# Future Combat Systems

## FCS NLOS-Mortar Key Requirements Overview 2 Oct 03

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### To provide an overview of the Future Combat System Non Line Of Sight -Mortar and it's overall development program

## **FCS System of Systems**





### **NLOS-M "Top Ten" Design Drivers**



### <u>Common</u>

- C130 transport Establishes weight and volume constraint
- ECC Weight (flyweight) Establishes deployability constraint
- Mine Protection Drives armor design and interior volume availability
- Operational Range Drives on board fuel capacity
- Add-on Armor time Drives armor design
- Reliability Overall design impact
- Silent Watch Drives power capacity

### Mortar Unique

- Crew Size Drives ergonomic design, impact on ammo compartmentation as well
- Max Rate of Fire Drives complexity of armament/ammo handling subsystems
- On board ammo capacity Drives overall vehicle weight & internal volume

### ECC Weight/C130 requirements are "the eye of the needle" for all MGVs

## **Concept Development Work**



- Requirements and RFI responses led to generation of numerous concepts
- Concepts for mission modules and subsystems spanned range of fully automatic to manual to completely bound the solution set



### **Concept Evaluation Emerging Results**



- Components of the evaluation
  - Full scale mock-ups of weapons compartment & ammo handling equip.
  - 1/6<sup>th</sup>-scale models of full vehicle and all components
  - Visual "fly-through" with Visual Integration Lab simulations
  - Pair-wise comparisons (performance, cost, risk)
  - Requirements compliance review
  - Establishment of NLOS-M Standards of Excellence
- Key Emerging Results
  - Concepts with crew or ammo in turret were rejected due to weight burden, integration challenges, and MANPRINT concerns
  - Crew size limited to 3 or 4 for further review
  - All crewmen co-located, with side access doors desired
  - Dual-tube configuration warrants further review
  - SD&D baseline configuration selected

### NLOS-M Concept Still Evolving...

## **NLOS-M Evolving Concept**





### **NLOS-M SD&D Baseline**



#### **GENERAL CHARACTERISTICS**

• 4-man crew, quad-seating arrangement

#### MOBILITY

- 90 kph top speed & 75 kph sustained
- 500 km range
- Fording: 1.5 m
- Vertical Obstacle: 1.0m
- Ground Clearance: Variable 203 406 mm (8 - 16 inches)



#### LETHALITY

- Single-tube 120mm smooth-bore, breech-loaded mortar
- - 3 to + 85° elevation capability
- Turret with 360° traverse
- 60+ rounds total capacity
- ORD max rate, ORD sustained rate, MRSI capability
- Close Combat Armament System

#### SYSTEM SURVIVABILITY - Integral

- Auto Cannon protection
- HMG ballistic and HE fragment protection
- AP mine protection
- Survivability Suite (sensors/decoys/countermeasures)
- C4ISR Situation Awareness
- CBRN protection / detection
- Ammo Compartmentation

#### **SYSTEM SURVIVABILITY - Removables**

- · Ballistic and signature management kits
- Modified AT mine protection
- Top attack protection

### **Baseline necessary to definitize SD&D contract**

## **Key NLOS-M Program Events**



<u>Event</u>	<u>Timeframe</u>
MGV (NLOS-M) Contract Award	30 Nov 03
Requirements Baseline Established (SFR)	May 04
Design Baseline Established (PDR)	Oct 04
Prototype Design Frozen (CDR)	Aug 05
1 <sup>st</sup> of 5 Prototypes Delivered for Test	Jan 07
Limited User Test 1	Apr 07
Initial Production Decision	Sep 08

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## **Path Forward**

• Participate in FCS SD&D contract definitization activity (complete by end Nov 03)

NLOS-Mortar is in line with FCS objectives and schedule

- Continue participation in Requirements trade activities
- Continue to refine Concept
  - Timeline/Thermal analyses
  - Human factors analyses
  - Crew task analyses
  - User/NCO input
  - Other engineering analyses
- Conduct subsystem trades
- Continue close coordination with other supporting FCS IPTs
- Establish NLOS-M Requirements and Concept Baseline



