

Digital Solid State Propulsion

Reno

Huntington Beach



Digital Solid State Microthrusters Using Electrically Controlled Extinguishable Solid Propellants

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Digital Solid State Propulsion Company (DSSP)

with ET Materials LLC



- **Electrically Controlled Extinguishable Solid Propellants (ECESP) ***
- **Throttles & restarts**
- **Two propellants: high and low conductivity**
 - **Each suited to either scaling up or down**
- **Isp's of $>220^{**}$ sec.**
- **Insensitive; cannot be easily ignited without proper voltage/current maintained**
- **Smokeless, when non metallized**
- **"Green", nontoxic components**

*Developed and under multiple AFRL SBIRs

**@ 1,000 psi with a 10:1 expansion ratio

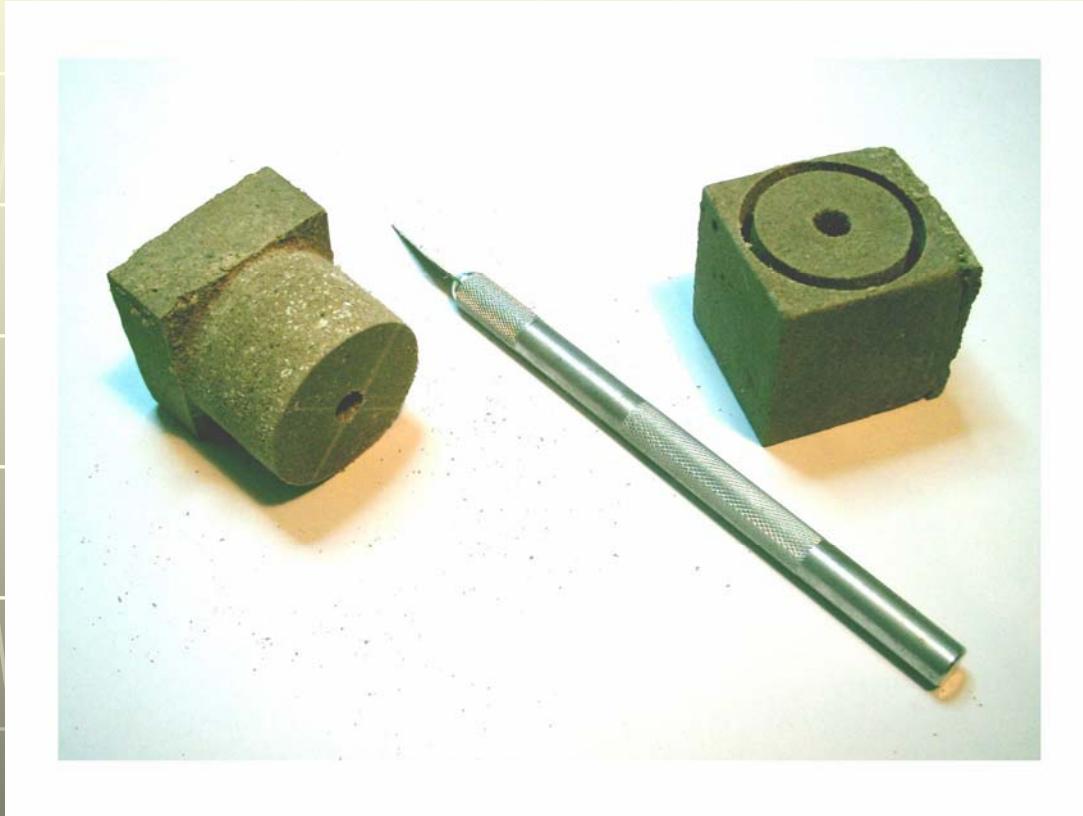
ECESPs Do Not Ignite With Torch



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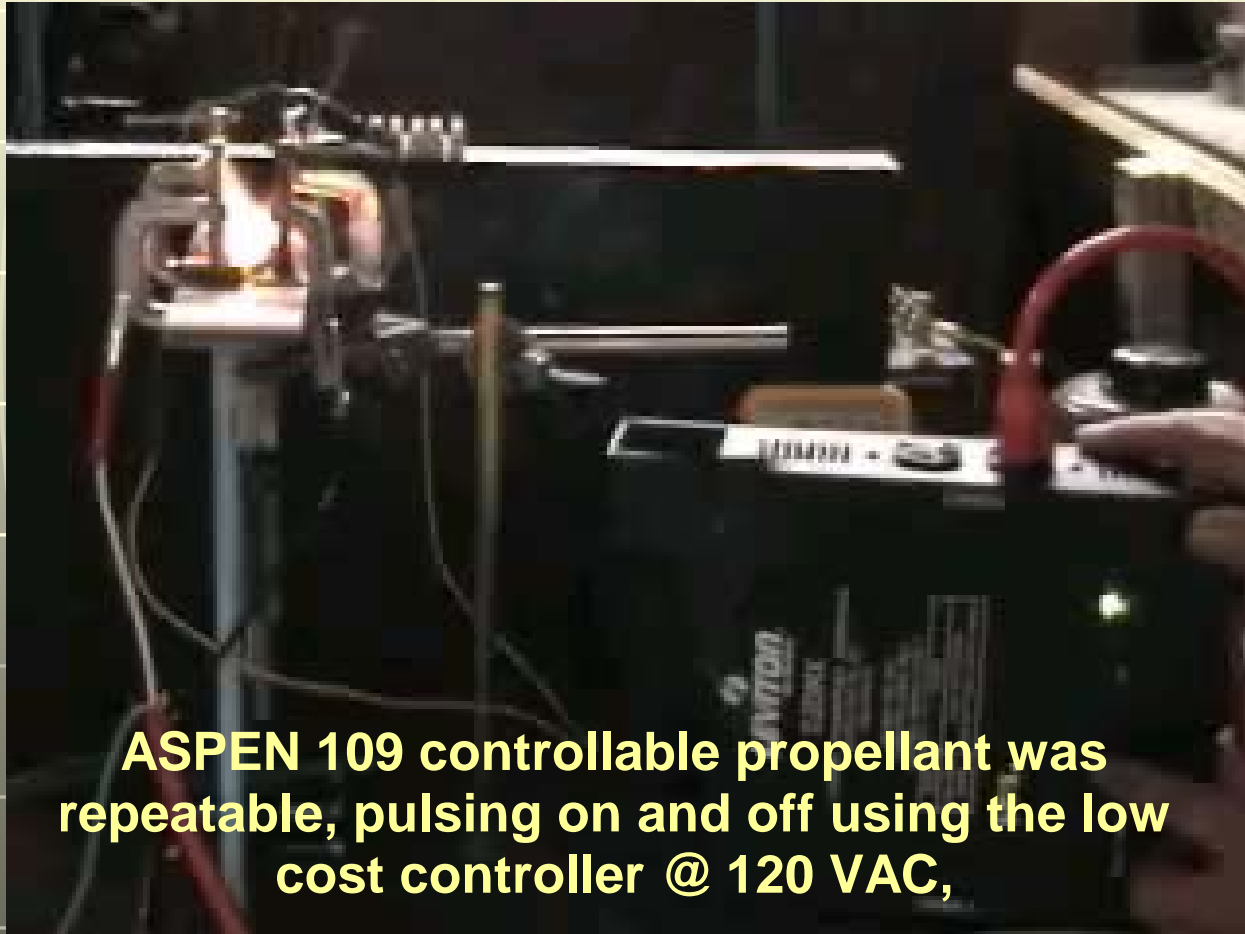
ECESP Propellants Allow Non-Hazardous Machining



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Baseline Pulsing @ 1/10 sec. Spring Fed Propellant



ASPEN 109 controllable propellant was repeatable, pulsing on and off using the low cost controller @ 120 VAC,

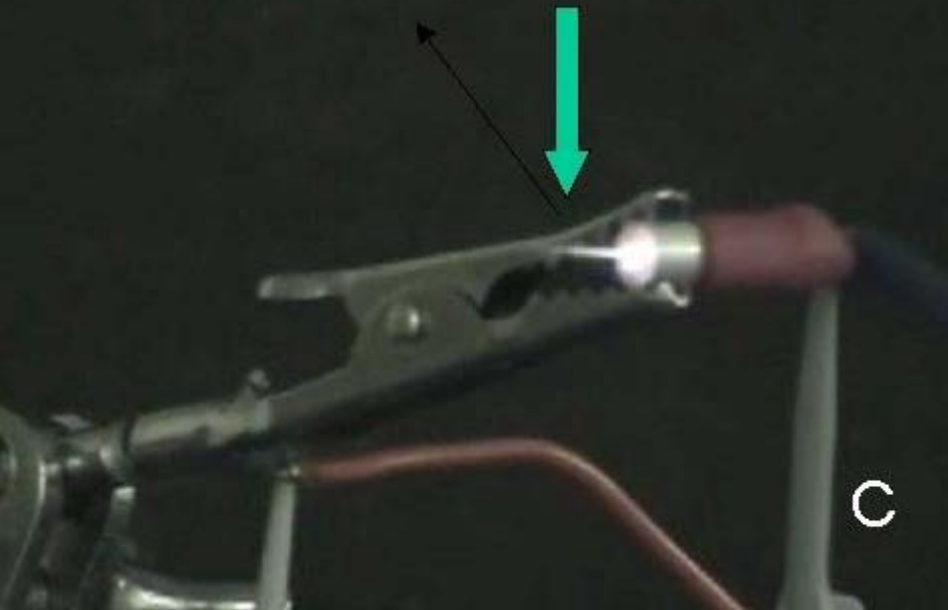
Combined Clusters* for Discreet and Throttled Impulse



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*** Patent pending DSSP**

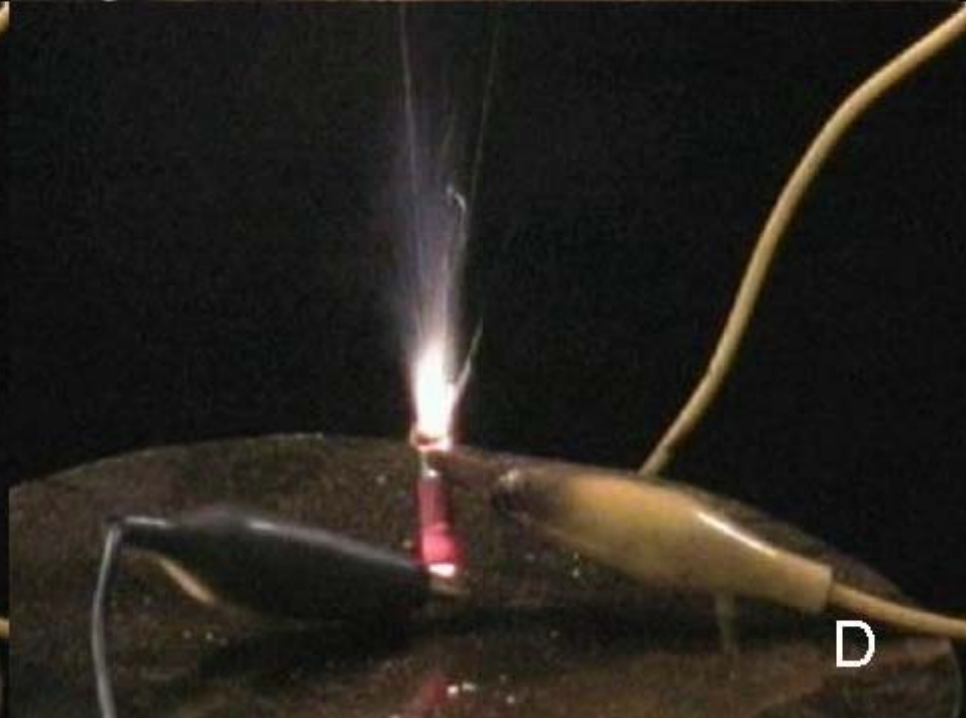
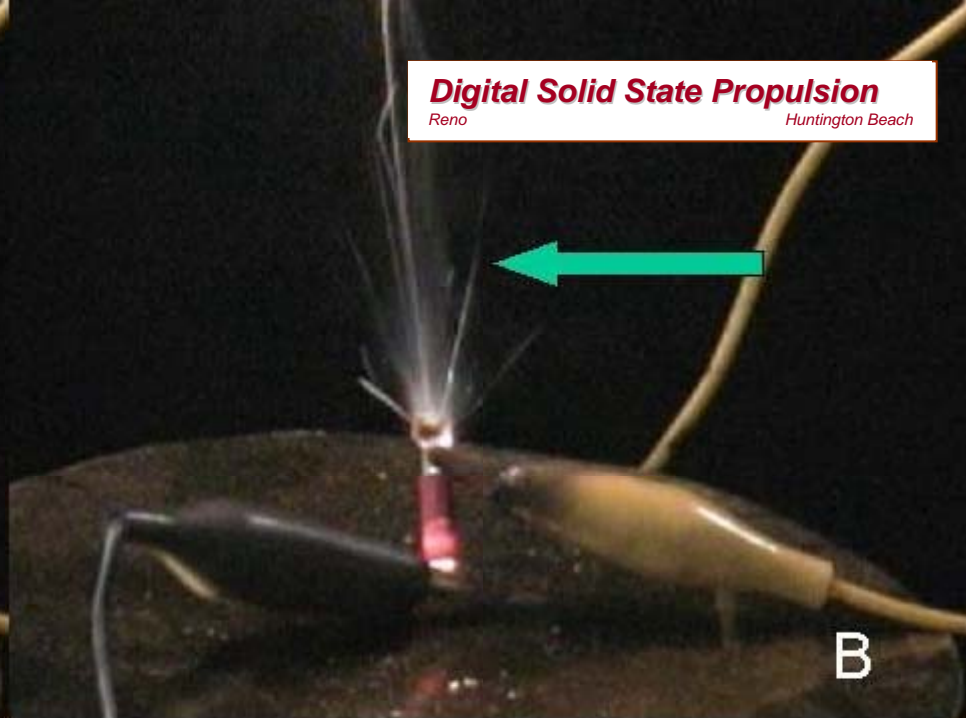
Low Power Operation



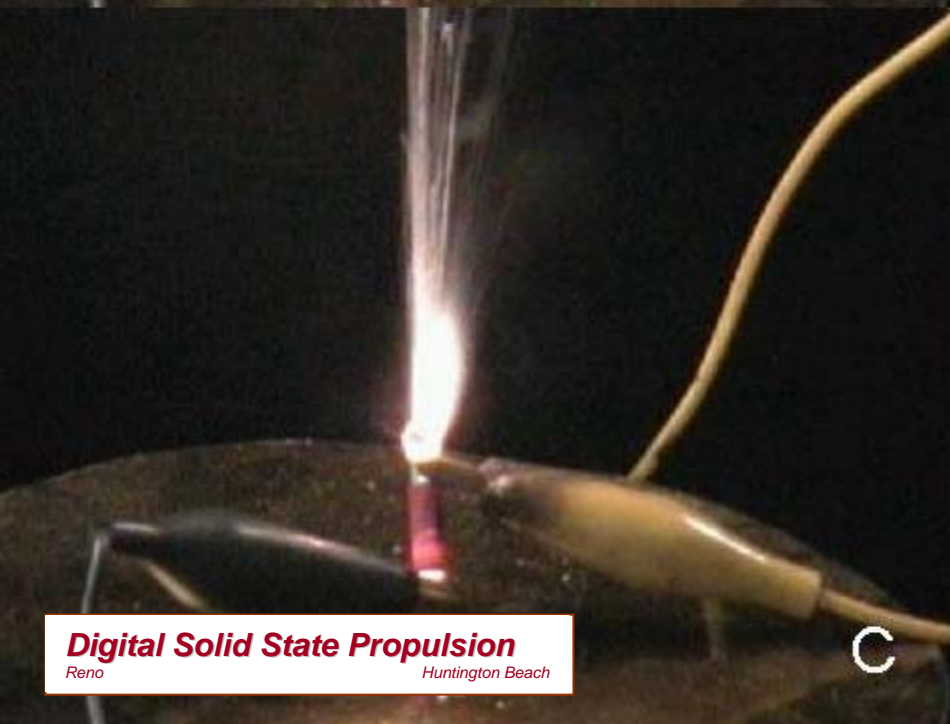
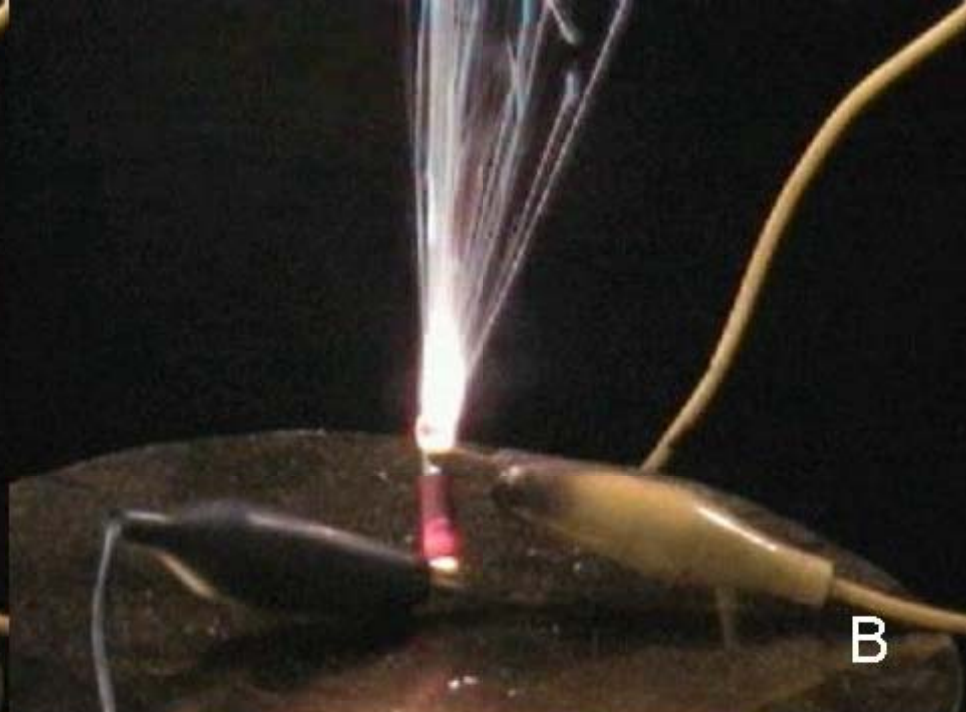
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Mid Power Operation

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High Power Operation



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NASA Thruster Tests with Multiple Restarts and No Moving Parts



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ECESP New Applications

- **Microsat primary propulsion**
- **Solid State ACS**
- **Modular On Orbit Re-fueling**
 - *No more complex than changing batteries in a flashlight*
- **Storable, "Responsive Space" Propulsion**
- **On Demand Gas Generators**