

# Supersonic Turbine Powered Engine

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# Policy/Vision Statements & High Speed Strike



*“Our security will require transforming the military...(to) be ready to strike at a moment’s notice in any dark corner of the world.”*

**George W. Bush**  
**01 June 2002**



## U.S. National Security Council

- Preemptive and Responsive Strike
- TCS and WMD

## Office of the Secretary of Defense

- Defense Planning Guidance
- Near-Term Transformational Capability
- National Aerospace Initiative (NAI)

## Chief of Naval Operations

- Persistent, Time Sensitive Strike
- Explore Advanced Technologies:
  - Hypersonic (fast) Missiles

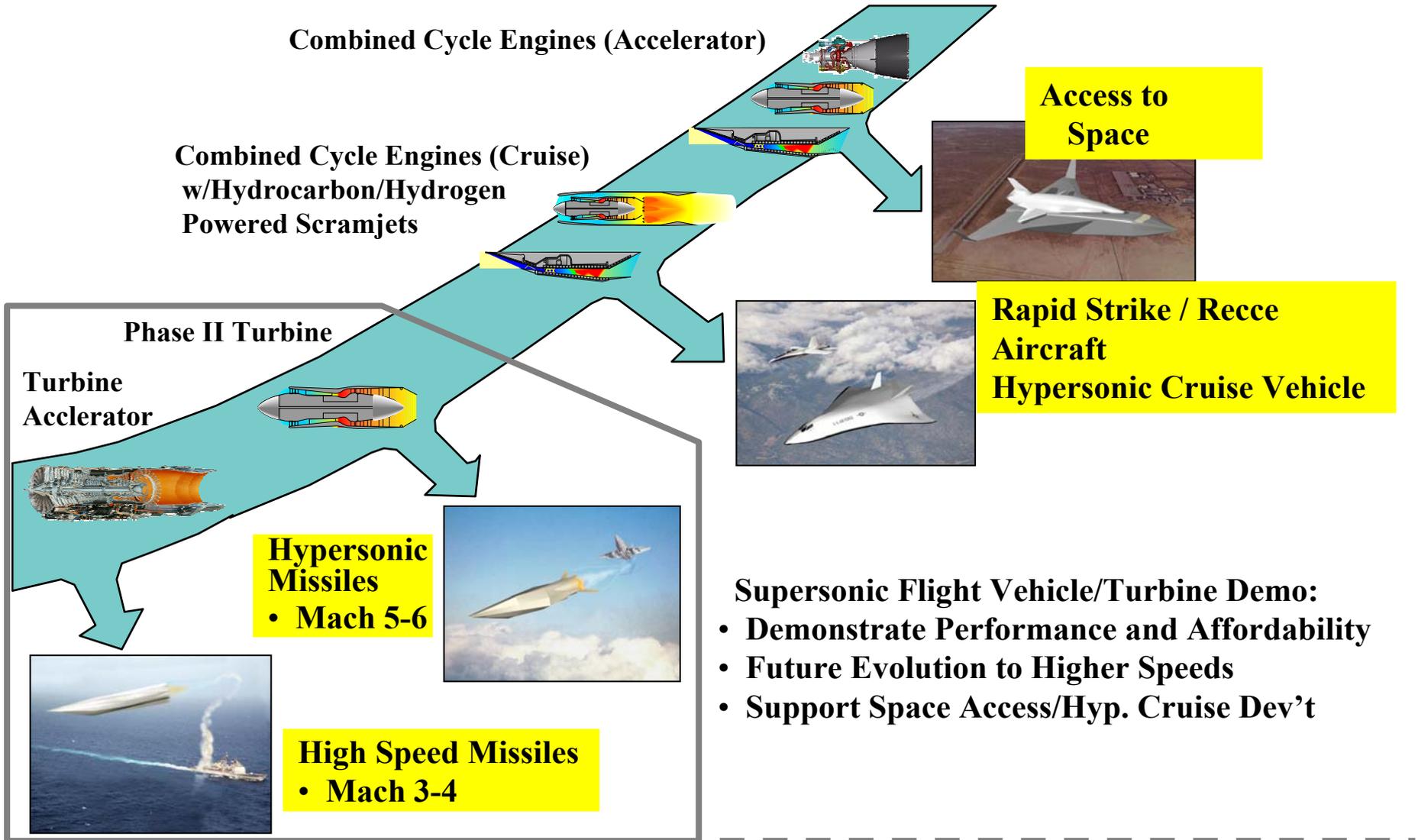


# Objectives

- Meet National Aerospace Initiative (NAI) Requirements
  - Provide a low cost knowledge base stepping stone critical to all NAI roadmap programs
- Address Military Requirements
  - Traceable to Weapon
- Flight Demonstration by FY06
  - Supersonic Accelerator Turbine
  - Blended Body Configuration
  - Inlet/Engine/Nozzle Integration
  - Three Demo Flight Tests
- Affordability



# Supersonic Turbine-Powered Engine Roadmap



Mid-Term

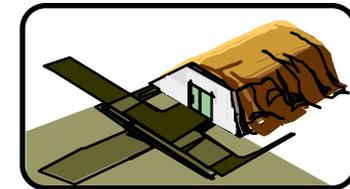


Far-Term



# Address Military Requirements

- Traceable to Weapon
  - Speed: ~Mach 3.5
  - Range: > 350 nMiles
  - Platform Flexibility
    - Air-Launched (F/A-18E/F)
    - VLS-Launched
  - Payload Flexibility
  - Platform and Weapon Survivability
  - End-Game Flexibility
  - Eliminate Ejecta
  - Execute TSTs and HDBTs
  - Deep in Enemy Territory



# NAI Supersonic Turbine Demonstration

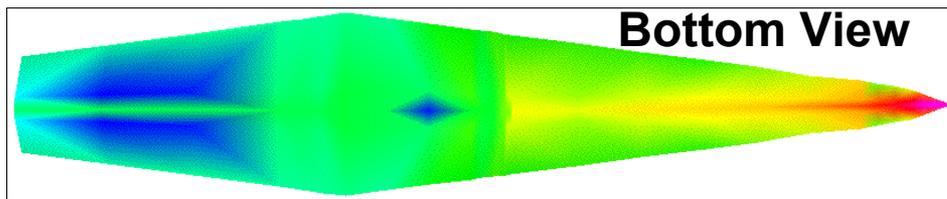
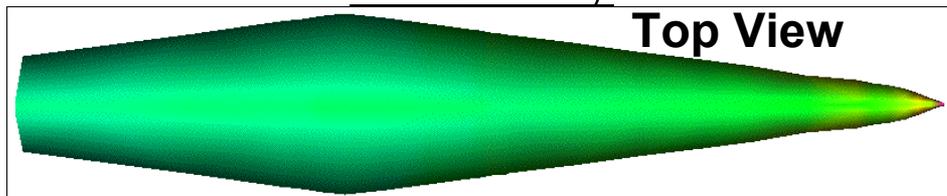
## Technology Challenges

### Affordability



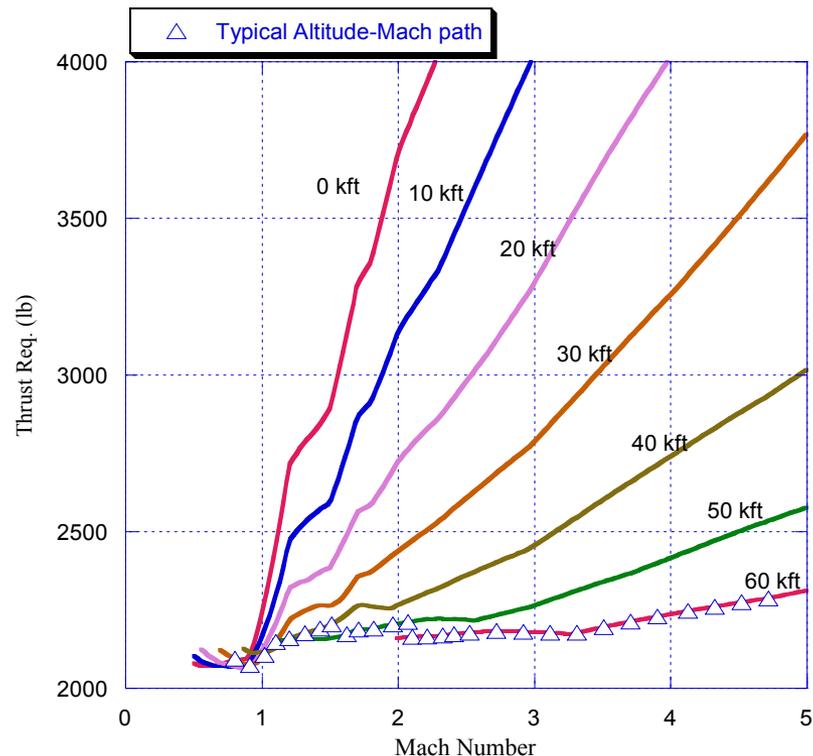
- Reduce Engine Cost
- High Temp Materials
- Reduce number of Parts
- Reduce system complexity

### Durability



- Improve Thermal Management

### Performance



Estimated thrust required based on vehicle weight of 1682 lb, 1g acceleration, (no small angle approx.)

- Increase Specific Thrust Available
- Reduce Thrust Required (Drag)



# Objective of USMA Study

- Investigate long-range time-critical strike (missile type) mission/vehicle trades
  - Address gross mission parameters (range, time-to-target)
  - Address gross vehicle parameters using mission-segmented Breguet Range (aero L/D, weight breakdown, acceleration rate)
- Assess mission/vehicle trade impacts on propulsion system requirements
  - Address propulsion system mechanical (overall weight, critical dimension)
  - Address propulsion system performance (fuel consumption, thrust, thrust/airflow)



# Conclusions & Learning Points



{jgs} Monday, 20 October, 2003