



## Stratolaunch FAQ

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### **Q. What was the inspiration for Stratolaunch?**

**A.** The idea of air launching payloads isn't new, but Paul Allen wanted to develop an aircraft-derived system that was capable of carrying payloads to space. It has become evident that the industry needs a responsive and operationally flexible solution to increase flight rate resulting in lower cost missions. This non-traditional approach to launch could open up the market for truly privatizing human spaceflight.

### **Q. What is the history of this project?**

**A.** This inspiration began with the successful suborbital flights of SpaceShipOne in 2004. SpaceShipOne was built by Burt Rutan's team at Scaled Composites and funded by Paul Allen. At the final flight of SpaceShipOne, Burt Rutan and his longtime colleague Mike Griffin began discussing the potential for a follow-on, orbital system. Paul Allen expressed his interest in funding the development of such a system as a means for reestablishing U.S. leadership in space launch and continuing his legacy of privately funded spaceflight. They reached out to NASA's Dave King and Gary Wentz and SpaceX's Gwynne Shotwell, and the group began formulating options for executing the program in 2010, which led to the formal announcement today.

### **Q. Why do this now?**

**A.** The timing for a system like this has never been better. The challenge with the launch market today is finding a way to put payloads into orbit affordably and responsively. This system will achieve both and mark the dawn of a new era in space transportation.

### **Q. How long was this idea in development?**

**A.** The concept isn't new but we began concerted development activities on this large-scale system over the past year.

### **Q. When do you see the maiden flight of new launch aircraft taking place?**

**A.** We are still in the planning stages but we expect to conduct flight testing beginning in 2016. The first flight will occur once we are satisfied the system is ready.

### **Q. How many missions per year do you expect to fly?**

**A.** It's too soon to predict but the objective is to have a routine mission schedule that takes full advantage of the operational responsiveness and flexibility of this system, and offers a very cost-competitive launcher to the market.

### **Q. How many jobs will this program create?**

**A.** There are already over 100 people assigned to this effort and we will see a significant ramp-up as we move deeper into the engineering phase then start manufacturing and eventually operations. These jobs will first be located in Alabama, California and Florida. We are proud that the headquarters for this effort are located in the Rocket City – Huntsville, Alabama.



## SpaceShipOne

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SpaceShipOne ushered in a new era of space travel in 2004, when it became the first non-governmental manned rocket ship to fly beyond the earth's atmosphere. The aircraft, a three-place, high-altitude research rocket, fueled interest in commercial space travel.

SpaceShipOne was developed by Mojave Aerospace, a joint venture of investor and philanthropist Paul Allen, and Scaled Composites, a Mojave-based aerospace company founded by legendary aerospace engineer Burt Rutan. It took about three years of full-time development to complete SpaceShipOne and its carrier craft, White Knight.

On June 21, 2004, SpaceShipOne made history when it successfully reached space and pilot Mike Melville became the first civilian to fly a spaceship out of the earth's atmosphere. Four months later, on October 4, SpaceShipOne became the first private manned spacecraft to exceed 328,000 feet twice in 14 days, earning it the prestigious \$10 million Ansari X-Prize.

The historic flight was the first time an aerospace program successfully completed a manned mission without government sponsorship – signifying private enterprise will play a major role the future of space travel. Business entrepreneur Richard Branson of Virgin Group has since licensed the technology behind SpaceShipOne for Virgin Galactic, a venture that will take paying customers into suborbital space.



### SpaceShipOne Highlights

- The first non-governmental manned spacecraft in history
- Winner of the \$10 million Ansari X-Prize in 2004
- Carried the first civilian astronaut



## Stratolaunch Systems: A Paul G. Allen Project

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Stratolaunch Systems, a Paul G. Allen project, is developing an air-launch system that will revolutionize space transportation by providing orbital access to space at lower costs, with greater safety and more flexibility. Delivering payloads in the 10,000lbm class into low earth orbit, the system allows for maximum operational flexibility and payload delivery from several possible operational sites, while minimizing mission constraints such as range availability and weather.

The air-launch system is made up of four primary elements: a carrier aircraft, a multi-stage booster, a mating and integration system, and an orbital payload. Initial efforts will focus on unmanned payloads; however, human flights will follow as safety, reliability, and operability are demonstrated.

Stratolaunch Systems has assembled a team of innovative aerospace leaders to build and deliver a commercial air launch system. Scaled Composites will build the carrier aircraft; SpaceX will provide the booster and space launch mission design and mission integration services; Dynetics will provide program management and systems engineering and integration, as well as test and operations support to Stratolaunch; Dynetics will also build the mating and integration system hardware. Stratolaunch Systems headquarters are in Huntsville, Alabama, and its aircraft hangar is in Mojave, California.

### **Carrier Aircraft**

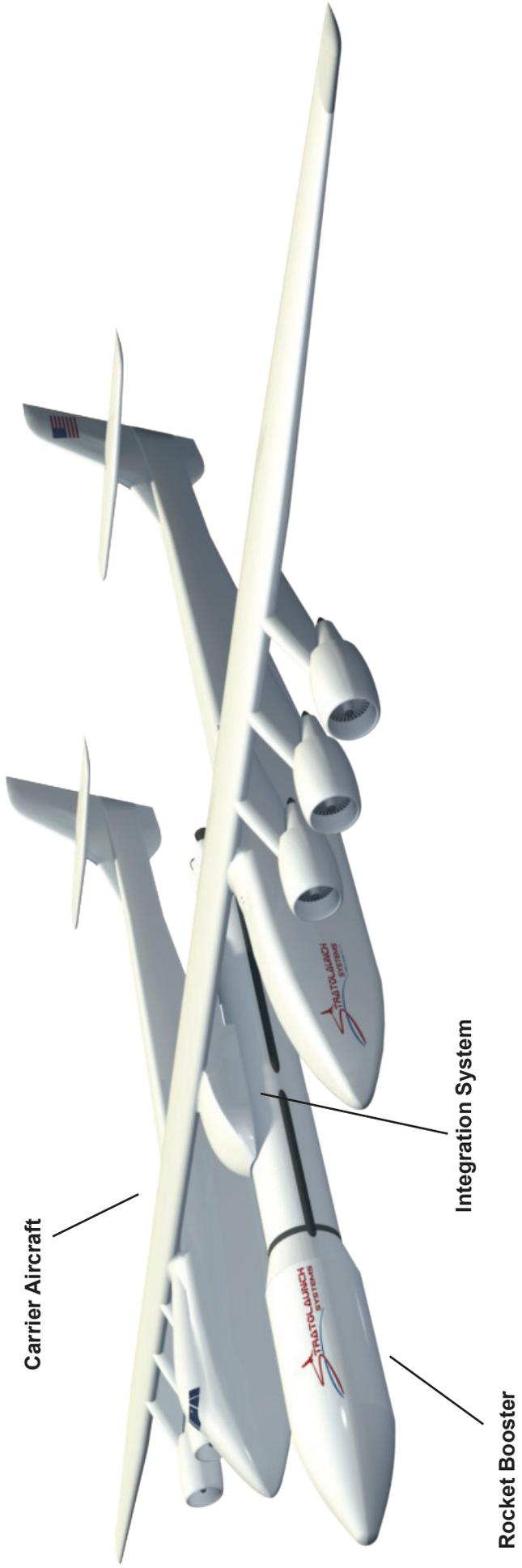
The carrier aircraft, built by Scaled Composites, weighs more than 1.2 million pounds and has a wingspan of 385 feet – greater than the length of a football field. Using six 747 engines, the carrier aircraft will be the largest aircraft ever constructed. The air-launch system requires a takeoff and landing runway that is, at minimum, 12,000 feet long. The carrier aircraft can fly over 1,300 nautical miles to reach an optimal launch point.

### **Multi-Stage Booster**

SpaceX's multi-stage booster is derived from the company's Falcon 9 rocket. At approximately 120 feet long, the booster is designed to loft the payload into low earth orbit. After release of the booster from the aircraft at approximately 30,000 feet, the first stage engines ignite and the spacecraft begins its journey into space. After the first stage burn and a short coast period, the second stage ignites and the orbital payload proceeds to its planned mission. The booster's health and status during flight is monitored from the carrier aircraft and on the ground.

### **Mating and Integration System**

Built by Dynetics, the mating and integration system (MIS) provides the single interface between the carrier aircraft and the booster. The MIS includes all systems required for the booster to interface with the carrier aircraft, including mechanical, electrical, thermal, fluids, and gases. The MIS is designed to safely and securely carry a booster weighing up to roughly 500,000 pounds. The MIS will secure the booster to the carrier aircraft, from taxiing to flight maneuvers to release of booster. In the case of a mission abort, the MIS will keep the booster secure during return to base and landing.



Carrier Aircraft

Integration System

Rocket Booster



## Stratolaunch Partners

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### **Scaled Composites**

Scaled Composites, LLC, a wholly owned subsidiary of Northrop Grumman Corporation, is an aerospace and specialty composites development company and the birthplace of many of the world's most exciting aircraft in recent decades, including SpaceShipOne that won the \$10 million Ansari X Prize in 2004, SpaceShipTwo, and Global Flyer. Founded in 1982 by Burt Rutan, Scaled Composites continues to focus on innovative, out-of-the-box aerospace solutions through its broad experience in air vehicle design, tooling and manufacturing, specialty composite structure design, analysis and fabrication, and developmental flight tests of air and space vehicles.

### **SpaceX**

SpaceX is the leading American space transport company, advancing the boundaries of space technology through its Falcon launch vehicles and Dragon spacecraft. Following the retirement of NASA's Space Shuttle Program, the Falcon 9 / Dragon system, will take over delivery of initially cargo and later astronauts to the International Space Station.

In April 2011, SpaceX announced its plans to design, build and launch the Falcon Heavy – the world's largest rocket since the Saturn V moon rocket. The Falcon Heavy will have the ability to carry payloads weighing over 53 metric tons to orbit, offering more than twice the performance of other commercial providers. The Falcon 9, Falcon Heavy and Dragon spacecraft together will ensure the U.S. maintains leadership in the dynamic global space marketplace.

### **Dynetics**

Founded in 1974 in Huntsville, Alabama, Dynetics provides engineering, research, and development products and services to both government and commercial customers. Dynetics enjoys a growing presence in five strategic business areas: intelligence, missiles, aviation, cyber, and space. It has extensive experience in large air-dropped payloads, including leading the development, integration, and flight of the world's largest precision-guided air dropped systems, the Massive Ordnance Air Blast (MOAB), and providing support to the follow-on program, the Boeing Massive Ordnance Penetrator (MOP).

Dynetics has extensive aerospace systems integration and analysis experience from programs such as FASTSAT, our commercial satellite; the Multi Purpose Nano Missile System (MNMS), a small launch system for the U.S. Army Space and Missile Defense Command; and numerous complex missile and aviation defense integration projects.



## Stratolaunch Leadership

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### **Paul G. Allen**

Investor and philanthropist Paul G. Allen creates and advances world-class projects and high-impact initiatives that change and improve the way people live, learn, work and experience the world through arts, education, entertainment, sports, business and technology. He co-founded Microsoft with Bill Gates in 1975 and remained the company's chief technologist until he left Microsoft in 1983. He is the founder and chairman of Vulcan Inc. which oversees his business and philanthropic efforts.

In 2004 Allen funded SpaceShipOne, the first privately-backed effort to successfully put a civilian in suborbital space and winner of the Ansari X-Prize competition. With lifetime giving of more than \$1 billion, Allen has been named one of the top philanthropists in America. In 2003, Allen contributed \$100 million to create the Allen Institute for Brain Science, an independent, nonprofit medical research organization dedicated to accelerating the understanding of how the brain works. Allen's investment portfolio includes holdings in real estate and more than 40 technology, financial services, consumer product and other companies.

## Stratolaunch Corporate Officers



### **Gary L. Wentz Jr.** **Chief Executive Officer & Chairman**

Prior to joining Stratolaunch Systems, Gary L. Wentz Jr. was Senior Executive at the National Aeronautics & Space Administration. Wentz served as the Chief Engineer of the Science and Mission Systems at the Marshall Space Flight Center (MSFC), Huntsville, Alabama, from January 2006 until 2010. The Science and Mission Systems activities at MSFC include exploration systems design and development, International Space Station element and payload hardware development, and science research and development activities.

Wentz holds a bachelor's degree in aerospace engineering and a master's degree in engineering management from the University of Central Florida in Orlando. He is the recipient of the NASA Outstanding Leadership Medal, NASA Certificate of Commendation, the NASA Space Station Program Team Excellence Award, numerous group achievements, and certificates of achievement.

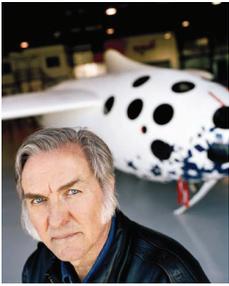


### **Susan G. Turner** **Chief Operating Officer & Technical Director**

Susan G. Turner has 25 years of NASA Launch Systems experience and most recently served as the Technical Assistant to the Engineering Director and Program Manager of the Space Technology Program at the Marshall Space Flight Center (MSFC), Huntsville, Alabama. In this capacity, she performed strategic and acquisition planning for the center.

Turner holds a bachelor's degree in chemical engineering from Auburn University and a master's degree in system engineering from the University of Alabama – Huntsville. She has completed the coursework for her doctoral degree in engineering management at the University of Alabama – Huntsville. She is the recipient of the NASA Exceptional Service Medal, NASA Group Achievements, graduate of the International Space University, and the MSFC Federal Women's Program Outstanding Woman Achiever Award (Engineer) in 1999.

## Stratolaunch Board Members



### **Burt Rutan**

Named “Entrepreneur of the Year” by *Inc.* magazine and described by *Newsweek* as “the man responsible for more innovations in modern aviation than any living engineer,” Burt Rutan is a bold entrepreneur and designer with the vision and passion for the advancement of technology.

Graduating third in his class, Rutan earned a bachelor’s degree in aeronautical engineering from California Polytechnic University in 1965. Since then, he has been awarded six honorary doctorates: Doctoral of Science from Daniel Webster College in 1987, Honorary Doctor of Science from California Polytechnic University in 1987, Doctoral of Humanities from Lewis University in 1988, Doctoral of Technology from Delft University of Technology in 1990, Honorary Doctoral of Engineering from University of Illinois in 2006, and an Honorary Doctoral Degree from the Free University of Brussels in 2007.



### **Mike Griffin**

Nominated by President George W. Bush and confirmed by the United States Senate, Michael Griffin began his duties as the 11th Administrator of the National Aeronautics and Space Administration on April 14, 2005. As Administrator, he led the NASA team and managed its resources to advance the U.S. Vision for Space Exploration.

Griffin received a bachelor’s degree in physics from Johns Hopkins University; a master’s degree in aerospace science from Catholic University of America; a Ph.D. in aerospace engineering from the University of Maryland; a master’s degree in electrical engineering from the University of Southern California; a master’s degree in applied physics from Johns Hopkins University; a master’s degree in business administration from Loyola College; and a master’s degree in Civil Engineering from George Washington University. He is a certified flight instructor with instrument and multiengine ratings.



### **Dave King**

Dave King is Executive Vice President, Integrated Systems and Special Programs for Dynetics. King is also a member of the Dynetics Board of Directors. He joined the company in April 2009. King has 25 years’ experience in space systems development and operations and in running large organizations. He retired from NASA as the center director of the Marshall Space Flight Center in 2009, where he was responsible for overseeing 7,000 onsite employees and contractors and a \$2.7 billion budget. King holds a bachelor’s degree in mechanical engineering from the University of South Carolina and a master’s in business administration from the Florida Institute of Technology.



### **Gwynne Shotwell**

Gwynne Shotwell joined SpaceX in 2002 as Vice President of Business Development, developing SpaceX’s customer base and managing strategic relations. As President, Shotwell’s responsibilities include providing strategic direction to support company growth and development, as well as management of day-to-day operations at SpaceX. Shotwell received her bachelor’s and master’s degrees from Northwestern University in mechanical engineering and applied mathematics.



### **Chris Purcell**

Chris Purcell is Vice President of Technology at Vulcan Inc. Purcell oversees Vulcan’s information systems, multimedia and technology planning, engineering, operations and R&D functions. These areas include business systems, software and emerging technology engineering, web development, program management, technology infrastructure and operations, audio/visual and studio engineering, marine and environmental technologies, enterprise systems integration, and end-user services. Purcell holds a bachelor’s degree in computer information systems from Purdue University.







**December 13, 2011**

## **Paul G. Allen Announces Revolution in Space Transportation Stratolaunch System to bring safer, less expensive, missions**

SEATTLE — Entrepreneur and philanthropist Paul G. Allen announced today that he and aerospace pioneer Burt Rutan have reunited to develop the next generation of space travel. Allen and Rutan, whose SpaceShipOne was the first privately-funded, manned rocket ship to fly beyond earth's atmosphere, are developing a revolutionary approach to space transportation: an air-launch system to provide orbital access to space with greater safety, cost-effectiveness and flexibility.

The space flight revolution Allen and Rutan pioneered in 2004 with SpaceShipOne now enters a new era. Only months after the last shuttle flight closed an important chapter in spaceflight, Allen is stepping in with an ambitious effort to continue America's drive for space.

"I have long dreamed about taking the next big step in private space flight after the success of SpaceShipOne – to offer a flexible, orbital space delivery system," Allen said. "We are at the dawn of radical change in the space launch industry. Stratolaunch Systems is pioneering an innovative solution that will revolutionize space travel."

Allen's new company, Stratolaunch Systems, will build a mobile launch system with three primary components:

- A carrier aircraft, developed by Scaled Composites, the aircraft manufacturer and assembler founded by Rutan. It will be the largest aircraft ever flown.
- A multi-stage booster, manufactured by Elon Musk's Space Exploration Technologies;
- A state-of-the-art mating and integration system allowing the carrier aircraft to safely carry a booster weighing up to 490,000 pounds. It will be built by Dynetics, a leader in the field of aerospace engineering.

Stratolaunch Systems will bring airport-like operations to the launch of commercial and government payloads and, eventually, human missions. Plans call for a first flight within five years. The air-launch-to-orbit system will mean lower costs, greater safety, and more flexibility and responsiveness than is possible today with ground-based systems. Stratolaunch's quick turnaround between launches will enable new orbital missions as well as break the logjam of missions queued up for launch facilities and a chance at space.

Rutan, who has joined Stratolaunch Systems as a board member, said he was thrilled to be back working with Allen. "Paul and I pioneered private space travel with SpaceShipOne, which led to Virgin Galactic's commercial suborbital SpaceShipTwo Program. Now, we will have the opportunity to extend that capability to orbit and beyond. Paul has proven himself a visionary with the will, commitment and courage to continue pushing the boundaries of space technology. We are well aware of the challenges ahead, but we have put together an incredible research team that will draw inspiration from Paul's vision."

To lead the Stratolaunch Systems team, Allen picked a veteran NASA official with years of experience in engineering, management and human spaceflight. Stratolaunch Systems CEO and President Gary Wentz, a former chief engineer at NASA, said the system's design will revolutionize space travel.

Former NASA Administrator Mike Griffin, also a Stratolaunch board member, joined Allen and Rutan at a press conference in Seattle to announce the project. "We believe this technology has the potential to someday make spaceflight routine by removing many of the constraints associated with ground launched rockets," Griffin said. "Our system will also provide the flexibility to launch from a large variety of locations."

The Stratolaunch system will eventually have the capability of launching people into low earth orbit. But the company is taking a building block approach in development of the launch aircraft and booster, with initial efforts focused on unmanned payloads. Human flights will follow, after safety, reliability and operability are demonstrated.

The carrier aircraft will operate from a large airport/spaceport, such as Kennedy Space Center, and will be able to fly up to 1,300 nautical miles to the payload's launch point.

It will use six 747 engines, have a gross weight of more than 1.2 million pounds and a wingspan of more than 380 feet. For takeoff and landing, it will require a runway 12,000 feet long. Systems onboard the launch aircraft will conduct the countdown and firing of the booster and will monitor the health of the orbital payload.

The plane will be built in a Stratolaunch hangar which will soon be under construction at the Mojave Air and Space Port. It will be near where Scaled Composites built SpaceShipOne which won Allen and Scaled Composites the \$10-million Ansari X Prize in 2004 after three successful sub-orbital flights. Scaled Composites is a wholly owned subsidiary of Northrop Grumman.

"Scaled is all about achieving milestones and pursuing breakthroughs, and this project offers both – building the largest airplane in the world, and achieving the manufacturing breakthroughs that will enable Scaled to accomplish it. We are thrilled to be a part of this development program," said Scaled Composites President Doug Shane. "We anticipate significant hiring of engineering, manufacturing, and support staff in the near and medium term."

The multi-stage booster will be manufactured by California-based Space Exploration Technologies, one of the world's pre-eminent space transportation companies. "Paul Allen and Burt Rutan helped generate enormous interest in space with White Knight and SpaceShipOne," said SpaceX President Gwynne Shotwell. "There was no way we weren't going to be involved in their next great endeavor. We are very excited."

Dynetics will provide the mating and integration system and the systems engineering, integration, test and operations support for the entire air-launch system. The mating and integration system will be manufactured in Huntsville, Alabama in Dynetics' new 226,500 square foot prototyping facility. Dynetics has been a leader in aerospace engineering since 1974. "We are excited to play such a major role on this system. This is an ambitious project unlike any that has been undertaken and I am confident the Stratolaunch team has the experience and capabilities to accomplish the mission," said Dynetics Executive Vice President and Stratolaunch Board Member David King.

Stratolaunch Systems' corporate headquarters is located in Huntsville, Alabama.

Today's announcement was the first public word that Allen and Rutan were back in the space business. But space has long been on Allen's mind. In the close of his memoir, *Idea Man*, published earlier this year, he hinted at his plans, writing that he was "considering a new initiative with that magical contraption I never wearied of sketching as a boy: the rocket ship."

**Note: Today's press conference is being webcast live at [Stratolaunch.com](http://Stratolaunch.com).**

**For more information:**

A broadcast quality video and other media material are available for download at [www.stratolaunch.com](http://www.stratolaunch.com).

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