Optimizations in material technologies for rocket propulsion for increased in-space propulsion thruster performance.

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Background

With space travel now affordable and passenger registrations on the rise, our resources will be well spent if we were to find ways to optimize fuel efficiencies in the rocket propulsion of spacecrafts.

Increased propulsion thruster performance would allow more payload and reduced travel times.

Approach

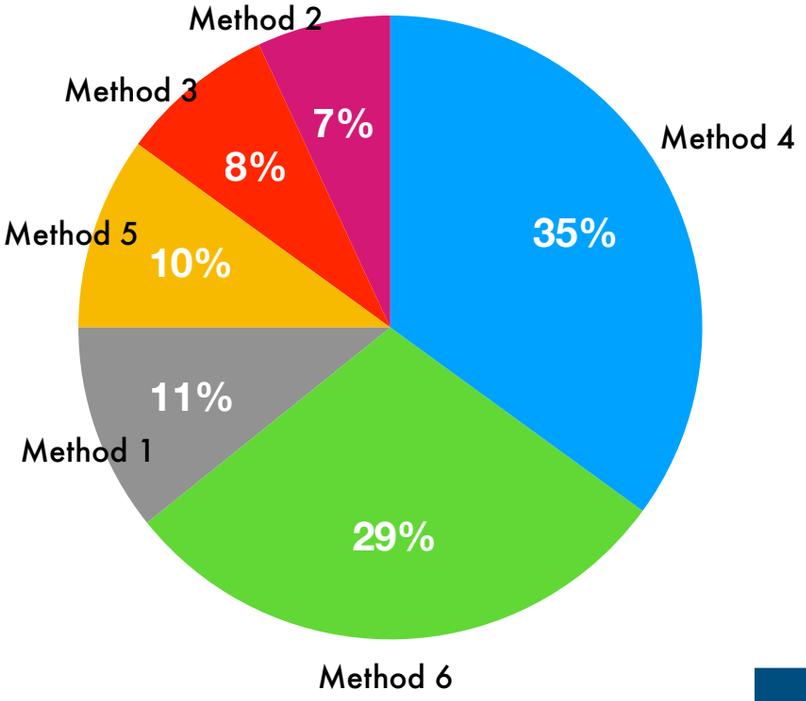
One approach would be to utilize an onboard, low-thrust, highly fuel-efficient system that would fire continuously to complete a large station change.

Another would be an on-orbit refueling system to resupply the propellants while changing stations. The on-orbit refueling capability would enable the space system to keep working and to make as many rapid station changes as required.

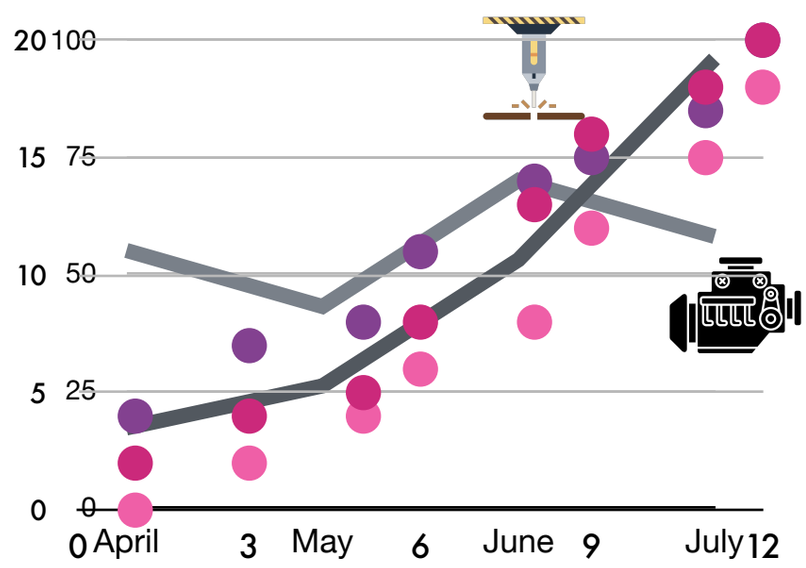
The best from these imaginary approaches was selected and simulated via different methods.

Methods

The final imaginary approach chosen was simulated using various methods like Hayes-Boyd's theorem, Haley's charges, Supersonic trials etc., and was finally distilled to the thruster that provided the best optimization for simulated propulsions. It was found to be most successful when made up of a discharge cathode, a three-ring cusp confinement, a multi-grid accelerator, and a neutralizer hollow cathode. The accelerator used in the 45-cm thruster utilized molybdenum grids with approximately 15,000 apertures to produce the high perveance xenon ion beam that could be replicated in Dexter's Laboratory.



Simulated Target optimization success rate



1. Dexter's Laboratory, Location: Top Secret.
2. Institute of Planetary Studies, Department of Transport, A place on Earth.

References

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2."How to Design an Effective Rocket" *The Space Travel Blog*, www.spacetravel.org/blogs/madeupstuff/zoom

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