

Topic: N10A-T011

BlazeTech Corp.

Prediction of the Full-Scale Cook-off Response Based on Small-Scale Testing

Currently assessment of insensitive munitions (IM) and hazards classifications (HC) requires full-scale testing, which for large diameter ordnance presents a logistical and financial burden. BlazeTech, with over 40 years of experience working on small- and full-scale testing of aircraft materials, fire and explosion modeling and simulations is currently developing innovative methodology that can predict the response of a full-scale weapon to both fast and slow cook-offs. The key is coordinated modeling and small-scale testing to predict full-scale cook-off. Using our extensive testing, and modeling and simulation experience, BlazeTech has proven the methodology on Polymer Based Explosive – (PBXN-109) and is presently demonstrating it on PBXN-111. We seek DoD partners and contractors who desire a cost-effective and timely solution to meet the requirements of IM and HC testing.

Technology Category Alignment:

Modeling, Simulation & Test Infrastructure

Ordnance

Propulsion

Undersea Weapons

Contact:

Albert Moussa

amoussa@blazetech.com

(781) 759-0700

<http://blazetech.com>

SYSCOM: NAVAIR

Contract: N68335-16-C-0038

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-16-C-0038

Department of the Navy SBIR/STTR Transition Program

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WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA 242

Transition Target: PMA 242

TPOC:

(301)744-4854

Other transition opportunities:

NAVSEA

Ordnance manufacturers

JIMTP

ARDEC

AMRDEC

Notes:

JIMTP: Joint Insensitive Munitions Technology Program

ARDEC: Armaments Research, Development and Engineering Command

AMRDEC: Aviation and Missile Research, Development and Engineering Command

USS Forrestal Fire 1967



Photo courtesy of US Navy, Photo # 1124794

WHAT

Operational Need and Improvement:

Develop an innovative methodology that provides a modeling and simulation capability sufficient to predict the response of full-scale weapons systems to fast cook-off (FCO) and slow cook-off (SCO) to meet Insensitive Munitions (IM) requirements.

Specifications Required:

The expected output is a fully functional computational protocol which will utilize small-scale experimental data to predict a full-scale cook-off response. The focus of this effort is on development of a protocol for solving a complex system level response to a thermal threat which will result in the prediction of the reaction violence of the system.

Technology Developed:

Using modeling and simulation, BlazeTech will develop a computational protocol that will successfully predict a full scale cookoff based on small scale laboratory experiments.

Warfighter Value:

- * Improved safety to the warfighter
- * Reduced testing costs

WHEN

Contract Number: N68335-16-C-0038 **Ending on:** May 15, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Develop cookoff model architecture	Low	Can predict both fast and slow cookoff	4	January 2014
Develop system level effects model	Low	Match data from historical accidents	4	July 2015
Develop model for PBX N-111	Low	Match known results	5	May 2017
Evaluate mitigation strategies using model	Med	Match future tests planned by JIMTP	5	May 2018

HOW

Projected Business Model:

BlazeTech will license the predictive tools to propellant and explosive formulators as well as munitions designers.

Company Objectives:

BlazeTech will continue to be at the forefront of developing modeling and simulation solutions for insensitive munitions.

BlazeTech will continue developing novel hardware and software solutions providing cost-effective solutions for:

- * Fire and Explosions
- * Environmental Safety
- * Aircraft Survivability
- * Risk Assessment

Potential Commercial Applications:

Ordnance manufacturers

Contact: Albert Moussa, CEO

amoussa@blazetech.com

(781)759-0700