Wave thrusters

Using sound waves to increase kinetic energy in chemical propellent

Present and future spaceflight missions depend on the ability to produce high exhaust velocities while reducing the dependence on chemical fuel and its mass onboard a spaceflight vehicle. Research being done at North Seattle College shows that additional thrust velocity can be achieved through the oscillation of propellant gas via wave drivers embedded within experimental electronic propulsion systems. Oscillation of gaseous molecules allow for ejection out of propulsion systems at higher velocities, increasing chemical fuel efficiency.

Oscillation of granulate and liquid reagents using simple harmonic motion has been shown to excite particles, forming geometric patterns when using calibrated frequencies. Methods shown to induce geometric patterns are used to attain vortex formations in the reagents *Lycopodium*, CO2(g) and SF6(g). Sulfur hexafluoride (SF6) is used to simulate xenon, a dense gas used in modern electronic propulsion devices. Ten-millimeter polypropylene, air-filled mass objects are used to observe acceleration, force, and velocity for a dense gas during oscillation and vortex formation. Force and velocity calculations taken during oscillation of SF6 demonstrate proof of concept for future experimentation using xenon as an oscillation and ionization medium, for ejection at velocities which can be used for spaceflight. This experiment introduces a new method for achieving space flight velocities and is part of continued experimentation in an effort to build a modular, wave driven electric propulsion device.