1067-35-2204 **James Francis Hickman*** (jh1659@ship.edu), 20 Carla Drive, Shippensburg, PA 17257. *Finite Difference Methods for Solving the Coupled Non-Linear Euler-Bernoulli Beam Equations, with applications to modeling the wing of a Micro Air Vehicle.*

Over the past decade the development of Micro-Air-Vehicles (MAV's) has been of interest to several groups. In particular the military envisions it as a potentially vital aspect of their intelligence division. This is certainly not the only function for this emerging technology, private companies also envision applying it to a variety of applications as well. This paper will focus on using a non-linear form of the Euler-Bernoulli beam equation in an attempt to model the batons of a flexible winged MAV. First the equations which constitute the core of this research will be derived using the principles of Hamiltonian Mechanics combined with ideas from Continuum mechanics. After the derivation is completed a numerical algorithm will be discussed which consists primarily of finite difference approximations which use iterative methods to solve this coupled system. Further advances in this area of study could incorporate a model which encompassed the entire wing, simulations based on material constraints, and finally integration of the principles of fluid mechanics into the problem to make it more relevant and applicable. This work has been completed as a part of the 2010 REU Program at George Mason University funded by the NSF-REU and DOD-ASSURE Programs. (Received September 22, 2010)