



# Modular Bomb Fuze

## FBM 21



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- **French Requirement**
  
- **Product Description**
  - **Characteristics**
  - **Performances**
  
- **Program status**



## ■ Compliant with Joint French Forces\* needs :

- Single Multirole Fuze : General Purpose, Proximity & Penetration
- Adaptable to all in-service / planned AUR
- Compliant with Insensitive Munitions (IM) Carrier requirements

## ■ Minimized Logistics

- No limitation of use (long captive carry, no maintenance, ext. service life ...)

## ■ Growth Potential (P<sup>3</sup>I)

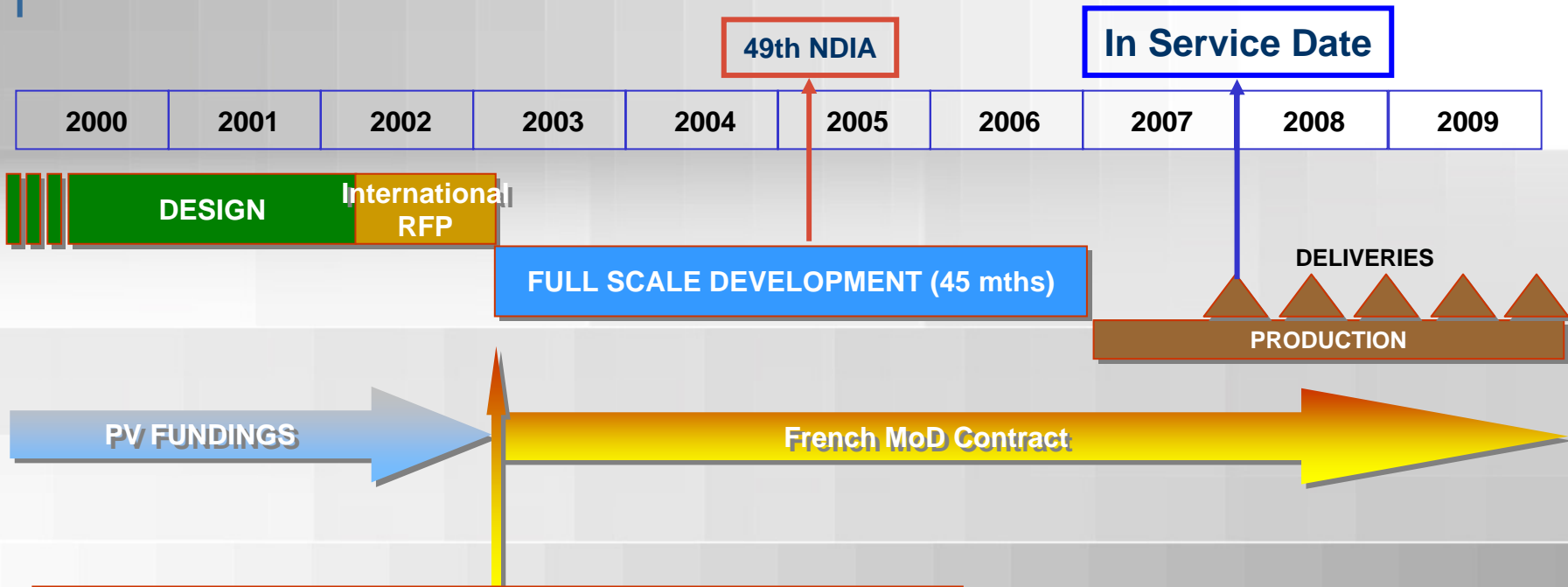
- Smart penetration features
- Adaptable to **future** armaments / Dialogue with A/C

## ■ Affordable

\* Armee de l'Air (Air Force)  
Aeronavale (Navy)

# A Unique and Modular Design using Electronic Safety and Arming Technology





**CONTRACT AWARD**

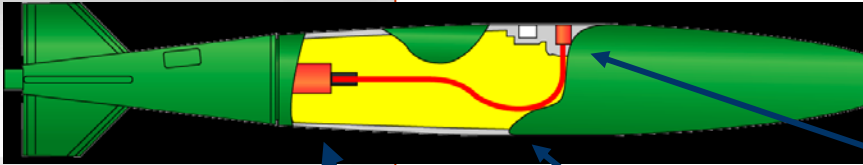
**TDA** **DGA**

**FBM 21** **FNG**





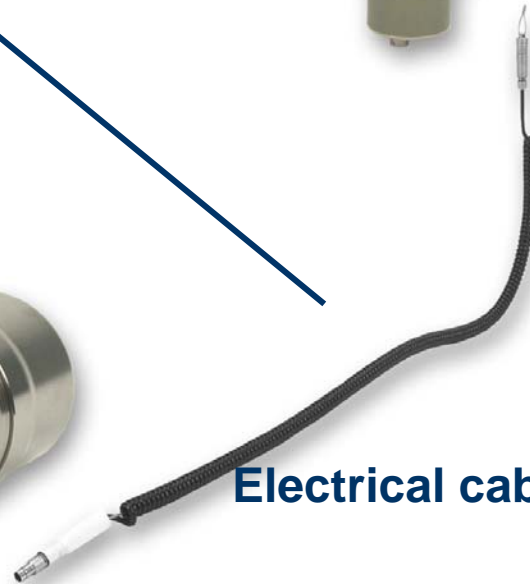
Arming Environments  
Sensor (AES)



FBM 21 Fuzeze

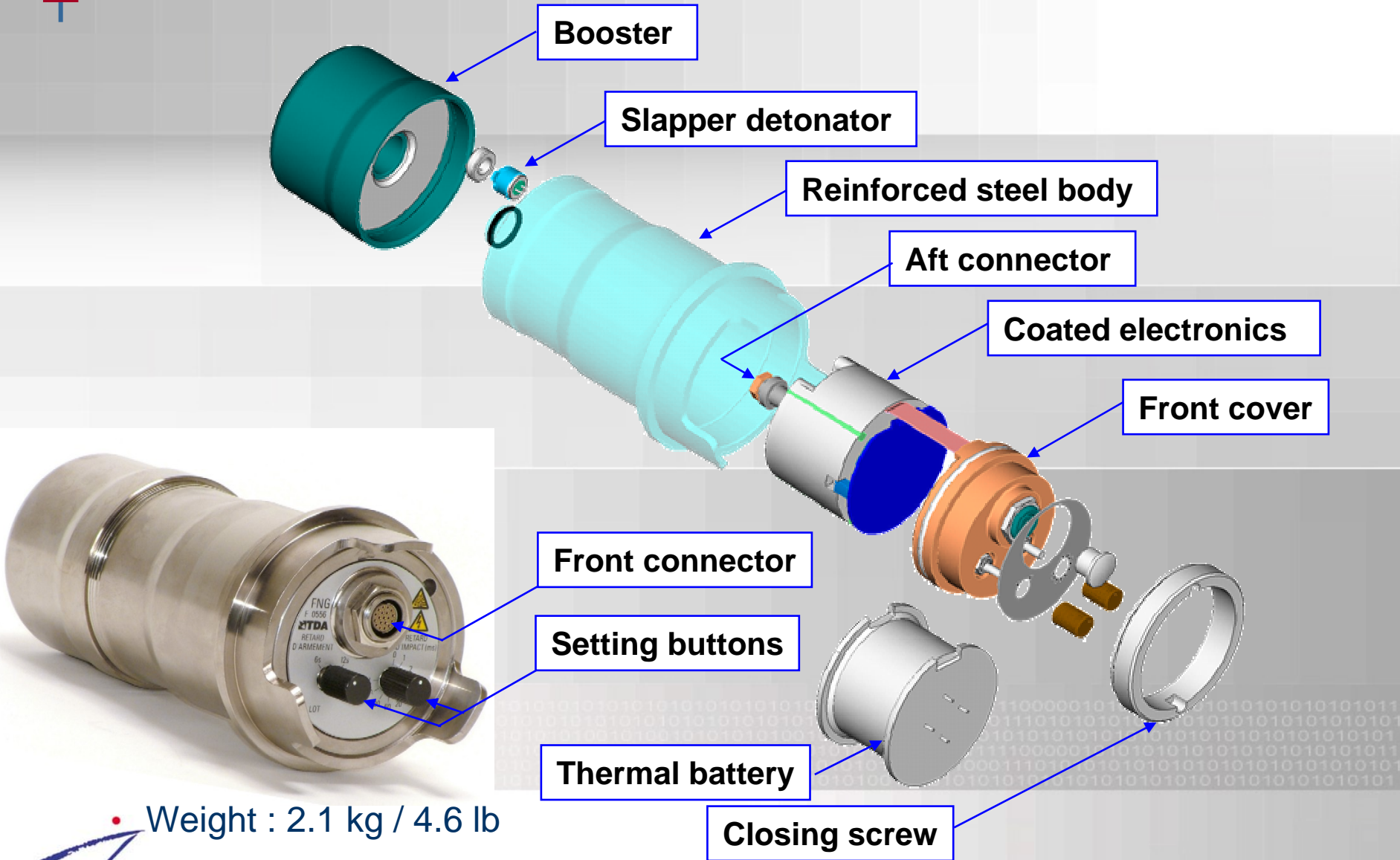


Electrical cable



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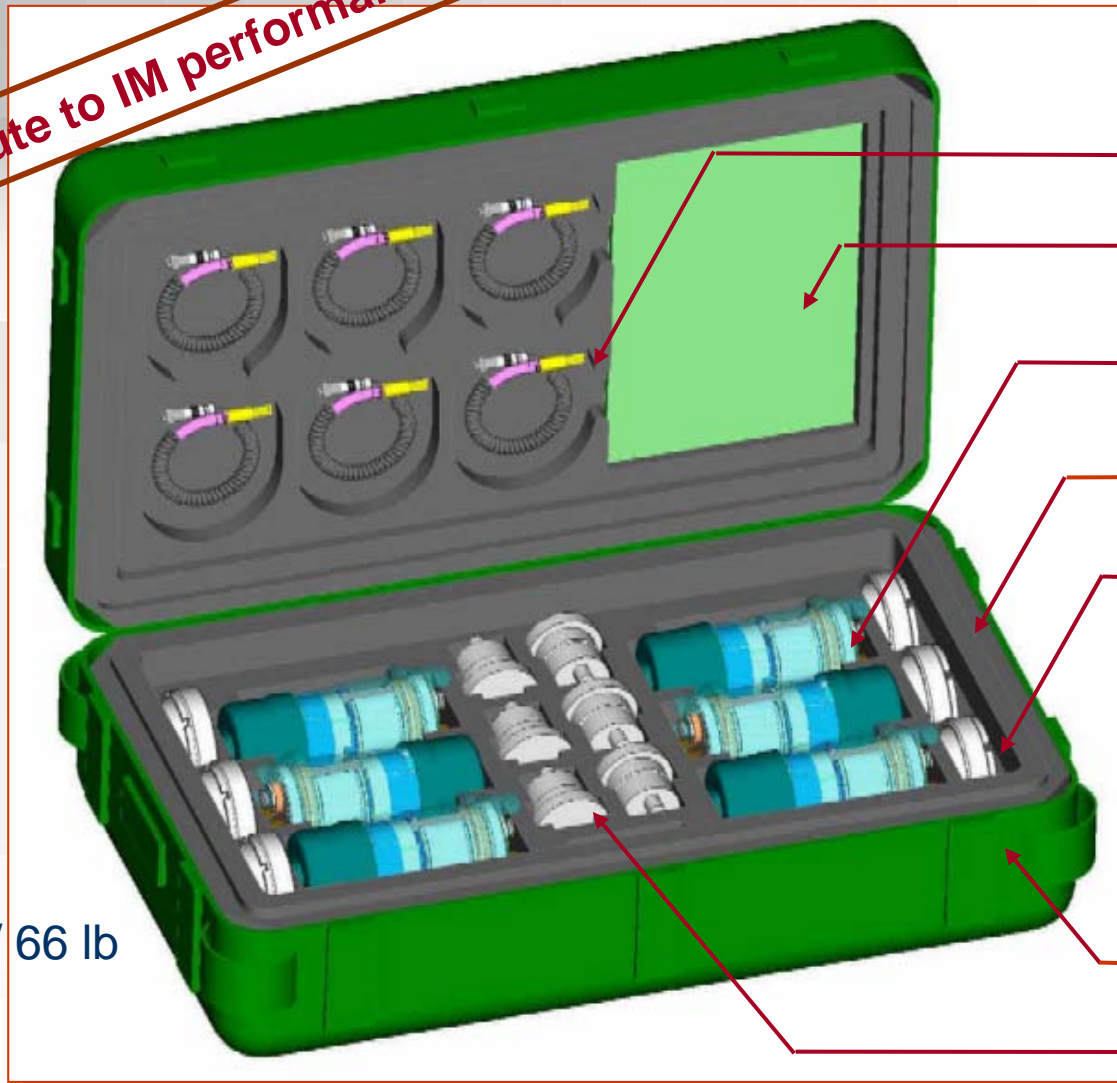




Weight : 2.1 kg / 4.6 lb



Contribute to IM performances



Electric cable

Documents

Fuze

Thermal insulating foam

Closure ring

Aluminium case

Arming env. sensor

Weight : 30 kg / 66 lb



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- For use on 3" fuze pocket bodies :

- General Purpose (Mk80 series, ...)

MK 83



BLU 109



- Penetration bombs (BLU109, CBEMS\*,...)

- Compatible with guidance kits : AASM\*\*, Paveway II & III, EPw II & III, JDAM .....



GBU24 B/B



AASM

- Accept external target detecting devices
  - Analog firing signal (ie: DSU 33 prox , ...)



- Digital firing signal (increased immunity ...)

- Compatible with Insensitive Bomb Filling :
  - PBXN-109, ORA86B, ...

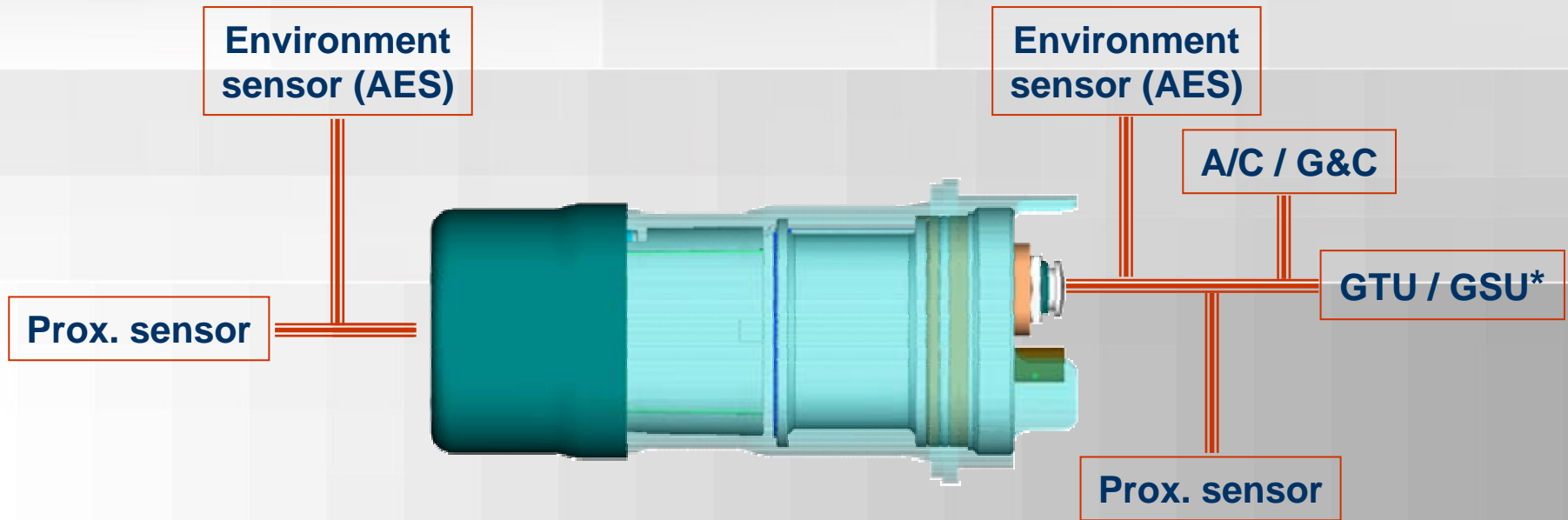
## ■ Keep and Relocate the Arming Environment Sensor

Paveway II



Low Drag

- Interface with peripheral equipment through front and/or rear fuze connectors



(\* ) Ground Testing Unit / Ground Setting Unit



- **Full Autonomous fuze system:**
  - AES senses the First and Second safety environment
  - Embedded energy (thermal battery): over 5 min of flight
- **May take advantage of the Carrier capabilities :**
  - First safety environment given by the carrier (Weapon or A/C)
  - External energy : unlimited flight duration
  - Receive Mission Data
  - Receive other commands (late arming, sterilization, ..)
- **Flexible use:**
  - Manual and / or electrical setting
  - Operated through front and / or rear connector
  - Supply energy to any peripheral (ie. Prox sensor)

- **Functional modes (not limited to ...)**
  - **Instantaneous : accurate impact threshold (+/- 20 g) / superquick detonation (< 100 μs)**
  - **Penetration : post-impact delays from 1 to 250 ms (step 1 ms)**
  - **Proximity : prime a prox sensor - receive external firing order**
  - **External firing order only : sterilize impact sensor**
  
- **Use conditions :**
  - **Temperature : -54°C / + 71°C (-65°F / +160°F)**
  - **release conditions :**
    - **up to 600 KCAS - 0,95 Mach / HALA\* conditions**
    - **exceed 40 000 ft**
  - **Insensitive to free flight perturbed airflow / guidance maneuvers**
  - **Carriage : more than 200 hours**
  - **Service life : 20 years**



## ■ Mission data could be downloaded via a serial link :

### ■ on ground



### ■ from the cockpit



### ■ during the free flight



- Full functional test permitted
  - anytime from factory to depot \*



(\* ) only need to unscrew the booster and remove the detonator



- Accept late arm order : **give safe over-flight**
- Pre / post arming sterilization in case of System failure : **reduce collateral damage risks**
- Accept re-arming order
- Allow inert release even in case of accidental in-flight lanyard pull : **prevent bird strike issue**
- Automatic back to a **Safe** position in less than 5 seconds after a sterilization order, or after power supply withdraw

- **Full electronic ESAF\* using EFI\*\* technology**
  - Compactness / Shock resistance (No moving components)
  - Safer :
    - No primary HE
    - Automatic return to a Safe position
  - Increased insensitivity & reliability in hostile environment
    - Hard impact
    - Electromagnetic / Electrostatic / Lightning environments
    - Other IM performances (ie. Thermal)
  - Greater flexibility of use via external programming
  - Allow full functional test up to detonator / booster
  - **STANAG 4187 ed 4 Safety Design Compliant**



(\*) ESAF : Electronic Safety & Arming Fuze

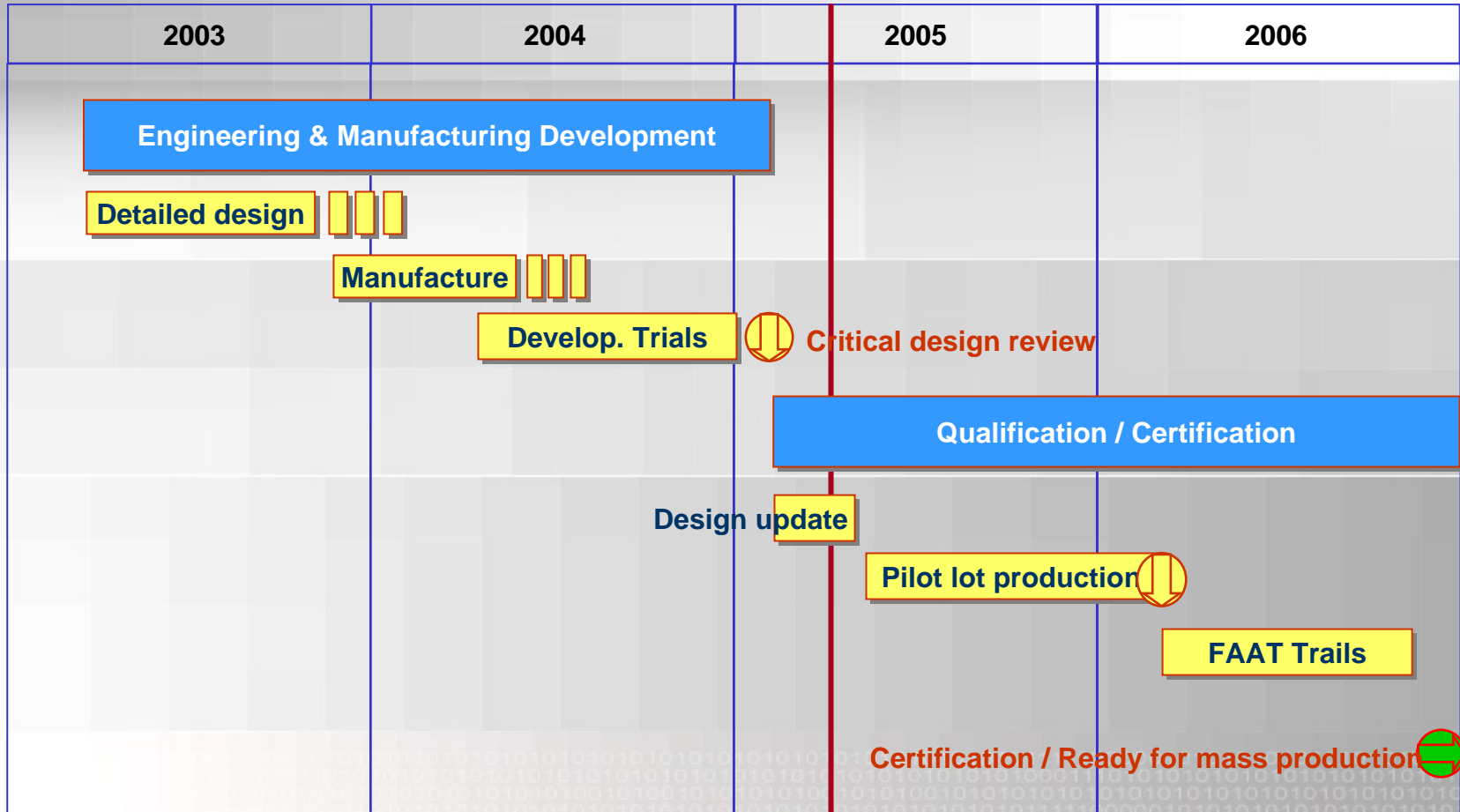
(\*\*) EFI : Explosive Foil Initiator # slapper detonator

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- Dialogue with host equipment : adaptation to weapon specific protocols
- BIT
- Target penetration processing : void sensing, layer counting ...
- Growth to MIL STD 1760 compatibility

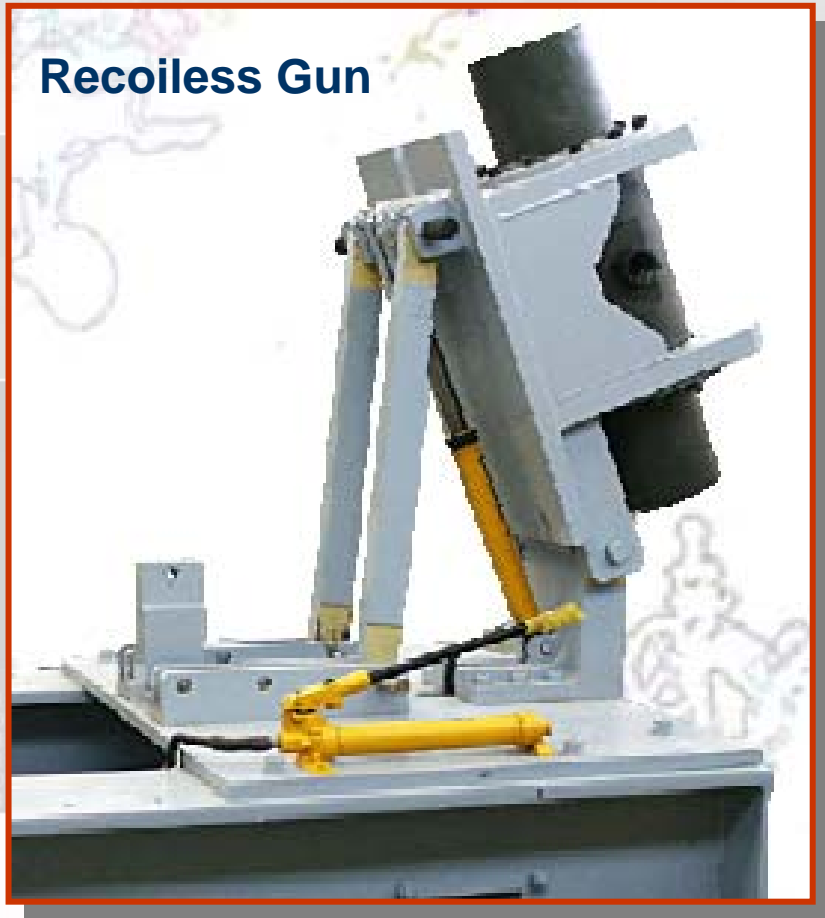
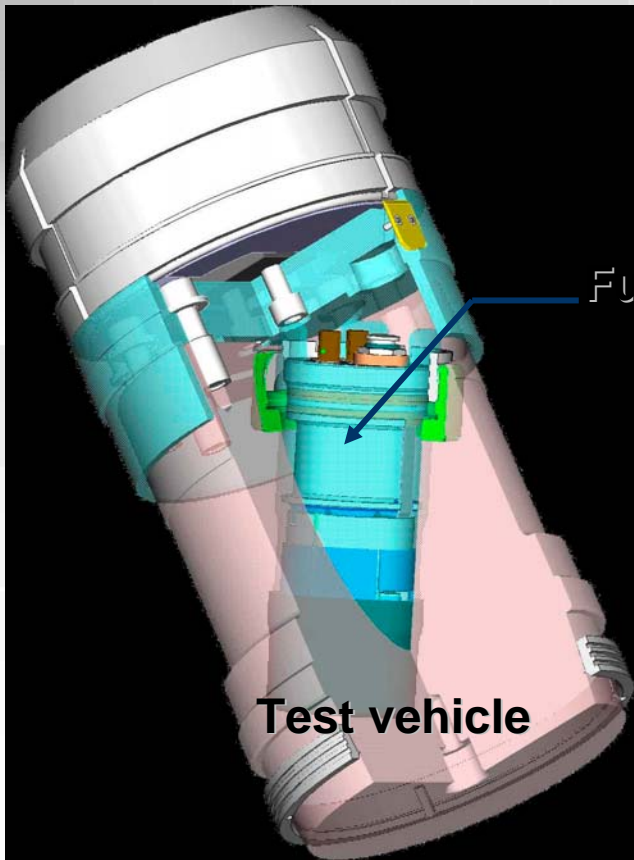






- Ergonomics / Interface with all FR “in service” AUR
- IM filling initiation in all conditions
- 200 Hours Captive Carry Endurance\*
- Electromagnetic environments :
  - HERO / EMI – EMC / ESD
- High altitude operating
- Operation under High G levels (gun / cannon):
  - 10 trials / 10 success in EMD phase

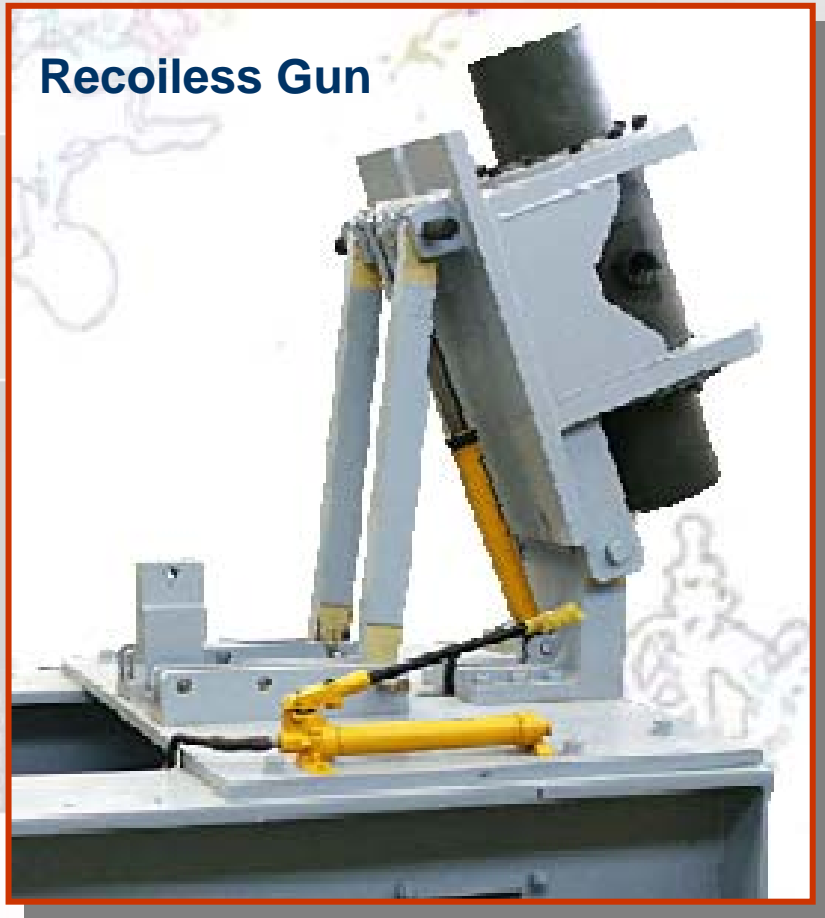
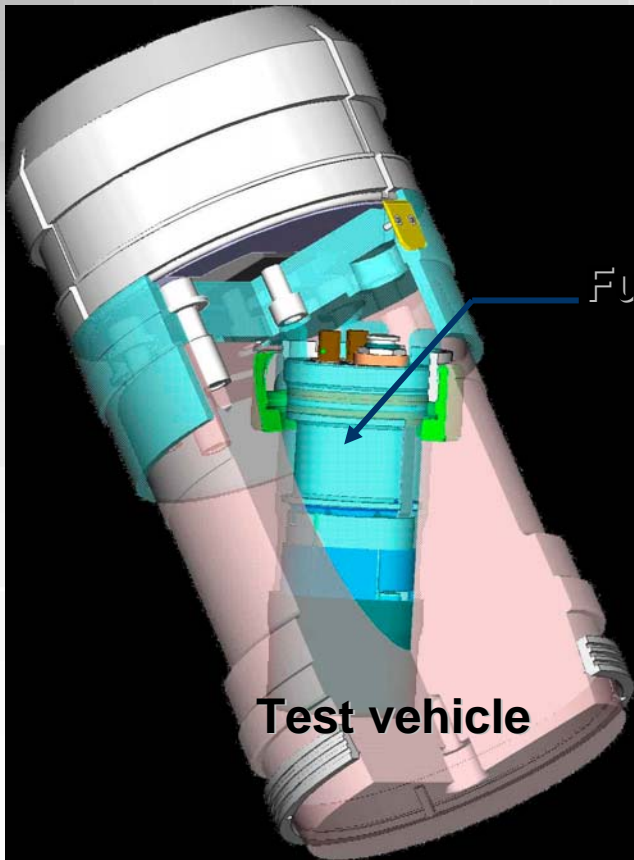
*(\*) to be extended next phase*





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## ■ Functional

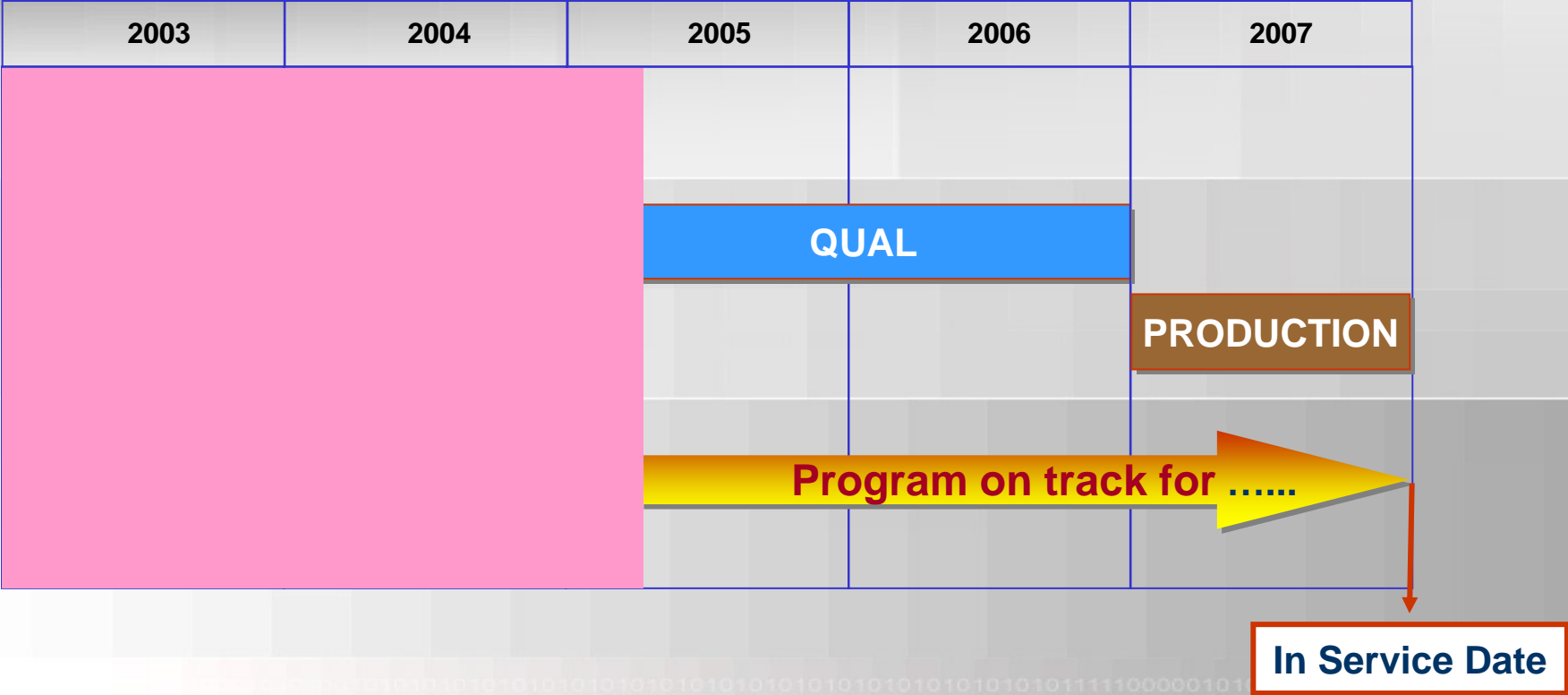
- Evolutive multirole fuze
- Ground and in-flight programming
- Compatibility : High Altitude - Perturbated airflow

## ■ Safety

- Hardened to : High Gs / EM / Hostile acts and hazards (IM)
- Sterilization command, late arming
- Automatic back to Safe position

## ■ Logistics

- No maintenance
- 20 years service life
- Carriage endurance : more than 200 hours







**Thanks for your attention.**

**Any questions ?**

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