1046-35-775 **Anthony N Johnson*** (anthony.johnson@usma.edu), 3032B McDougall Place, West Point, NY 10996. *Development of an unsplit, time dependent, three dimensional elastic perfectly matched layer for elasto-dynamic analyses.*

A time dependent finite element approach to numerically calculating the surface radiation of an elastic wave in half space is presented. The development of the elements require the coupling of a system of linear, second-order, partial differential equations describing elastic wave propagation into a single weak-form (Galerkin) wave equation, from which the characteristics of a composite finite element matching layer are derived. An important problem of interest, and the motivation for this work, is the optimization of a source for use in a seismo-acoustic sonar for the detection of buried mines and improvised explosive devices (IEDs). Various source excitations are presented which maximize the energy of the unidirectional Rayleigh wave while suppressing the energy of associated body waves. The hp-adaptive finite element code SAFE-T (Solid Adaptive Finite Element -Transient), a Finite Element Method (FEM) implementation developed by the author utilizing Altair Engineering's Prophlex kernel, is used to perform the numerical computations. Results for radial and vertical wave strengths are given. This work represents an important step forward in the development of tools needed to pursue applications of seismo-acoustic sonar technology. (Received September 11, 2008)