

Download Jet Rocket Nuclear Ion And Electric Propulsion Theory And Design Applied Physics And Engineering

A reaction engine is an engine which provides propulsion by expelling reaction mass, in accordance with Newton's third law of motion. This law of motion is most commonly paraphrased as: "For every action there is an equal, and opposite, reaction". Examples include both duct engines and rocket engines, and more uncommon variations such as Hall effect thrusters, ion drives and mass drivers. An ion thruster or ion drive is a form of electric propulsion used for spacecraft propulsion. It creates thrust by accelerating positive ions with electricity. The term refers strictly to gridded electrostatic ion thrusters, and is often incorrectly loosely applied to all electric propulsion systems including electromagnetic plasma thrusters. [citation needed] With ion engines, chemical engines, and nuclear torches we're facing a classic Newton's Third Law problem. Somehow the exhaust needs to have sufficient momentum for the opposite reaction to give the ship a good acceleration. Everything about fundamental spacecraft design revolves around the Tsiolkovsky rocket equation.. $\Delta v = V_e \cdot \ln[R]$. The variables are the velocity change required by the mission (Δv or delta-V), the propulsion system's exhaust velocity (V_e), and the spacecraft's mass ratio (R). Remember the mass ratio is the spacecraft's wet mass (mass fully loaded with propellant) divided by the dry mass ...