DTRA Counter WMD Technologies

Fuzing & Instrumentation Technology Overview

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Outline

- Mission
- Requirement for Hard Target Fuzing
- Current Fuzing and Instrumentation Technology Thrusts
- Summary

DTRA Mission

- Mission:
  - …reduce the threat to the United States and its allies from Weapons of Mass Destruction (CBRNE) by providing capabilities to reduce, eliminate, and counter the threat, and mitigate its effects.
- Functions:
  - Conduct RDT&E programs…in areas related to WMD and designated advanced weapons to include…WMD-related targets and the entire class of hard and deeply buried facilities.
- Vision:
  - Develop, test, and demonstrate to the Warfighters reliable and effective solutions to defeat WMD and WMD-related functions protected in Hard and Deeply Buried Targets

Hard & Deeply Buried Target (HDBT) Defeat Critical to Counter WMD Mission

- **Use of HDBTs is widespread among both hostile states and terrorists to protect WMD and WMD-related functions including:**
  - **Production, storage, research**
  - **Delivery systems**
  - **Command and control**
  - **National/terrorist leadership**

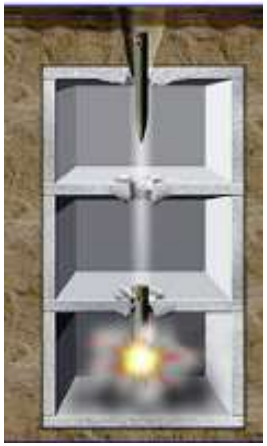
MOST VALUABLE ASSETS

You can't defeat WMDs, if you can't defeat HDBTs!!

You can't defeat HDBTs, if the fuze does not survive!!

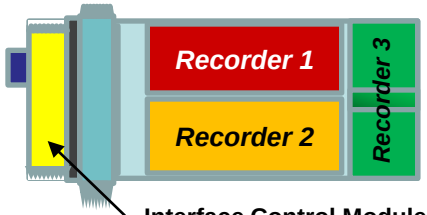
Fuzing and Instrumentation Technology Vision

- Develop and demonstrate innovative **survivable** fuze and instrumentation technologies to support the defeat of **hard** WMD related facilities
  - Robust Fuzewell Instrumentation System (RFIS)
  - Sub-scale Survivability Test Protocol
  - FMU-152 Baseline Survivability Assessment (BSA)
  - 3-Axis DTRA Data Recorder Advanced Miniaturization (3DDR-AM) Universal Booster Cup Recorder



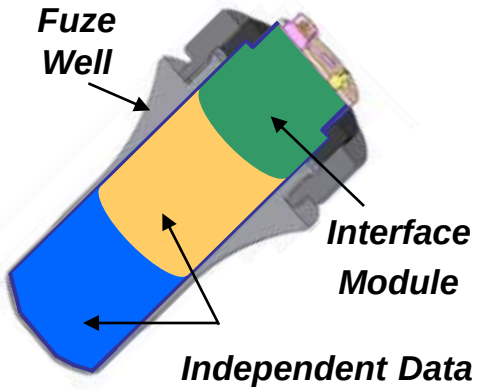
Robust Fuzewell Instrumentation System (RFIS)

- Collaborating with AFRL/RW to develop a shock survivable data recorder instrumentation package with redundant internal data recorders to fit in standard 3” fuzewell
  - 27 month contract awarded to ATK for prototype development and delivery concludes January 2013
  - Support CONOPS for laboratory, sub-scale cannon, and full scale sled and flight testing
  - Provide electrical/mechanical ICD for internal recorders
  - Successful System Requirements Review (SRR) and System Functional Review (SFR) , Preliminary Design Review in June 2011



Interface Control Module
With FMU-152 Connector

Notional RFIS Concepts



RFIS Prototype Features

- Internal infrastructure supports up to 3 recorders
- To be delivered with modified commercially available recorders
- JPF compliant interface for external control of recorders
- Will provide battery power for internal recorders
- Modular design supports recorder installation and removal by trained technician

Sub-scale Survivability Test Protocol

- Joint research program with AFRL/RWMF to develop a Fuze Survivability Protocol (FSP)
  - Test series developed to replicate portions of full-scale impact environments using laboratory and field test equipment
  - FSP Version 1.0
    - Test protocol defined and tested in FY10
    - VHG and Drop Tower testing conducted
  - FSP Version 2.0
    - Refinement of initial FSP
    - Protocol tests based on impact data from multiple systems and targets
    - Initial testing began in early FY11

Notional Shock Spectrum

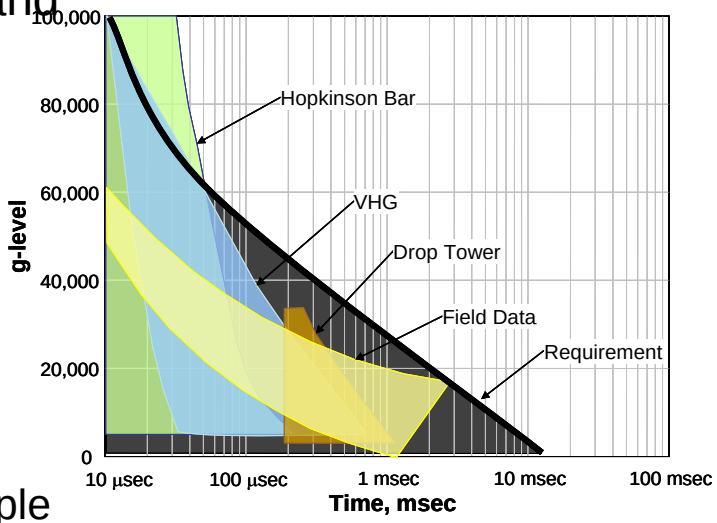


Photo Courtesy of AFRL/RWMF
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FMU-152A/B Baseline Survivability Assessment (BSA)

- Joint research program with AFRL/RWMF & Kaman Precision Products
  - FMU-152A/B fuze used to establish a survivability baseline for the Fuze Survivability Protocol (FSP)
- Phase 1 Survivability Testing
  - FMU-152A/B LAT units completed testing in 3rd & 4th qtr FY10
  - Tested using FSP version 1.0
- Phase 2 Survivability Testing
  - Testing to begin in 3rd qtr FY11
  - LAT units tested using FSP version 2.0
  - Baseline testing anticipated to be completed by 1st qtr FY12

Photo Courtesy of AFRL/RWMF
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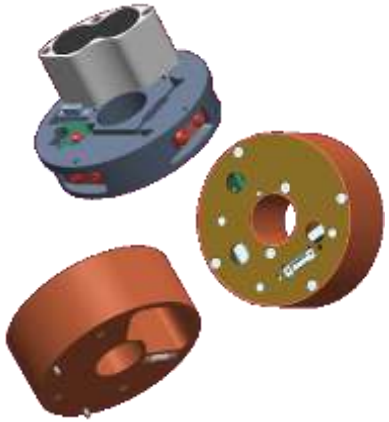
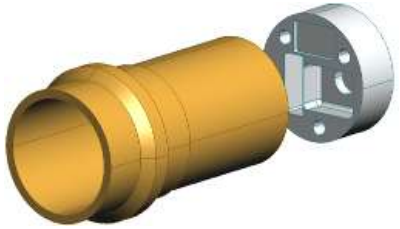
3DDR-AM Universal Booster Cup Recorder

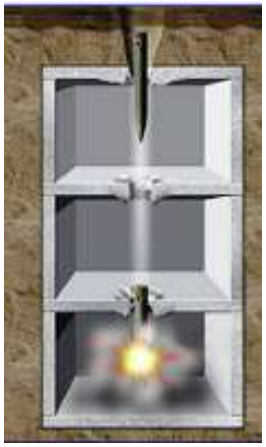


- Collaborating with Sandia National Lab (SNL) to develop the 3-axis DTRA Data Recorder Advanced Miniaturization (3DDR-AM) shock survivable data recorder designed for the booster cups of legacy and developmental munitions
  - Design requirements based on a super set of hard target defeat inventory and EMD fuzes
  - Design based on 3DDR brassboard
  - Exploit miniaturized electronics, improved packaging techniques, and reduced power requirements of miniaturized electronics
  - Replaceable batteries (fast test turnaround)
  - Replaceable accelerometers (primary failure mode)
  - Functional and physical models have been developed, and physical model has been validated against system technical requirements



Fuzing and Instrumentation Technology Vision

- Develop and demonstrate innovative **survivable** fuze and instrumentation technologies to support the defeat of **hard** WMD related facilities



- Develop and demonstrate innovative fuze technologies to support the defeat of WMD related facilities using **non-penetrating** munitions.

Fuzing for Non-penetrating Munitions

- Wide spectrum of possible WMD targets requires a wide variety of fuzing technologies and capabilities beyond classic penetrating fuze mounted in the fuzewell:
  - Distributed sensing
  - Non-traditional sensors
  - Modular and distributed fuzing
  - Scalable effects based fuzing

Summary

- Hard target **survivable** fuzing is critical to Counter-WMD mission
  - Hardened or deeply buried facilities have become:
    - More important to potential adversarial nations and non-national organizations
    - Harder to defeat
  - Smart post-impact fuzing essential to defeating HDBTs
    - Provides optimum burst point control
  - Fuze harsh environment characterization is essential
    - Predictive test and modeling capabilities for fuze/fuze component survivability
    - Requires reliable, survivable, multi-purpose instrumentation
- Need for non-traditional fuze technologies and capabilities to defeat wide variety of WMD targets
  - DTRA pursuing a more balanced fuzing portfolio

WMD defeat requires more than just hard target fuzing