USING MASSIVE INTERACTIVE STATIONS IN THE HUMBLE GINGKO STRUCTURE

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ABSTRACT

Stations that move with the flow as part of the hydrodynamics have recently been added to SHAMRC to increase post-processing capabilities. These stations have the same behavior as the particles previously used to simulate aluminum particles (i.e. have mass and are subject to drag). The pressure, temperature, and density of the gas in which the station is embedded are monitored as a function of time. Position and velocity of the stations are also recorded. This allows us to track the hydrodynamic variables in the environment to which a particle is exposed as it travels from room to room and when it leaves the structure. With this data, we can then track the heating and cooling of an individual or group of particles. Possible applications for this new capability include determining the temperature time history for chemical and biological agent defeat, pressure and temperature time histories for evaluation of viability as a time dependent function of exposure level and further analysis of explosives with metal particles.

A calculation has been completed in the Humble Gingko structure at Kirtland AFB that allowed us to obtain information that was typically unavailable previously. This calculation was completed for a shock dispersed fuel. In addition to plotting the pressure and temperature time history, we also provide the aluminum burn rates, energy released and graphics to show when and where the aluminum particles are burning. ARA's hydrodynamic code, SHAMRC, has been used extensively to model the blast environments in the Humble Gingko facility and the addition of massive interactive stations will give the user additional information about what is happening in the structure. This work was completed under the Defense Threat Reduction Agency Advanced Energetics program.