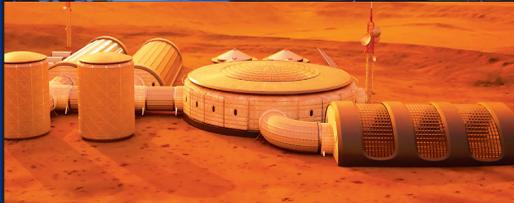


# Jacobs

## Challenging today. Reinventing tomorrow.

For more than 60 years, Jacobs engineers, technicians and scientists have provided integrated solutions to help solve the complex challenges of space exploration. With a global web of resources and more than 5,000 employees supporting multiple NASA centers, other government users and industry partners around the United States, the Jacobs team is able to stay steps ahead to provide advanced engineering, research and operations support.

We **invent**  
by **imagining**  
what is **possible.**



# Innovative Solutions for Driving Launch, Flight and Mission Success

## Launch Support

As prime contractor for NASA's Exploration Ground Systems Program at Kennedy Space Center (KSC), Jacobs is responsible for the development and operations of flight vehicle components, including integration, processing, testing, launch and recovery. The Jacobs team has helped NASA to modernize and upgrade facilities and ground equipment at KSC to prepare for the launch of the Space Launch System (SLS) and Orion crew vehicle in support of the Artemis Program, which aims to put humans on the Moon by 2024. Examples of this work include upgrades to the 6-million pound crawler transporter, the 380-foot-tall mobile launcher and launch pad 39B. The launch team has completed development of the spaceport command and control system software for Artemis I, and has completed assembly, integration, and final test and checkout of the flight hardware for the launch of SLS and Orion. The Jacobs team also provides technical and engineering support to a variety of commercial space companies, including Lockheed Martin, Boeing, Northrop Grumman, and Sierra Nevada.

## Space Launch System

Jacobs is providing technical leadership and support to NASA's Space Launch System Program in the areas of vehicle systems engineering and integration; flight software development; avionics systems integration; lab construction and operation; vehicle structural load development; structural, propulsion and acoustic testing; and design, development and analysis. The Jacobs team also designs and oversees development and test of the ground support equipment required to transport, test, and operate the massive SLS flight hardware on the ground.

## Orion

Jacobs is part of the team of engineers supporting development and construction of NASA's Orion crew capsule, which is built for long-duration, human-rated missions to the moon and into deep space. Jacobs is providing critical engineering, fabrication and testing of Orion's vital systems to validate strict reliability guidelines that will ensure mission readiness on the first flight to the moon since Apollo. Multiple Jacobs contract operations work as one team to test the Environmental Control Life Support Systems, the Launch Abort System, Capsule Parachute Assembly System and Water Impact Drop and Stress Tests, as well as validating the Thermal Heat



### Crawler Transporter-2 Upgrades

This unique vehicle, more than 50 years old, has been upgraded to transport NASA's SLS and Orion spacecraft to Pad 39B.



### Launch Pad 39B

This historic launch pad has been transformed with refurbished flame trenches, propellant lines, storage tanks, and communications to support a modified mobile launcher that will transport NASA's 79-metric-ton SLS rocket.



### The Space Launch System (SLS)

The most powerful and complex rocket ever built, this heavy-lift vehicle will take scientific missions and humans beyond Earth orbit, launching a new era of deep space exploration.



### Capsule Parachute Assembly System

Performed high-altitude drop tests of a capsule mockup, slowing the vehicle from thousands of miles per hour to a gentle 25 miles per hour.



### Thermal Protection System/Heat Shield

Developed and produced heat shield components tested in arc jet test facilities under simulated Earth re-entry temperatures exceeding 4,000 degrees Fahrenheit.

Shield withstands re-entry temperatures of more than 4,000 degrees Fahrenheit. The Jacobs team at KSC has developed and produced thousands of heat shield components for Orion.

### International Space Station

Jacobs supports cargo delivery to the International Space Station (ISS) for NASA under the Commercial Resupply Services contract at Kennedy Space Center, coordinating logistics of launch payloads in concert with commercial cargo platforms such as Northrup Grumman Cygnus, and Japan Aerospace Exploration Agency HTV. The Jacobs teams at both Kennedy and Johnson Space Center have the expertise to manage the life cycle of technical and scientific payloads bound for the ISS, from concept formulation to operational systems integration. They can develop and maintain flight hardware used for experiments, coordinate with scientists to prepare and process experiments, and develop on-orbit crew procedures and plans to support the science. At the Marshall Space Flight Center, Jacobs team members develop, manufacture and test components of the ISS Environmental Control and Life Support System, as well as support materials science experiment design, development and fabrication.



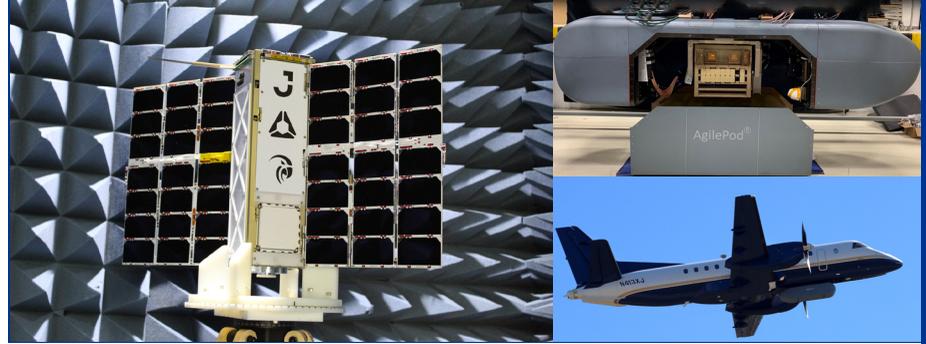
### Robonaut

Created as part of an integrated NASA team, Robonaut is a humanoid robot designed to work alongside astronauts on the ISS. Jacobs procured parts, designed hardware, and assisted with assembly and certification tasks.



### International Space Station

As an integrated solution provider, multiple Jacobs contract operations work as one team to provide crucial engineering and testing support to the ISS, a test bed for deep space technologies and systems.



### Jacobs Space Payload Development & Launch

Through its Rapid Solutions group, Jacobs is developing and demonstrating a suite of space and airborne radar systems hardware and software mission planning and processing tools for ground air and space intelligence, surveillance, reconnaissance (ISR) and targeting support that cuts across defense, civilian and commercial customers.

As an aerospace and defense prime space payload hardware and software provider of affordable, commercial space based Active Electronically Scanned Arrays (AESAs), Jacobs began a new era with the successful launch of its Mango One satellite in January of 2021 from Cape Canaveral, FL aboard the Space X Falcon 9 Transporter One mission. Mango One is funded and developed by Jacobs utilizing Spire's Space as a Service (SpaaS) offerings to demonstrate and qualify radar, communications and intelligence capabilities in space. The on-orbit performance is a milestone towards delivering affordable, commercial space-based AESAs.

Since 2020, Jacobs has also built and flown two airborne X-band radars to support multiple radar collection scenarios. Jacobs also designed a large-scale data repository system; commissioned the fabrication and production of an additional AgilePod-30; and developed a complete air worthiness structural substantiation and documentation package to support the FAA Experimental Type Certificate.

Jacobs' use of commercial 5G technology and state of art high volume and quality electronics manufacturing processes allows Jacobs to rapidly scale capacity to meet market demand, and insertion of leading-edge technology reduces the cost of space radar by a factor of two to five times less than legacy radar systems. Jacobs brings more than 25 years of airborne and terrestrial radio frequency (RF) synthetic aperture radar (SAR) and moving target indication (MTI) payload hardware and processing.

To further accelerate rapid prototyping and deployment Jacobs invented AgilePod® as a truly modular, standards based, reconfigurable open systems architecture that is a payload agnostic, multi-mission pod. Jacobs employs world-class aerospace structure design, analysis, and fabrication to deliver a truly one-of-a-kind capability that is a force multiplier on the battlefield allowing the warfighter to integrate multiple sensing modalities into a single pod without requiring permanent class-A aircraft modifications.

# Research, Test and Facility Support

As NASA's largest professional and technical services provider, Jacobs brings subject matter experts with proven experience in their technical fields, delivering innovative solutions to exploration and research programs across the country. This work includes the operation and maintenance of a variety of unique research and development facilities, including NASA arc jet facilities and wind tunnels, with a long history of supporting similar Department of Defense facilities as well.



## Wind Tunnels

Jacobs is the world's premier provider for all wind tunnel related services, delivering highly technical, innovative solutions across the entire life cycle including wind tunnel design, fabrication, commissioning, operations, maintenance, condition assessment and capital investment. Our wind tunnel services support a range of wind tunnel customers and users from automotive, freight trucking, aerospace and government. Jacobs provides operations service for all of NASA's wind tunnels contributing to flight and propulsion research and access to space for Commercial Resupply, Commercial Crew and the agency's Space Launch System.



## Full-Range Testing Services and Capabilities

Jacobs provides an extensive range of reliability testing and prototyping solutions for any aerospace hardware or software application, including: Mechanical & Electronics Manufacturing, Structural Load Testing, Environmental Testing (Thermal/Vacuum, Electromagnetic Interference, Vibration), Antenna Performance, Battery Performance & Failure Testing, Pyrotechnics Testing, and Hypervelocity Impact Testing. To add more fidelity to testing data, unique analysis tools, techniques and computational models are applied to ensure accurate results.

## Marshall Space Flight Center, Huntsville, AL

A campus of world-class facilities for propulsion system and launch vehicle development, advanced materials and manufacturing processes development, flight software development and test, and systems engineering and integration of the SLS rocket. Jacobs support includes construction and operation of the SLS flight software/hardware integration and test facility, the Systems Integration Lab (SIL).

## Johnson Space Center, Houston, TX

Jacobs provides space exploration integration systems engineering, astro-materials science and hardware reliability testing services at NASA's primary center for design, and development for human spaceflight. Jacobs engineers also design and test robotic systems, life support systems, communications, and astronaut safety systems along with image analysis of space systems hardware.

## Langley Research Center, Hampton, VA

Jacobs provides maintenance, operations, and engineering support at NASA's Langley Research Center, home to 270 Research and Institutional Facilities, 220 of which are classified as critical. Efforts include support to subsonic-to-hypersonic wind tunnels, laboratories, test stands and instrumentation. NASA's focus is on revolutionary improvements to aviation and expanding the understanding of Earth's atmosphere and technology development for space exploration.

## Ames Research Center, Moffett Field, CA

Jacobs provides Aerospace Testing and Facilities Operations and Maintenance and additional facility support services at NASA's lead conductor of innovative research and development.

## Kennedy Space Center, Cape Canaveral, FL

Jacobs provides overall management and implementation of Kennedy's ground systems capabilities, flight hardware processing and launch operations. This includes

operation and maintenance of the Vehicle Assembly Building, Launch Pad 39B, the Multi-Payload Processing Facility, Launch Equipment Testing Facility, International Space Station science payload support laboratories, and the Thermal Protection System research and production facility.

## Glenn Research Center, Cleveland, OH

At NASA's center for designing and developing innovative technology in aeronautics and space exploration, Jacobs' technical services support subsonic and supersonic wind tunnels, engine altitude chambers and component, space propulsion, zero gravity and space simulation facilities.

## Goddard Space Flight Center, Greenbelt, MD

In addition to developing and validating new technologies for future mission support, Jacobs provides electrical/electronic engineering support services to include the study, design, development, fabrication, integration, testing, verification and operations of space flight, airborne, and ground system hardware and software.



## Designing and Building the World's Most Advanced Facilities

Jacobs is the No 1 ranked Architect, Engineering, and Environmental firm by Engineering News Record. Jacobs has planned and designed some of the most significant government facilities and infrastructure, from the establishment and maintenance of military bases worldwide to some of the largest civil works projects. Jacobs provides a full spectrum of services, from policy and strategy through site analysis and project execution, helping our clients improve and diversify their planning and infrastructure to better fulfill their important missions.

- Master Planning & Installation/Site Planning
- Asset Management & Smart Installations
- Cost Estimating & Cost Management
- Design Management
- Cybersecurity Analysis and Planning
- Building Engineering
- Data Centers
- Microgrids
- Industrial Control Systems
- Communications & Information Technology Networks
- Utility Infrastructure Studies & Capacity Analysis
- Value Engineering & Optimization
- Business Case Alternatives Analysis
- Energy Resiliency Planning
- Mission Assurance Assessments
- On-site Generation Solutions
- Renewable Energy Systems
- Defense Threat Reduction
- Environmental Planning
- Environmental Regulatory Compliance
- Climate Change Remedial Planning
- Commissioning, Retrocommissioning & Recommissioning
- Integrated Project Delivery
- Program Budgeting & Planning
- Project Controls, Accounting, & Reporting
- Scope-to-Budget Validation & Value Engineering

# Defense Systems and Mission Solutions



## Providing **Secure Solutions** for Our Nation's **Defense**

Built to handle the dynamic and evolving needs of missile defense, the Missile Defense Agency (MDA) supports research and development, system-level test and evaluation, and operational training for U.S. combatant commands. Jacobs provides 24x7 support to the MDA's integration and operation center at Schriever Space Force Base – a key component of the Missile Defense System (MDS). This includes enterprise solutions to support concurrent tests, training and operations for flight and ground test systems; hardware-in-the-loop tests, execution, and control; and classified and unclassified war games.

Additionally, we provide IT, cybersecurity and telecommunication solutions for the Agency's enterprise communications and information technology environment to help secure and protect this cornerstone of our nation's defense.

Beyond our key support to MDA, we deliver innovative operations, maintenance and sustainment solutions as well as experimental research and development for an expanding portfolio of U.S. Government, military and commercial customers, driving added value while enabling its clients' most critical missions. From operations and maintenance

on airborne, land-based and space-based systems that sense and report threat activities; to support of classified communications and processing for Command and Control (C2) capability at Cheyenne Mountain Space Force Station (CMSFS) and Peterson Space Force Base; to transitioning rocket and space propulsion-related technologies to the warfighter through our critical R&D support as a premier solutions provider to the AFRL Rocket Propulsion Lab on Edwards Air Force Base; Jacobs protects our nation's most critical coveted assets and critical defense missions.

For more than  
**60 years...** we've built a **worldwide reputation** for  
providing **innovative solutions** to government,  
private companies and industries.

# Cyber & Intelligence



Our combined **Cyber & Intelligence** footprint allows us to become true enablers for **delivering and operationalizing** the next generation solutions into **Multi-Domain and Joint All Domain** operations for mission-critical clients.

## Who We Are

### Cyber

Service offerings focused on an information environment that includes assets such as networks, technology, infrastructure and data.

### Intelligence

Service offerings focused on all-source intelligence, counter-terrorism, space resiliency, and open source & social media analysis.

## Key Capabilities



**PREPARING**  
your people, processes, and technologies to withstand adversary advances and remain ready throughout the contested domains.



**DELIVERING**  
proactive and reactive mission-tailored operations



**PROVIDING**  
data-centric solutions that create key insights and transform data into actionable intelligence.

## Differentiated Solutions

- Advanced Cyber Training
  - Digital Solutions
  - Enabling Technologies
  - Cyber Resilience
- 
- Information Operations
  - Defensive & Offensive Operations
  - Space/Counter Space Operations
  - Mission Operations
- 
- All Source/Multi-INT Fusion
  - Open Source Intelligence & PAI Analysis
  - Biometrics & Identify Intelligence
  - Advanced Analytics & Automation

## Supporting Key Missions



Space Domain Awareness



Space / Counterspace



Collection Management



Counterintelligence & Human Intelligence



Counter Proliferation



Defensive & Offensive Cyber Operations



Knowledge Management & Dissemination



Indications & Warnings (I&W)

# Intelligent Asset Management Solutions



## Maximizing Our Clients' Return on Investment

Jacobs addresses every aspect of asset management, from concept to retirement. Regardless of the asset's lifecycle phase – from strategic planning, concept, design, construction, operation, maintenance, or asset extension/retirement – Jacobs deploys our Asset Management Delivery Framework to improve asset effectiveness and reduce the total cost of ownership.

[www.jacobs.com](http://www.jacobs.com)



# Jacobs

Jacobs Asset Management Deployment Strategies for NASA Langley Research Center:

- Deployed technologies to enable real-time monitoring and analytics of critical assets, improving efficiency, reliability, and availability
- Instrumented ~665 assets using ~60,000 discrete points to measure vibration data through a wireless network
- Introduced Building Automation and combined 11 disparate systems (primarily HVAC) into a single integrated system, now monitoring more than 110,000 points
- Designed and implemented the hardware and software to enable real-time-asset monitoring and data capture in the Integrated Operations Center

- Leveraged our cybersecurity experts to ensure the safety and integrity of data transfer and capture
- Linked floor plans using Geographic Information Systems (GIS) and attached control drawings to facilitate troubleshooting and quickly identify problem areas

Benefits to NASA Langley Research Center since rollout of our Asset Management Delivery Framework in October 2015:

- No failures or unplanned outages of instrumented assets
- Validated client cost avoidance of ~\$5M equating to a 4-year return on investment
- Recognition by Uptime Magazine as the Reliability Program of the Year for 2017

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