CHEM-BIO SYSTEMS ANALYSIS BRANCH

NAVY MODELING AND SIMULATION FOR CB DEFENSE

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Multiscale Atmospheric Dispersion Modeling Workshop
Silver Spring, MD
6 - 8 June 2000

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CHEM-BIO SYSTEMS ANALYSIS BRANCH
THREAT AND TECHNOLOGY
Task Description (U)

POC: Timothy J. Bauer; 540-653-3091; bauertj@nswc.navy.mil

Product: Threat and Technology Symposium, reports and data to JSIG M&S CAM and JSTPCBD

Means: liaison with M&S CAM, Joint Service, intelligence, DoE, civil response, and international groups (TTCP TP-9, ATP-45)

Value: M&S efforts focused on meeting requirements and doctrine; reduced duplication

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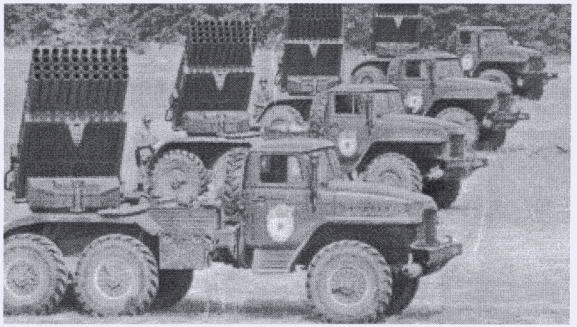
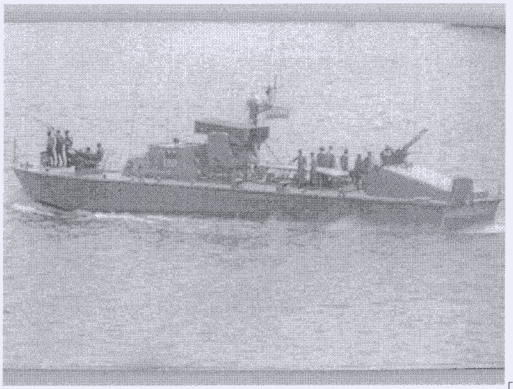
CHEM-BIO SYSTEMS ANALYSIS BRANCH
THREAT AND TECHNOLOGY
Scenario Development (U)

- MLRS Attack on an FFG from a Fast Attack Craft
- 40 - 122mm Rockets at 10 m Burst Ht.
- Vapor/Droplet Mix of Soman (GD)
- Historical Meteorology for Geographic Location, Date, and Time
- Ship Dimensions and Speed





Weapon System Parameters

- Agent Fill Weight
- Dissemination Efficiency
- Targeting Accuracy
- Vapor/Liquid Split
- Droplet Distribution
- Initial Cloud Size

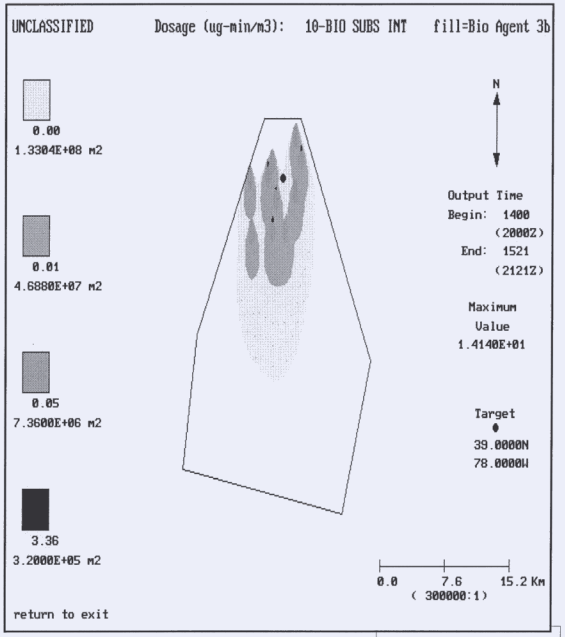
CHEM-BIO SYSTEMS ANALYSIS BRANCH
VLSTRACK
Task Description (U)

POC: Timothy J. Bauer; 540-653-3091; bauertj@nswc.navy.mil

Product: operational/R&D CBW hazard assessment model

Means: continue development of novel methodologies to address weapon and agent physics and chemistry: maintain relevance to DoD needs

Value: DoD standard model for hazards from CBW attacks; Use in JWARN, JWARS, JCATS, JACE, CATS, STAFFS, NCBR Simulator



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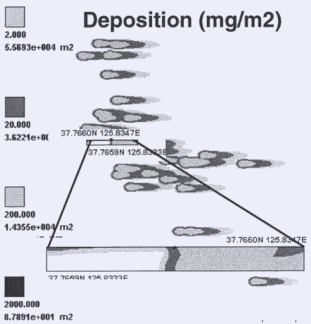
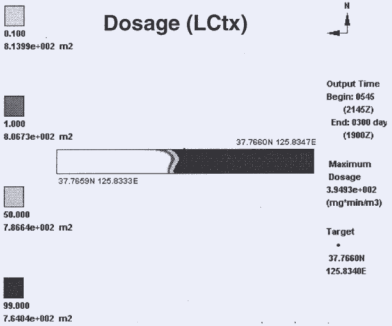
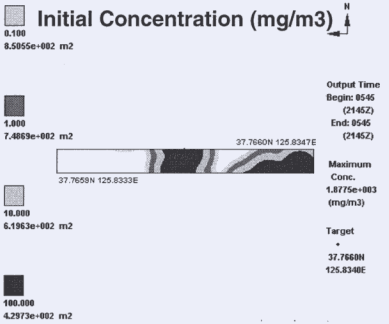
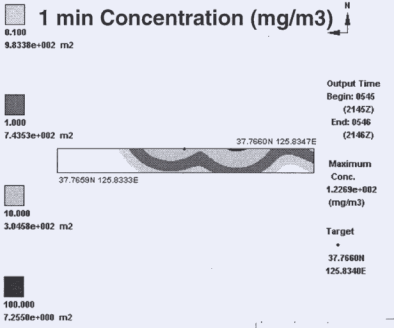
VLSTRACK
Large Area Hazard Assessment (U)





- 40 - 122mm Rockets
- Fill = GD (Soman)
- Box Sized to Equal Dimensions of FFG
- Deposition Scale is 1/5 Scale of Dosage and Concentration





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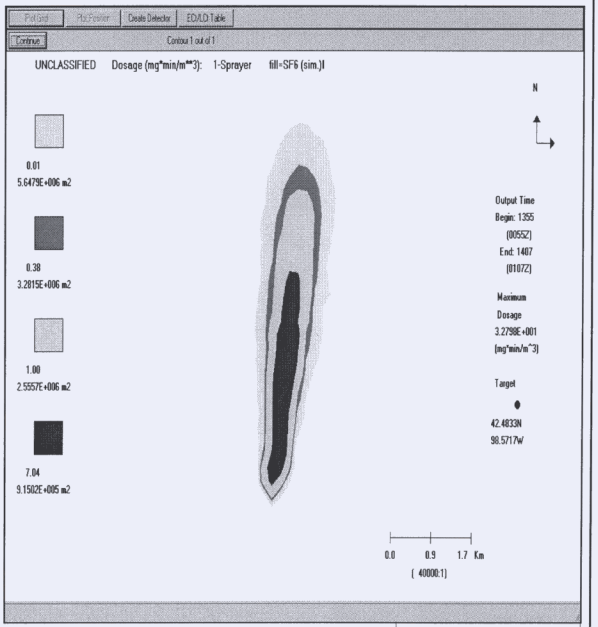
CHEM-BIO SYSTEMS ANALYSIS BRANCH
MESO - NEXT GENERATION
Task Description (U)

POC: Karena L. Swisher; 540-653-3090; swisherkl@nswc.navy.mil

Product: MESO high-fidelity Lagrangian particle model

Means: further develop to add applicable CB physics

Value: more accurate complex flow and planetary boundary layer treatment than VLSTRACK



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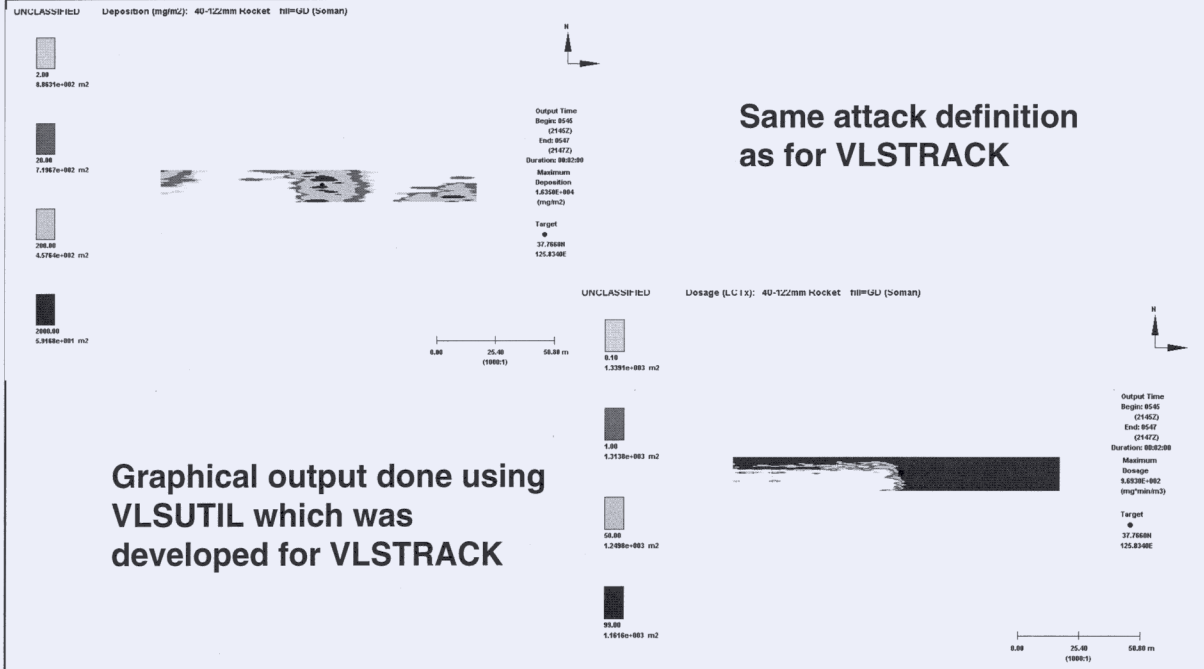
MESO - NEXT GENERATION

Lagrangian Droplets and Particles (U)



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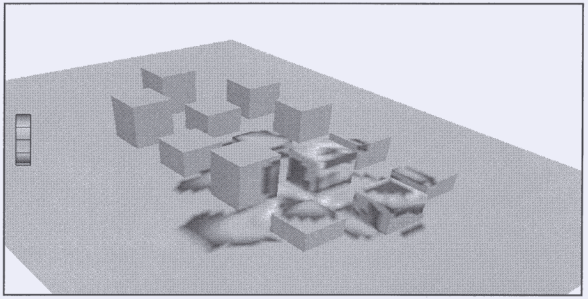
CHEM-BIO SYSTEMS ANALYSIS BRANCH
CFX - CBW CFD
Task Description (U)

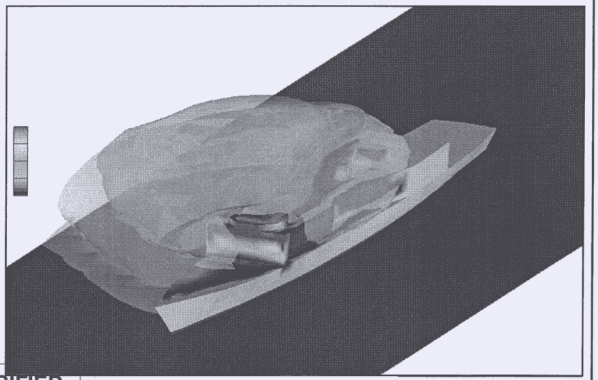
POC: Mary Beth Rowles; 540-653-3082; rowlesmb@nswc.navy.mil

Product: CFX comp. fluid dynamics code for CBW

Means: add VLSTRACK interface, CB physics subroutines, ventilation model, casualty assessment

Value: hazard assessment for ships, port facilities, urban regions, and air bases; JSIMS





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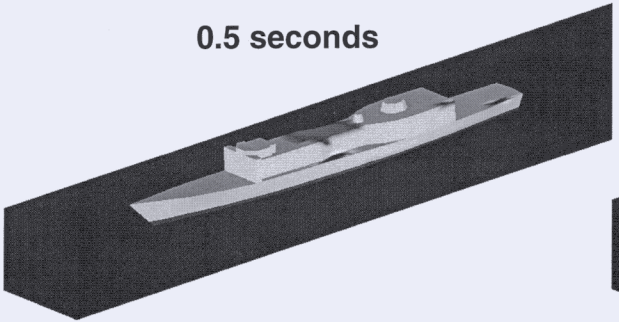
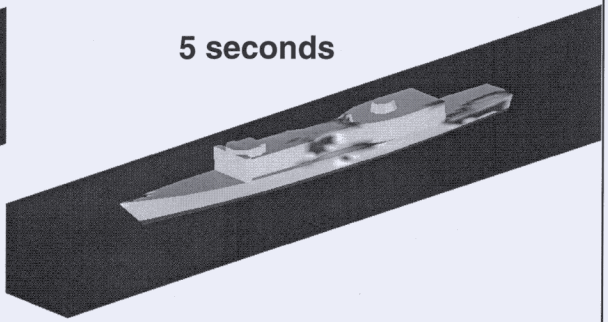
CHEM-BIO SYSTEMS ANALYSIS BRANCH
CFX - CBW CFD
Deposition on Ship Surfaces (U)

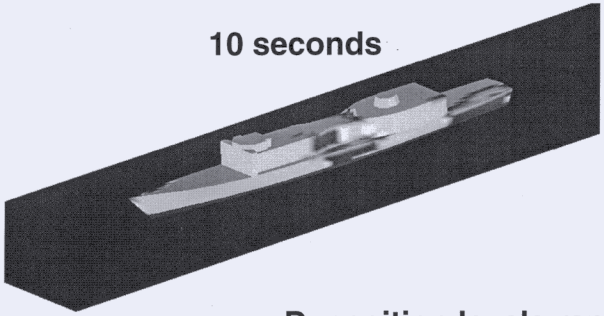
0.5 seconds



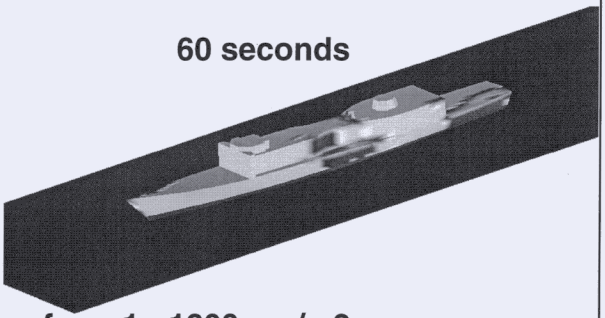
5 seconds



10 seconds



60 seconds



Deposition levels range from 1 - 1800 mg/m2

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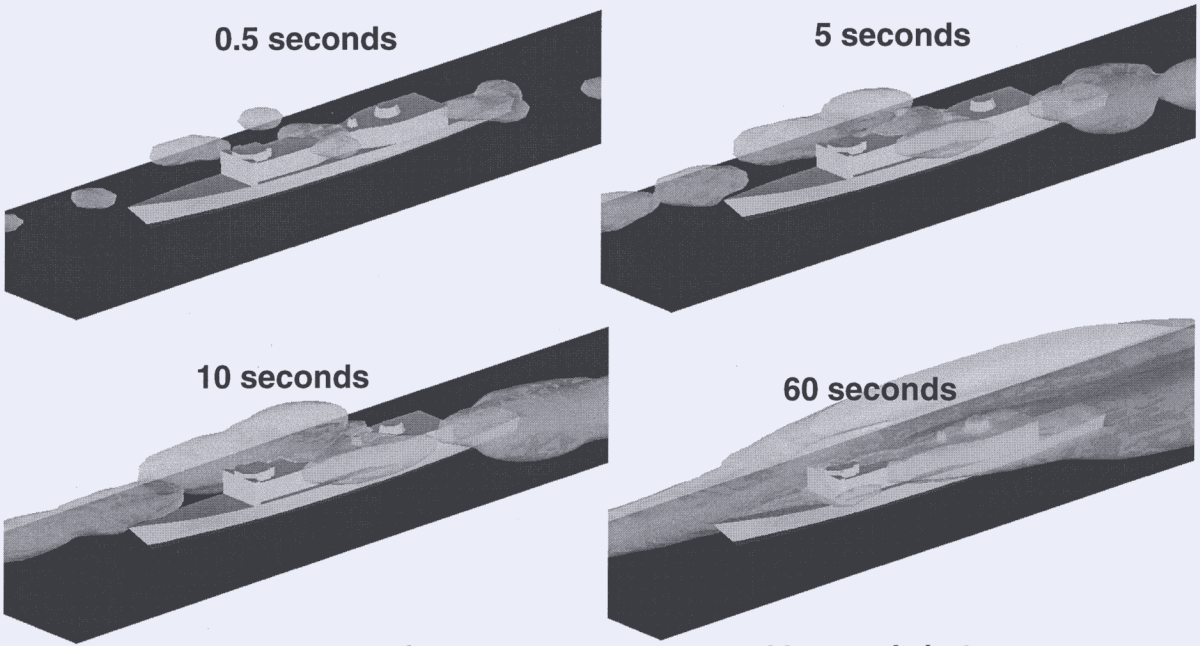
CFX - CBW CFD
External Vapor Dosage (U)



Dosage iso-contours represent 10 mg-min/m3

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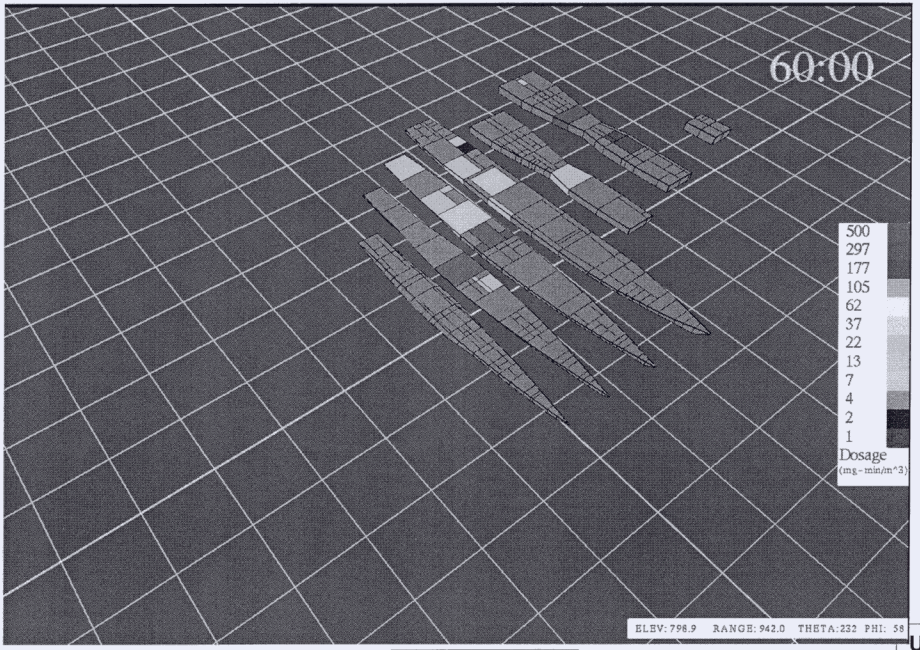
CWNAVSIM - CBW CFD

VENM Internal Vapor Dosage (U)

POC: Thomas J. Yencha; 540-653-3088; yenchatj@nswc.navy.mil



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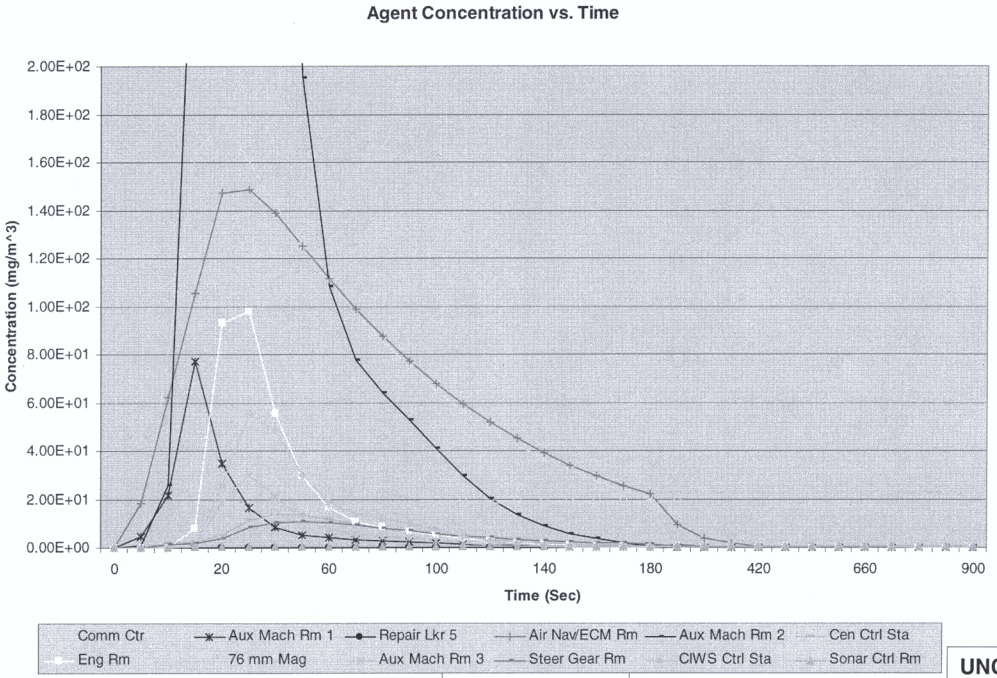
CWNAVSIM - CBW CFD

VENM Internal Concentration (U)



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