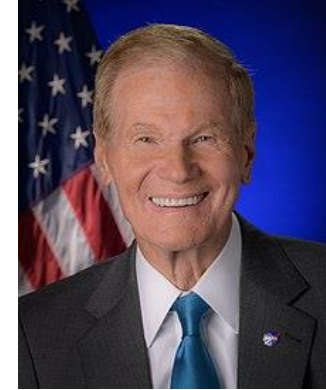
Established **June 29 1958 (66 years ago)**

NASA operates with four goals:

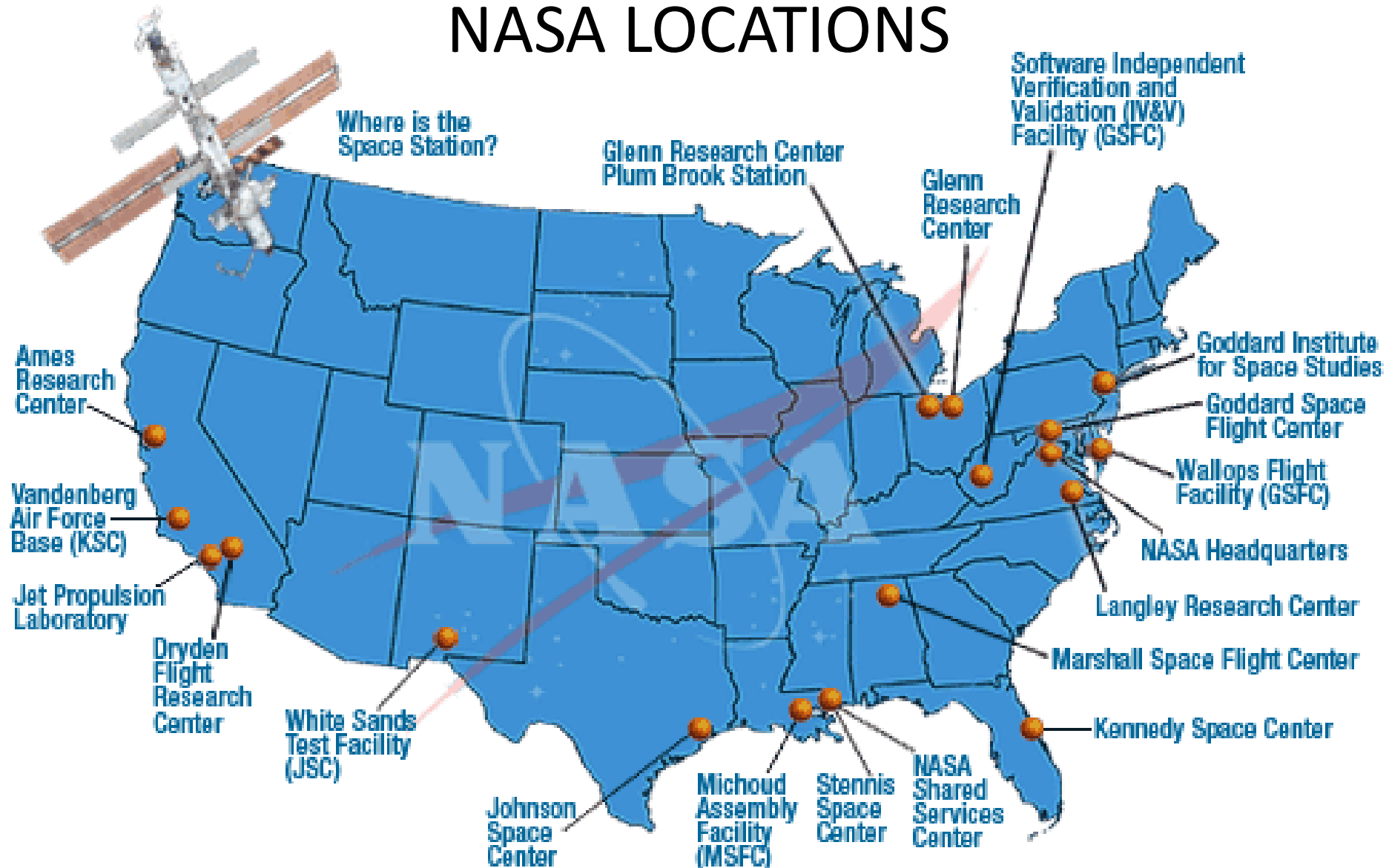
1. Expand human knowledge through new scientific discoveries
2. Extend human presence to the Moon and on towards Mars
3. Catalyze economic growth and drive innovation to address national challenges
4. Enhance capabilities and operations to catalyze current and future mission success

# WHO AND WHERE ?

- Administrator: **Bill Nelson**
- Deputy Administrator: **Pamela Melroy**
- NASA headquarters is located in **Washington D.C.**
- There are other NASA sites across the US



# NASA LOCATIONS



# Johnson Space Center (JSC)

- Located in Houston Texas, was named in honor of Lyndon B. Johnson - <https://www.nasa.gov/johnson/>
- The center that conducts flight control, human space flight training and research
- Consists of approximately 100 buildings
- Home of Mission Control Center (MCC) which has provided flight control function for **every** NASA human spaceflight

# Marshall Space Flight Center (MSFC)

- Located in Huntsville, Alabama was named in honor of George C. Marshall – <https://nasa.gov/marshall>
- The center that develops civilian rocketry and spacecraft propulsion research.
- The largest NASA center employing around 7,000 people
- Developed the Saturn launch vehicle for the Apollo program

# Kennedy Space Center (KSC)

- Located in Florida was named in honor of John F. Kennedy – <https://www.nasa.gov/kennedy/>
- It is the primary launch center of American spaceflight
- Over 700 facilities and buildings on the large land area
- Home of the Vehicle Assembly Building (VAB) for assembling rockets



## Other NASA centers

Do you know what the other center's specialties are?

# NASA SPACEPORTS

NASA launch facilities at:

- Kennedy Space Center (KSC) - Florida
- Cape Canaveral Space Force Station (CCFS) - Florida
- Vandenberg Space Force Base - California
- Wallops Flight Facility (WFF) - Virginia



# NASA Spinoffs

NASA technology at work on Earth!

# NASA Spinoff

- Spinoff highlights NASA technologies that benefit life on Earth in the form of commercial products.
- <https://spinoff.nasa.gov>
- Search spinoffs where you live, right here in Georgia
- <https://spinoff.nasa.gov/map?state=GA>

<https://spinoff.nasa.gov/map?state=GA>

Phoenix Refrigeration Systems (PRS) Inc. of Conyers, Georgia are using heat pipes to control humidity in supermarkets

An application of NASA space technology the heat pipe addition to the product stemmed from a large scale field test of heat pipes as enhancements to the air conditioning systems



# HPC spinoff

In the 1990s, a pair of computer engineers at **Goddard Space Flight Center** successfully used a new, open source operating system to turn a cluster of standard computers into a single supercomputer. Known as the **Beowulf cluster**, the technology dramatically reduced the cost of supercomputing, and most of the world's top supercomputers today are based on it. ... primarily to design products through modeling and simulation

[https://spinoff.nasa.gov/Spinoff2020/it\\_1.html](https://spinoff.nasa.gov/Spinoff2020/it_1.html)

The High-Performance Computing and Communications Initiative, started in **1992**, Goddard had set a goal of achieving teraflops-level supercomputing performance by **1997** ... And it needed to work on systems cheap enough to be assigned to a single employee. But by 1993, the best codes were achieving just a few tens of gigaflops on the biggest machine, more than an order of magnitude slower and at many times the desired cost per operation.



# What do you do at NASA?





**WHAT WOULD YOU SAY...**

**YOU DO HERE?**



# What do you do at NASA?

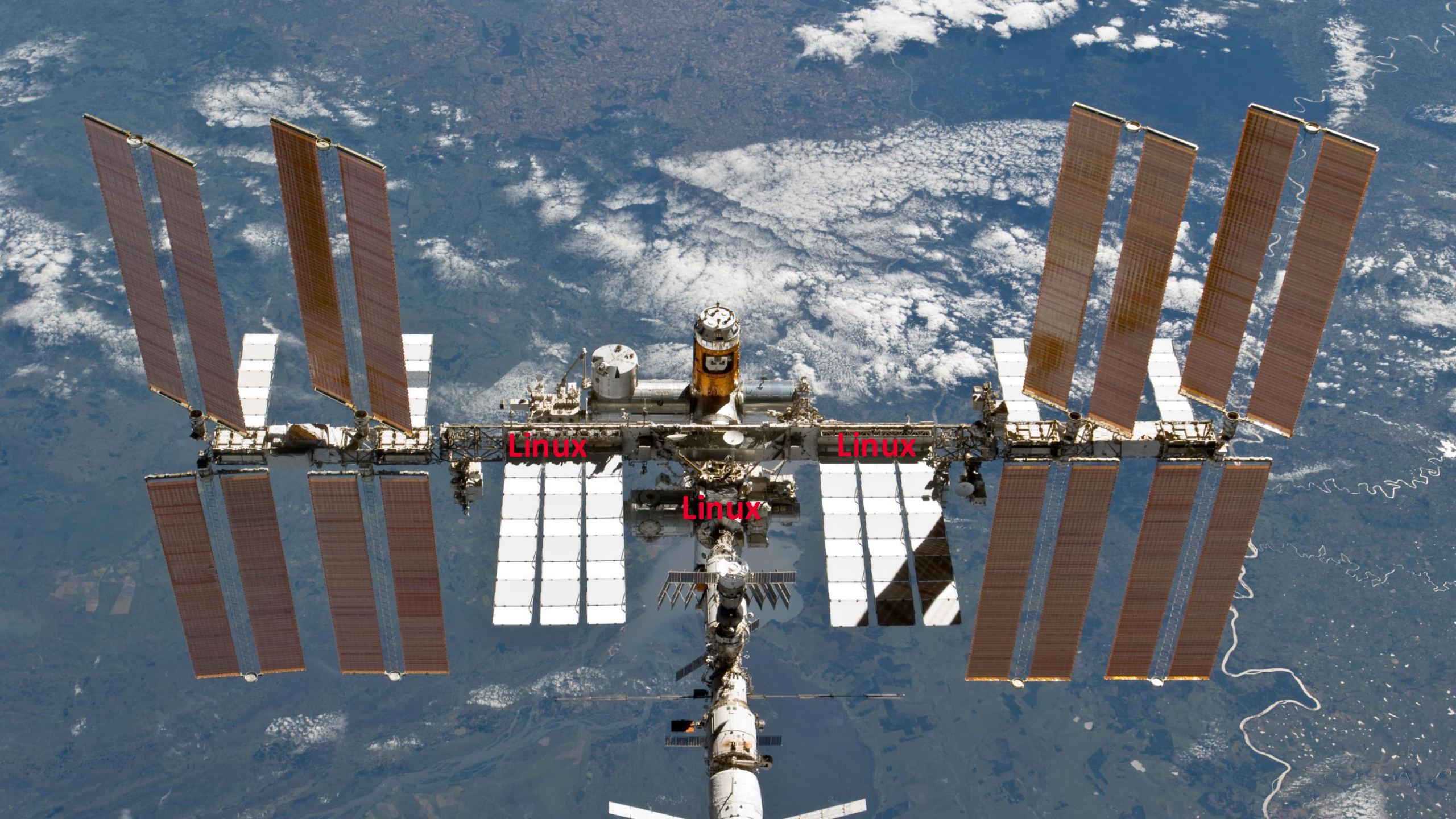
- System administrator for the High Performance Computer (HPC) center at Johnson Space Center
  - The Engineering department needs to run simulations, monte carlo experiments, and other computationally expensive operations
- In simple terms: **HPC is making many computers work cooperatively to solve large problems**
- Previously worked on the computer system aboard the International Space Station (ISS)

Also known as **LINUX** in SPACE!









Linux

Linux

Linux



# What can YOU do at NASA?

What do YOU need to work at NASA?

- Do what you love and do it well
- Find a listing on [usajobs.gov](https://usajobs.gov) in that field
- Create your profile **now** (it takes a long time), so you can apply right when you find your job
- Dream big and submit your application

# NASA employs people with a variety of skills

- NASA hires **more** than rocket scientists and engineers
- Accountants plan how to spend the limited resources
- Security professionals (both cybersecurity and physical security)
- Food scientists, and dieticians prepare food for the ISS
- Computer programmers write software and simulations for space travel
- People work to maintain the facilities and buildings
- People sew fabric into new suits, gloves, and parachutes
- Linguists teach the astronauts to speak other languages



# Know your acronyms

We use a lot of acronyms and abbreviations at NASA!

Know your acronyms

<https://nasaacronyms.com>

This website has over 25,000 NASA acronyms a collection from multiple NASA centers.

I still find acronyms that are not on this website, because we make up new ones daily!

Seriously acronyms are use **EVERYWHERE** at NASA!







# Questions

What is it like to work for the government at NASA?  
Do they have jobs other than astronauts?  
What else do you want to know?

# Jet Propulsion Laboratory (JPL)

- Located in Pasadena California is a federally funded research and development center – <https://www.nasa.gov/jpl/>
- It is the primary location for construction and operation of robotic spacecraft
- Operates the Deep Space Network (DSN)
- Managed by the California Institute of Technology (Caltech)

# Ames Research Center (ARC)

- Located in California's Silicon Valley as a research center – <https://www.nasa.gov/ames/>
- Home of the NASA Advanced Supercomputing (NAS) division
- Operates the high-performance computing (HPC) environment for NASA
- Provides data analytics, data science and visualization for other centers

# Glenn Research Center

- Located in Ohio, named in honor of astronaut John Glenn – <https://www.nasa.gov/glenn/>
- A long history of avionics, flight and propulsion (predates NASA)
- Provides wind tunnels, drop towers, vacuum chambers and research aircraft
- Primary mission to develop science and technology for use in aeronautics and space