

# NDIA 48<sup>th</sup> Annual Fuze Conference Low Cost SDF for ICM Rounds









# M223E1 Self-Destruct Fuze (SDF) An L-3 BTFP ARDEC IPT Success





#### **Contents**

- Contract Requirements
- Design
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- Applications
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- Summary





#### **Current Contract Requirements**

- 20-Year or better storage life
- SDF function time ≥ 24 sec
- Reliability:

Primary Mode 95%

- SDF Mode 95%

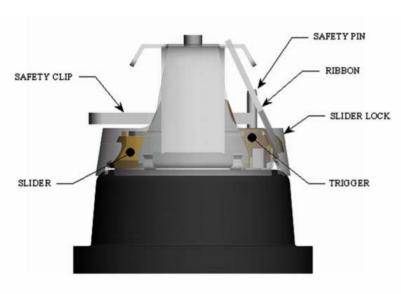
– Hazardous Duds ≤ 1/500



#### **Contract History**

- Contract Awarded May 2000
  - Concept Validation
  - Ballistic Testing
- Contract awarded February 2002
  - Formation of the IPT
  - Design improvements
  - -Three(3) ballistic tests









#### **M223E1 SDF Design Features**

- Based on M223 Fuze Design
  - Arming screw, weight, slider, housing, cover
- Compatible with M42, M46 and M77 Grenades
  - SDF functions with or without spin
- SDF is independent of primary mode.
- All energetics are contained in slider
  - Stab ignitor, pyro delay, transfer element, M55 detonator
- Pyrotechnic delay is a standard mix (Tungsten/Barium Chromate/Potassium Perchlorate Composition: (MIL-STD-82710))
- Compatible with all existing LAP facilities

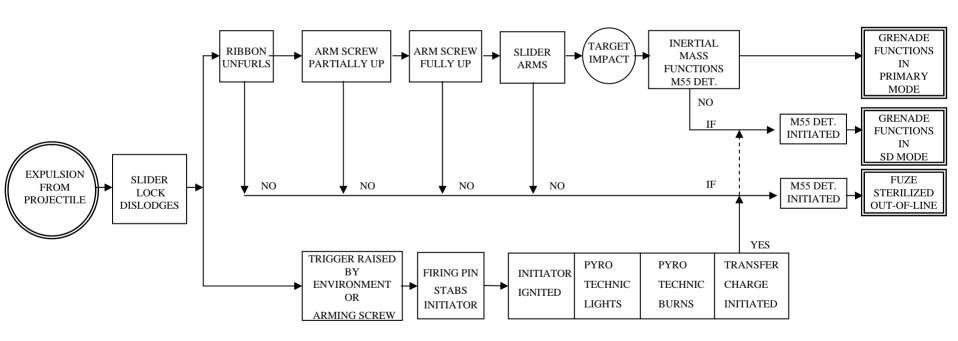


### **Description of Applications**

Application	Projectile	Grenade	Fuze Configuration
Cannon Artillery	M915 (105mm)	M80	M223E1 (Mod)
	M483A1 (155mm)	M42, M46	M223E1
	M864 (155mm)	M42, M46	M223E1
Rocket	GMLRS	M77	M223E1 (Mod)



#### **M223E1 Pyrotechnic Self-Destruct Fuze**



#### **FUNCTIONAL SEQUENCES**



#### **Value: Operational Effectiveness**

- TACOM-ARDEC self-destruct timing based upon statistical analysis of grenade fall times, various ranges for both M577 and M762 fuzed projectiles
- Criteria established at minimum 24 seconds for self-destruct to preclude air bursts
- TACOM-ARDEC 24 sec criteria ensures:
  - 100% coverage for M762
  - M577 all ranges/all QEs @ a reasonable 97.7%
- L-3 BTFP design <u>exceeds</u> the TACOM-ARDEC standard of 24 seconds



#### **Objective**

Use Design for 6 Sigma Tools to Minimize
Transition Risk from Prototype to
Full-Rate Production

A
PM ARMS, TACOM-ARDEC, L-3 BTFP &
DZI
Team

# Six Sigma Supporting Tools & Status



Status	
Complete	
Complete	
Complete	
Complete	
Complete	
Complete	



#### Test #1 Results - Dec 02

Projectile/#	Zone	Fuze Configuration	# Grenades	Component Reliability
M864	8	Primary Only	93	98.9%
M864	8	SD Only	96	50%
M864	8	Tactical	95	96.8%



#### Test #2 Results - Dec 03

Projectile/#	Zone	Fuze Configuration	# Grenades	Component Reliability
M864	8	SD Only	190	88%
M864	8	Tactical	96	100%



#### Test #3 Results - March 04

Projectile/#	Zone	Fuze Configuration	# Grenades	Component Reliability
M864	8	Primary Only	60	100%
M864	8	SD Only	240	100%
M864	8	Tactical	132	100%

100% Functional Reliability – No UXO
An L-3 BTFP ARDEC IPT Success



#### **Production Price at Full Rate**

- L-3 BTFP Self Destruct Fuze is designed for volume production
- Pricing models suitable for artillery or missile ICM production



#### Summary

- Today: Design exceeds contract design requirements (<1%)</li>
- L-3 BTFP SD Fuze:
  - Developed in "three years" IRAD/Govt. funding
  - SDF compatible with current U.S. LAP facility requirements
  - Loadable: Standard components and Technology
  - Affordable
  - Meets or exceeds 20-year shelf life
  - Reliable (100% in last test)
- Pre-Production Engineering is the IPT's next step