

GENERAL ATOMICS AERONAUTICAL SYSTEMS, INC.

Remotely Operated Aircraft Systems



Predator Stinger Missile Live Fire Demonstration

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Overview

- Program Objectives
- System Components
 - MQ-1 Predator Unmanned Aerial Vehicle (UAV)
 - Air-to-Air Stinger (ATAS) Weapon System
- Integration Program
- Flight Test Program
- Conclusion

Program Objectives

- Integrate the Stinger Air-to-Air Missile on the MQ-1 Predator UAV
 - Rapid integration and demonstration effort
 - Complete effort in 60 calendar days or less
 - Utilize HELLFIRE components where possible
 - Develop UAV Air-to-Air Human Machine Interface (HMI)
 - Prove safe carriage and release of weapon system
- Potential for leave behind capability to support real-world operations

MQ-1 Predator UAV

- Multi-role capability
 - EO/IR and SAR reconnaissance
 - Laser designation
 - Communications relay
 - HELLFIRE delivery
- Currently supporting Global War on Terrorism



Length	27 ft
Wing span	48.7 ft
Payload Internal	450 lb
Max gross wt	2450 lb
Endurance	35-40 hr
Two wing hard points	120 lb each

Air-to-Air Stinger Weapon System

- Accurate and lethal system
 - Fire and forget missile
 - Two color IR/UV seeker
 - Effective against all known countermeasures
- Currently fielded on OH-58C, OH-58D, and MH-60 helicopters



Missile Length	58 in
Missile Diameter	2.75 in
Missile Weight	23 lbs
Missile Speed	Up to Mach 2
Air-to-Air Carriage System	Two per launcher



Integration Program

- Mechanical Integration
 - ATAS electronics
 - ATAS launcher
- Develop Human Machine Interface
 - Visual representation
 - Audio cues

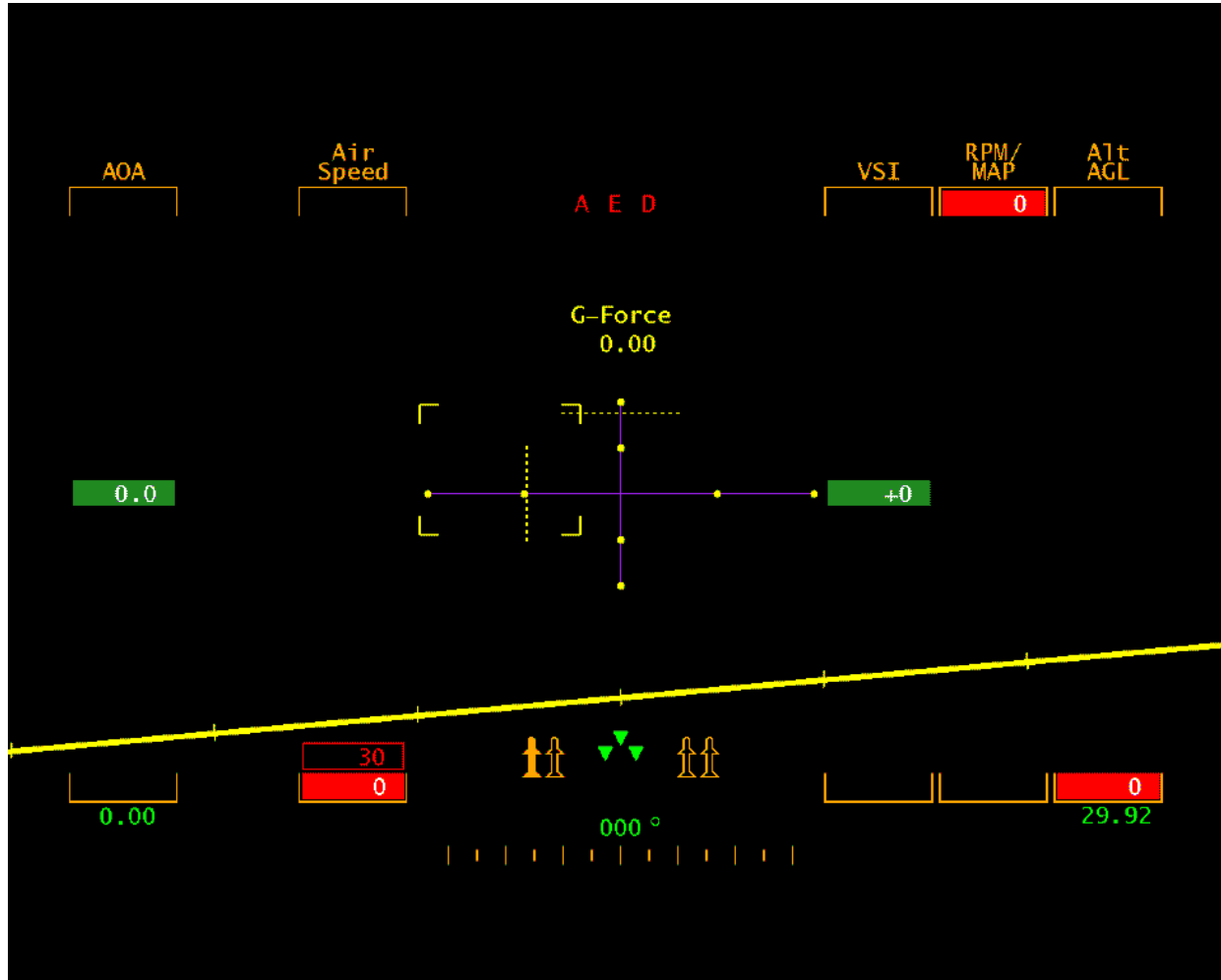
Mechanical Integration - Electronics



Mechanical Integration - Launcher



Human Machine Interface



Predator Stinger Aircraft



Predator Stinger Flight Test Program

- Captive Carry Tests
 - Functional air-to-ground tests
 - CONOPs development
 - Cessna 206 engagements
 - F-16 engagements
- Live-Fire Tests
 - All air-to-ground launches
 - Operations based from China Lake NAWC
 - Varied aircraft communications
 - C-band LOS
 - Ku-band SATCOM
 - Eight missile launches
 - Four Blast Test Vehicles
 - Four Full-up Rounds



Predator Stinger Missile Test Video



Predator Stinger Flight Test Program

- Captive Carry Test Results
 - Robust air-to-ground capability
 - Initial air-to-air CONOPs developed
- Live Fire Demonstration Results
 - Safe separation from all eight missile shots
 - Four Full-up Rounds
 - Shot 1: Impact between ground targets
 - Shot 2: Timed self-destruct prior to target
 - Shot 3: Timed self-destruct prior to target
 - Shot 4: No self-destruct – potential missile failure
 - Set world record for highest Stinger Missile launch (20,000' MSL)

Predator Stinger Flight Test Program

- Issue
 - Minor wing, tail, and pylon damage from missile debris
 - No impacts on propeller
 - Issue not considered flight critical



Predator HELLFIRE/Stinger Aircraft – The Next Step?



Conclusion

- Successfully integrated and demonstrated the capability to employ the Stinger Air-to-Air Missile from the MQ-1 Predator UAV
- Program completed in 56 days
 - Contact Award 25 Sept 02
 - Four BTV Launches 15 Nov 02
 - Two Live Launches 19 Nov 02
 - Two Live Launches 20 Nov 02
- Capable system ready for further development by the USAF