

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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HONEYCOMB PROPELLANT TANK DESIGN USED FOR SRMSAT - 2

Abstract

SRMSAT - 2 is a student designed satellite mission to design and develop a micro class satellite into the Low Lunar Orbit using Articulated Low Energy Transfer. Traversing up a trajectory so huge requires on board propulsion and thus the SRMSAT - 2 uses a hybrid propulsion system where a bi-propellant system is designed for the Primary Propulsion System (**PPS**) which uses a mixture of Hydrazine (N_2H_4) and Nitrogen Tetroxide (N_2O_4) and a mono propellant system for the Reaction Control System (**RCS**). The tanks are pressurised using Helium at 200 bar. The fuel and oxidizer requirement are huge with a very tight volume constraint for the satellite structure. Therefore, the tanks must be designed in manner that we have enough volume to accommodate the fuel and oxidizer yet leave volume for other COTS components. Due to the huge volume requirement by the propulsion system, the tanks began to contribute to a huge mass of the satellite which was unacceptable. One solution to this would be using composite tanks but due to economic constraints we couldn't opt for composite materials for tanks. Therefore, the tanks are proposed to be made of honeycomb sandwich panels which would account for the mass reduction of the tanks. Honeycomb Sandwich panels help reduce the mass of the tanks with more or less the same strength of the tanks. The idea is to implement honeycomb structures into propellant tanks and avoid the usage of composites. The paper describes the mechanics of honeycomb structures and is then simulated using Finite Element Methods.