

# [New forms of rocket propultion](https://assignbuster.com/new-forms-of-rocket-propultion/)

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At liftoff, the space shuttle weighs about 4, 400, 000 pounds. Over 98% of this weight, however, is fuel.

By bringing its fuel along with it, the shuttle is extremely inefficient. At a price tag of about $450 million per mission, it is also costly. Therefore, new forms of propulsion will be needed to continue our space exploration program and expand it beyond our solar system. These new vehicles antimatter spacecraft will take us into the deepest reaches of space. The first form of propulsion is antimatter spacecraft.

In 1928, a British physicist named Paul A. M. Dirac, a sublime man, changed Einstein’s equation E= mc? so that the “ m” could have both negative and positive properties. Dirac’s equation, E = + or – mc2, made anti-particles a possibility in our universe. Antimatter is the opposite of normal matter. Each anti-particle has the same mass and volume as its matching particle, but the electrical charges are reversed.

There is not much antimatter in the universe. When the universe was created, it is possible that regular particles outnumbered anti-particles. This probability would mean that the matter-antimatter reactions could have taken place years ago and there are no more antiparticles left. However, scientists discovered a possible location of antimatter near the center of the galaxy. A good video about anti-matter is at http://www. Youtube. com/watch? v= g0ZZIUSejfk. When antimatter comes into proximity with normal matter, they generate an explosion shooting out pure radiation at the speed of light. To use this energy, three main components are needed The first is circular magnetic storage rings. These are like circular jails that hold in the matter and antimatter. The antimatter must be stored separately from normal matter until it is needed.

The next is a feed system. When the spacecraft needs more power, the antimatter will be released through a feed system to collide with a target of matter. Thirdly a magnetic rocket nozzle will be needed to move the energy created by the matter-antimatter through a thruster. Another possible solution is solar sails. A primary document on solar sails is at http://videos.

howstuffworks. com/science-channel/5084-discoveries-solar-sail-video. htm. Johannes Kepler came up with the idea of space travel using sails around 400 years ago by noticing that comet tails were blown by some sort of solar wind. He thought that sails could capture the solar wind that he observed to propel spacecraft.

Although Kepler’s hypothesis of a solar wind has been proven wrong, scientists have since found out that sunlight does apply enough force to move objects. To use this force, there has been experimentation with solar sails that could be pushed by light. Light is made up of electromagnetic radiation that exerts force on objects it touches. Researchers have discovered that at 1 astronomical unit of sunlight can produce about 1. 4 kilowatts of power. If 1.

4 kw is divided by the speed of light, the force exerted by the sun is about 9 newtons/square mile. The three components to a solar sail-powered spacecraft are continuous force exerted by sunlight, a large, tenuous mirror, and a separate launch vehicle. The vehicle is needed to send the solar sail into orbit. Once in orbit, the sails are deployed using an inflatable boom system that is triggered by a built-in deployment mechanism. As it continues to be pushed by sunlight, the solar sail-propelled vehicle would eventually travel at about 56 mi/sec; therefore, the speed would be more than 200, 000 mph. By adding a laser or magnetic beam transmitter, it could reach speeds to 18, 600 mi/sec, which is one-tenth the speed of light.

A third form of propulsion that also uses light is light propultion. http://www. youtube. com/watch? v= 5\_9ac-w4DW8 has good information on this topic. More than 20 years ago, the United States began to develop a missile defense system. This system was designed to track and use lasers to shoot down missiles launched by foreign countries.

While this system was designed for war, researchers have found many other uses for these high-powered lasers. The basic idea for the lightcraft is simple. An acorn-shaped craft uses mirrors to receive and focus the incoming ground-based laser beam to heat air, which explodes to propel the craft. The basic parts of this propulsion system consist of the following: Carbon-dioxide laser – Lightcraft Technologies uses a 10kw Pulsed Laser Vulnerability Test System. Parabolic mirror – The bottom of the spacecraft is a mirror that focuses the laser beam into the engine air or onboard propellant.

Absorption chamber – The air is directed into this chamber where it is heated by the beam, expands and propels the lightcraft. Onboard hydrogen – A small amount of hydrogen propellant is needed for rocket thrust when the atmosphere is too thin to provide enough air. Before liftoff, compressed air is used to spin the lightcraft to about 10, 000 revolutions per minute. The spin is needed to stabilize it and lets the craft to cut through the air with more stability. Once the lightcraft is spinning, the laser is turned on. The light beam is focused by the parabolic mirror on the bottom of the lightcraft, which heats the air to between 18, 000 and 54, 000 degrees Fahrenheit.

Air is transformed into plasma when it is heated to these high temperatures; this plasma then explodes to propel the craft upward. In October 2000, a miniature lightcraft, which has a diameter of 4. 8 inches and weighs only 1. 76 ounces, achieved an altitude of 233 feet. Although the model is made of aircraft-grade aluminum, the final lightcraft will be built out of silicon carbide.

As we look to the future, it is obvious that we will need to prod on new forms of propulsion to continue our space exploration program and expand it beyond our solar system. These new vehicles will take us into the deepest reaches of space. The importance of this is clear. “ I don’t think the human race will survive the next thousand years, unless we spread into space. There are too many accidents that can befall life on a single planet. But I’m an optimist.

We will reach out to the stars.” -Stephen Hawking.