THREAT AGENT DEFEAT MODELING AND TESTING USING WMD SIMULANTS

Two-dimensional Particle Image Velocimetry Measurements In A Wind Tunnel Model Of The Jack Rabbit II Chlorine Field Tests

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The Jack Rabbit II (JR-II) Mock Urban Environment (MUE) was reproduced in 1:50 scale physical model in the wind tunnel of the University of Arkansas. The agreement between the approach wind characteristics of the field test and model was verified using 3D Laser Doppler Velocimetry (LDV). The wind tunnel tests modeled the chlorine releases using a dense gas wall jet validated by comparison of cloud arrival times using video records. The focus here is on 2D Particle Image Velocimetry (PIV) tests conducted to obtain velocity measurements in the MUE. Two phases of measurements were made using a vertical laser sheet placed on the centerline of the CONEX container stack and also a horizontal laser sheet at 1 m field elevation. In the horizontal measurements, sections of some CONEX were built with a resin layer to allow measurements within the MUE array. Velocity measurements taken before and during a simulated chlorine release were compared. PIV results show the general flow complexity in the last rows of the MUE and the impact of the release. Changes in the vorticity were also observed, especially for lower windspeed cases. PIV measurements are suitable for validation of CFD simulations within the MUE.

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