Bundeswehr

Federal Office of
Defense Technology
and Procurement

JUNGHANS
Feinwerktechnik

Novel Family of Multi Option Fuzes for Mortar and Artillery Munitions

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LBDir Franz Jueptner

Federal Office of Defense Technology and Procurement, Germany

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Requirements

LBDIR Franz Jueptner

Federal Office of Defense Technology and Procurement

Germany

General Requirements (1)

System Requirements for the MFZ M/A, Multi Option Fuze Mortar /Artillery

1. **Compatible with NATO Standards for Dimension and Contour of Artillery and Mortar Munition**
2. **Insensitive Munition according to STANAG 4439 & AOP 39**
3. **UN-Protocol V on Explosive Remnants of War**

General Requirements (2)

4. **Improved Aim Point Accuracy by One-Dimensional Course Correction for Artillery Fuzes**

5. **G-hardened Modular Design of Subassemblies for common Use in Mortar & Artillery Fuzes**

6. **Two-Dimensional Course Correction Feasibility to be analyzed**

Functional Requirements (1)

1. Programmable Features

- **Impact w/o delay incl. Penetration**
- **Time**
- **Proximity, Programmable Height of Burst**
- **1-D Course Correction for Artillery Fuzing**

Functional Requirements (2)

2. Safety Requirements

- **Fuze Design i.a.w. STANAG 4187**
- **Performance & Safety Testing i.a.w. STANAG 4157**
- **Overhead Safety better than 10^{-5}**
- **Muzzle Safety 150 meters**

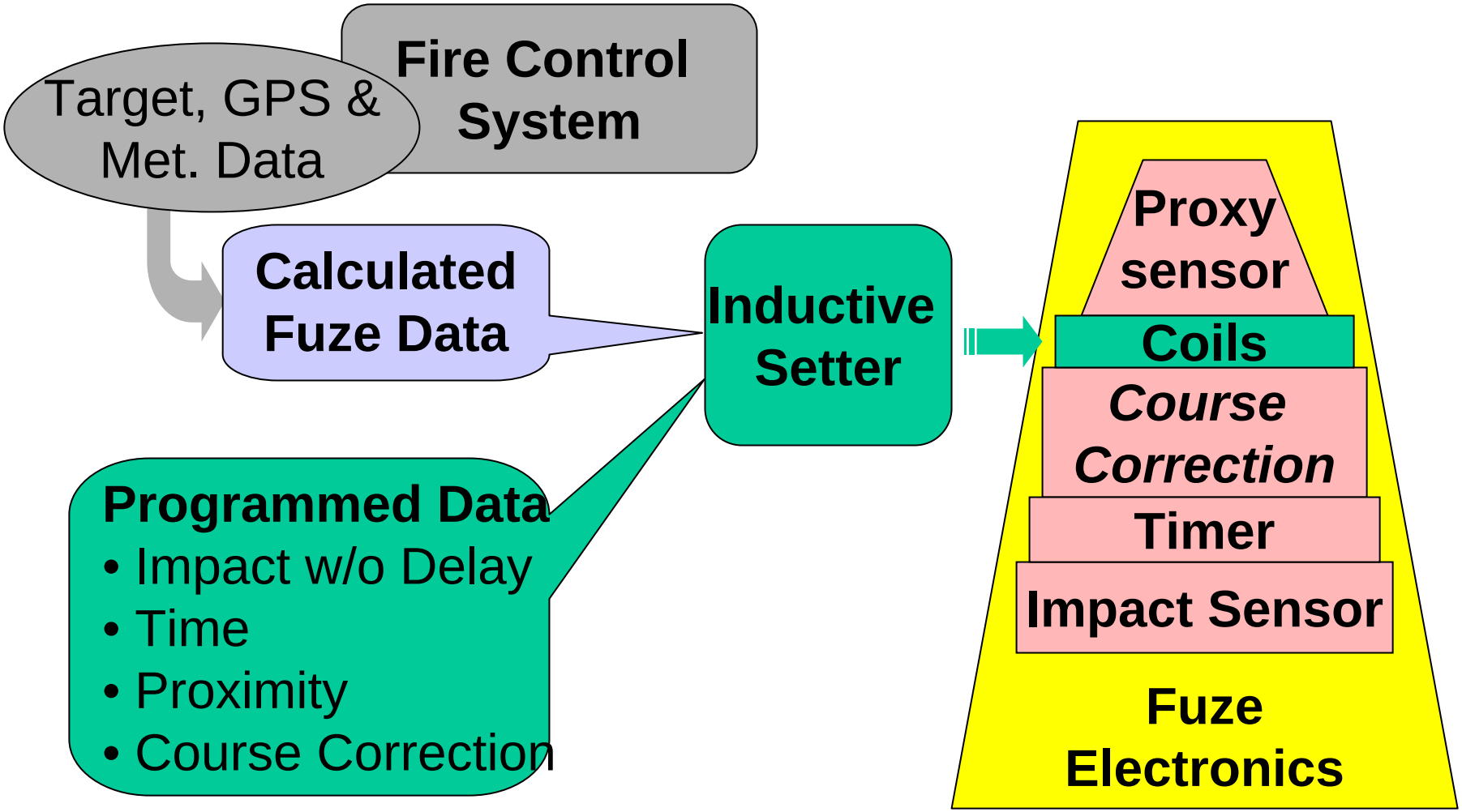
Modular Design

- **Proximity Sensor**
- **Explosive Train**
- **Electromechanical Safety & Arming Device**
- **Battery**

Programmable Features

- **Time, Impact and Proximity i.a.w. STANAG 4369**
- **1-D Course Correction Programming:**
  - ✓ **Technical Requirements for GPS Signals**
  - ✓ **Joint Ballistic MoU, STANAG 4593 (draft)**

Inductive Programming



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Technological Solutions

Modular Fuze Concept for Mortar / Artillery

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JUNGHANS - History

JUNGHANS Feinwerktechnik

1861 – Founded by Erhard Junghans

1905 – Start of own fuze development

DIEHL

1957 – Takeover by Diehl

1984 - Separation in **JUNGHANS Feinwerktechnik** and **JUNGHANS watches**

2000 - Restructuring of the Diehl-Gruppe: **JUNGHANS Feinwerktechnik** GmbH & Co. KG becomes part of **Diehl VA Systeme**

2006 - Relocation of the site Schramberg in Seedorf

2007 - **JUNGHANS *microtec*** as a Joint Venture Company between Diehl and Thales

JUNGHANS - Product range

Mechanical and electronic fuzes for:

Mortar ammunition

Rockets

Tank ammunition

Anti-tank ammunition

Artillery ammunition

Medium calibre ammunition

Submunition

...and Safety and Arming devices

Fuze types mortar / artillery – functioning

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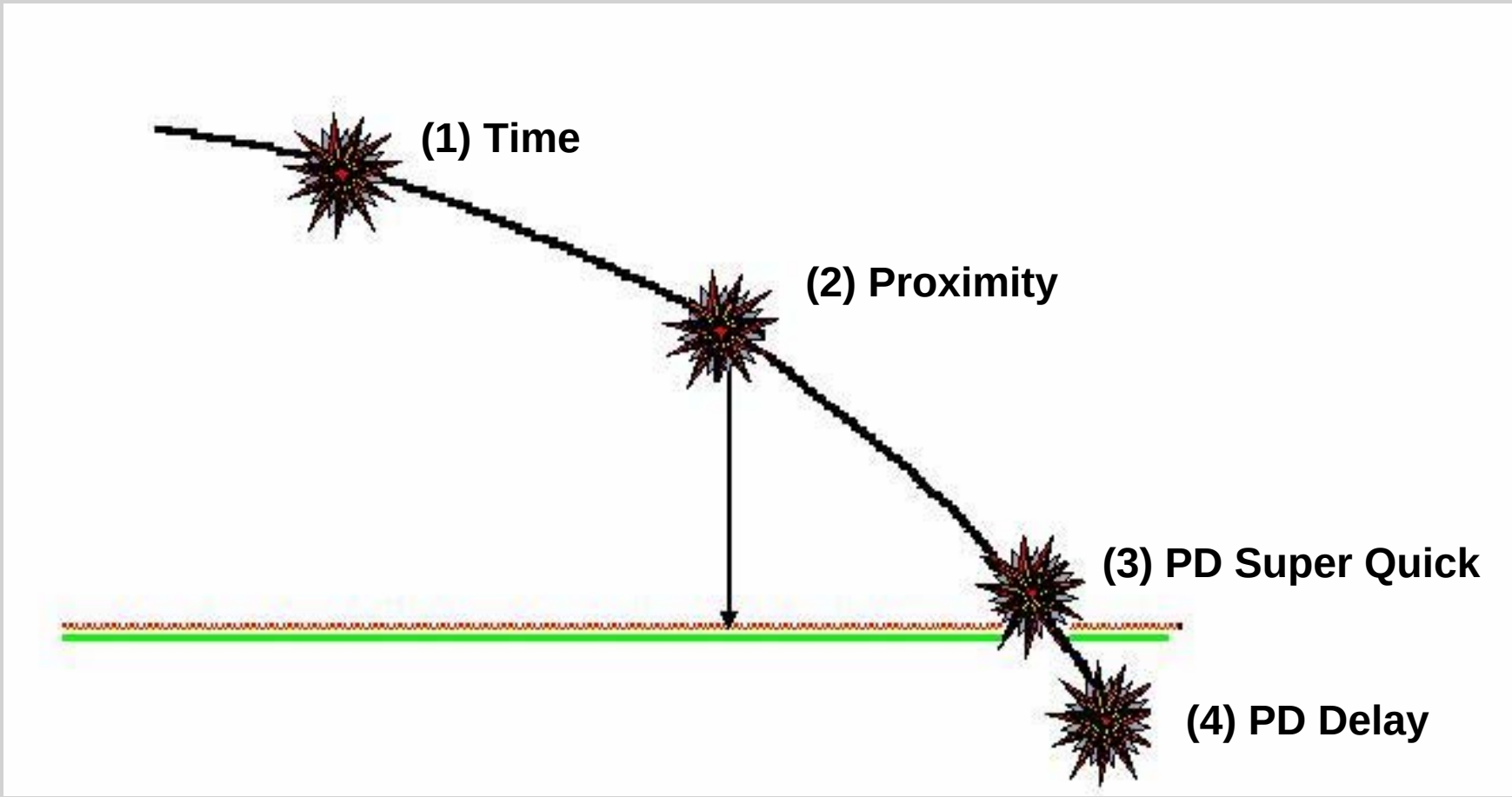

Requirements and Technology Solutions

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Requirements	Hardware	Technology Solution
Insensitivity	Insensitive Projectile Insensitive Fuze	Newly developed explosives / Technology
Penetration capability	Hardened projectile Hardened Fuze	New developement: ➢ Hardened fuze structure ➢ Micro SAD - MEMSAD ➢ Small Firing train
EMC stability	EMC stable proximity sensor	Enhanced radar and multi function electronics
Enhanced precision	Optimized Height of Burst Trajectory Correction	New multi function electronic Trajectory Correction Module

Technological Solutions

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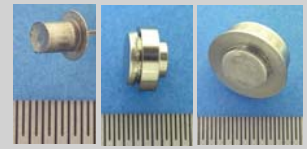
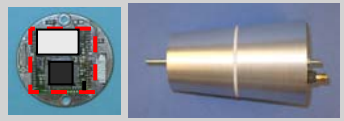
- Penetration Capability
  - Mortar
  - Artillery

- Firing Train - Definition & Design
  - Miniaturization
  - Insensitivity



- Safe and Arm Device - Definition & Design
  - Miniaturization
  - Function with spinning and non-spinning Projectile

- GPS-Receiver - G-Hardening
  - Definition, Design and Tests
  - Design of GPS – Antenna



- Radar and Multi Option Electronics

Synergies Mortar - / Artillery Fuze Family

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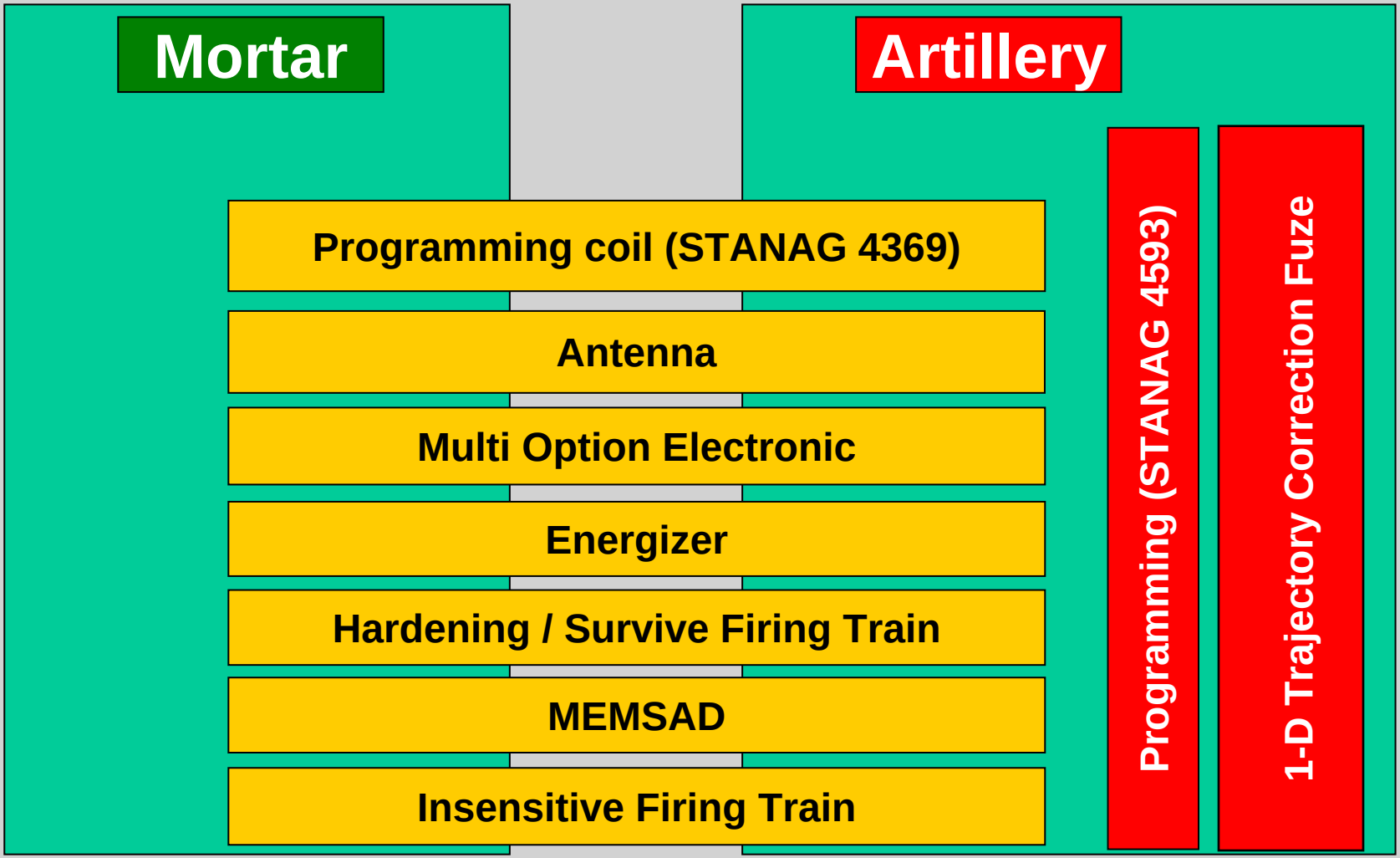

Novel Family Multi Option Fuze
Mortar / Artillery modular Design

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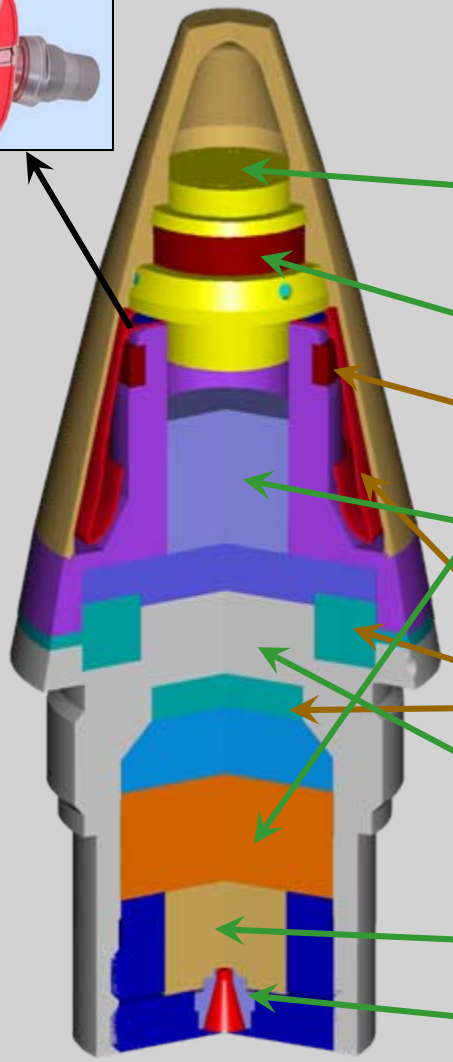


RF Module

Programming STANAG 4369

Programming STANAG 4593

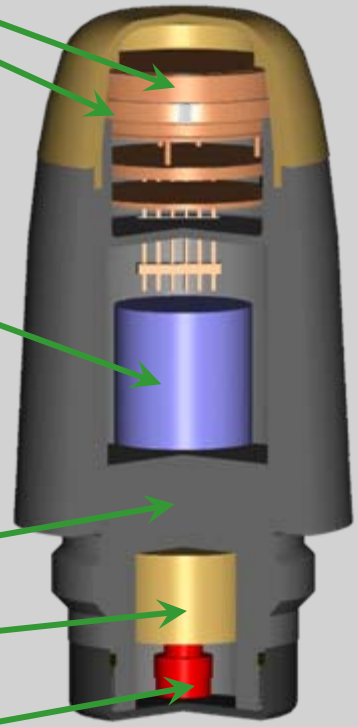
Energizer

Correction module
incl. GPS-Antenna

Penetration Shield

MEMSAD

IM-Booster



Novel Family Multi Option Fuze Mortar

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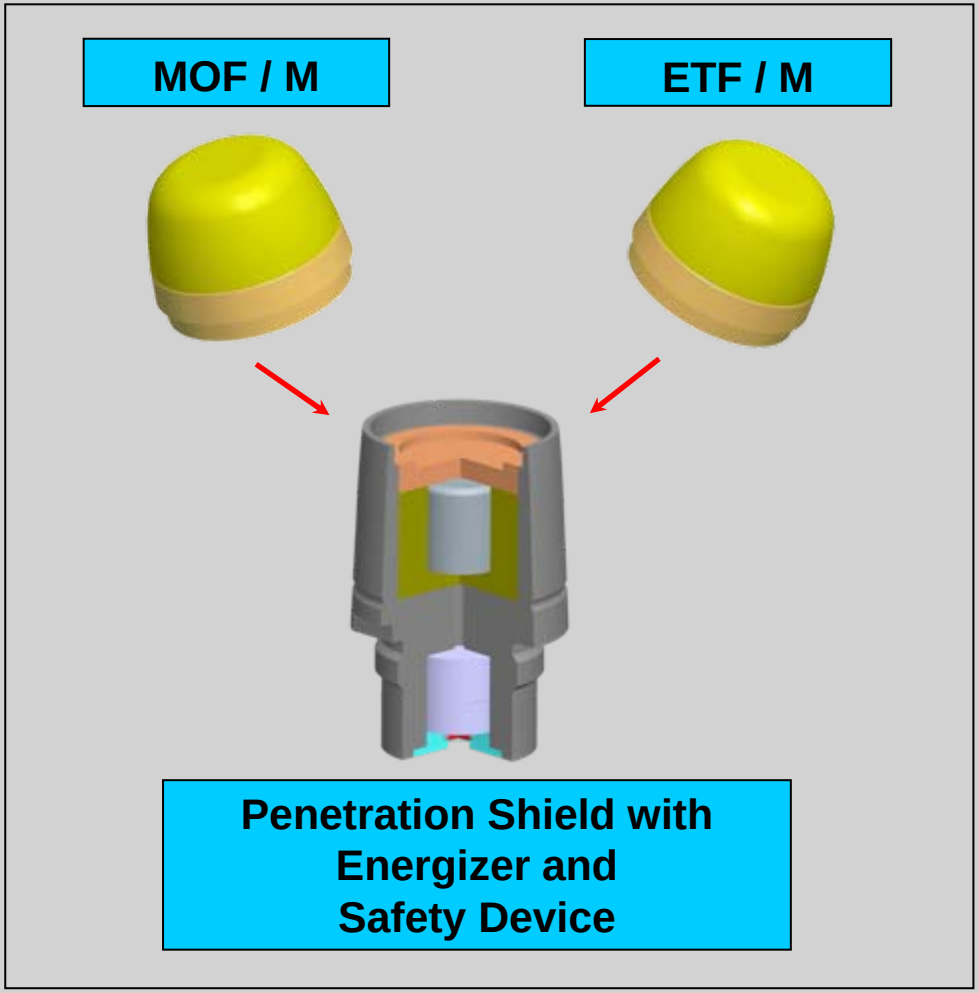

Novel Family Multi Option Fuze Artillery

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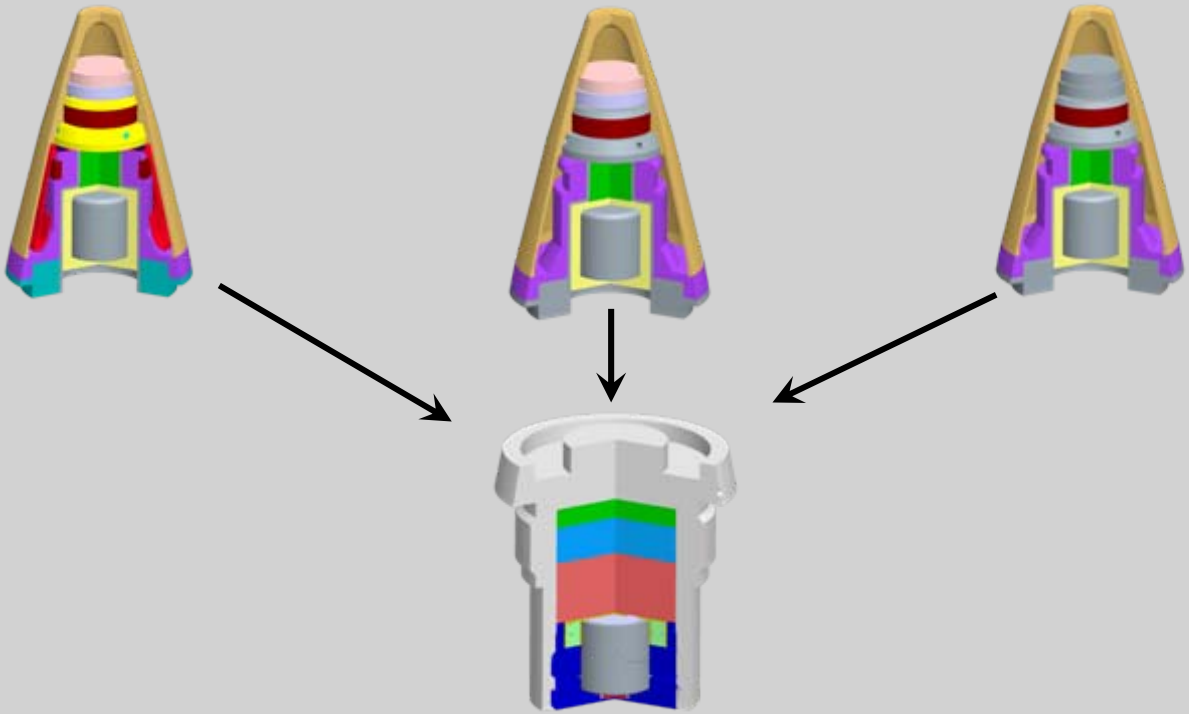
Fuze Head Multi Operation with Correction

Fuze Head Multi Operation

Fuze Head Time Function



Penetration Shield with Safety Device

DZI & FWT PGK Proposal

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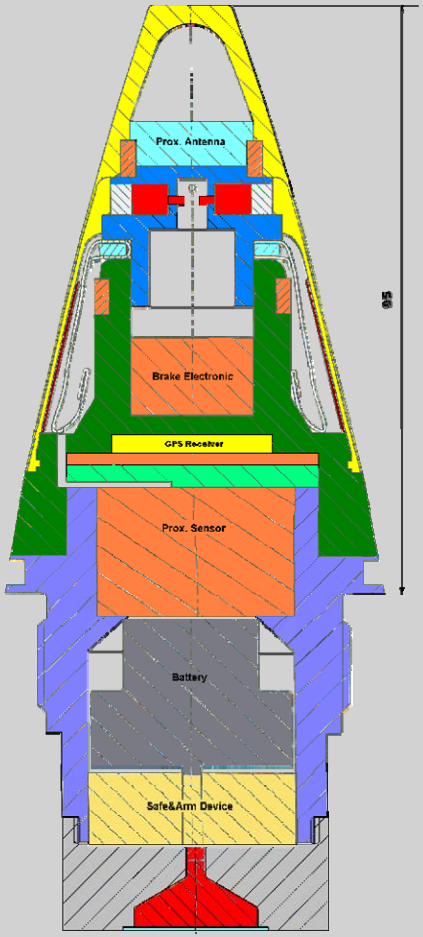

- DZI & FWT Proposal was based on novel Family Multi Option Fuze Artillery in Germany
- Essential components are demonstrated during current activities
- The US Version considers the US respective Requirements
- DZI & FWT have not won the competition, but are still prepared to bring in the proposed solution
- FWT is working continuously on the German Multi Option Fuze Artillery, which includes the 1-D Trajectory Correction Fuze



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Thank you for your kind attention!

Questions?