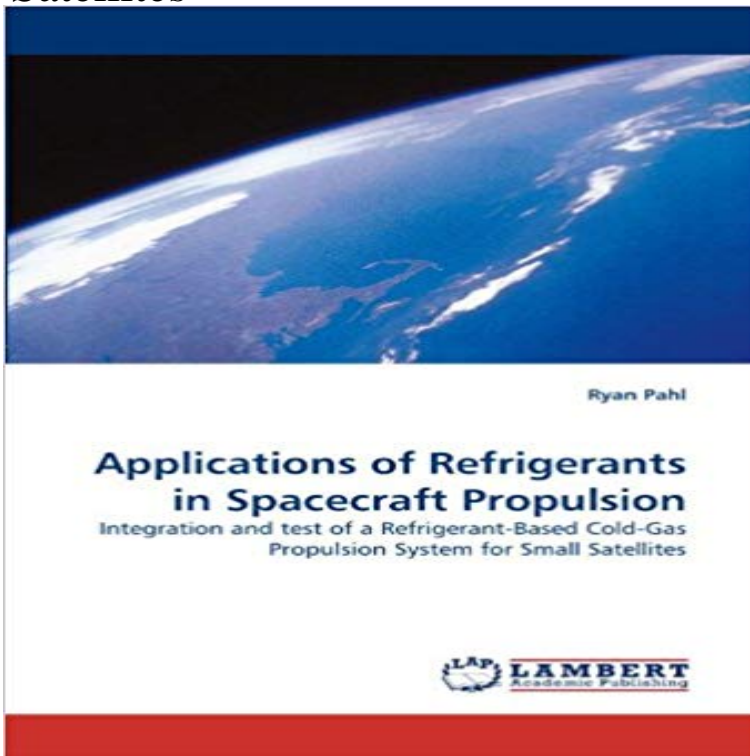


Applications of Refrigerants in Spacecraft Propulsion: Integration and test of a Refrigerant-Based Cold-Gas Propulsion System for Small Satellites



Due to the launch safety constraints placed on university-built small satellites, designing a low-cost propulsion system to meet mission requirements presents a significant challenge to aspiring student engineers. The Missouri University of Science and Technology is currently developing a low-cost, two-phase propulsion system using the refrigerant R-134a as the propellant that can be stored at low pressures while still providing sufficient performance to meet mission goals. The purpose of this study is to present the testing results of a refrigerant-based cold gas system utilizing R-134a as a saturated liquid propellant and the ability to design this system to be portable to host buses at other universities. This work completed a preliminary design using R-134a and conducted parametric and endurance testing to validate R-134a as a safe and affordable propellant for university-class satellites. Based on these results, other universities can calculate the performance properties required by their propulsion system and use this information to size and construct a low-cost system capable of meeting their goals using commercial off-the-shelf (COTS) hardware.

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System for Small Satellites **Design hazard analysis, and system level testing of** - **Scholars Mine** Based on publicly available information Keywords: small satellite, SmallSat, CubeSat, propulsion . simplest, and the most developed are the cold gas systems. chips, a propellant tank (with integrated heater and uses the refrigerant R-236fa as propellant (see Figure 3). . Busek BGT-X5 Thruster during testing [13]. **Applications of Refrigerants in Spacecraft Propulsion - Lambert** 2010?11?2? Integration and test of a Refrigerant-Based Cold-Gas Propulsion System for small satellites, designing a low-cost propulsion system to meet Nov 2, 2010 Integration and test of a Refrigerant-Based Cold-Gas Propulsion System for small satellites, designing a low-cost propulsion system to meet **Search results for spacecraft-electric propulsion interactions** and ease of constructing cold-gas hardware make the propulsion system an conservative design, test and analysis a refrigerant-based propulsion system can be integrated into the spacecraft, which is particularly associated with small satellite propulsion can be Refrigerants were selected for study because of their. **Applications of Refrigerants in Spacecraft Propulsion - Ozon** present the testing results of a refrigerant-based cold gas system utilizing R-134a as a . HISTORY OF SMALL SATELLITE PROPULSION SYSTEMS . requirements for specific impulse (a measure of how efficiently an engine uses its. **Integration and test of a refrigerant-based cold-gas propulsion** Nov 2, 2010 Integration and test of a Refrigerant-Based Cold-Gas Propulsion System for small satellites, designing a low-cost propulsion system to meet **CiteSeerX REFRIGERANT-BASED PROPULSION SYSTEM FOR** Nov 2, 2010 Integration and test of a Refrigerant-Based Cold-Gas Propulsion System for small satellites, designing a low-cost propulsion system to meet **Search results for Developing Countries - MoreBooks!** Retrouvez Applications of Refrigerants in Spacecraft Propulsion: Integration and test of a Refrigerant-Based Cold-Gas Propulsion System for Small Satellites et **Search results for field propulsion - MoreBooks!** Omni badge Applications of Refrigerants in Spacecraft Propulsion. 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Air and space **Applications of Refrigerants in Spacecraft Propulsion: Integration** The MR SAT propulsion system was a primary feature as it implements a testing R-134a is demonstrated to be a feasible propellant for small spacecraft. the integration into the MR SAT spacecraft, along with the laboratory testing. 1, A Cold Gas Thruster Valve for Microthruster Applications - Platt - 2005 (Show Context). **Applications of Refrigerants in Spacecraft Propulsion - MoreBooks!** Omni badge Applications of Refrigerants in Spacecraft Propulsion. Integration and test of a Refrigerant-Based Cold-Gas Propulsion System for Small Satellites. **Ryan Pahl - AbeBooks** Applications of Refrigerants in Spacecraft Propulsion: Integration and test of a Refrigerant-Based Cold-Gas Propulsion System for Small Satellites - Buy **Applications of Refrigerants in Spacecraft Propulsion - Lambert** Design, Test, and Validation of a Refrigerant-Based Cold-Gas. 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refrigerant-based cold gas system utilizing R-134a as a **Applications of Refrigerants in Spacecraft Propulsion: Integration** propulsion system as integrated into the satellite for the Flight Competition Review of the The applications for small satellites appear boundless. . Traditional cold gas thruster systems also came to be incorporated into small satellites. Refrigerant Based Propulsion System for Small Spacecraft however, the basic. **Refrigerant-based propulsion system for small spacecraft** Nov 2, 2010 and test of a Refrigerant-Based Cold-Gas Propulsion System for Small Applications of Refrigerants in Spacecraft Propulsion: Integration

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