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RÉPUBLIQUE FRANÇAISE

MINISTÈRE DE LA DÉFENSE

120 mm HE mortar round procurement

An application example of the French

MURAT policy

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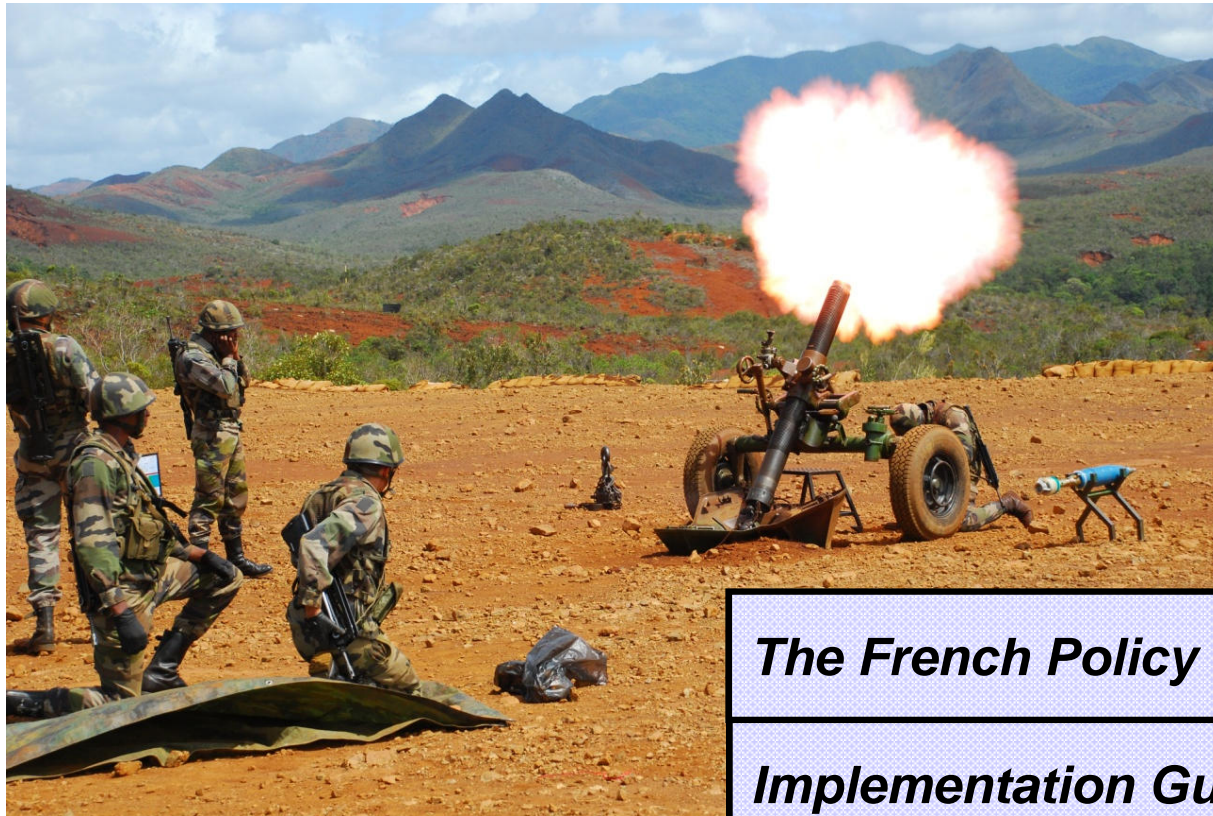
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DIRECTION GÉNÉRALE DE L'ARMEMENT



OUTLINE



The French Policy Update

Implementation Guide - MURAT Specification

***An Example of MURAT Specification :
a 120 mm Mortar Ammunition***



French MURAT policy update

<i>French Policy Update</i>
<i>Implementation Guide - MURAT Specification</i>
<i>Example : Mortar Munition</i>

Ministerial Instruction n°211893 (July 2011) principles

1. Specification of MURAT level for new acquisitions
2. MURAT signature assessment
3. MURAT signature database management



French MURAT policy update

French Policy Update
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Three additional IPE instructions (technical guides) to describe/clarify the new policy implementation

Specification of MURAT level 1

Instruction n° 1184 (20/12/2012)

MURAT signature assessment

Instruction in preparation

MURAT signature database management

Instruction in preparation



Specification of the MURAT Level

<i>French Policy Update</i>
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<i>Example : Mortar Munition</i>

■ Instruction IPE n°1184 dated 20 December 2012 :

"Specification of MURAT Level for New Acquisition of Munitions"

■ General Principles of the process:

- Systematic search of the highest "reasonably" achievable safety level in accordance with STANAG 4439 and more generally the national safety policy on personnel and assets
- Strong involvement of Armed Forces in all the phases of the MURAT specification process and reinforcement of the dialogue with DGA
- Validation by IPE of the compliance with the MURAT specification process



Specification of the MURAT Level

<i>French Policy Update</i>
<i>Implementation Guide - MURAT Specification</i>
<i>Example : Mortar Munition</i>

■ Three main steps:

1. Military requirements and MURAT standards
2. Determination of a MURAT signature called "stabilized" and used in the Request for Proposal (RFP)
3. Validation of a MURAT signature called "reference" resulting from industry consultation and proposed in the final contract



MURAT Specification Steps

1 – Military Requirements

<i>French Policy Update</i>
<i>Implementation Guide - MURAT Specification</i>
<i>Example : Mortar Munition</i>

- **The Armed Force Staff concerned by the munition acquisition puts in the reference table of standards to be applied:**
 - STANAG 4439 and ministerial instruction n°211893

- **The concerned Armed Force Staff sets up a group of experts in charge of defining the MURAT requirements:**
 - Representatives of Armed Force Staff(s), of IPE and DGA/DT (if DGA is in charge of the procurement)
 - Led by a representative of the concerned Armed Force Staff and assisted by an IPE representative



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

<i>French Policy Update</i>
<i>Implementation Guide - MURAT Specification</i>
<i>Example : Mortar Munition</i>

- **Signature defined by the group of experts before bid solicitation:**
 - Signature based on hazard acceptance (**consequences of munition reaction**)
 - Determination of munition life cycle phases and munition configurations in the different phases (tactical, logistical, etc.)
 - Evaluation of the munition reaction level to avoid for each aggression a hazard with catastrophic consequences (hazard analysis)
(MURAT aggressions of the instruction n°211893)
 - Determination of the MURAT State of the Art for the considered munition type
 - Evaluation of potential logistic constraint reduction (DR 1.2 Unitary Risk, SsD 1.2.3, etc.)



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

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Example : Mortar Munition

■ Consequences of munition reaction

Hazard severity	Persons	Class 1 equipment	Class 2 equipment	Class 3 equipment	Environment
Catastrophic (Cat)	Several deaths	Loss	-	-	Severe damage
Critical (Crit)	Single death and/or multiple severe injuries	Severe damage	Loss	-	Major damage
Marginal (Marg)	Single severe injury and/or multiple minor injuries	Minor damage	Severe damage	Loss	Minor damage
Negligible (Neg)	At most a single minor injury	No effect	Minor damage	Severe damage	No effect

■ Equipment classes :

- Class 1 - Major facility, ship, submarine, aircraft, or helicopter
- Class 2 - Minor facility, boat, armoured personnel carrier or major system
- Class 3 - Major component or support equipment



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

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<i>Example : Mortar Munition</i>

■ Signature defined by the group of experts before bid solicitation:

- Signature based on hazard acceptance (consequences of munition reaction)
 - Determination of **munition life cycle phases** and munition configurations in the different phases (tactical, logistical, etc.)
 - Evaluation of the munition reaction level to avoid for each aggression a hazard with catastrophic consequences (hazard analysis)
(MURAT aggressions of the instruction n°211893)
- Determination of the MURAT State of the Art for the considered munition type
- Evaluation of potential logistic constraint reduction (DR 1.2 Unitary Risk, SsD 1.2.3, etc.)



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

■ Example of a 120 mm HE mortar munition

- Life cycle phases

Life cycle phase		Environment	Configuration
Storage	National	Peacetime (P)	Pallet
	Logistical Storage	Operations (O)	Pallet
	Tactical Storage	O	Tactical
Transport	Road	P	Box
	Road	P	Pallet
	Road	O	Tactical
	Rail	P	Pallet
	Sea	P	Pallet
	Air (Aircraft)	O	Pallet
	Air (Helicopter)	O	Box
Fire	Training	P	Tactical
	Combat (vehicle)	O	Tactical



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

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<i>Example : Mortar Munition</i>

■ Signature defined by the group of experts before bid solicitation:

- Signature based on hazard acceptance (consequences of munition reaction)
 - Determination of munition life cycle phases and munition configurations in the different phases (tactical, logistical, etc.)
 - **Evaluation of the munition reaction level** to avoid for each aggression a hazard with catastrophic consequences (hazard analysis)
(MURAT aggressions defined in the instruction n°211 893)
- Determination of the MURAT State of the Art for the considered munition type
- Evaluation of potential logistic constraint reduction (DR 1.2 Unitary Risk, SsD 1.2.3, etc.)



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

■ Example of a 120 mm HE mortar munition

Life cycle phase		Environment	Configuration
Storage	National	Peacetime (P)	Pallet
	Logistical Storage	Operations (O)	Pallet
	Tactical Storage	O	Tactical
Transport	Road	P	Box
	Road	P	Pallet
	Road	O	Tactical
	Rail	P	Pallet
	Sea	P	Pallet
	Air (Aircraft)	O	Pallet
	Air (Helicopter)	O	Box
Fire	Training	P	Tactical
	Combat (vehicle)	O	Tactical

- *Persons : 0*
- *Class 1 equipment : 0*
- *Class 2 equipment : 0*
- *Class 3 equipment : 0*
- *Environment : storage*

- *Persons : 5*
- *Class 1 equipment : 0*
- *Class 2 equipment : vehicles*
- *Class 3 equipment : mortar systems*
- *Environment :*



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

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Example : Mortar Munition

■ **Example of a 120 mm HE mortar munition**

Life cycle phase		Environment	Configuration	Type I reaction	Type III reaction	Type IV reaction
Storage	National	Peacetime (P)	Pallet	Crit	Marg	Marg
	Logistical Storage	Operations (O)	Pallet			
	Tactical Storage	O	Tactical			
Transport	Road	P	Box			
	Road	P	Pallet			
	Road	O	Tactical			
	Rail	P	Pallet			
	Sea	P	Pallet			
	Air (Aircraft)	O	Pallet			
	Air (Helicopter)	O	Box			
Fire	Training	P	Tactical			
	Combat (vehicle)	O	Tactical	Cat	Cat	Crit



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

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Example : Mortar Munition

■ **Example of a 120 mm HE mortar munition**

Life cycle phase		Environment	Configuration	Type I reaction	Type III reaction	Type IV reaction
Storage	National	Peacetime (P)	Pallet	Crit	Marg	Marg
	Logistical Storage	Operations (O)	Pallet	Cat	Crit	Marg
	Tactical Storage	O	Tactical	Cat	Marg	Marg
Transport	Road	P	Box	Cat	Marg	Marg
	Road	P	Pallet	Cat	Marg	Marg
	Road	O	Tactical	Cat	Crit	Marg
	Rail	P	Pallet	Cat	Marg	Marg
	Sea	P	Pallet	Cat	Marg	Marg
	Air (Aircraft)	O	Pallet	Cat	Cat	Crit
	Air (Helicopter)	O	Box	/	/	/
Fire	Training	P	Tactical	Cat	Crit	Marg
	Combat (vehicle)	O	Tactical	Cat	Cat	Crit



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

- Example of a 120 mm HE mortar munition
 - IM signature coming from hazard analysis

	FCO	SCO	BI	FI _{light}	FI _{heavy}	SD	SCJ
Signature	IV	IV	IV	IV	III	III	III



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

<i>French Policy Update</i>
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<i>Example : Mortar Munition</i>

■ Signature defined by the group of experts before bid solicitation:

- Signature based on hazard acceptance (consequences of munition reaction)
 - Determination of munition life cycle phases and munition configurations in the different phases (tactical, logistical, etc.)
 - Evaluation of the munition reaction level to avoid for each aggression a hazard with catastrophic consequences (hazard analysis)

(MURAT aggressions of the instruction n°211893)

- Determination of the **MURAT State of the Art for the considered munition type**
- Evaluation of potential **logistic constraint reduction** (DR 1.2 Unitary Risk, SsD 1.2.3, etc.)



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

■ Example of a 120 mm HE mortar munition

- Hazard analysis generalized to all MURAT aggressions

	FCO	SCO	BI	FI _{light}	FI _{heavy}	SD	SCJ
Signature	IV	IV	IV	IV	III	III	III

■ MURAT State-of-the-Art

	FCO	SCO	BI	FI _{light}	FI _{heavy}	SD	SCJ
Signature	V	V	V	IV	III	III	I

■ Reduction of Logistic constraints

- Operational benefit of a NATO SsD 1.2.3 Storage sub-Division
- Relevant because the small deviation between the signature from the danger analysis and MURAT signature is technologically achievable

	FCO	SCO	BI	FI _{light}	FI _{heavy}	SD	SCJ
Signature SsD 1.2.3	V	V	V			III	



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

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- Example of a 120 mm HE mortar munition
 - Proposed "stabilized" signature

	FCO	SCO	BI	FI _{light}	FI _{heavy}	SD	SCJ
Signature	V	V	V	IV	III	III	I



MURAT Specification Steps

2 – "Stabilized" MURAT Signature

<i>French Policy Update</i>
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<i>Example : Mortar Munition</i>

■ Justification report for the "stabilized" MURAT signature :

- Report written by the group of experts
- Describe and justify the information used to define the "stabilized" MURAT signature
- If the "stabilized" signature is downgraded compared to the signature obtained with hazard analysis : evaluation of consequences
- Official IPE advice requested on the report before validation of the "stabilized" MURAT signature by the concerned Armed Force Staff



MURAT Specification Steps

3 – "Reference" MURAT Signature

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Example : Mortar Munition

Signature	FCO	SCO	BI	Fl _{light}	Fl _{heavy}	SD	SCJ
Stabilized	V	V	V	IV	III	III	I
After bidding process	V	IV	V	III	III	III	I

■ Based on the signature resulting from the bidding process:

- Analysis of the deviation from the "stabilized" MURAT signature
 - Performed by the group of experts
 - Differences compared through a **risk analysis**
 - Proposal of corrective and preventive actions for risk levels judged as "inacceptable"
- Justification report for the "reference" MURAT signature based on these elements
- Official IPE advice requested on the report before validation of the "Reference" MURAT signature by the concerned Armed Force Staff



MURAT Specification Steps

3 – "Reference" MURAT Signature

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Example : Mortar Munition

■ Risk assessment

Hazard severity	Persons	Class 1 equipment	Class 2 equipment	Class 3 equipment	Environment
Catastrophic (Cat)	Several deaths	Loss	-	-	Severe damage
Critical (Crit)	Single death and/or multiple severe injuries	Severe damage	Loss	-	Major damage
Marginal (Marg)	Single severe injury and/or multiple minor injuries	Minor damage	Severe damage	Loss	Minor damage
Negligible (Neg)	At most a single minor injury	No effect	Minor damage	Severe damage	No effect

Consequences of munition reaction

Mishap probability levels

Probability level	Probability designation	Specific individual equipment
Probable	P	Likely to occur several times
Occasional	O	Likely to occur sometime
Remote	R	Unlikely but possible to occur in the life of an item
Improbable	I	Possible but so unlikely that occurrence is not expected



MURAT Specification Steps

3 – "Reference" MURAT Signature

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Example : Mortar Munition

■ Risk assessment

Risk level matrix

Hazard \ Likelihood	Catastrophic	Critical	Marginal	Negligible
Probable	A	A	B	C
Occasional	A	B	C	C
Remote	B	C	C	C
Improbable	C	C	C	C

Risk management

Risk level	Interpretation
Class A	Inacceptable except in extraordinary circumstances
Class B	Undesirable but can be accepted by the Armed Force Staff if no risk reduction is possible
Class C	Acceptable



MURAT Specification Steps

3 – "Reference" MURAT Signature

- Example of a 120 mm HE mortar munition
 - Risk analysis for fragment aggression

Life cycle phase	Environment	Configuration	Mishap Probability	Type III reaction		Type IV reaction		
				Hazard severity	Risk	Hazard severity	Risk	
Storage	National	Peacetime (P)	Pallet	R	Marg	C	Marg	C
	Logistical Storage	Operations (O)	Pallet	O	Crit	B	Marg	C
	Tactical Storage	O	Tactical	O	Crit	C	Marg	C
Transport	Road	P	Box	R	Crit	C	Marg	C
	Road	P	Pallet	R	Marg	C	Marg	C
	Road	O	Tactical	P	Crit	A	Marg	B
	Rail	P	Pallet	R	Marg	C	Marg	C
	Sea	P	Pallet	R	Marg	C	Marg	C
	Air (Aircraft)	O	Pallet	R	Cat	B	Crit	C
	Air (Helicopter)	O	Box	P	Crit	A	Crit	A
Fire	Training	P	Tactical	I	Crit	C	Marg	C
	Combat (vehicle)	O	Tactical	P	Cat	A	Crit	B



MURAT Specification Steps

3 – "Reference" MURAT Signature

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Example : Mortar Munition

Signature	FCO	SCO	BI	Fl _{light}	Fl _{heavy}	SD	SCJ
Stabilized	V	V	V	IV	III	III	I
After bidding process	V	IV	V	III	III	III	I

■ **Based on the signature resulting from the bidding process:**

- Analysis of the deviation from the "stabilized" MURAT signature
 - Performed by the group of experts
 - Differences compared through a **risk analysis**
 - Proposal of corrective and preventive actions for risk levels judged as "inacceptable"
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QUESTIONS ?

