

DEPARTMENT OF

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3:30-4:20pm, Friday, January 31, 2014
Frank H. Walk Design Presentation Room

by **Adam Baran***

The topic has origins in circa-1990s NASA / Air Force Research Laboratory (AFRL) research on cryogenic hybrid rockets and high energy density matter (HEDM) propellants. A novel advanced in-line reusable vehicle concept has been proposed by the speaker (Baran et al (2013), AIAA 2013-3921) which involves use of a monolithic cryogenic propellant as a load bearing member and phase-change in flight in an end-consuming manner to enable reuse of main-stage engines.

The talk describes a development program utilizing a set of design concepts for similarly configured small-scale end-burning solid and hybrid rocket powered glider vehicles to assess/demonstrate feasibility of various key technology issues for the full-scale vehicle concept. The development program has a sequential plan to: (1st) work with propellants that are solid at ambient temperature; i.e., common solid propellants and paraffin hybrid rocket propellants then (2nd) progress with propellants with melting points below ambient temperature.

Dr. Adam Baran received his B.S. and M.S. in Aerospace Engineering (1985, 1994) from the University at Buffalo, then his Ph.D. in Mechanical Engineering (2009) from Tulane University for his work on rapid melting of a cryogenic surface with a high temperature vapor jet. He has jet.et.et