

IM Technology and Munitions Insensitive Munitions Technology Tool IMT2

IMEMTS

Tucson, AZ

May 2009

Ken Tomasello

Insensitive Munitions Office

Naval Ordnance Safety & Security Activity

301-744-6078

Ken.tomasello@navy.mil

Background

- **Observation/Problem:**
 - Large number of ongoing S&T/R&D IM programs across the DoD community JIMTP, IMAD, IMTTP, MDA SBIR/STTR, Army/Navy/AF In-house, Munitions Risk Reductions
 - No single source for easy access and dissemination of ongoing IM technology development efforts and munitions shortfalls to the S&T/R&D community, Munitions Program Managers
- **Approach:**
 - Develop a one-stop shopping relational interactive website that will allow instant access to technology developments and munitions needs.
- **Solution:**
 - "INSENSITIVE MUNITIONS TECHNOLOGY TOOL" (IMT2)
 - ✓ Website – DSTKOL
 - ✓ S&T/R&D Project Quad Charts
 - ✓ Available IM Technology
 - ✓ Relational and User Friendly
 - ✓ Munitions IM Quad Charts
 - ✓ JIMTP MATGS Focus Areas

Objectives – Improve value and impact of IM data

- Develop a **user friendly relational management tool** for S&T and advanced development programs along with available technologies correlated with Joint service primary goals.
- Identify ongoing **S&T and advanced development programs** with **munitions** IM technology **shortfalls**.
- Eventually **establish an IM technology roadmap throughout DoD** to facilitate program planning, sponsor support and execution.

IMT2 Landing Page (after login via username/password)

[Log Out](#) | [Admin](#) | [Home](#)

Insensitive Munitions Technology Tool

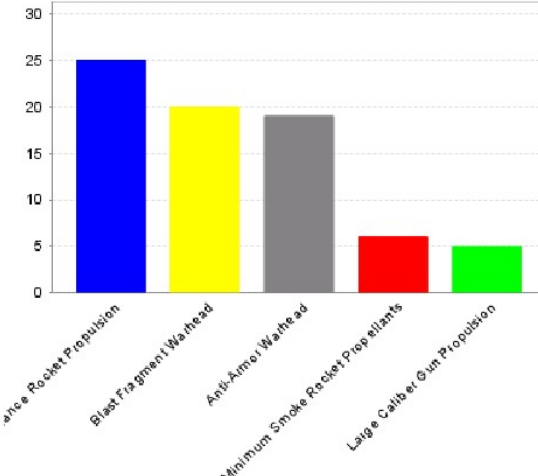
Developing Technology
Priority Munitions
Available Technology
Data Management
Reports

Under Construction

Project Name	Last Updated*	Recent Activity
Bench Top Insensitive Energetics Research	2009-02-10	
CFD Research Corporation Modeling Cook Off	2009-02-10	
Cornerstone Research Group: Venting FCO and SCO	2009-02-10	
Corvid Technologies FCO SCO	2009-02-10	
Corvid Technologies Modeling	2009-02-10	
Enerchem LLC BI and FI	2009-02-10	
Exquadrum, Inc. FCO SCO	2009-02-10	
Full Spectrum Technology Modeling Cook Off	2009-02-10	
HARM IM Study	2009-02-10	
High Fidelity Modeling	2009-02-10	
Insensitive Propellant for Extended Range 5-inch Conventio...	2009-02-10	
Inspace Propellant	2009-02-10	
Low Sensitivity, High Metal Driving Explosives Mechanical Pr...	2009-02-10	
Luna Inovations BI and FI	2009-02-10	
Luna Inovations Incorporated FCO SCO	2009-02-10	
Perfected Air to Air Warhead	2009-02-10	
Physical Sciences FCO SCO	2009-02-10	
Physical Sciences Inc, Multi-Functional High Performance IM ...	2009-02-10	
Physical Sciences Propellant MFNO	2009-02-10	
Physical Sciences, Inc. SCO Additive	2009-02-10	
Processing / Test Technologies	2009-02-10	
Slow Cook-off Mitigation of Booster Motors in the Vertical L...	2009-02-10	
Strategic Insight, Ltd.	2009-02-10	


All Services / Agencies
Update

Project Commitments across Priority Munitions



Munition Type	Commitment Count
Air Rocket Propulsion	25
Blast Fragment Warhead	20
Anti-Armor Warhead	19
Minimum Smoke Rocket Propellants	6
Large Caliber Gun Propulsion	5

Project Totals by Maturity



Maturity Level	Project Total
8.2	25
8.4	15
Low	5

Developing Technology View

Log Out | Admin | Home

Insensitive Munitions Technology Tool

Developing Technology | Priority Munitions | Available Technology | Data Management | Reports

Under Construction

Search

Project Name All Projects	
Priority Munitions All	Technology Area All
Funding Year All	Service / Agency / Program All
Maturity Level All	Transition Status Unavailable

[Filter](#) [Clear](#)

Under Construction
Insensitive Munitions Office (IMO)

Developing Technology, Navy IMAD Search

Log Out | Admin | Home

Insensitive Munitions Technology Tool

Developing Technology
Priority Munitions
Available Technology
Data Management
Reports

Under Construction

Search

Project Name
All Projects

Priority Munitions: All | Technology Area: All

Funding Year: All | **Service / Agency / Program: Navy IMAD**

Maturity Level: All | Transition Status: Unavailable

Filter | Clear

Searching For: Navy IMAD
Found 14 Projects

Project Title	Maturity Level	Funding Year	Service / Agency
Composite Tomahawk Booster	6.4	2006, 2007, 2008, 2009	Navy IMAD
CVLWT Shaped Charge Warhead Candidate Explosive IM...	6.4	2008, 2009	Navy IMAD
Development of a High Energy Insensitive Gun Prope...	6.4	2007	Navy IMAD
Insensitive Boost Propellant Development	6.4	2007, 2007, 2008, 2009	Navy IMAD
Insensitive Propellant for Navy Large Caliber Ammu...	6.4	2007	Navy IMAD
Metal Matrix Composite (MMC) Case & Venting Motor ...	6.4	2006, 2007	Navy IMAD, Navy IMAD
PBXIH-137 Qualification (RDX/HTPB)	6.4	2007	Navy IMAD
PBXIH-18 Production Evaluation	6.4	2007, 2008, 2009	Navy IMAD
PBXIH-18 Production Evaluation (HMX/AL/HyTEMP)	6.4	2007	Navy IMAD
PBXN-114 Optimization	6.4	2008, 2009	Navy IMAD
PBXW-14 Qualification (HMX/TATB/VITON)	6.4	2006, 2007	Navy IMAD, Navy IMAD

Program Summary and Link to Supporting Data

[Log Out](#) | [Admin](#) | [Home](#)

Insensitive Munitions Technology Tool

Developing Technology
Priority Munitions
Supporting Documentation
Data Management
Reports

Under Construction

Composite Tomahawk Booster

Funding Year: 2006, 2007, 2008, 2009
 Service/Agency: Navy IMAD
 Maturity Level: 6.4
 Last Updated: 2007-07-12

PEO	Munition	Documents / Quads (click on link to view file)
PEO IWS	Guided Missile, STANDARD Missile-2 (SM-2)	4Sep08_Composite Tomahawk Booster.ppt
	Guided Missile, STANDARD Missile-3 (SM-3)	
	Guided Missile, STANDARD Missile-6 (SM-6)	Composite Tomahawk Booster IMAD Quad.ppt
PEO LMW	Ground-Based Inceptor (GBI)	
	Kinetic Energy Interceptor (KEI)	
	Terminal High Altitude Area Defense Interceptor (T...	
PEO MS	Guided Missile, PAC-3	
	Guided Missile, PAC-3 MSE	
PEO U&W	Guided Missile, HARPOON Block III, Grade B (RGM-84...	
	Guided Missile, HARPOON Block III, Thickwall (RGM-...	
PEO Weapons	Guided Missile, TOMAHAWK, Block IV Sub Launch (UGM...	
	Guided Missile, TOMAHAWK, Block IV Surface Launch ...	
	Guided Multiple Launched Rocket System (GMLRS)	

Transition Status

Composite Tomahawk Booster

Supporting Data

http://156.80.141.66:8080/imt2/data_sources/Blast%20Mitigation%20Material%20Evaluation%20IMTTP/ - Microsoft Internet Explorer

File Edit Browse Go To Favorites Help

UNCLASSIFIED

POC Information

Name: Troy R. Taylor,
E-mail: troy.r.taylor@navy.mil
Phone: 760-939-7728

Composite Tomahawk Booster

9-04-08
Service:
Navy

Project Description

OBJECTIVE:

- The objective of this effort is to design a carbon composite rocket motor case after the fashion of the Mk 135 Mod 0 Tomahawk solid propellant booster (Fit & Function).
- Improve insensitive munitions (IM) performance in BI, FCO, FI, SCO while maintaining required ballistic requirements and function. Effort includes one (1) successful static firing at ambient temperatures.

APPROACH:

- Characterize cyanate ester resin system w/ (IM7) fiber for case construction. Proof out bolted composite/aft closure joint FY08.
- TRL: 6 S&T/R&D: 6.3/6.4

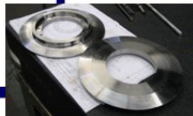
Current MK135 IM Performance

Fast Cook-Off:	DEFLAGRATION TYPE IV
Slow Cook-Off:	DEFLAGRATION TYPE IV
Bullet Impact:	DEFLAGRATION TYPE IV
Fragment Impact:	BURNING TYPE V
Sympathetic Detonation:	N/A

Application Potential

General Applications: Rocket Motor Booster

Specific: Tomahawk Mk 135 Mod 0



Investment Schedule: To FY12

POA&M to FY12 CMK 135 (COMPOSITE CASE) DEMONSTRATOR	FY08				FY09				FY10				FY11				FY12				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Preliminary Resin Compatibility Study; CDR Action																					
Re-evaluate structural model. Apply KDF's and Load Req. CDR Action																					
First Article Burst Case Fabrication																					
IM Case & Hardware Fabrication																					
New Nozzle Design & Fabrication																					
ARCADENE 360B Qualification, 1-Gallon Mix																					
Split Boot Design & Fabrication																					
First 50 Gallon (ARCADENE 360B) Mix																					
Static Fire SN#1 Conventional Grain Design w/ ARCADENE 360B																					
Second 50 (ARCADENE 360B) Gallon Mix																					
IM Testing (FCO, SCO, FI, BI) SN#2 - 5																					
Case Venting/Mitigation Evaluation, Down Select, Risk Reduction (JMTP)																					
Composite Case Optimization, Design Iteration																					
Electrical & Flow Conduit Design and Integration, Evaluation, Testing																					
New Propellant End Burning Grain Design, Introduce new IM Propellant																					
IM Case & Hardware Fabrication																					
First 50 Gallon (IM Propellant) Mix																					
Static Fire SN#6 End Burning Grain Design																					
Second 50 Gallon (IM Propellant) Mix																					
IM Testing (FCO, SCO, FI, BI) SN#7 - 10																					

Product/Deliverables

OHEB "Pass" ruling on BI, FCO, FI, and at least a "Deflagration" ruling on SCO. Successful static fire of the composite case demo.

Progress To Date:

- Wind tooling design complete and fabricated.
- (2) Aft and fwd polar boss closures fabricated
- Cyanate ester resin conditioning/compatibility study completed 7/28: Hot/Wet, JP-10
- Successfully fabricated hydro burst prototype

Near Future: Successfully (1) hydro burst composite case design by end of FY08. Start fabricating (6) IM demo cases start of FY09.

- (4+1) IM demonstrations.
- (1) Successful Static Fire

Unknown Zone

Priority Munitions View

Log Out | Admin | Home

Insensitive Munitions Technology Tool

Developing Technology | **Priority Munitions** | Supporting Documentation | Data Management | Reports

Under Construction

Priority Munitions POA&M Search

PEO Munition Project

Under Construction
Insensitive Munitions Office (IMO)

Priority Munitions, PEO IWS Search

Log Out | Admin | Home

Insensitive Munitions Technology Tool

Developing Technology | **Priority Munitions** | Supporting Documentation | Data Management | Reports

Under Construction

Priority Munitions POA&M Search

PEO Munition: **PEO IWS** | Project: All | [Filter](#) | [Clear](#)

Searching For: PEO IWS
Found 8 Priority Munitions

Priority Munitions
BTERM
Guided Missile, Evolved SEASPARROW Missile (ESSM)
Guided Missile, Rolling Airframe Missile (RAM)
Guided Missile, STANDARD Missile-2 (SM-2)
Guided Missile, STANDARD Missile-3 (SM-3)
Guided Missile, STANDARD Missile-6 (SM-6)
Projectile, Extended Range Guided Munition (ERGM)
Projectile, Long Range Land Attack Projectile (LRLAP)

Under Construction
Insensitive Munitions Office (IMO)

Priority Munition Summary and Link to Supporting Data

[Log Out](#) | [Admin](#) | [Home](#) | [Help](#)

Insensitive Munitions Technology Tool

Developing Technology
Priority Munitions
Available Technology
Data Management
Reports

Under Construction

Priority Munitions

This page allows you to search for munitions using the filters shown below. After selecting the necessary criteria, click the "Filter" button.

Priority Munition: Guided Missile, Evolved SEASPARROW Missile (ESSM)
PEO: PEO IWS Munition

Associated Projects	Documents / Quads (click on link to view file)
Bench Top Insensitive Energetics Research	FY09/10 ESSM Quad Chart
CFD Research Corporation Modeling Cook Off	FY09/10 ESSM POA&M
Combat Safe Insensitive Munitions (CSIM)	04 ESSM Quadchart 111506 from Diana.ppt
Composite Tomahawk Booster	04 ESSM Quadchart 111506.ppt
Cornerstone Research Group: Venting FCO and SCO	111506_ESSM IM POAM_FY08.doc
Corvid Technologies Modeling	
DCPD Binder System for SRM Propellants	
Development and Evaluation of Insensitive Ammonium...	
Evaluation of Aluminum Hydride	
Evaluation of HNFx	
Exquadrum, Inc. FCO SCO	
Flame Retardant Ballistic Materials for MDA	
High Fidelity Modeling	
Insensitive Nanomaterial-Impregnated SRM Propellan...	
Inspace Propellant	
Low Sensitivity, High Metal Driving Explosives Mec...	
Luna Inovations BI and FI	

Community

Today

- S&T/R&D IM Community
 - Investigators
 - PMs/TDs
- Joint Staff
- OUSD Office of Munitions
- Services IM Offices
- PEO IM Coordinators
- Munitions Programs

Future

- Defense Organizations
 - JANNAF
 - NDIA
 - AIAA
- Prime Contractors
- Sub Contractors
- Acquisition Executives

Benefits Summary

- Web Enabled
 - Browser based intuitive navigation
 - Ease of access to data, reports and analysis
- Data Management
 - Role based user access
 - Data reliability, change management and audit trails
 - Data entry by 'data owners' pushes the responsibility of data 'up to dated-ness' to data owners
- User Community
 - Scalable to meet the needs of a growing community

Next Steps

- Pilot Program
 - April 01-30
- Resolution of Feedback/Findings from Pilot Users
 - May 01-31
- Production Target
 - June 15

Thank you