



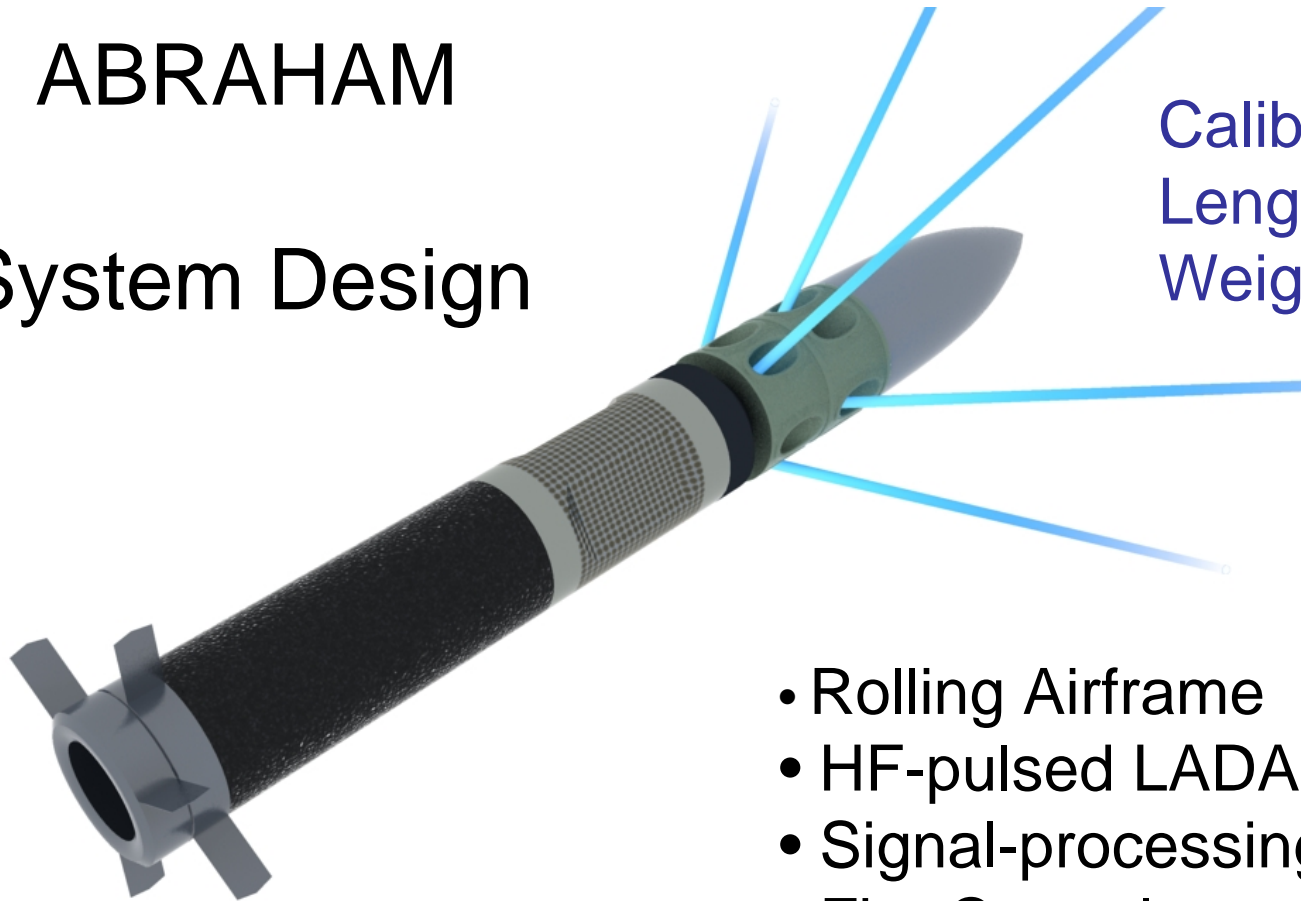
# *Our Vision*



# ABRAHAM

BAE SYSTEMS

## ABRAHAM System Design



Calibre: 120 mm  
Length: 1600 mm  
Weight: < 25 kg

- Rolling Airframe
- HF-pulsed LADAR
- Signal-processing
- Fire Control
- Advanced Warhead

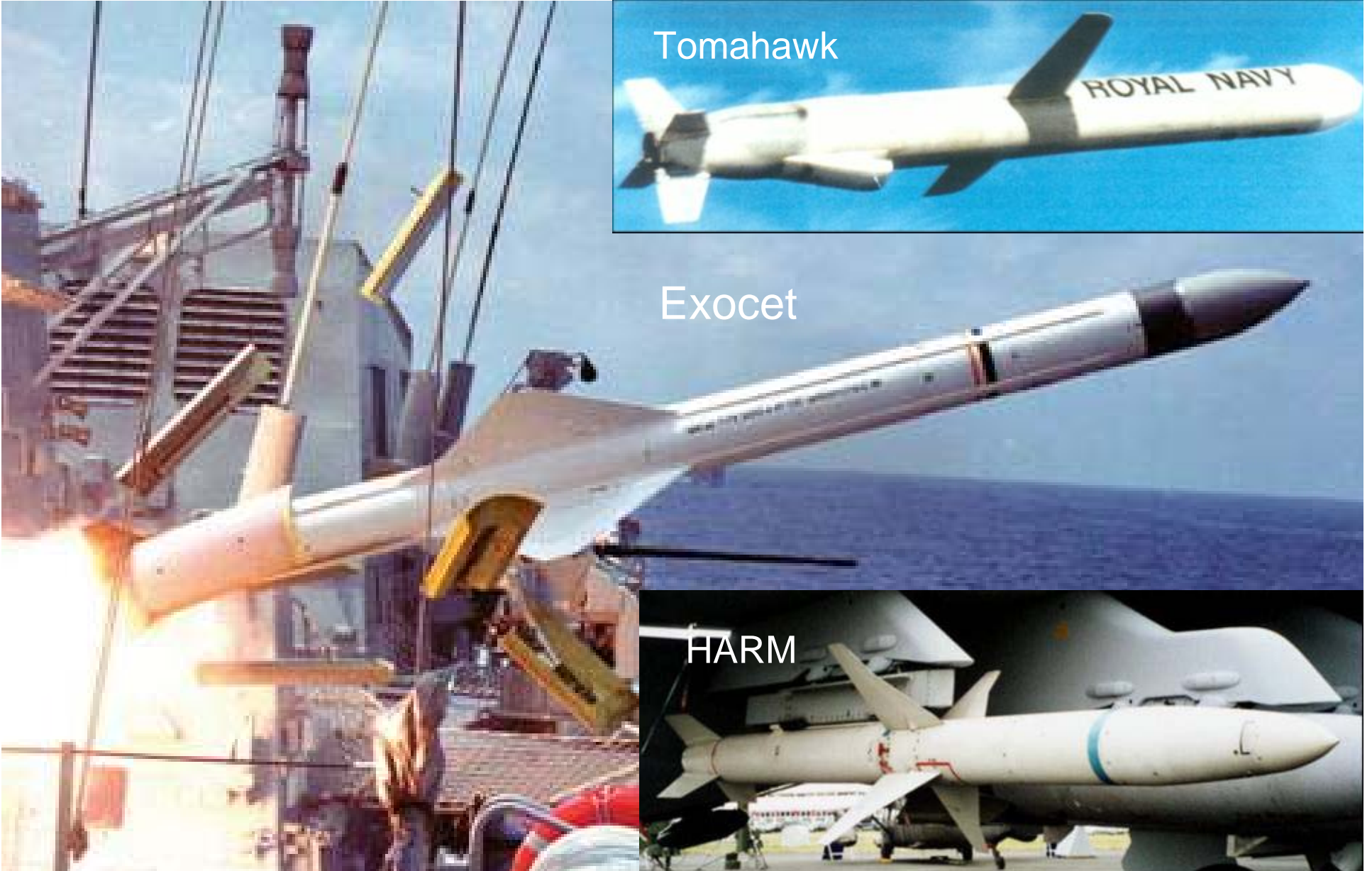
# Primary Targets

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Tomahawk



Exocet



HARM



# Additional Targets

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# Secondary Targets

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# Other targets

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# System Components

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- Surveillance RADAR
- C<sup>2</sup>
- Fire Control
- Firing Units



# ABRAHAM System

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The Unit is thought to be a part in a system by system approach  
The Unit should be possible to operate remotely  
Equipped with a radar site complex firing tasks could be accomplished

- Maximum Intercept range should be ~3000 m from each unit
- Flight out time to ~3000m will be ~5s
- Maximum target speed 1000 m/s.
- Launch should be done when target a a distance of ~8km
- A ~15 km detection capability of the Surveillance radar

## A firing unit consist of:

- Gun
- Radar site (option)
- Rocket in ready to launch tube



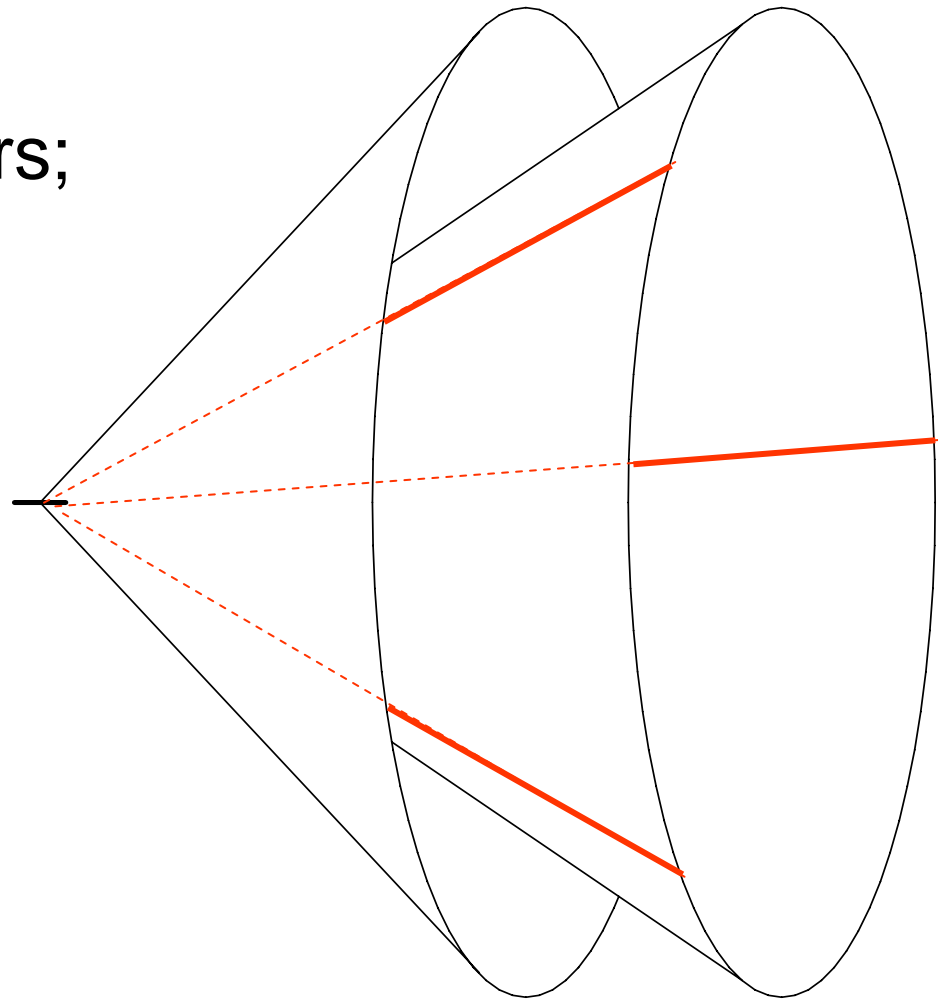
# ABRAHAM - Sensor

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# Sensor -- Principal

- Six laser range-finders;  
three per helix
  - Laser transmitter
  - Laser receiver
  - Software
- Target Detection Software

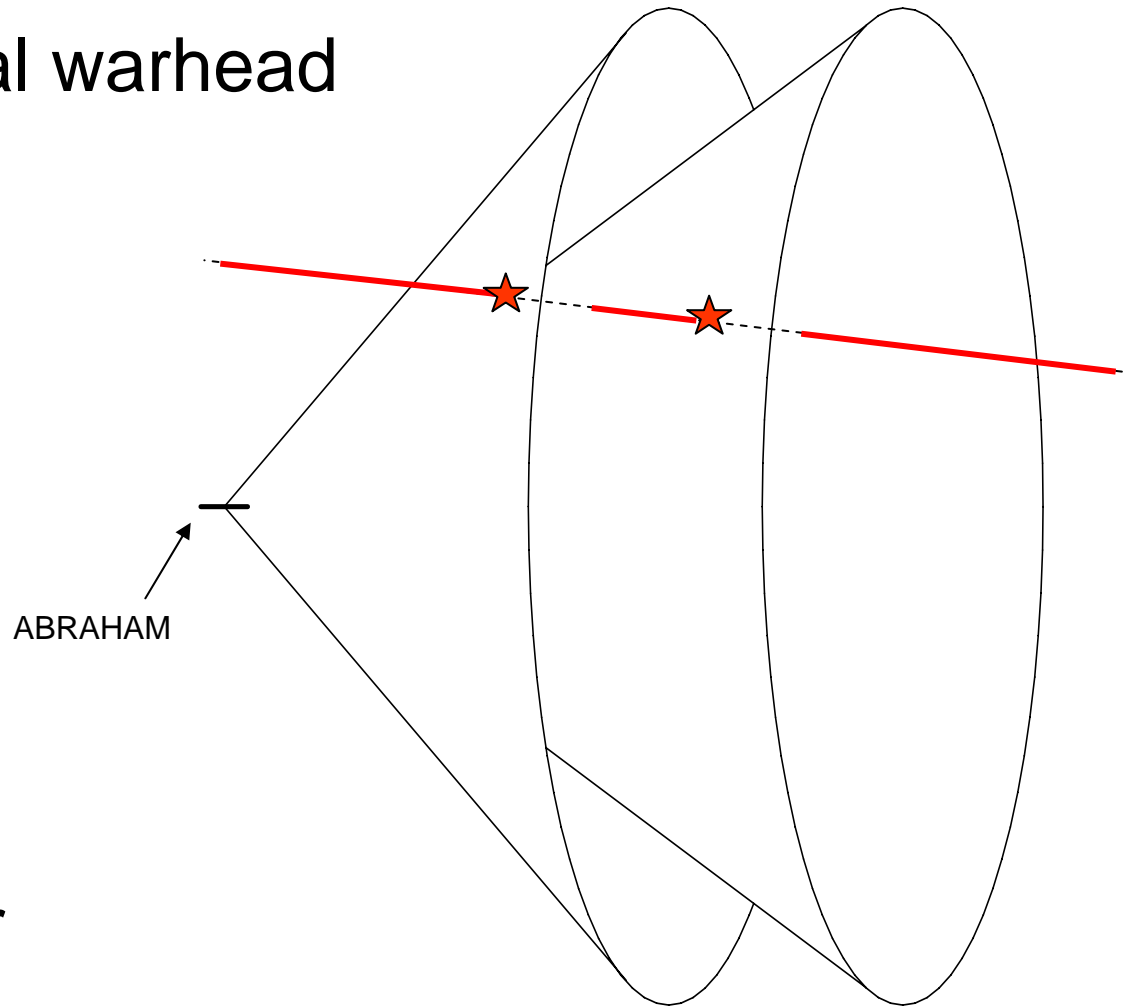


# Sensor -- Principal

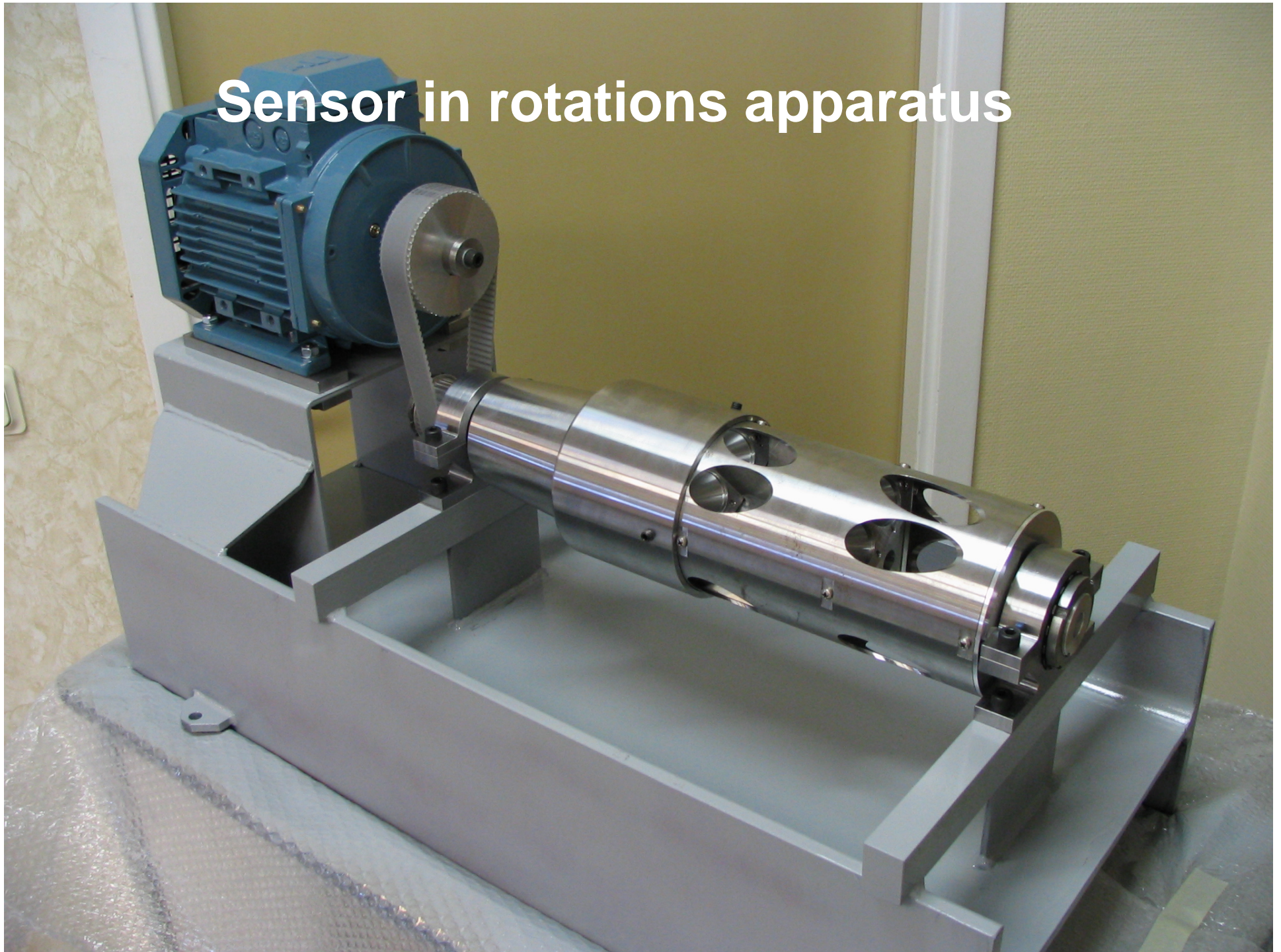
- Rotating directional warhead
- Rotating sensor
- Two helixes
  - Distance
  - Angle



Laser range-finder



# Sensor in rotations apparatus

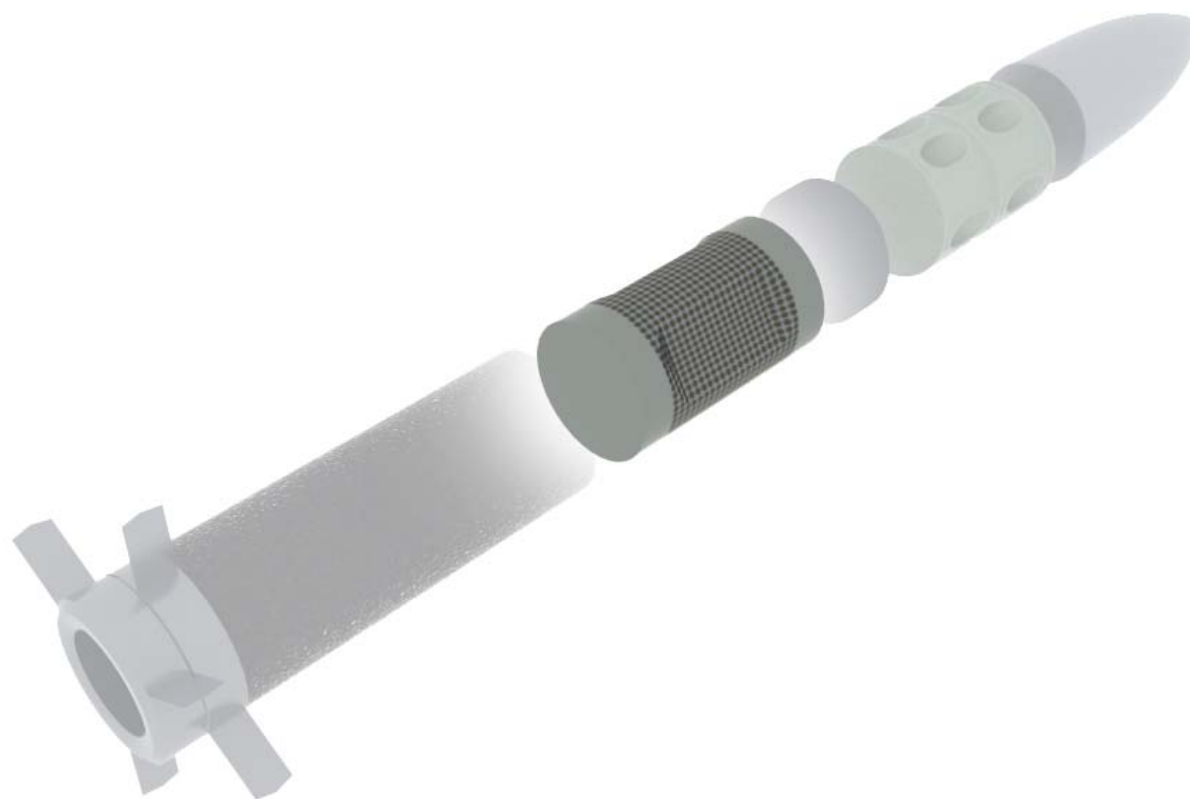


# Sensor trial – Shot no.1



# ABRAHAM - Warhead

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# Warhead Design

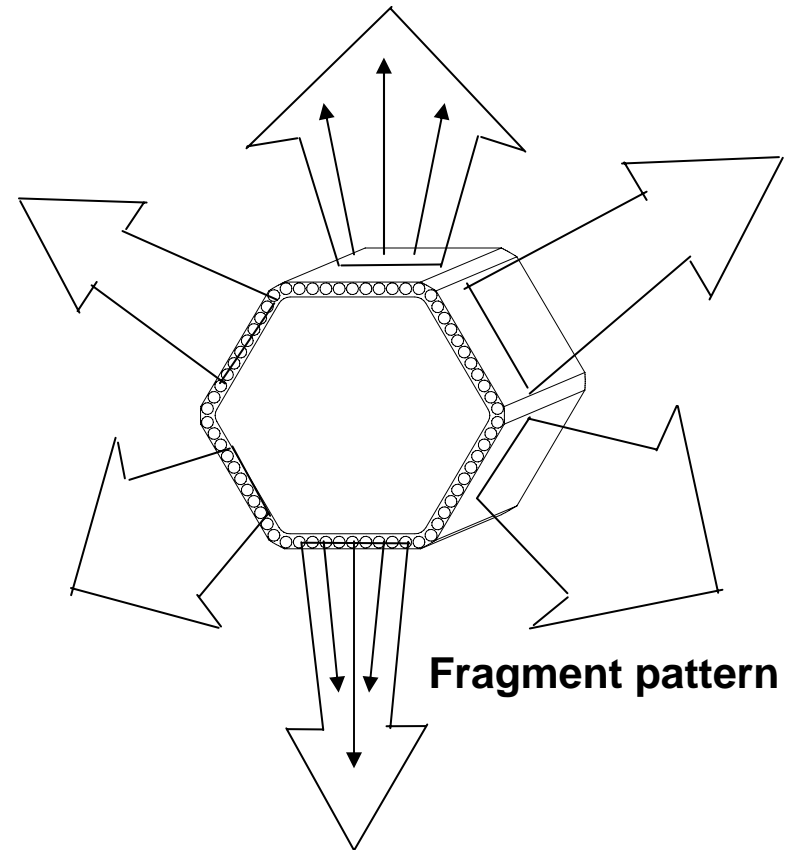


METAL MATRIX  
AIRFRAME BODY  
- Tungsten Pre-Formed Fragments

ADVANCED SHAPE  
Simultaneously  
- Long Range  
- Short Range



Rolling Airframe



Foot-print of 1m<sup>2</sup> @ 50m



# Warhead Rotation Trial



A: Warhead with rotation device.

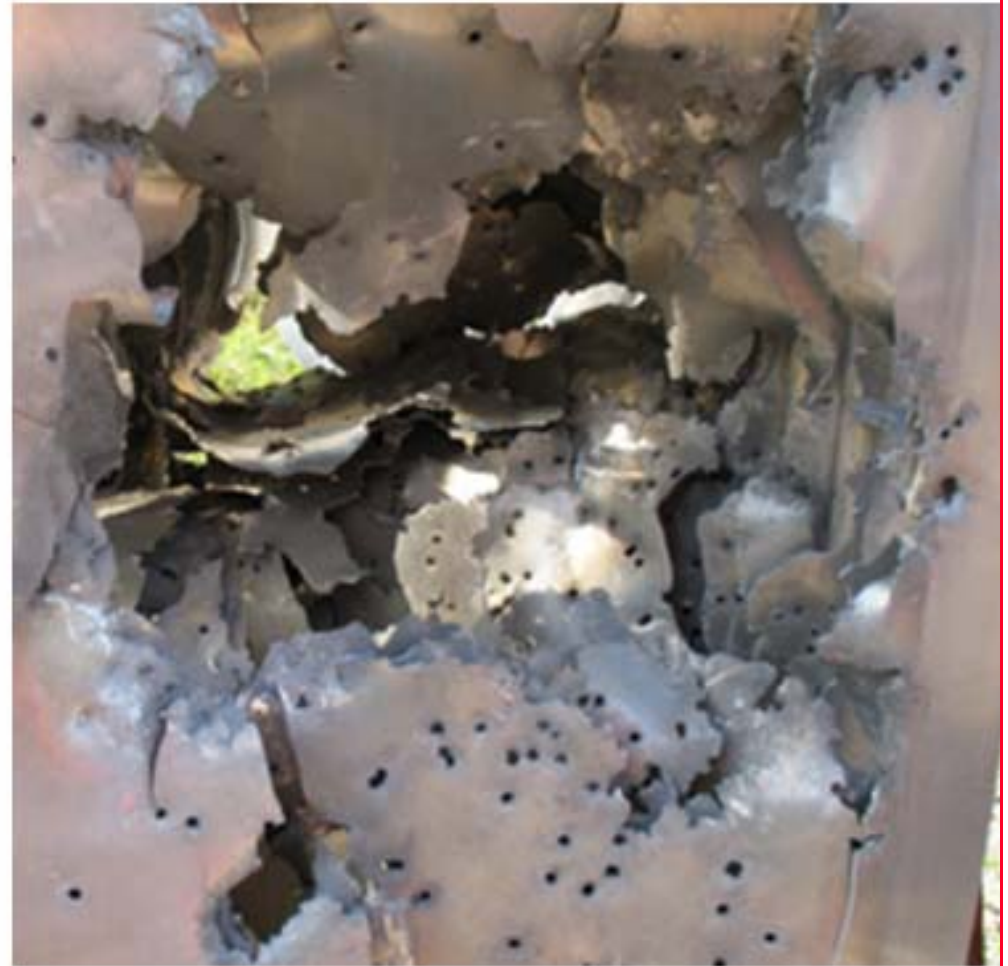
B: Target setup with dural aluminum sheets (20 with 2,5 cm spacing)

C: High speed video.

D: Camera for surveillance of safety- and arming functions.

# Warhead Impact with rotation

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# Penetration Capability

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# 120mm Mortar Rounds



The long distance mode impacts with approx 110 TM-balls.

The explosives was brought to detonation by chock initiation.

Close range mode impacted with approx 20 TM-balls.

The explosive was brought to deflagration.

# ABRAHAM

## Launch and Propulsion

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# Launch Trial



# Fin Deployment Test

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- Picture at top: projectile closes in on whiteness paper
- Picture in middle: Hood is ejected
- Lower pictures: Projectile has flown through paper with fins deployed

# ABRAHAM

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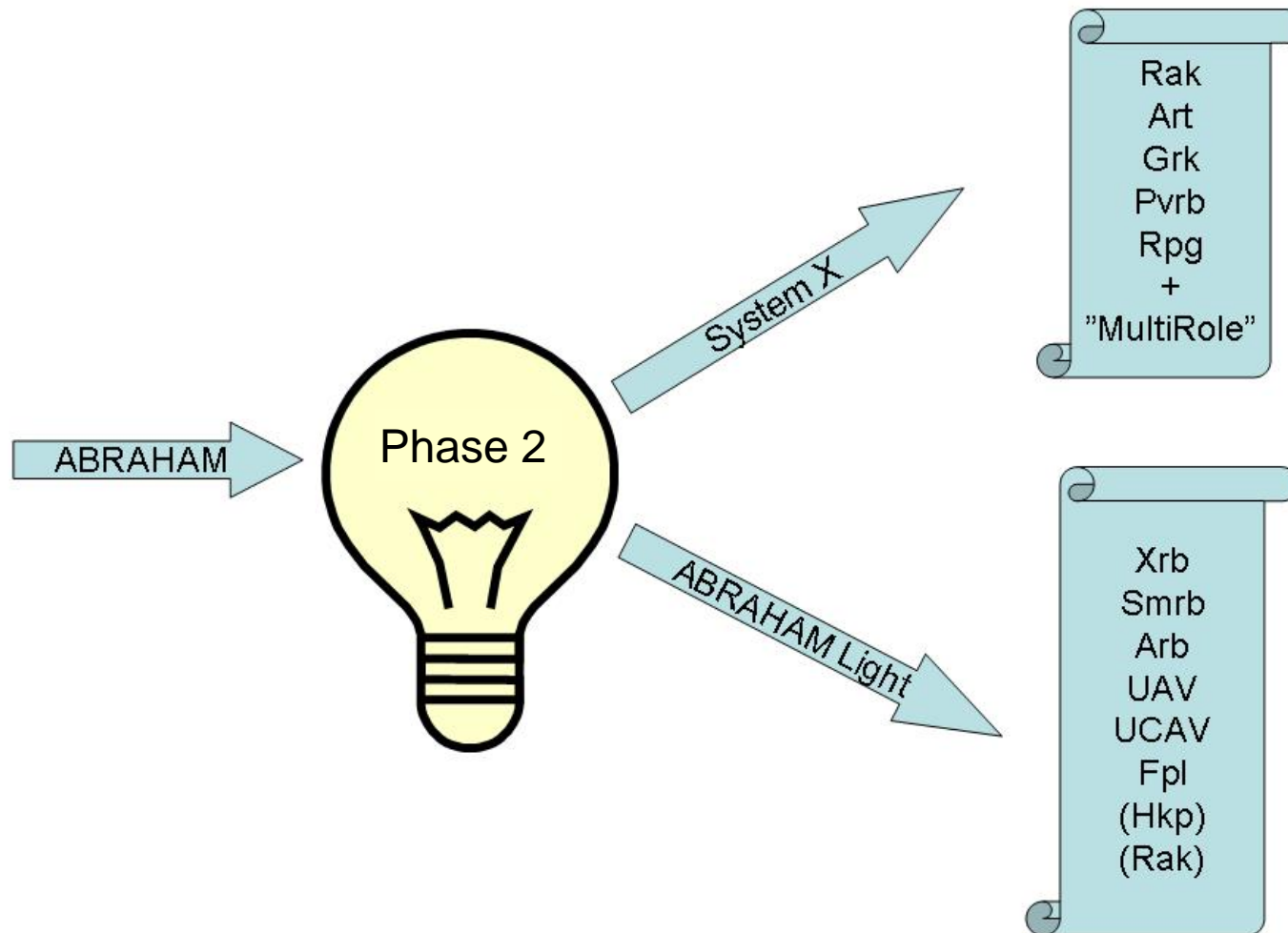
ABRAHAM from a Launch and Propulsion perspective:

- A “recoilless” launch gives the rocket  $\sim v_0$  250 m/s
- A rocket motor accelerates the rocket to a maximum of 1000 m/s
- Tilted fins gives a stable flight and a rotation of approx. 12 - 15000 rpms





# TWO WAYS TO GO



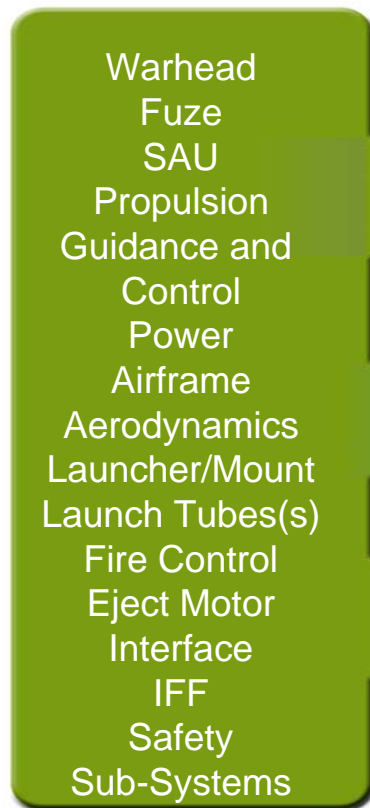
# System Development Philosophy

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## Sub-systems

## Philosophy

## Systems

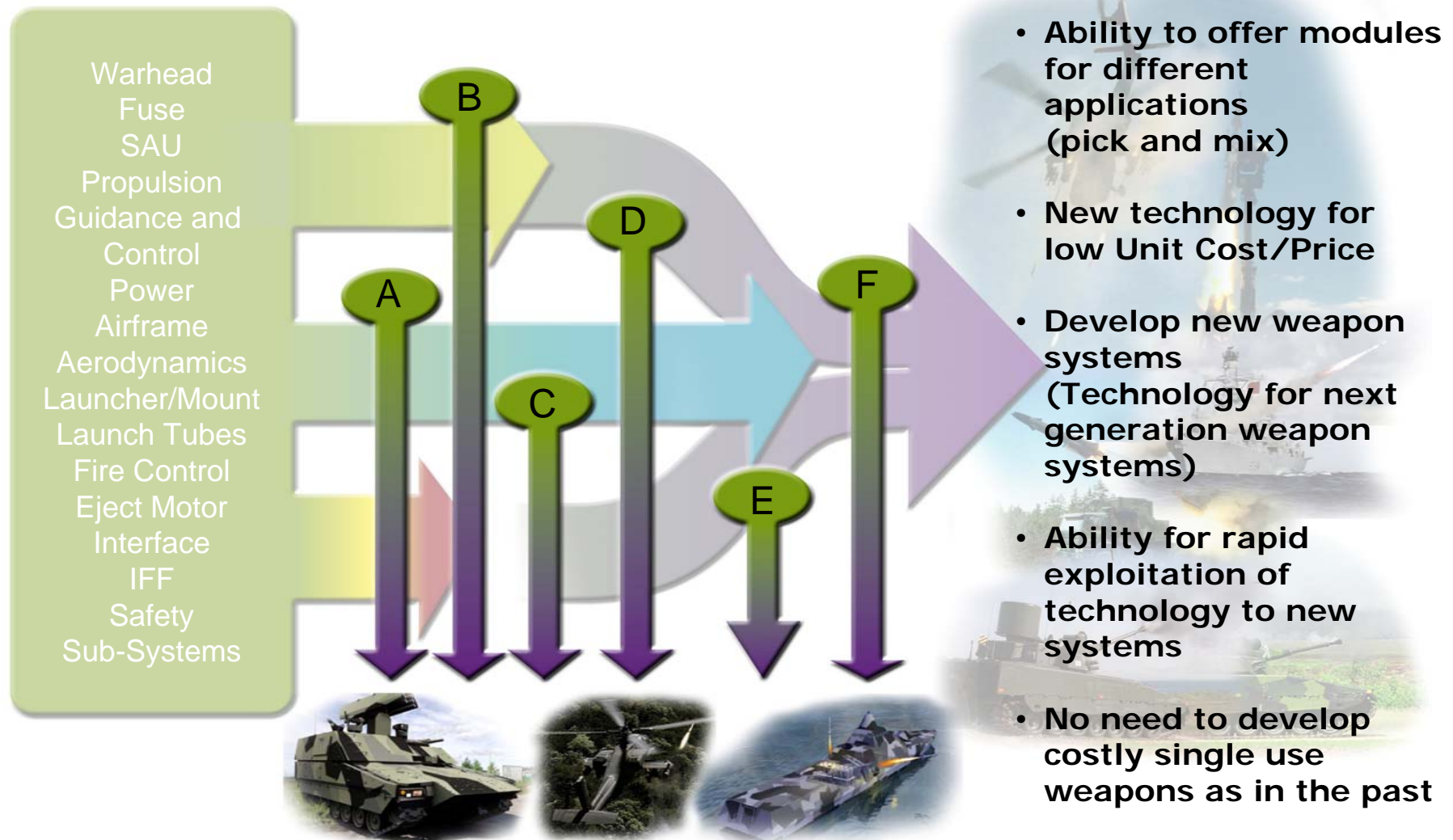


Low risk  
Low cost  
Modular approach



# System Development Philosophy

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# Objects that needs Protection



Camp Victoria in Kosovo



East gate at Camp Fylke in Arbusove



Escort under preparations, munitions handling and evacuation.



Recon party driving on road and off road. Destroyed vehicle.

The object various in:

- size
- mobility
- passive protection levels

# Terrorist Threat



Iraq rebel with American 60 mm mortar.



QUASSAM 2, improvised rocket.

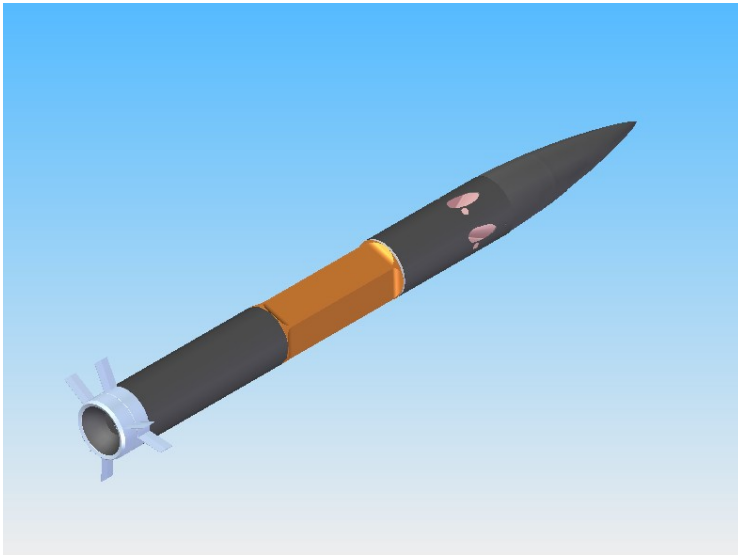


RPG can be used for indirect fires. The grenades AD-function after approx. 900 m of flight has been used to obtain airburst.

The most common targets are small and many are hard.

# ABRAHAM Light

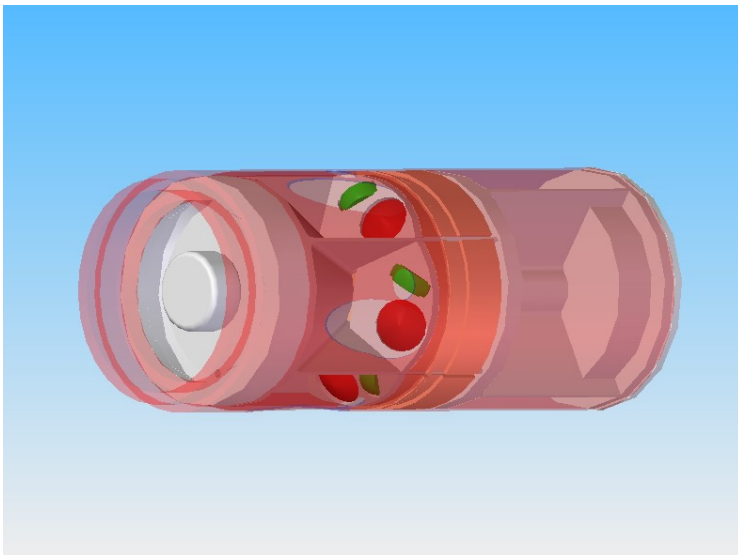
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Has a multifaceted shaped warhead and increased numbers of laser designators.

The increased numbers of laser designators detects targets in the forward helix and another in the back helix.

The rocket now weighs well under 20 kg.



It will also be slightly shorter than the original version.

# ABRAHAM

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## Potential Applications of ABRAHAM Technology

- **Future Ground Based Air Defence Adjunct**
- **Low Cost Naval Point Defence**
- **Naval Anti-Surface - Counter Attack Craft**

Original  
Concepts

- **Counter Mortar Point Defence System**
- **Direct Battlefield Engagement (soft skinned)**
- **120 mm Smooth Bore/Interim Rifled**
- **Future Rapid Effects System (FRES) Weapon**
- **Indirect Battlefield Artillery Warhead/Payload**
- **Loitering Munition Payload**

Evolving  
Concepts

- **Replacement of current payloads**

Payload  
Concepts

# *Our Vision*

