# Aerial Targets
# & Unmanned Aviation

## Critical Threats Driving Future Requirements

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# Naval UAS Family of Systems

USN

USMC 3-Tier FOS

Tier 5

Tier 4

Tier 3

Tier 2

Tier 1

*Increasing performance, payload, vehicle size*

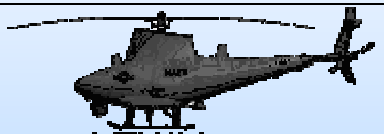
**Family of Systems**
- Interoperable
- Affordable
  - Leverage investment
  - Avoid "re-inventing the wheel"
- Commonality in:
  - Software
  - Parts
  - Training (Common FRS)
  - Interfaces

*Navy UCAS*
*USN*

*GlobalHawk Maritime Demo*
*USN*

*BAMS*
*USN*

*Pioneer Sustainment*
*USMC*

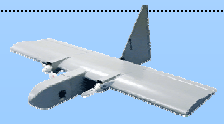


VTUAV
USN

*VUAS AoA*
*USMC*

*ISR Services*
*USN/USMC*

*Joint Tier II UAS*



*Dragon Eye*
*USMC*

**Enablers**
- Open/scalable systems
- Standardized interfaces
- Human Capital Strategy
- Single UAS FIT
- Partnership

*Increasing Reach, C2 Integration, & Complexity*

*Key:* *POM 08 Issue* *Not Funded*

# MQ-8B Fire Scout VTUAV


***Fire Scout Shipboard landing aboard USS Nashville 16 & 17 Jan 06***

# Aerial Targets
## A Major Segment Of Unmanned Aviation

### Navy Subsonic

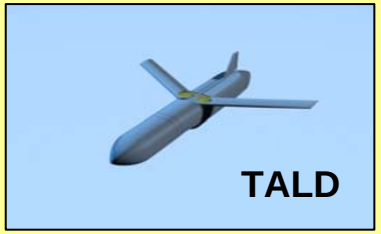
BQM-34S



### Navy Supersonic




### Decoys

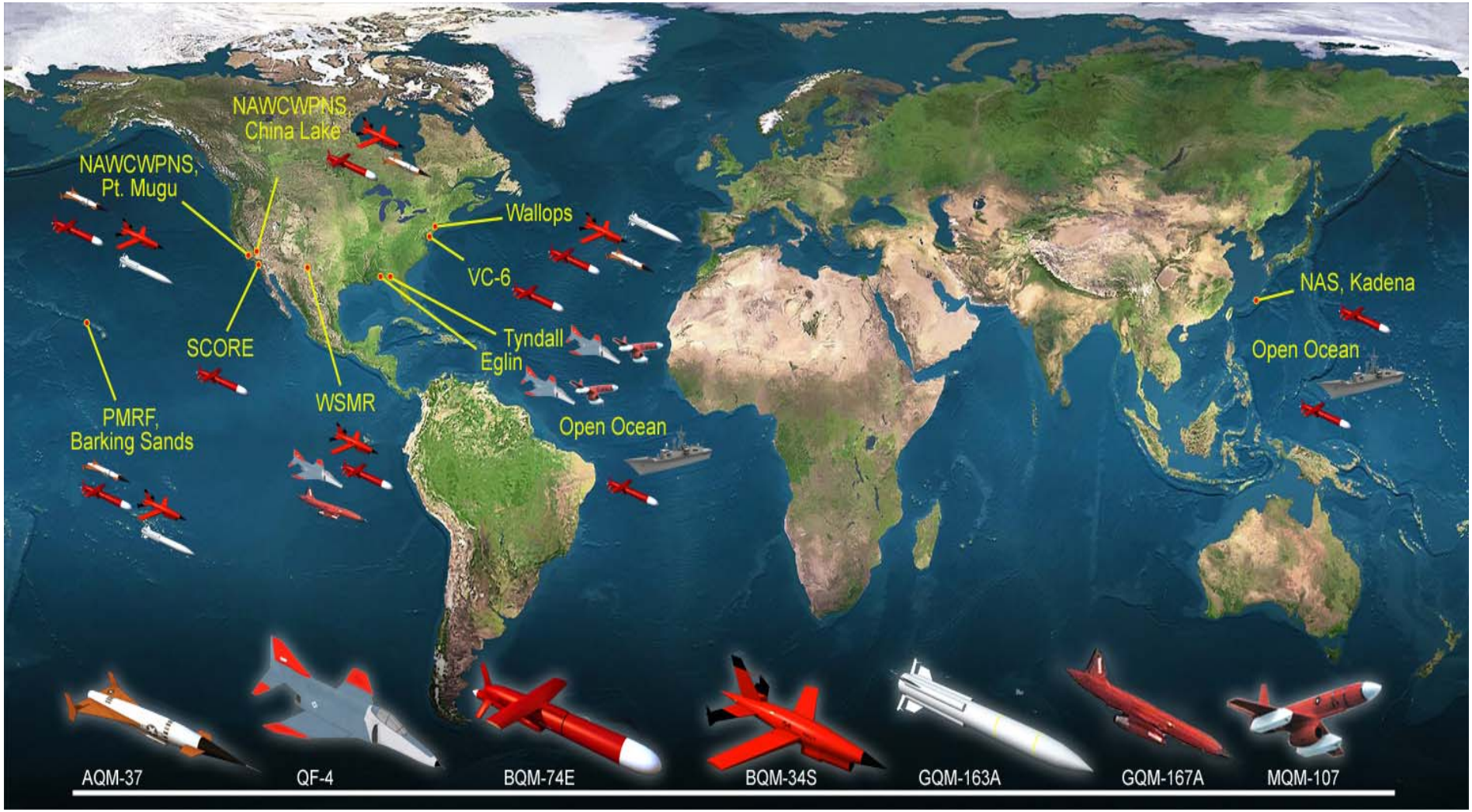




### Air Force / Army



# Aerial Targets
## A World-Wide Operation



# U.S. Navy Aerial Targets

# Aerial Targets
## More Than An Air Vehicle

Targets

Range
Interface Standards

Payload
Interface Standards

Ranges

Control & Data
Standards

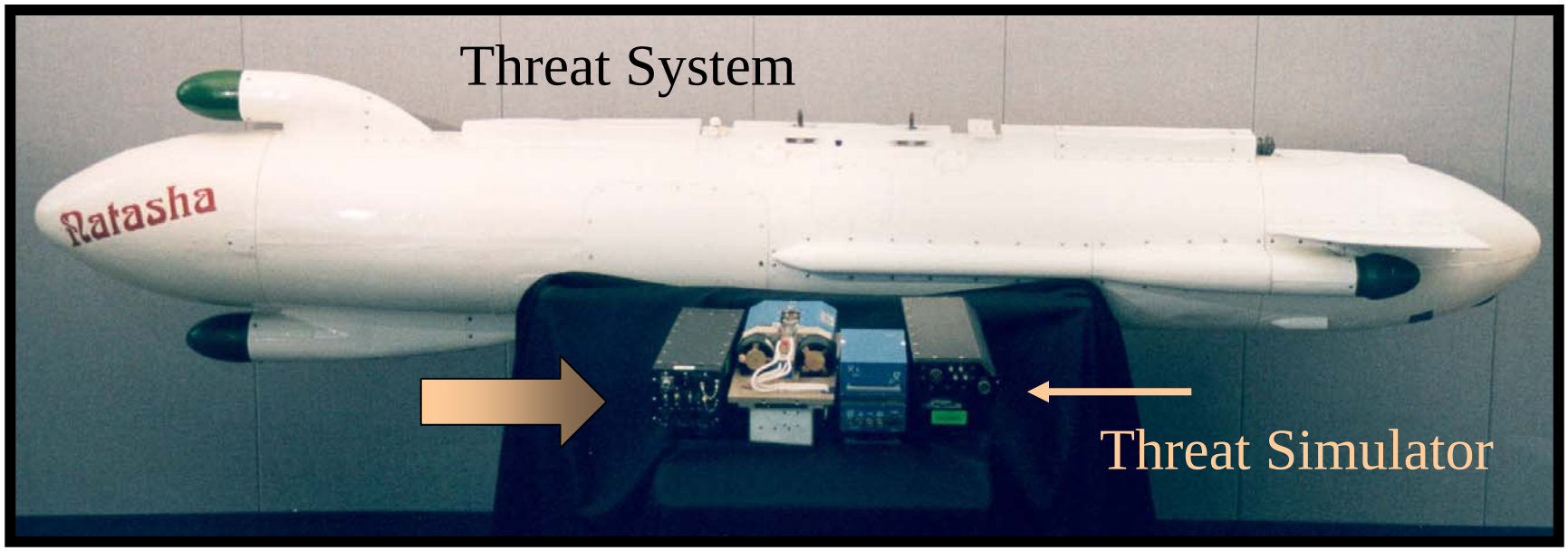
Target Payloads

Transponder

Control Systems

# Threat System Miniaturization (Phase 1)

## Initial Miniaturization (BQM-34S / Full Scale Aircraft Compatible)



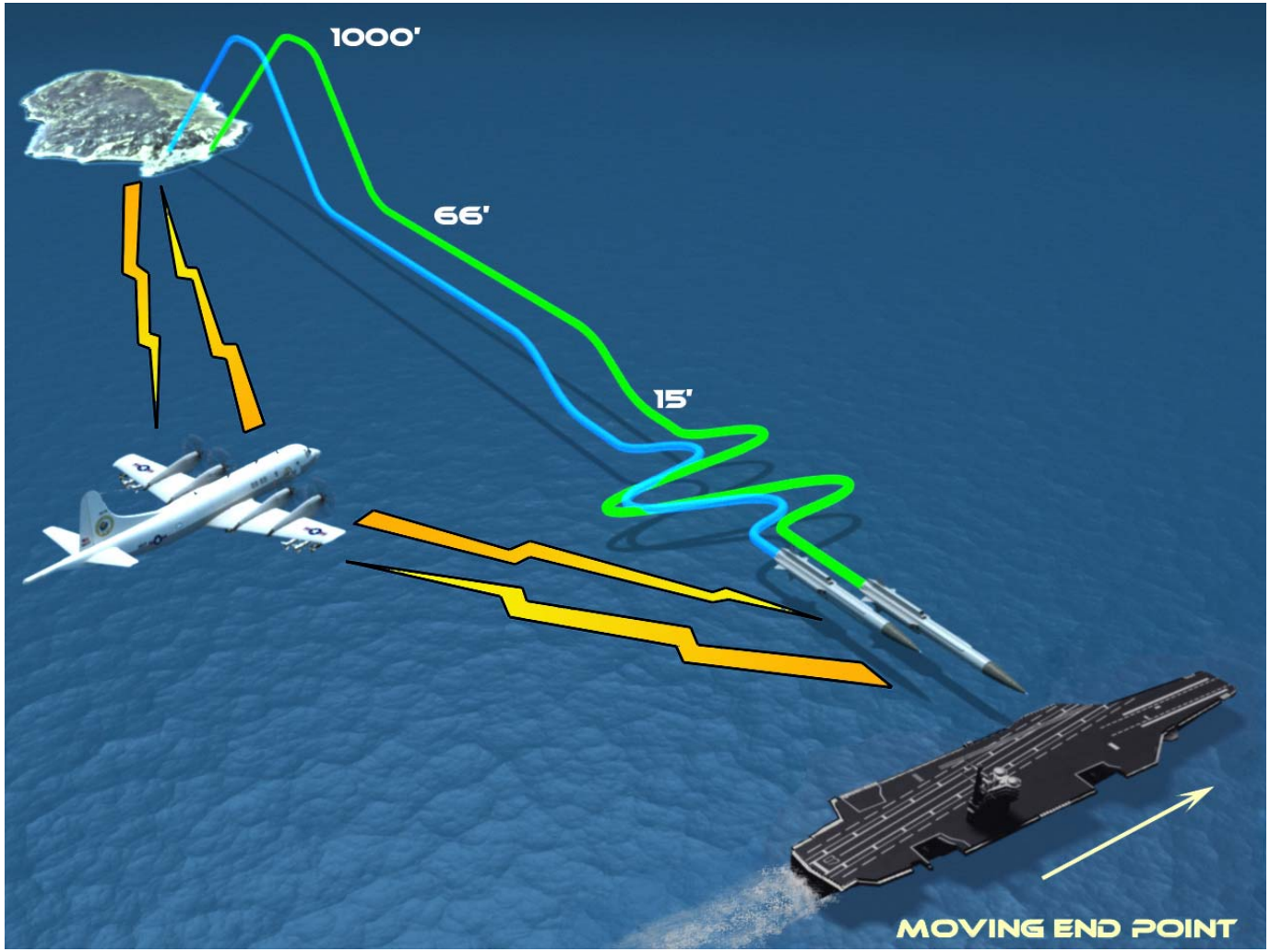

- Size » 94 % Reduction
- Weight » 82 % Reduction
- Power » +28 VDC / 50A

# Threat System Miniaturization (Phase 2)

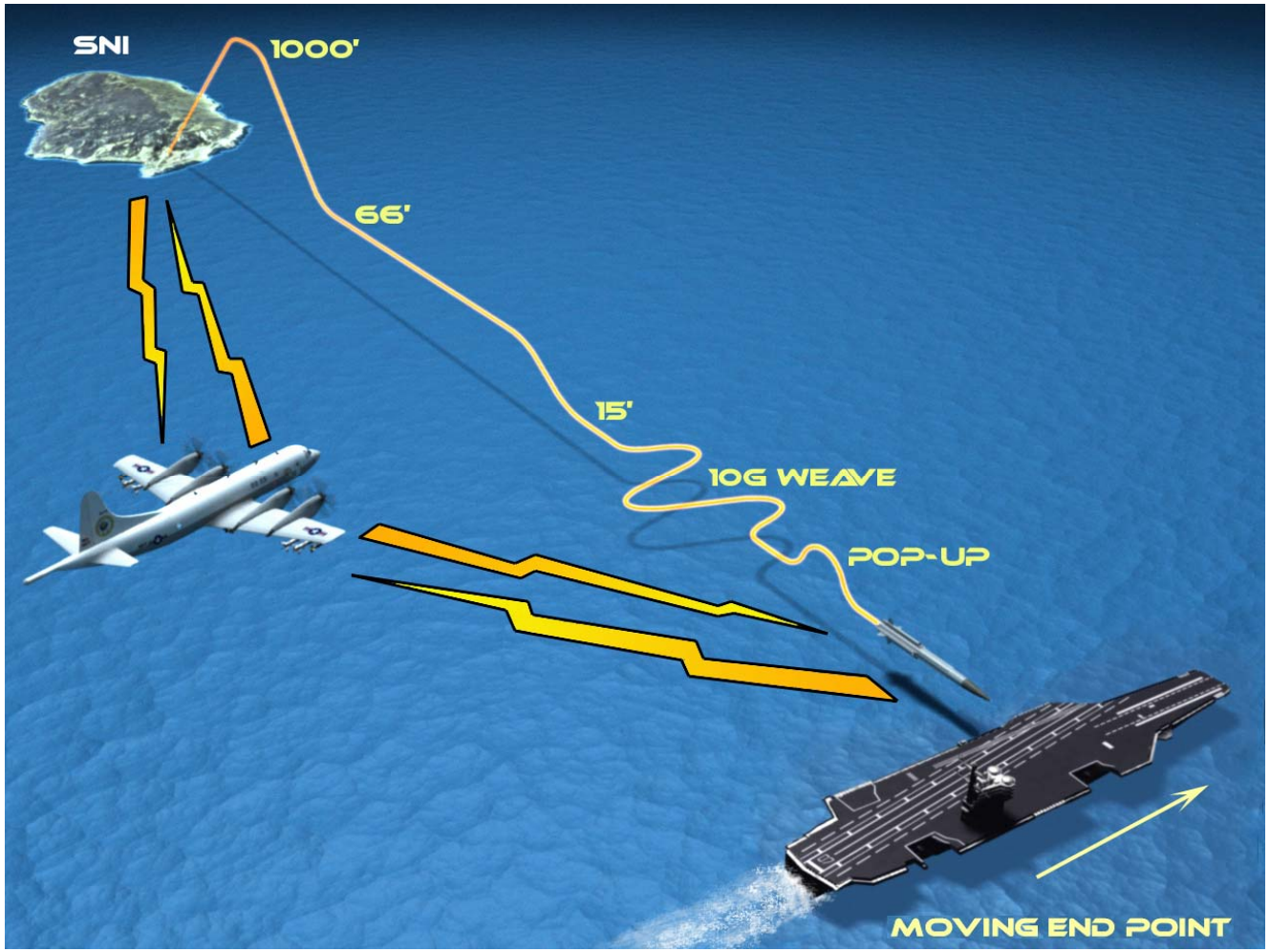

- Size » 55% / 98% Reduction
- Weight » 73% / 95% Reduction
- Prime Power » 28% Reduction

# GQM-163A
## State-Of-The-Art Capabilities

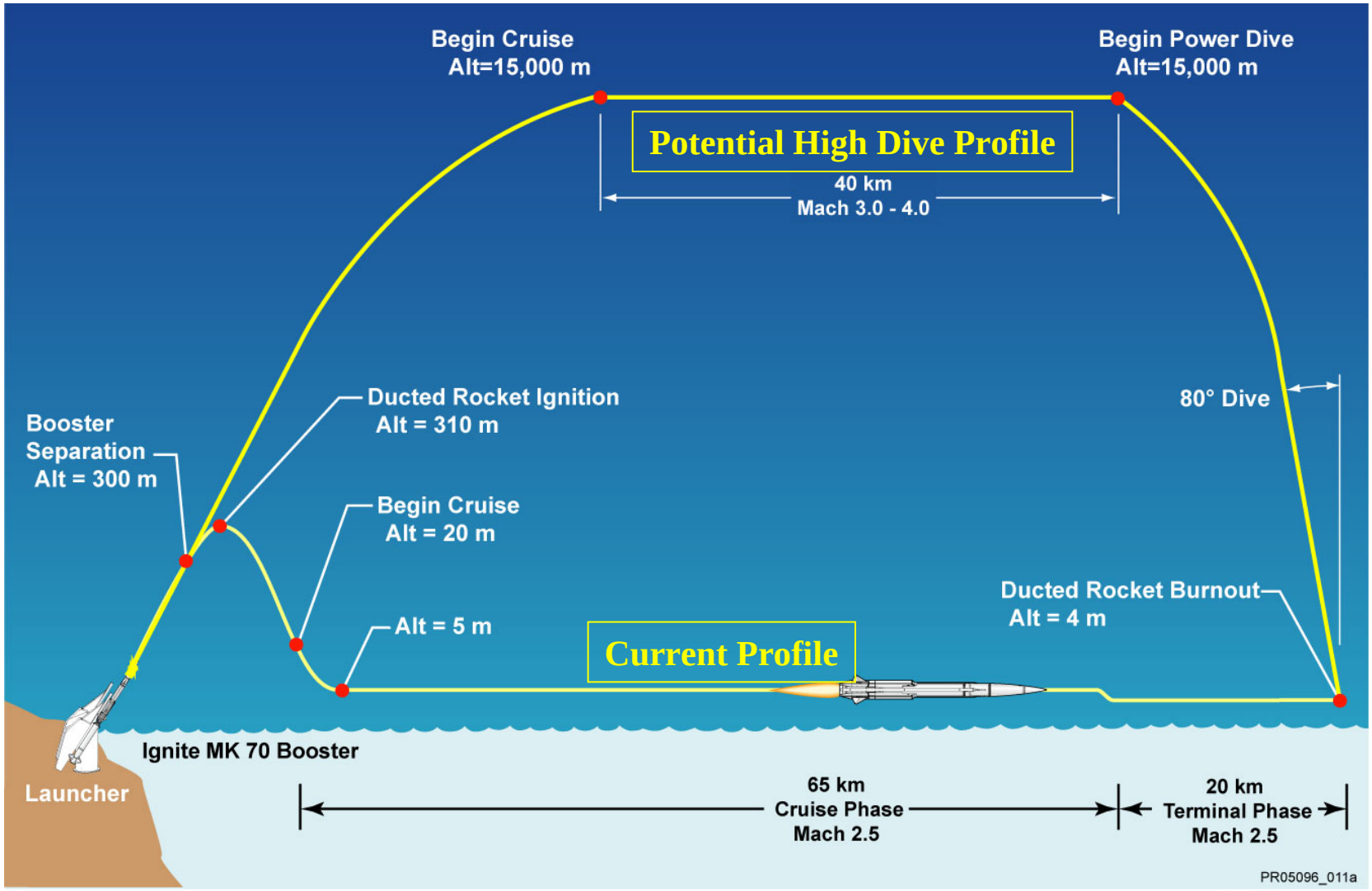
# GQM-163A Stream Raid



# GQM-163A Enhanced Maneuver



# GQM-163A High Diver



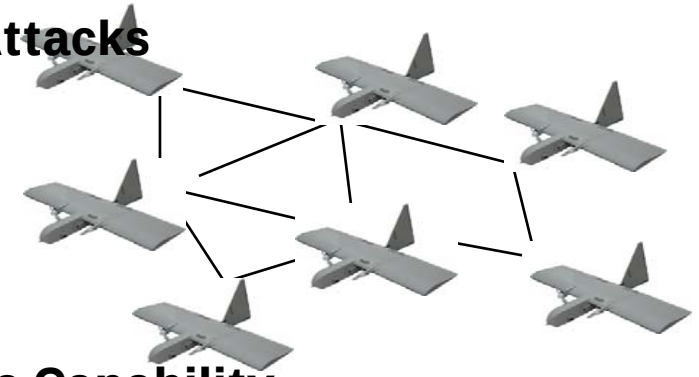
# Future Targets
## Advanced Threats

# UAV Target

- **Develop UAV Targets to emulate both the low slow flier and the med-high altitude loiterer**
  - Deny the enemy the ability to gather ISR data, utilizing relatively low-cost proliferated UAVs, on our own forces
  - Protect our forces in the littoral against "hunter/killer" UAVs to support Sea Shield and Sea Strike capabilities

# Multi-Target Presentations

- **Need to Replicate High Density, Multi-Axis Attacks**
  - Surface Targets
  - Ground Targets
  - UAV Targets
  - Aerial Targets (limited)



- **New Control Schemes Needed To Enable This Capability**
  - Multi-Target Control (Direct Human Control)
  - Autonomous Pre-Programmed Missions (Indirect Human Control)
  - Effects-Based Control (Human Guidance, Not Control)
    - Pre-programmed mission objectives
    - Rules based
    - Reactive autonomous movement based on real-time observations vs mission objectives
    - Cooperative vs coordinated multi-target presentations

# Electronic Target Generator

- **Electronically simulates radially Inbound/Outbound threat aircraft, targets, and anti-ship cruise missiles**
  - ***Reprogrammable!*** Simple expansion for new threats
  - High Fidelity Amplitude
    - Programmable $1/R^4$ amplitude variation, Scintillation, Radar Cross Section (RCS) Fluctuations & Multipath
  - Can also include associated self screening and standoff jamming (SSJ/SOJ)
- Can be used at land based sites, or in motor vehicles and helicopter based configurations
- Can simulate Subsonic, Supersonic or even Hypersonic targets with any RCS
- Can simulate Manned Aircraft, Target Launched Weapons, Stream Raids, Small Boats, and other targets

# Target Systems
## Future Trends

- Simulation of terrorist type (asymmetric) threats
- Multiple Target applications
- New target types
- Greater emphasis on T&E
- Expanded payloads

# *Target Systems*

**The threats are real and evolving …**

**…the need is critical**

**… budgets are constrained**

**Target systems must rise to the challenge!**