National Aerospace Initiative

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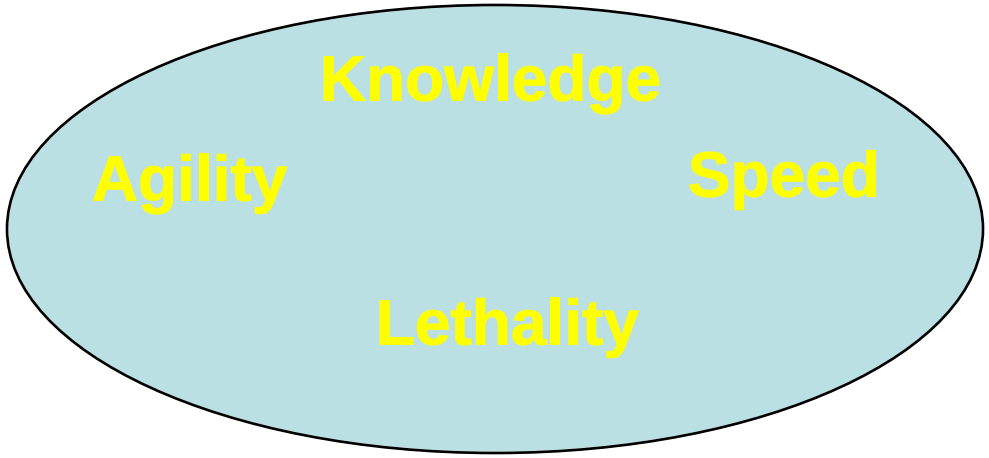
NATIONAL AEROSPACE INITIATIVE

Agenda

- Background – Transformation
- The National Aerospace Initiative (NAI) Overview
- NAI – High Speed / Hypersonics
- NAI – Space Access
- NAI – Space Technology
- Conclusion

Transformation Technology Initiative

- **Transformation Attributes**



- **Transformation Technology Initiatives**
  - **National Aerospace Initiative**
  - **Surveillance and Knowledge Systems**
  - **Energy and Power Technologies**

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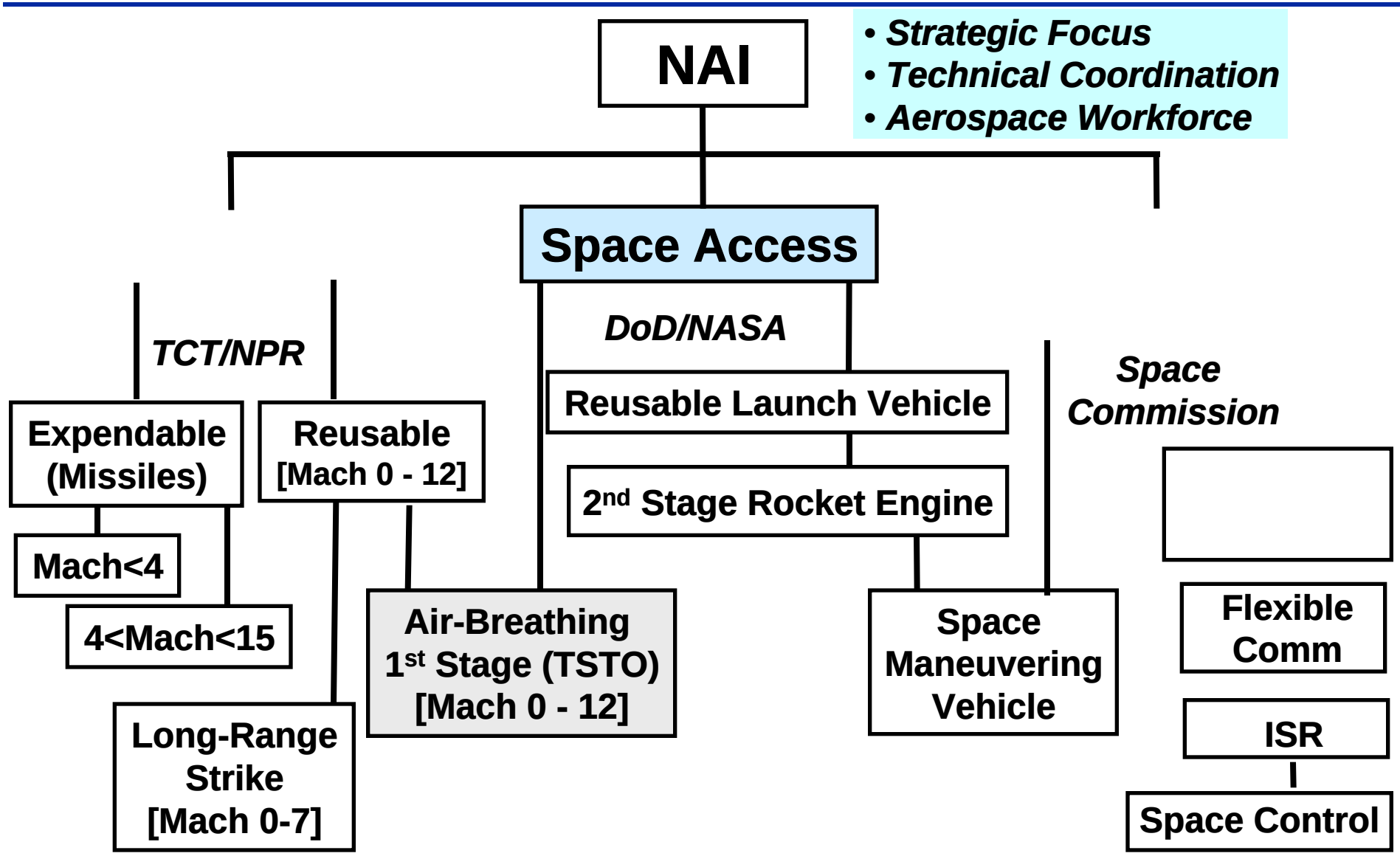
Technology Planning Questions

- **What Are You Trying to do?**
  - **Goals: Challenging, Achievable, & Measurable**
- **By When?**
  - **Pace: Users, Industry, & Other Advocates**
- **What Difference Will it Make?**
  - **Payoffs: Military/Commercial Capability**
- **What Makes You Think You Can do it?**
  - **Technical: "GOTChA" Process**
  - **Financial: Roadmaps vs. Budgets**

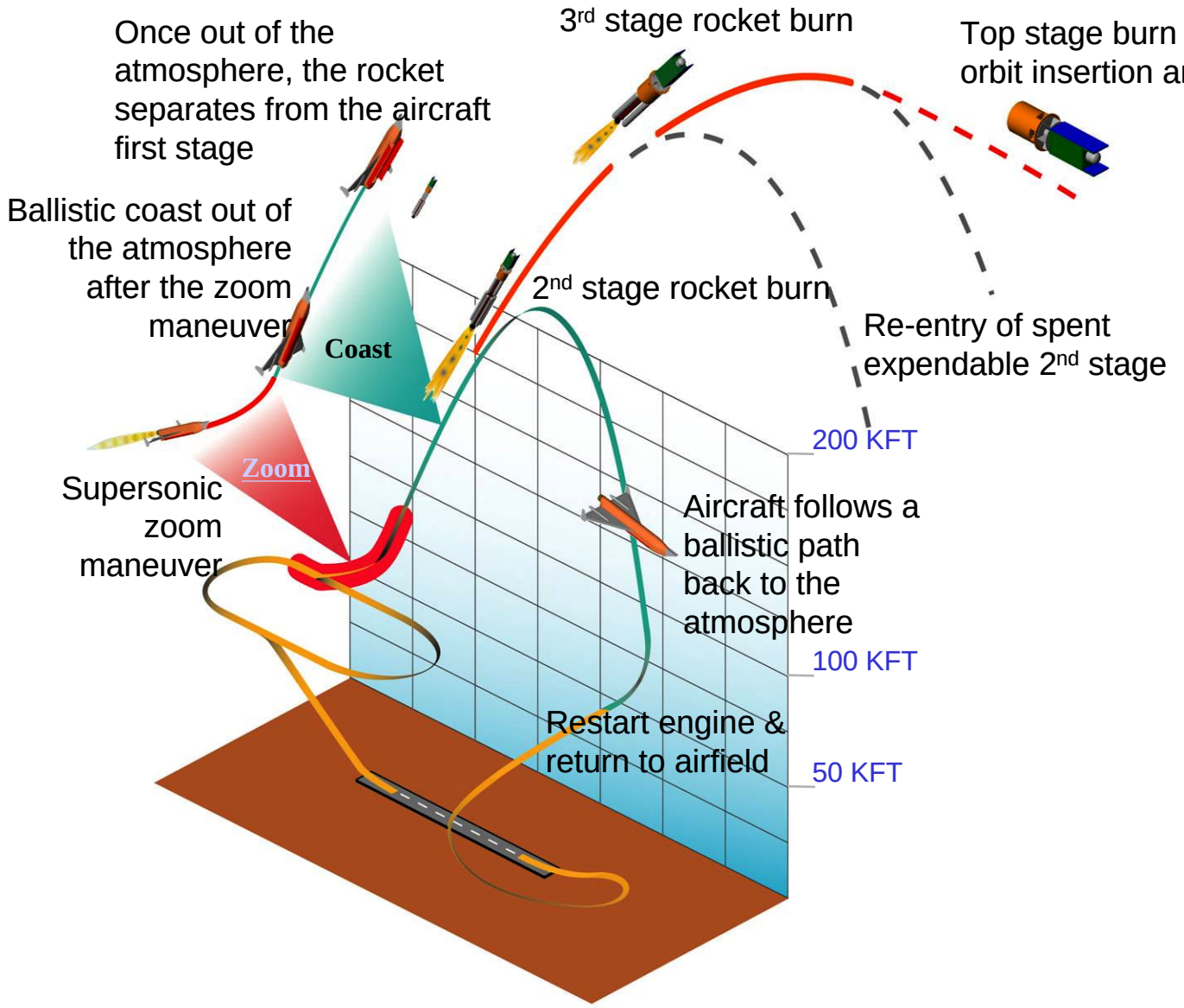
National Aerospace Initiative

-- Technology Framework --



DARPA RASCAL PROGRAM

-- High Speed / Hypersonics --



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-- International Perspective --

- **Foreign Experience / Expertise Growing**
  - **-- Excellent Ground Test Facilities**
  - **-- Long-Term Commitment for Aerospace Investment**
  - **-- Examples of Hypersonic R&D**

China – (TAD 2015) Hypersonic Aircraft Dev	**Mach 5**
France – 1999 Scramjet Ground Demo	**Mach 6 – 7.5**
Germany – 2002 Air Defense Flight Demo	**Mach 6.5**
India – 2002 Cruise Missile Flight Demo	**Mach 2.0-3.0**
Russia – 1991 Scramjet Flight Demo	**Mach 6**
Australia – 2002 Scramjet Flight Demo	**Mach 7.6**

- **Serious Threat to Current U.S. Systems by End of Decade**
  - **-- Strategic/Tactical Standoff Capability Threatened**
  - **-- Aircraft Survivability Threatened**
- **U.S. Government / Industry Aerospace Knowledge Base is Eroding**
- **National Aerospace Initiative is Needed to Sustain American Aerospace Leadership**

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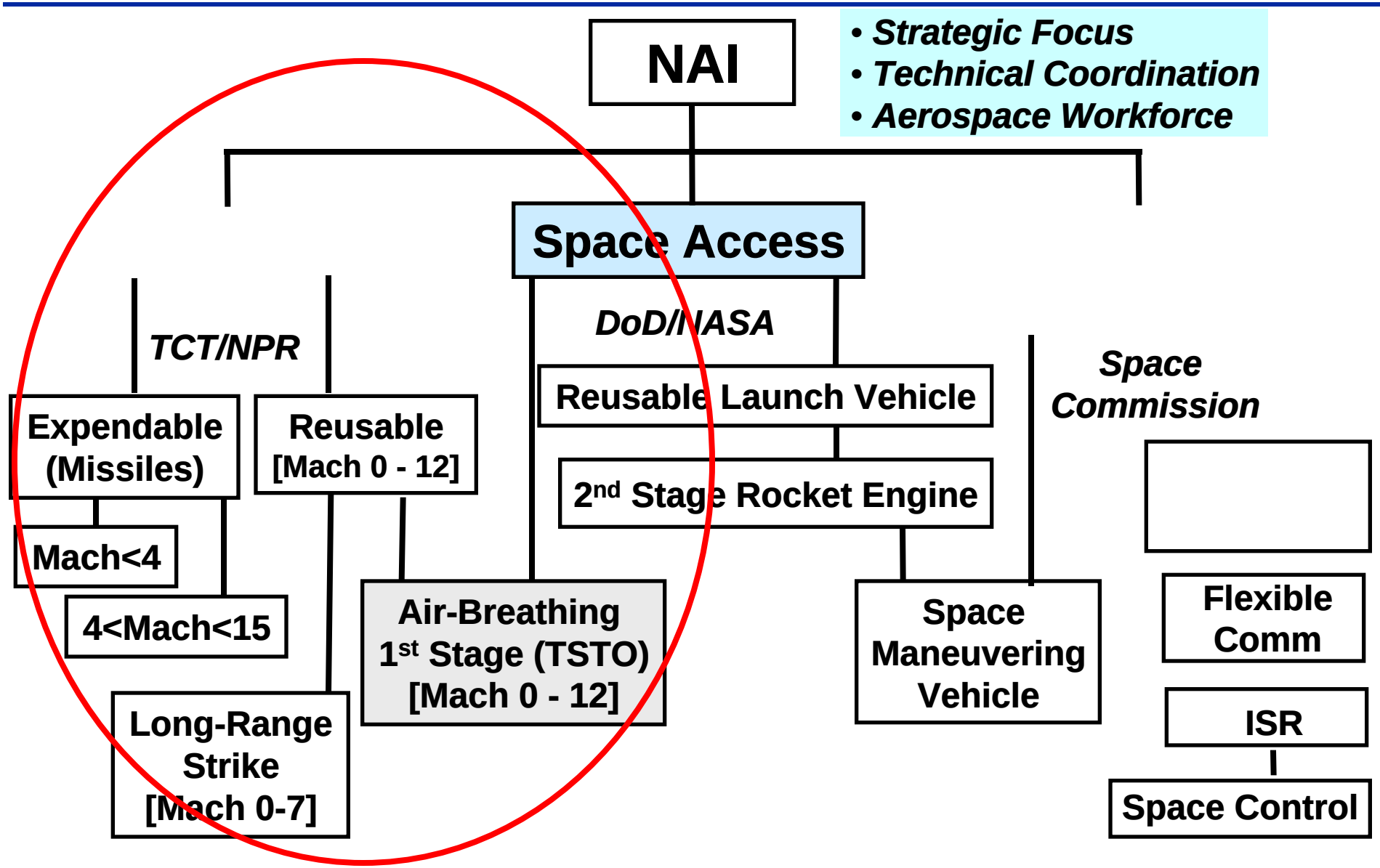
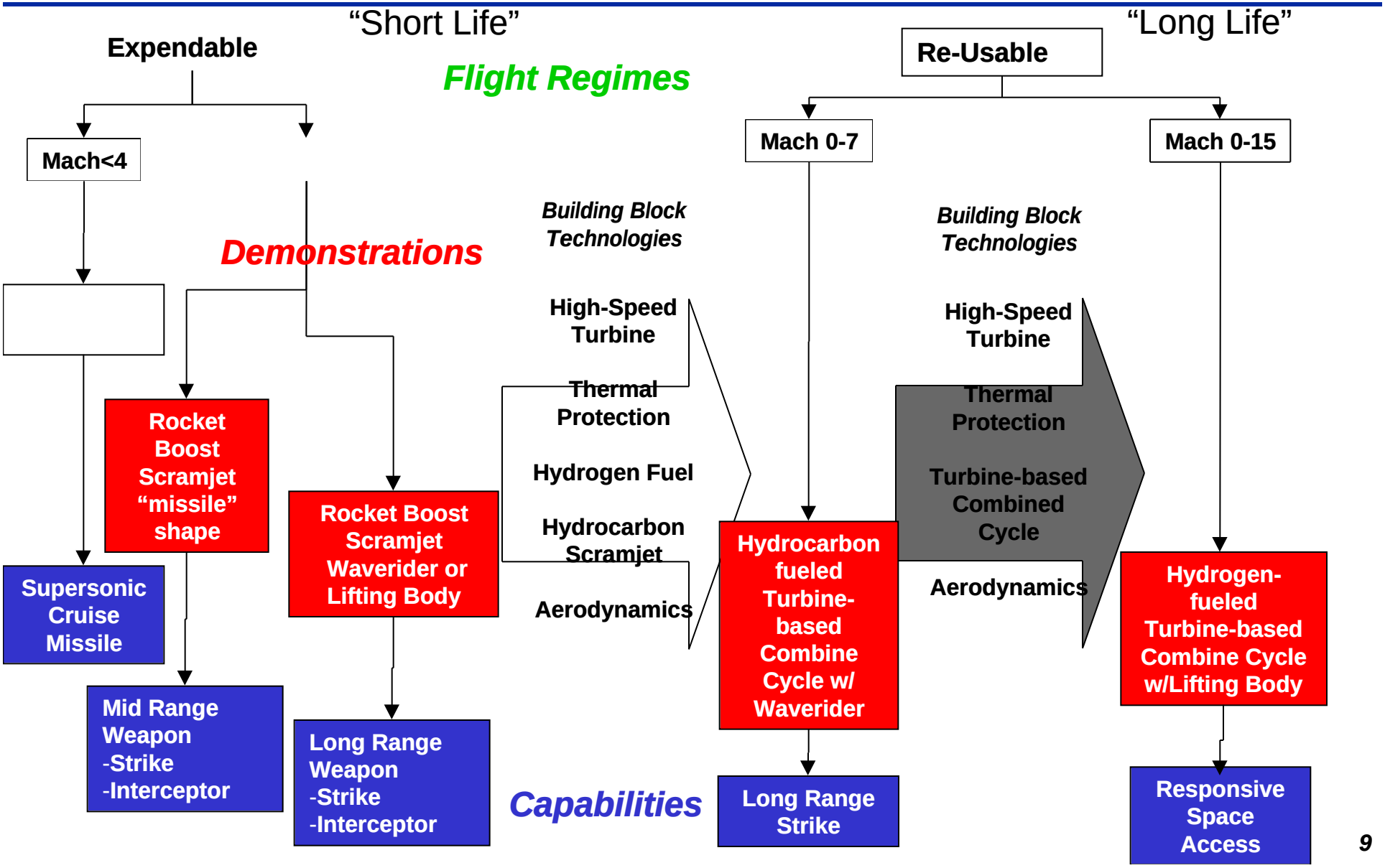


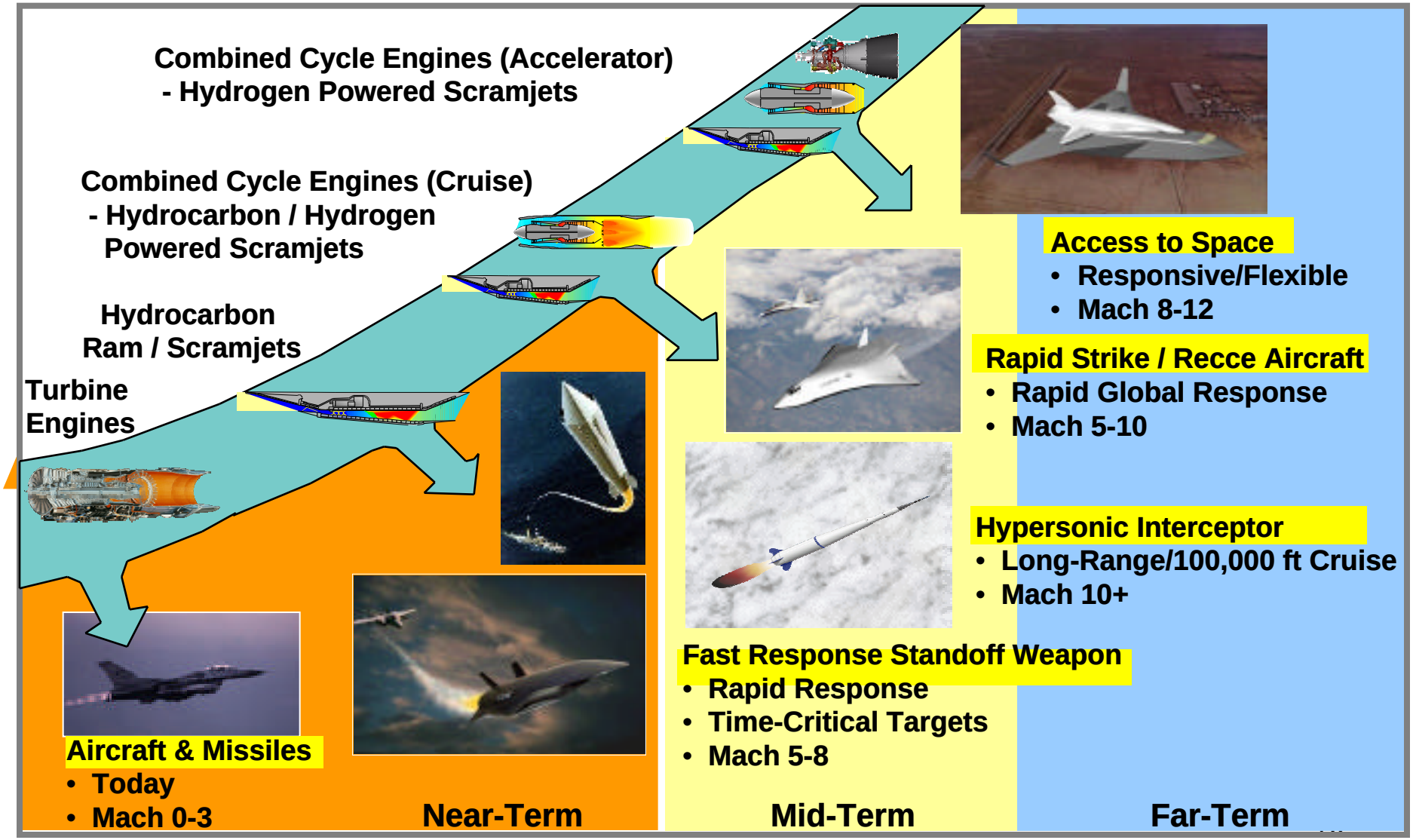
Technology Development Approach

-- High Speed / Hypersonics --



NAI High Speed / Hypersonics Options

-- Engine Combinations / Capability Off-Ramps --



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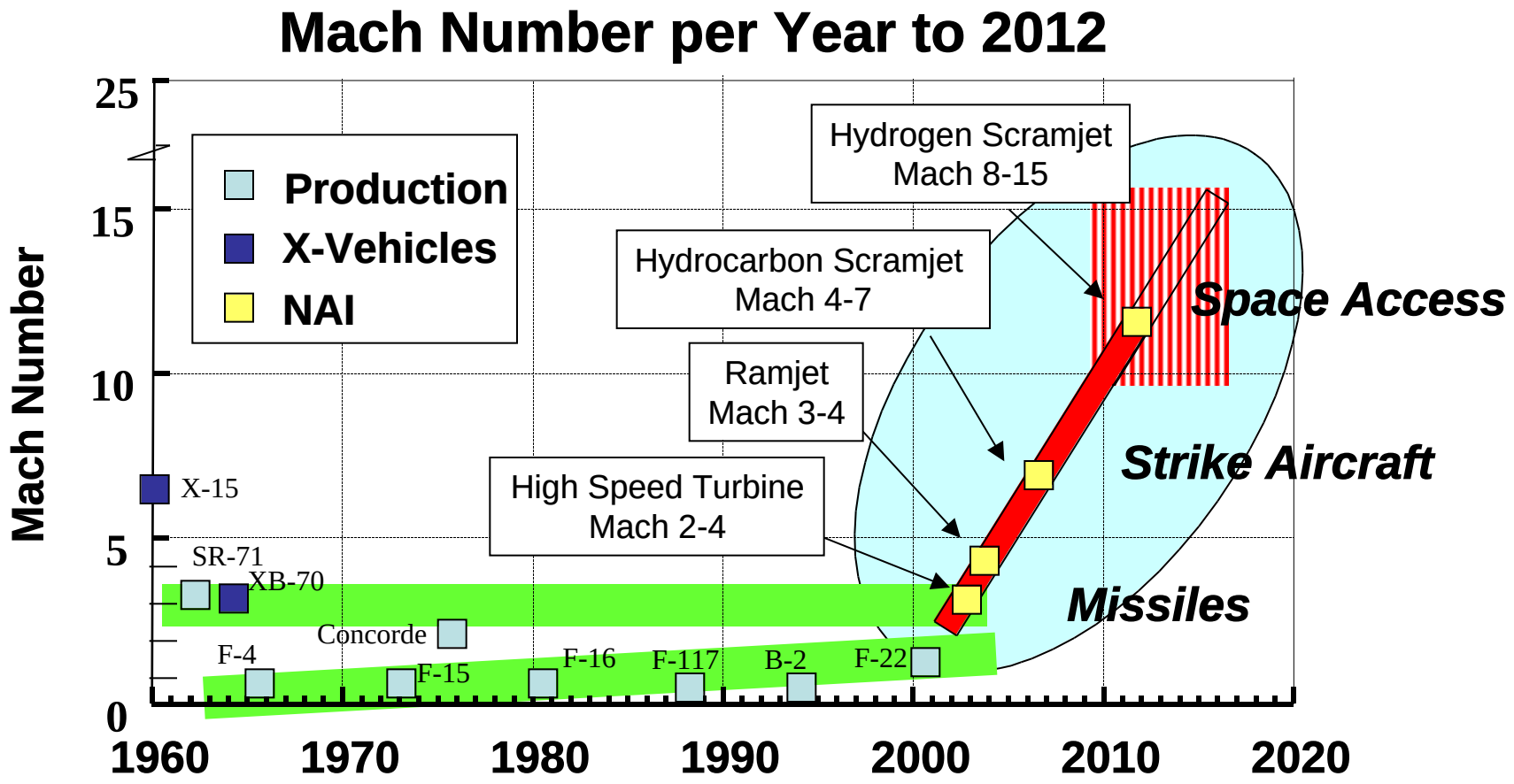
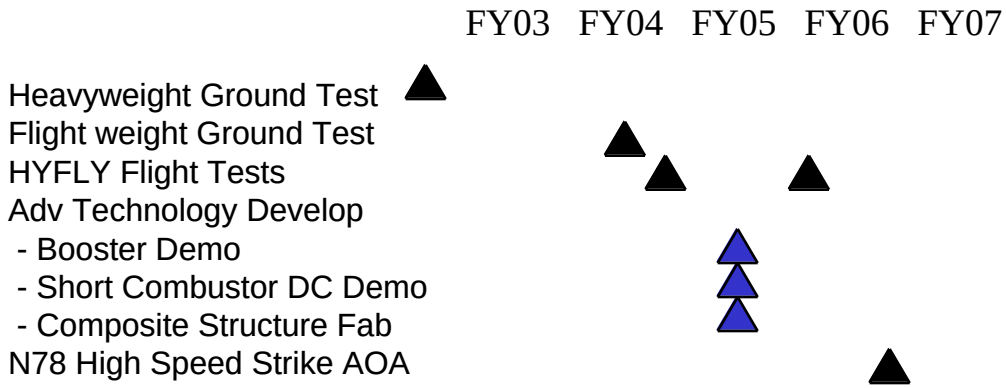


DARPA/Navy Scramjet R&D

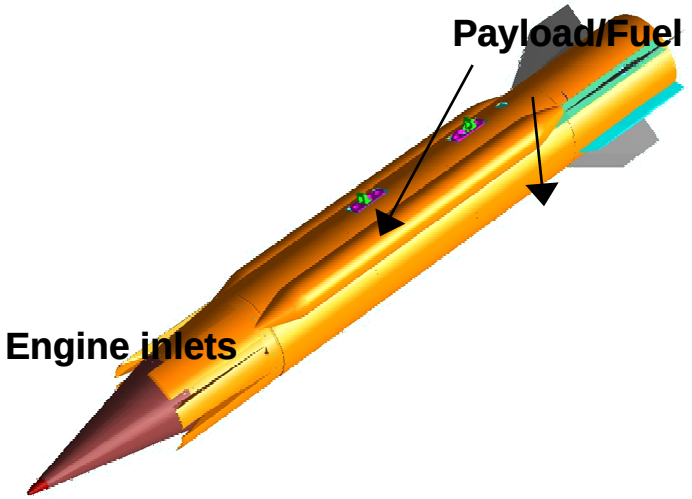
Hypersonic Flight Demonstration Program (HYFLY)



Successful Ground Test - May 30, 2002

HYFLY Weapon Characteristics

- **2150 lb Launch Weight, Length 183”**
- **250 lb Penetrator**
  - **F/A 18 E/F Compatible 400 Nmi Flyout**
  - **VLS Compatible - 600 Nmi Flyout**



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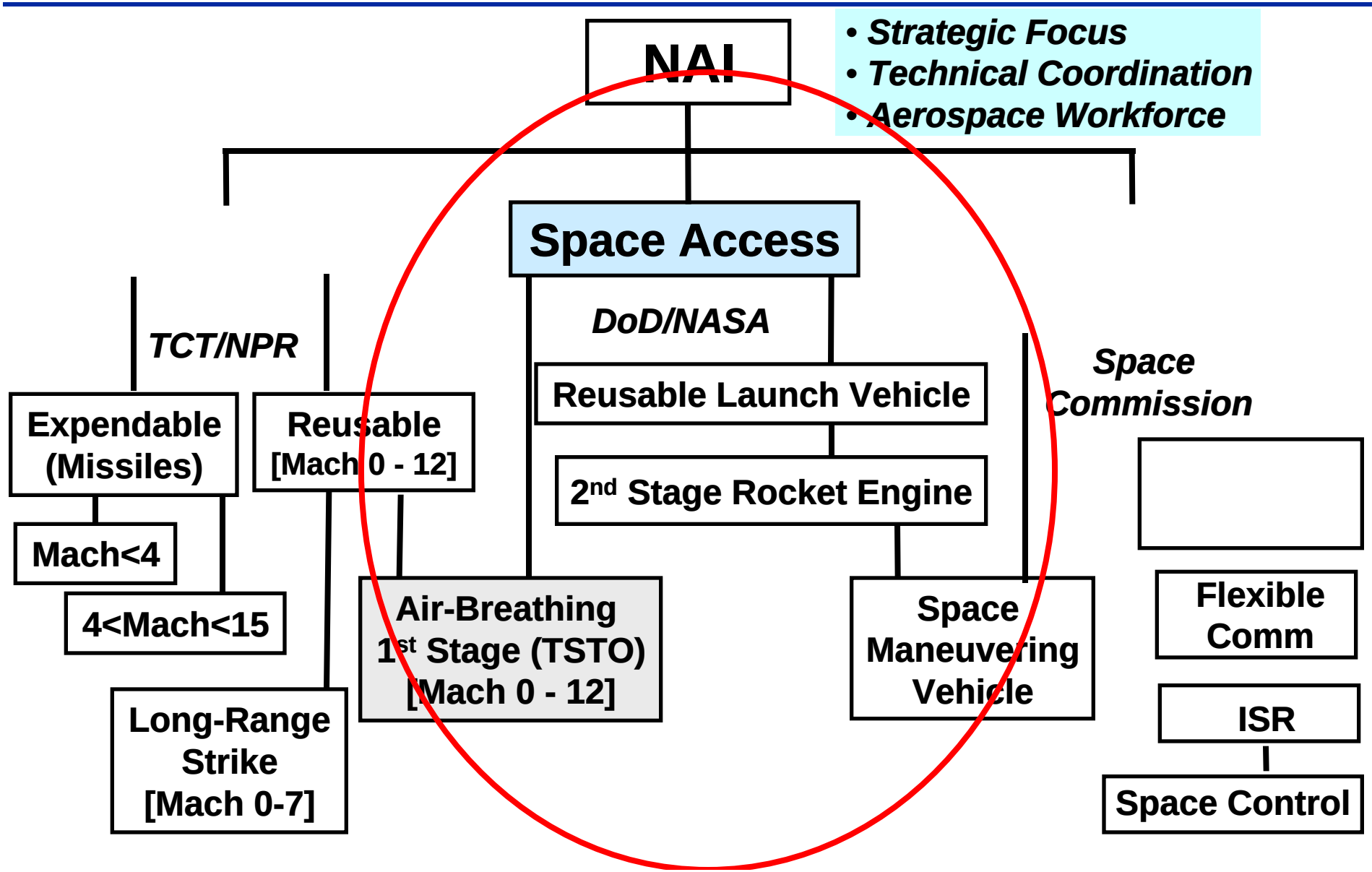
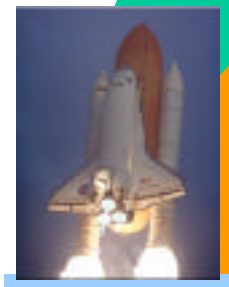


NAI Space Access
-- System Payoffs/Requirements --



BASELINE
Shuttle,
DC-X, X-33, SLI

Phase I - 2008
- Sustained 7 Day Turn
- 250 Sortie Airframe
- 100 Sortie Propulsion & Systems
- Marginal Sortie Cost $10M
- Reliable (1/1,000 loss rate)
- Weather Sensitive (Cat 1)
- Low Weight (DMF) – SOA
- 8% Payload Fraction

Near Term

Phase II - 2015
- Sustained 1 Day Turn
- 500 Sortie Airframe
- 250 Sortie Propulsion & Systems
- Marginal Sortie Cost $5M
- Reliable (1/2,000 Sorties)
- Weather Tolerant (Cat 2)
- Reduced Weight (DMF) – 10%
- 16% Payload Fraction (2X)

Mid Term

Phase III - 2025
- Sustained 12 Hr Turn
- 1,000 Sortie Airframe
- 500 Sortie Propulsion & Systems
- Marginal Sortie Cost $1M
- Reliable (1/5,000 Sorties)
- Most Weather (Cat 3)
- Reduced Weight (DMF) – 15%
- 24% Payload Fraction (3X)

Far Term

2000 2008 2016 2025

NAI Space Access

-- *Technology & Development Roadmap* --

02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20

Propulsion

HC Boost

H2 Boost

Operations

Maintainer

IVHM

Depot/Support Infrastructure

Field Repair/ Spares Distribution

$6B+ Past Tech Investment

MIS/CAV

Flight Subsystems

Payloads

SMV

Airframe

X-42

Flight Test

Follow On X-Vehicles

National Aerospace Initiative

Continuing S&T Advancement

DOD

Operations

Y-Vehicle

Flight Test

IOC

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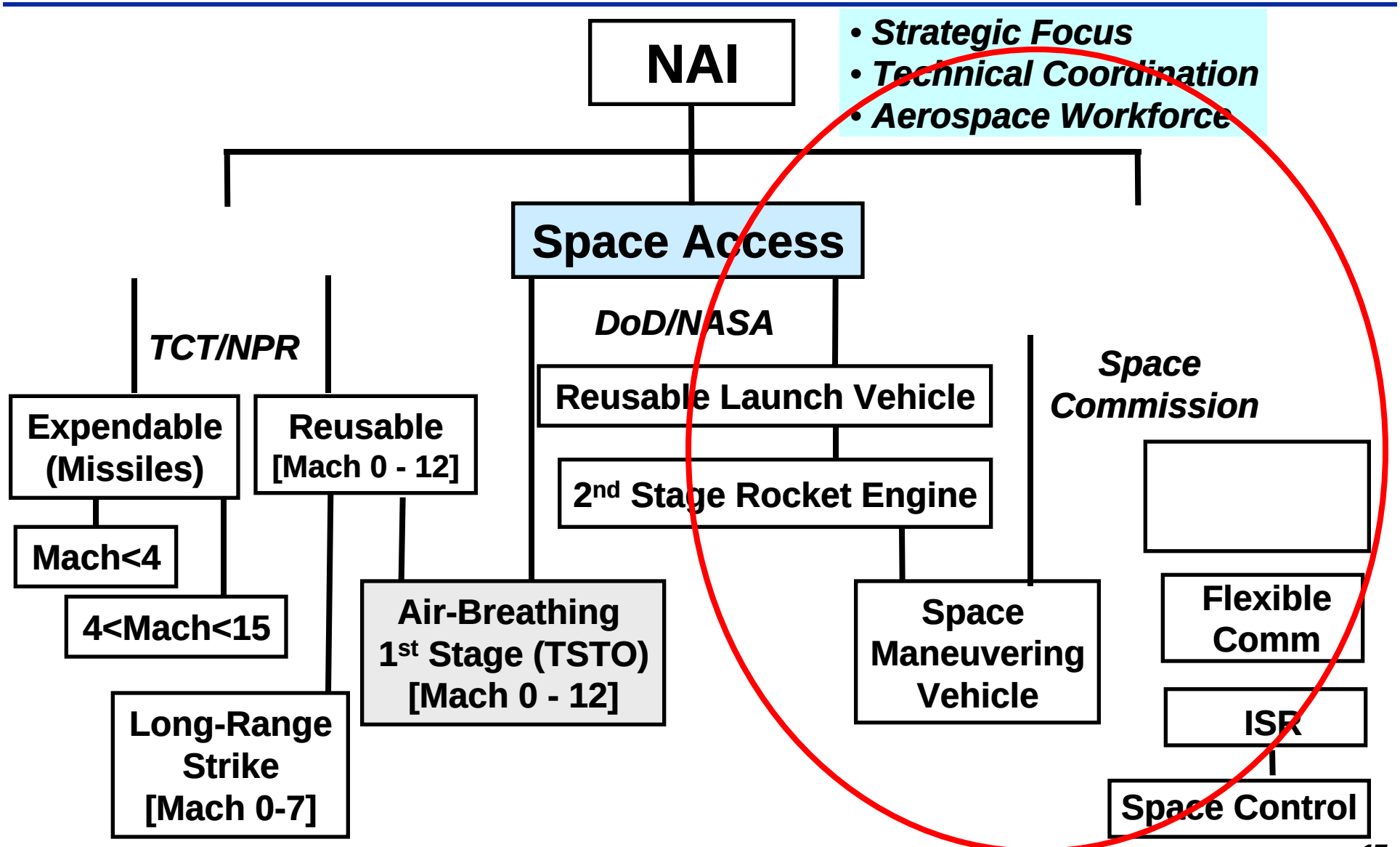


Technology Development Approach
-- Space Technology --

- ***Space Control:***

Space Situational Awareness and Ability to Defend Space Systems

- ***Responsive Payloads:***

Quick response deployment and employment of space capabilities

- ***Intelligence Surveillance Reconnaissance:***

Persistent, Global Intelligence, Surveillance and Reconnaissance for the Warfighter

- ***Flexible Communications:***

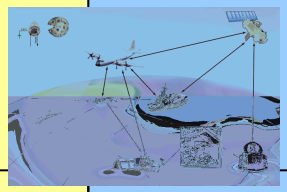
Deliver the right information to the right place at the right time

NAI Space Technology Goals
-- Responsive Payload Emphasis --

Transformational Comm Arch

- Ground-to-Air Laser Comm
- Direct Theater Downlink and Uplink
- Programmable TT&C

- Air-to-Air Laser Comm
- Air-to-Space Laser Comm
- Space-to-Space Laser Comm
- Space-to-Ground High Datarate RF
- Programmable Multi-Band Sat Comm



- High bandwidth end-to-end

Future ISR Architecture

- Airborne ISR
- National Assets
- Fused Collections
- Large Inflatable Antenna (30m)

- Bistatic Engagement
- Joint Hyperspectral Capability
- Real-Time ISR Fusion
- Large Inflatable Antenna (100m)

- Realtime Engagement

Space Control Architecture

- Autonomous and Proximity Ops
- Predictive Space Situational Awareness
- Rapid On-Orbit Checkout
- Rapid Payload Processing
- High Altitude Airship

- Realtime Space Control Ops
- Space Protection Testbad
- Electric Laser in Space
- Rapid Reconstitution of Space Capabilities

- High ISP Microsat

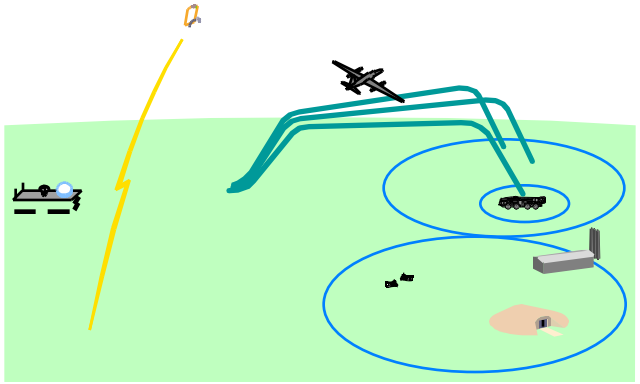
Near Term | **Mid Term** | **Far Term**

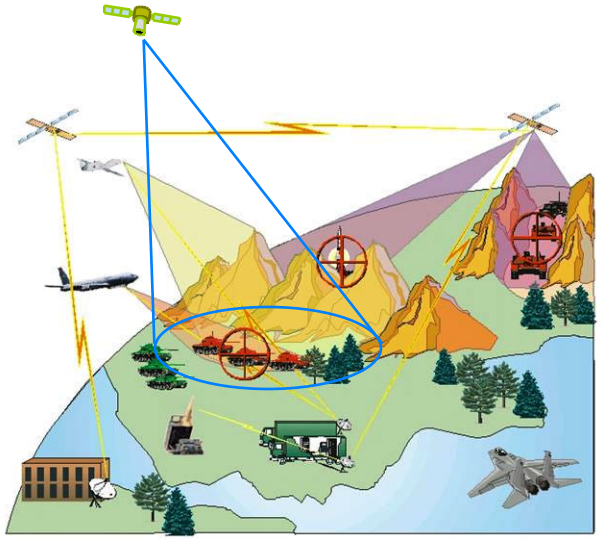
2000 | 2008 | 2016 | 2025

NAI Space Technology

-- Intelligence Surveillance Reconnaissance --

Transformation:
Persistent, Global ISR
for the Warfighter





National Aerospace Initiative

-- Conclusion --

- Advancing U.S. Aerospace Capabilities is Critical for National Security, Civil, and Commercial Sectors
- Space Architecture Options Would Increase if Access to Space was Responsive, Flexible, and Affordable
- Leap-Ahead Technologies are Developed for High Speed Strike, Space Access, and Space Missions
  - Emphasis on Rapidly Advancing Technology, Flight Tests, and Technology Demonstrations
  - Stair Step Approach Provides “Off-Ramps” for Fielding Systems
- NAI is an Integrated, National Approach to Sustain American Leadership in Aerospace