

WHO

SYSCOM: NAVSEA
Sponsoring Program: NAVSEA – HQ & DIR
Transition Target: Navy bases' civil engineering and safety offices,
TPOC: (301) 744-6059
Other Transition Opportunities: NAVFAC EXWC, Other Service's engineers and safety offices, The DoD Explosives Safety Board (DDESB), The Defense Threat Reduction Agency (DTRA), The commercial explosives safety sector, International partner's defense and commercial explosives safety communities.

Notes: The Fast Running Models (FRMs) developed will be used for explosives safety site planning when ESQD criteria can't be met. Use of FRMs in site planning is non-existent at present, providing a clear competitive advantage.

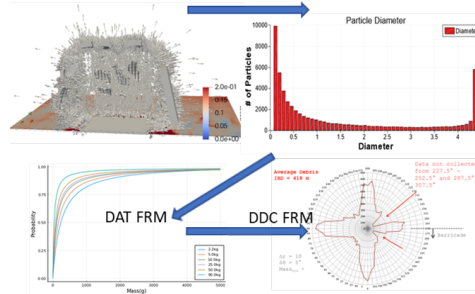


Image courtesy of A-P-T Research [2021]

WHAT

Operational Need and Improvement: Better fast running analytical models for explosives safety will enable explosives safety site planners to conduct realistic risk analysis based on physics.
Specifications Required: Fast running modeling tools to run on personal computers in minutes, calculate initial launch conditions of debris generated in accidental explosion of ammunition storage magazines, calculate debris trajectory and density of dispersed degree as a function range of azimuth from the magazine.
Technology Developed: Fast Running Models (FRM), including a Debris Analysis Tool (DAT) to better model the break-up and initial velocity conditions of all secondary debris from a detonation inside a magazine or operating building, and a Debris Density Calculator (DDC) to determine where the debris will land once lofted by DAT. DDC will be used to determine safe distances for exposed sites near explosives storage magazines and operating buildings.
Warfighter Value: Validated models enable navy base engineers to reliably assess debris hazard of existing munitions storage magazines and operating buildings as they are re-purposed for different storage or operations.

WHEN

Contract Number: N68335-22-C-0094 **Ending on:** Nov 09, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Complete and Validate Stochastic Coupled HFPB	Medium	Reasonable comparison with experimental data	3	4th QTR FY22
Select Parameters for Generating Magazine Response Data	Low	Parameter selection completed already	3	4th QTR FY22
Produce a Debris Generation (Synthetic) Database	Medium	Completion of 48 HFPB computations	3	1st QTR FY23
Develop Prototype DAT and DDC FRMs	Medium	Reasonable verification against experimental data	5	1st QTR FY23
Integrate Product (in LUI), with documentation	Medium	Preliminary integration of DAT in LUI	6	1st QTR FY23

HOW

Projected Business Model: Multi-pronged commercialization strategy includes: Use the FRMs for direct sales of commercial and defense services, delivery of a synthetic database to the Navy for use in future R&D efforts, release of FRMs software to US Government entities through integration into Defense Threat Reduction Agency's lightweight user interface (LUI) platform that provides a software developer's toolkit (SDK) for expedient UI fielding 3-D, GIS M&S environment (for modeling, user interface, and visualization)
Company Objectives: The team members are active consultants in the fields of blast and explosives safety; the analytical research performed in this project will allow the APT team to expand consulting to government and private industry in the fields of blast effects and explosives safety
Potential Commercial Applications: The DAT and DDC software will transition to NOSSA and any U.S. government employee who meets access requirements. DAT and DDC will provide DON and DoD with analytical capabilities that do not currently exist.
 This software could be expanded for secondary debris modeling for:
 - collateral damage estimation during U.S. military offensive operations
 - allowing increased precision during military operations in urban terrain
 Implementation of DTRA and ARA's Lightweight User Interface (LUI) will have the added benefit of adopting a framework already approved for integration on IT systems across the Navy, Army, Air Force and several DoD Agencies.