Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Topanga: A Modern Code for E3 Simulations[1] D. J. LARSON, M. A. BELYAEV, B. I. COHEN, Lawrence Livermore Natl Lab, V. A. THOMAS, Los Alamos Natl Lab — We are developing the Topanga code for simulating the generation and propagation of the E3 electromagnetic pulse. The E3 component has a long pulse, lasting tens to hundreds of seconds. It is caused by a nuclear detonation's temporary distortion of the Earth's magnetic field. E3 EMP has similarities to a geomagnetic storm caused by a solar flare and can produce geomagnetically induced currents in long electrical conductors, damaging components such as power line transformers. Our code's attributes include the following: spherical geometry for simplified boundary conditions and computational efficiency; couples a hybrid plasma model (fluid electrons and neutrals, particle ions, Ohm's law, and reduced Maxwell's equations) to a finite-difference time-domain electromagnetic solver (FDTD-EM); uses the IGRF magnetic field model, neutral atmosphere profiles from the US Standard Atmosphere or the NRL MSISE model, ionosphere profiles from the International Reference Ionosphere model; has ion-neutral, electron-ion, electron-neutral collisions; uses a fluid algorithm for motion of the neutral atmosphere; and has limited atmospheric chemistry. An overview of the code and simulation examples with some comparison to experimental data will be presented

[1]This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under contract DE-AC52-07NA27344. Lawrence Livermore National Security, LLC

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Date submitted: 02 Jul 2019 Electronic form version 1.4