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RÉPUBLIQUE FRANÇAISE

MINISTÈRE DE LA DÉFENSE

New French IM 500 lb Bombs

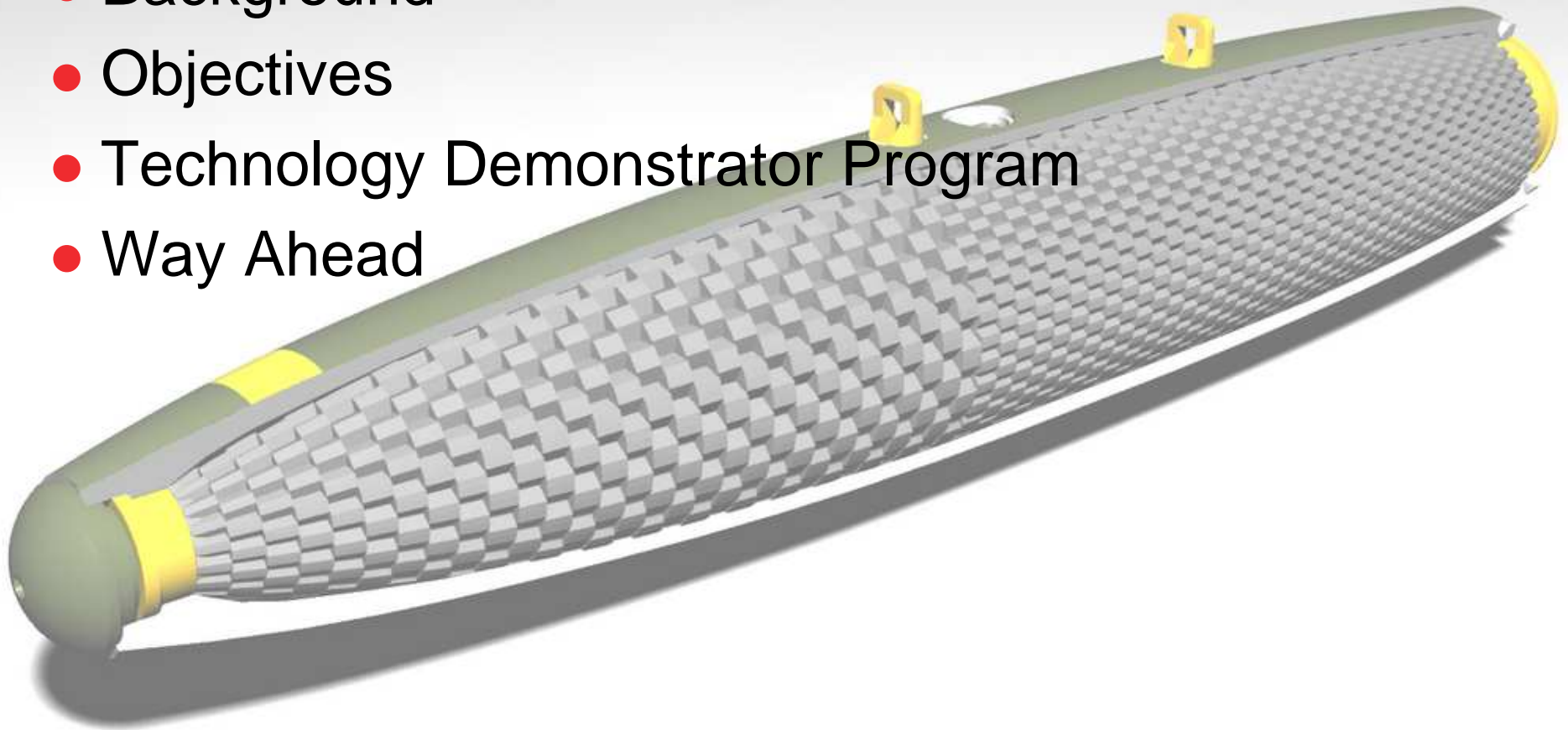
Laurent Delrieu (DGA), Sébastien Régnaut (SAMP),
Bruno Nouguez (Eurencos)



DIRECTION GÉNÉRALE DE L'ARMEMENT

New French IM 500 lb Bombs

- Background
- Objectives
- Technology Demonstrator Program
- Way Ahead





Background

- 500 lb bombs in French Forces

- Mk 82



- BLU 111



- CBEMS 250





Background : Mk 82



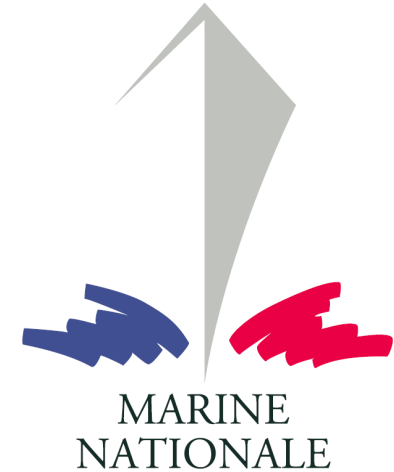
- Use
 - General Purpose Bomb
 - Armée de l'air
- Description
 - Similar to US BLU-111/B
 - PBXN-109 iRDX
- Manufacturer
 - SAMP
 - Eurenco
- IM Signature (MSIAC)



FCO	SCO	BI	FI	SR
IV/V	IV/V	V	V	I



Background : BLU 111



● Use

- General Purpose Bomb
- Marine Nationale

● Description

- Similar to US BLU-111A/B
- Thick Thermal Coating (FM26)
- PBXN-109 iRDX



● Manufacturer

- SAMP
- Eurenco

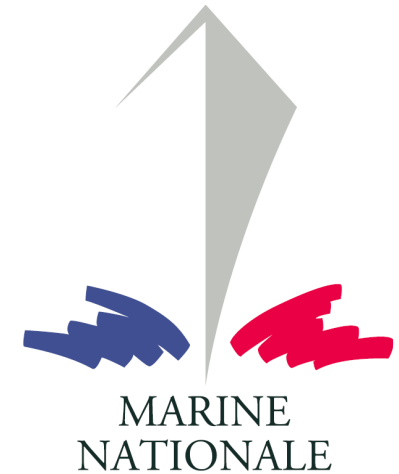
● IM Signature (MSIAC)

FCO	SCO	BI	FI	SR
IV/V	IV/V	V	V	I





Background : CBEMS 250



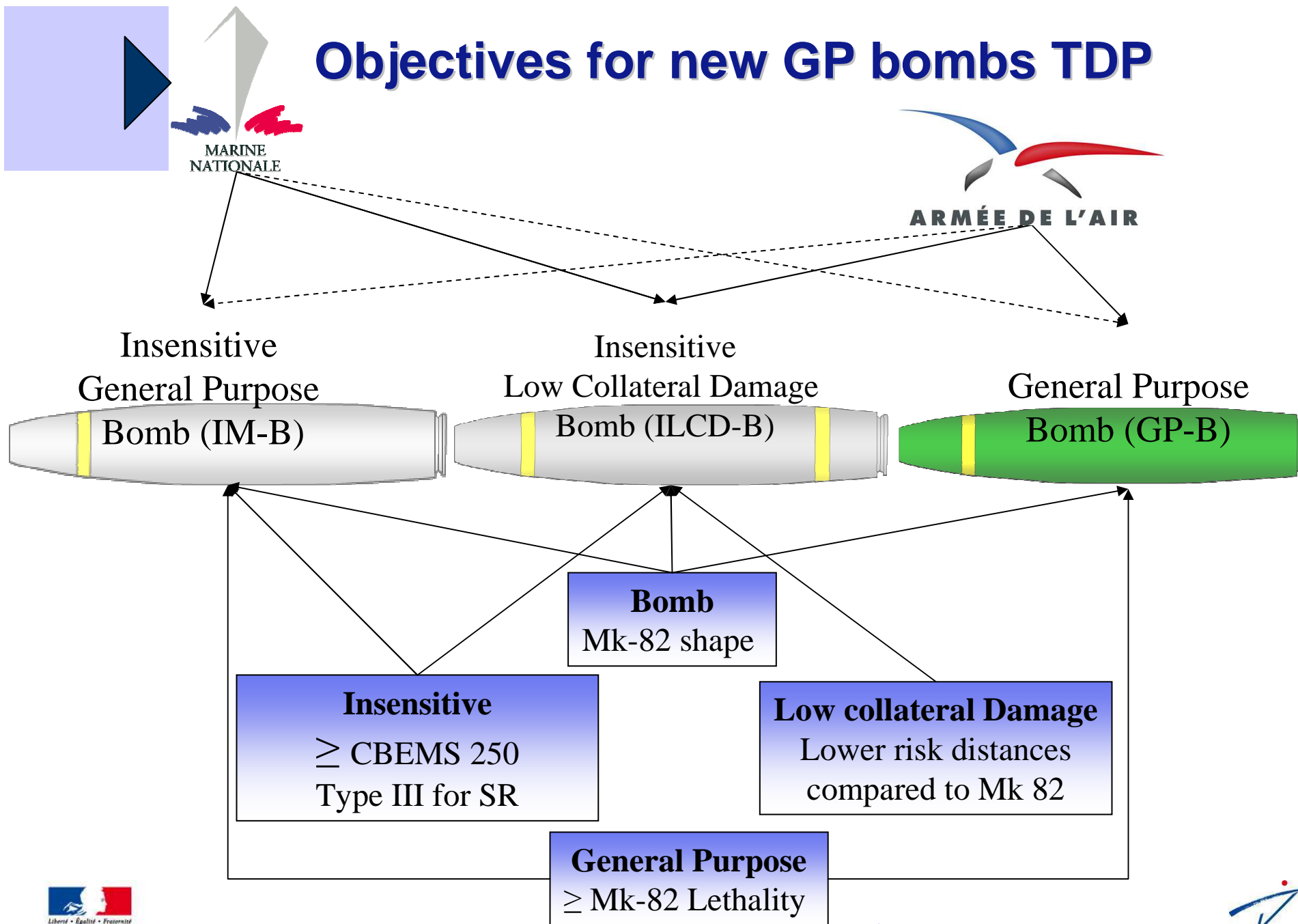
- Use
 - General purpose but with high penetration capabilities
 - Marine Nationale
- Description
 - B2214B (EIDS)
 - Intumescent coating
 - Venting systems
 - Logistic palette
- Manufacturer
 - MBDA
 - Eurenco
- IM Signature



FCO	SCO	BI	FI	SR
V	V	V	V	III



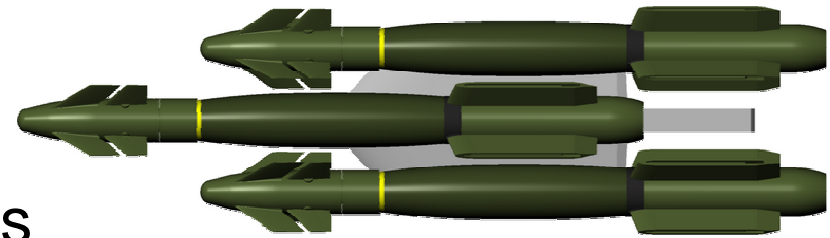
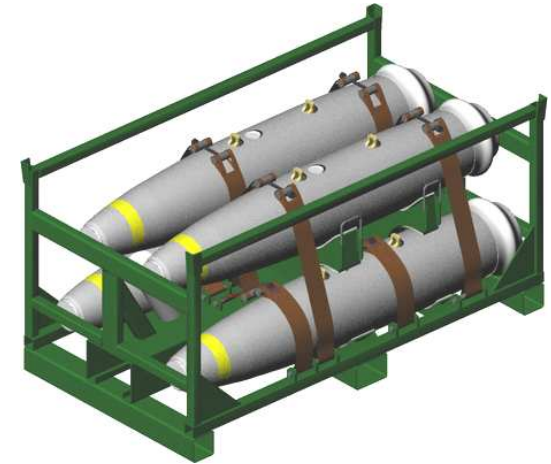
Objectives for new GP bombs TDP





Objectives : Insensitive

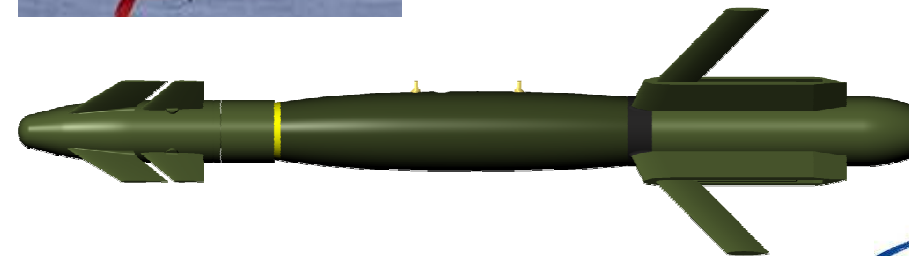
- Sympathetic Reaction
 - No propagation of detonation
 - Reaction \geq Type III
- Fast Cook Off
 - No reaction for several minutes
 - Reaction limited to combustion
- Heavy Fragment Impact
 - No explosion when subjected to an impact of an Heavy Fragment





Objectives : Bomb

- Compatibility with different interfaces
 - Mk-82 outline : no thick thermal protection
 - Fuzes : FBM21, FMU-139, FMU-143
 - Ejectors : TG480, ...
 - Kits : AASM, Paveway





TDP : Team

- Contracting French MoD

- DGA UM Aéro
- DGA Technical direction
- CEA Gramat Expertise

- Forces

- EMA : CNC
- Armée de l'air
- Marine Nationale

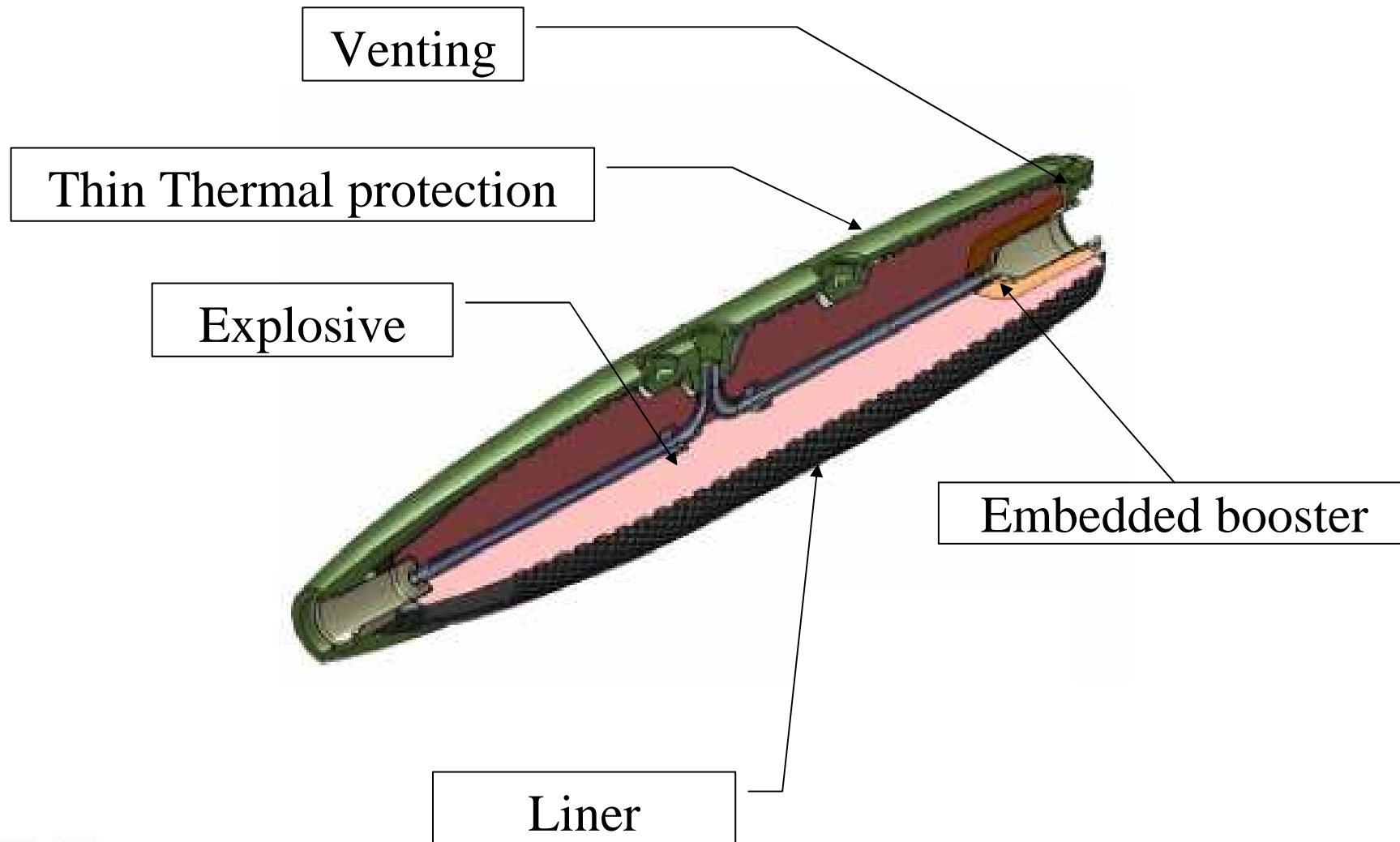
- Industry

- SAMP
- Eurenco
- CEA





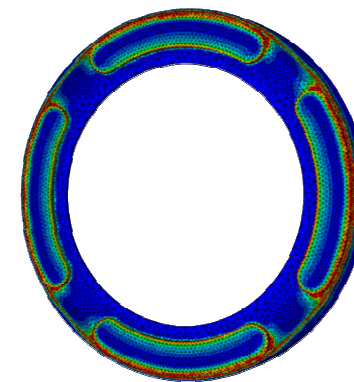
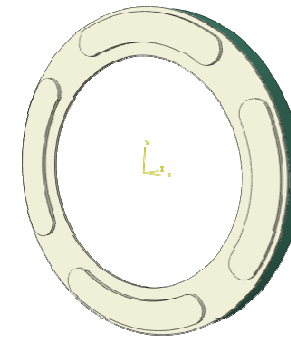
TDP : Major Parts





TDP : Venting

- Prevent violent reaction for
 - Sympathetic Reaction
 - Slow Cook Off
 - Light / Heavy Fragment Impact
- No reduction of reaction time for
 - Fast Cook Off
- Principle
 - Safety cut-out
 - Pressure breaking
 - Withstand environment



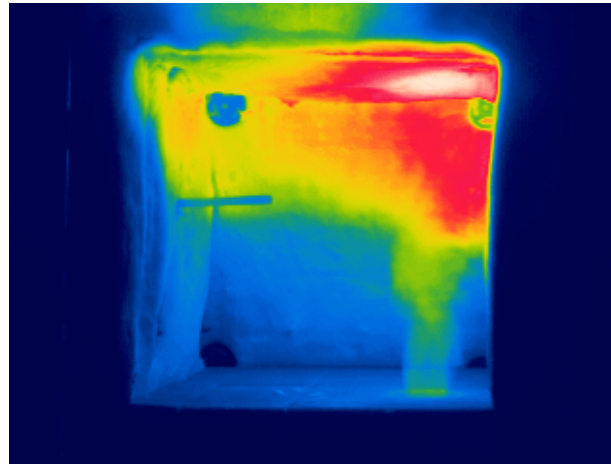


TDP : Thermal Protection



- Test on intumescent coating with ENSCL (France)
 - Evaluation of thermal coating, common and “home-made” intumescent coating
 - Coated steel sample
 - FAST COOK OFF (GAS OVEN)
 - TEMPERATURE INCREASE AND FLUX
 - COMPLIANT WITH STANAG 4240

INDIRECT FIRE (RADIATOR)





TDP : Thermal Protection



- Common intumescent coating (layer < 1 mm)

- Less efficient than FM26 (15% less)
- Thin layer
- No burning
- European supply



- “Home-made” intumescent coating (layer < 1 mm)

- As efficient as FM26
- Thin layer
- No burning
- European supply





TDP : Explosives



	GP-B	IM-B	ILCD-B
Main Filling	B2258B	B2268A	B2274A
Main Ingredients	RDX/AP/AI/HTPB	RDX/NTO/AI/HTPB	RDX/AI/HTPB
Embedded Booster	/	B2273A	B2273A
Main Ingredients	/	HMX/HTPB	HMX/HTPB



TDP : Liner and Booster



Boostering reliability



Fragment shapes and velocities identification



Overall view

- Velocity screen plates
- Water bottle « frag catcher »
- Overpressure measurement

LDTU

Large Diameter Testing Unit

Post test view





Way Ahead

- IM test on IM-B
 - Sympathetic Reaction
 - Fast Cook Off
 - Slow Cook Off
 - Heavy Fragment Impact
- Arena tests
 - IM-B
 - ILCD-B
- Delivery of demonstrators to DGA



DGA corporate site: www.defense.gouv.fr/dga
Industry portal: www.ixarm.com



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