Computational Modeling Related to Blast Exposure
Modeling Vehicle Underbody Blast to Mitigate the Effects on the Service Member

Numerically modeling the blast environment experienced by vehicles from close-in detonation of buried explosive devices requires both (a) well-characterized soil properties and (b) test data to validate the computational modeling. Under the Army Engineer Research and Development Center's Adaptive Simulation to Characterize Emerging Non-Ideal Threats program in collaboration with U.S. Army Tank Automotive Research Development and Engineering Center, numerous vehicle underbody blast (UBB) experiments have been conducted on a deformable vehicle-like structure with an internal cab allowing the integration of blast seats, various blast loading measurement gauges, and Anthropomorphic Test Device's for collecting occupant injury data. A database of high-pressure properties for over 100 theater-relevant soil conditions has been developed and a soil prediction methodology is being created to minimize the time required to characterize new soils. The UBB experiments provided the test data to validate computational models that are used to generate virtual blast environments, varying both the charge mass and location (relative to the vehicle), as well as the soil properties and vehicle configuration. These efforts help researchers understand the effect of UBB on its occupants and how technology can mitigate these effects on the Service member.