



US DEPARTMENT OF DEFENSE  
**BLAST INJURY RESEARCH PROGRAM**  
COORDINATING OFFICE

## Studies on Repetitive Blast Exposure

### Monitoring Blast Exposure while Firing a Tube-Launched, Optically-Tracked, Wire-Guided Missile in a Joint Light Tactical Vehicle

The Joint Light Tactical Vehicle (JLTV) is being developed to replace some of the services provided by the High Mobility Multipurpose Wheeled Vehicle fleet (Figure 1). It will feature scalable armor and improved missile reloading to support the Tube-Launched, Optically-Tracked, Wire-Guided (TOW) missile.

To determine the potential risk of injury from blast overpressure (BOP) for a live gunner, researchers at the U.S. Army Public Health Center (USAPHC; Aberdeen Proving Ground, Maryland) and Redstone Test Center (Redstone Arsenal, Alabama) estimated the risk of lung injury from blast generated by combustion of propellant from TOW missiles fired from the JLTV. Data were collected in September 2017 from blast test devices located at the gunner, driver, commander, left rear, and right rear crew positions while



**FIGURE 1:** JLTV. (Figure used with permission from the authors)

TOW missiles were firing at 20 degrees of elevation under two conditions of azimuth: 20 and 270 degrees. These data were sent to the USAPHC and analyzed using the BOP-health hazard assessment (HHA) software version 2.1. This software was developed by the U.S. Army Medical Research and Materiel Command under a contract with JAYCOR Corporation (now L-3 Corporation). It uses an algorithm based on a biomechanical model of the thorax that calculates the amount of “push” or mechanical work imparted to the thorax by a blast pressure wave. The BOP-HHA algorithm uses the calculated work values and information about injuries from over 1,000 blast-exposed specimens to estimate lung injury risk.

The analysis determined that the TOW gunner can be exposed to blast from more than 1,000 rounds within a 24-hour period without incurring significant risk of trace lung injury. The results of this test verified that a live gunner could fire the TOW missile during the next round of testing without incurring significant lung injury risk.

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