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Approaches to interplanetary rideshare accommodations for CubeSats

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ULA would like to offer mission solutions to the CubeSat community beyond a dedicated launch vehicle. Rideshare provides satellite developers the opportunity to fly their spacecraft in an inexpensive and reliable manner. The ability to marry Rideshare and Earth-escape disposal of the Atlas-Centaur upper stage provides some new capabilities for performing interplanetary science exploration using CubeSats. ULA mission delivery approaches for CubeSats can take advantage of the newest developments and technologies. One is the operational Aft Bulkhead Carrier (ABC), which can launch up to 24 1U CubeSats to orbit. Second is the Aquila system developed by Adaptive Launch Solutions, which allows for up to a 1000 Kg spacecraft to be launch from inside the Aquila system. A third is the ULA's Lite-electric 3'rd stage (MULE) "tug" that uses an ESPA ring structure as a delivery system. HALL thrusters, using iodine as propellant, would provide for Mars capture and on-orbit maneuvering with 3X the density of xenon. Once in orbit, the MULE can deploy CubeSats from multiple NPSCuL carrier systems. After deployment, the MULE can act as a data relay station for a comm-link between the CubeSats and the Earth DSN.

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GPS geodesy infrastructure for coastal subsidence in the Gulf Coast region

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The Gulf Coast region includes southern U.S. states and the Gulf Coast of Mexico. Over 800 Continuous Operating Reference Stations (CORS) have been installed in the Gulf Coast region by the joint efforts of local governmental agencies, private land survey companies, and research institutes during the past two decades. In this presentation, I will introduce the current GPS geodesy infrastructure in the Gulf Coast region. The infrastructure is consisted of the CORS in the Gulf Coast region, and a newly defined Stable Gulf of Mexico Reference Frame (SGOMRF). SGOMRF is a local reference frame established for precisely delineating local ground motion associated with fault creep, salt dome uplift, and land subsidence in the Gulf Coast region. The root-mean-squares (RMS) of the velocities of 13 reference stations have achieved 0.2 mm/year in horizontal and 0.3 mm/year in vertical directions within the local reference frame. Using this GPS geodesy infrastructure, significant spatial variation of subsidence rates has been observed in both Mexico City and the Houston-Galveston area.GPS stations in southeastern Louisiana have indicated minor (<6.0 mm/year) but consistent subsidence over time and space. SGOMRF is also critical for deriving long-term absolute seal-level changes.

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