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Author: Mr. Tyrone Jackson  
Raytheon, United States

Ms. Allura Jackson  
United States

Ms. Kristella Jackson  
California State University, Long Beach, United States

Ms. Tyra Jackson  
United States

## LAUNCHING SMALL SPACECRAFT INTO SPACE USING KINETIC FORCE

**Abstract**

As the 21st century advances onward, the use of spacecraft also grows. Focusing mainly on the government and commercial uses on a global scale, more countries utilize spacecraft today than ever before. Eventually, more robotic spacecraft will be needed to accommodate the demands of the commercial asteroid mining industry, as well as many other ways not thought of now that small spacecraft will be used. Considering that it is very expensive to build and launch a single spacecraft today, launching 1,000's annually would be quite a financial burden for the many under-developed countries around the world. But what if there was a way to significantly reduce the cost of launching spacecraft into space? What if that way involved using kinetic force in a manner that eliminated or greatly decreased the need for burning toxic rocket propellants to launch small spacecraft into space? Well, this is not a new ideal. It is inspired by combining the ideas in the 19th century Jules Verne science-fiction novel, *From The Earth To The Moon*, with the physics of a roller coaster. This paper describes a more ecologically friendly and significantly cheaper method of launching small spacecraft into space. Basically, the objective would be to use kinetic force, as opposed to pyrotechnic thrust, to throw the spacecraft into space. Even if the kinetic force were insufficient to do the job it would lessen the need for rocket fuel. This paper describes the physics associated with launching small spacecraft, a comparison of different rocket propulsion systems currently in use and their associated costs, as well the benefits and disadvantages of using kinetic force to launch small spacecraft instead.