Industry Cooperation on NLOS-LS

Lockheed Martin and Raytheon Have Joined Forces Forming a 50/50 NetFires LLC to Produce NLOS-LS for the Army
- Sharing Resources, Experience
- Developing Commonality Between Missiles
- Political Strength to Maximize Program Support
- Collaboration And Sharing of Proprietary Data

NetFires Limited Liability Company

Board of Directors

Program Office

Raytheon

- Scott Speet - Exec Vice President
- Robert Wickliffe - Engr Director
- George Svitak - Dep Bus Devel Dir
- Ken Warner - Dep Bus Mgmt Dir
- Scott Hawthorne - Contracts Dir

LAM PM

PAM PM

CLU PM

Ric Magness - President
Don Mayo - Dep Engr Dir
Steve Altman - Bus Devel Dir
Brenda Davidson - Bus Mgmt Dir
Bob Allen - Dep Contracts Dir

- 50/50 Workshare, Board, And Management
- Every Position has Peer in Partner Company
- Job Titles Rotate
NLOS-LS Components

**LLC Mission Specific Common Components**
- GPS/Inertial Navigation
- Network Radio
- Launcher-Missile Interfaces
- C2 Interface to FCS UA
- Canister-Missile Interface
- ESAF (Missiles only)
- Control Actuation System (Missiles only)
- Canister Housing *
- CLU Base *
- Canister Cover *
- Test Connector *
- Warhead *
- AND GROWING

**Mission Specific Packages**
- Solid Rocket Propulsion
- Dual Mode Seeker

* New Since LLC Formed

**NetFires LLC Development Program Cost Reducers**
- System Requirements Development
- Common Subsystem Development
- Specialty Engineering
- Logistics Development
- Common Simulation Environment
- Special Test Equipment Development
- Fully Integrated Test Program

**Container Launcher Unit (CLU)**

**Loitering Attack Missile (LAM)**

**Precision Attack Missile (PAM)**
NLOS-LS Concept of Operation

- GPS
- Self Aligning Remote Control Launcher
- UCIR w/ATR
- Short Time of Flight
- LAM
- LADAR ATR
- Observed Fires Report BDA
- Report Redirect
- Immediate Attack
- Wide LAM Search Area
Development Roadmap for NLOS-LS

**Increment I SDD**

- Launcher - Platform Independent, C-130 RO/RO, Anti-Tamper
- LAM - Area search with limited ATR; high value targets
- PAM - Stationary and moving hard targets with network updates
- FCS network compatible missile data link
- Interoperability with FCS and legacy C4ISR network

**S&T**

- Increment 1 Risk Mitigation
  - Insensitive Munitions
  - ATR
  - Networking
- Future Forces
  - LAM/PAM Upgrades
  - Other Missile Variants

**Technology Insertions**

- Expand area search/loiter time
- Update HW/SW architectures
- Improve warhead lethality, non-lethal effects
- Improved GPS Anti-Jam
- Adverse weather performance

**NLOS LS S&T Program**

**Production**

**Ongoing R&D**
PAM: Current System

Anti-Jam GPS with Micro Electro Mechanical Inertial Measurement Unit
Allows the missile to navigate to a point where a target is even in the presence of jamming

LASER and Uncooled Infrared Seeker
The missile can find a target on its own, or a soldier can designate a target with a laser

Pop-Out Fins
These steer the missile

Data Link
The missile can receive target location updates while it is flying

Variable Thrust Rocket Motor
Allows the missile to go fast to nearby targets or to maximize range

Approved for public release, distribution unlimited
PAM GTV 2
PAM CFT 2 Results

Test Helo

Typical Daytime Conditions

Form Factored NetFires PAM Seeker, GPS/INS and MEM

Target Array - Day

Target Array - Evening

GTV-1 Rehearsal

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LAM: Current System

**Deployable Wing**
Is folded while in the launch tube, then deploys for flight

**Fin Control Motors**
Move the fins in response to commands from the autopilot

**GPS / INS Navigation System**

**LADAR (Laser Radar) Seeker**
Produces a 3-D image of the target scene and is good at searching large areas for targets automatically

**Data Link**
Allows information to be passed to and from the missile in flight, including mission updates and images from the missile

**Turbojet Motor**
Provides propulsion during the horizontal flight of the missile

Example of LAM launch

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LAM CTV

LAM CTV1
LAM CFT Examples

Intensity Image…Videos are Faster Than Real Time

Height Above Ground Image, False Color Added…Videos are Faster Than Real Time

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**Platform Assumptions**

- Maximize number of munitions per plane load
- Minimize system prep time
- Meet the intent of NLOS-LS ORD transportability requirements
- No or minimal impact to force structure

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**NLOS-LS Potential Platform Carrier:**

- **FMTV:** 3 CLU’s
- **HEMTT:** 4 CLU’s
- **HMMWV:** 1 CLU

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Overarching requirement is for NLOS-LS to be platform independent.

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Roll Off: 15 missiles

Roll Off: 45 missiles available for support