Quiet Supersonic Platform (QSP)

2003 Supersonic Aircraft Workshop

13 November 2003

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Future Strike Systems Perspective

Recent and On-Going Studies

- USAF Future Strike Aircraft
- USAF Next Generation Bomber
- USAF Trans-atmospheric/ Future Strike
- DARPA Quiet Supersonic Platform
- USAF Long Range Strike Aircraft (LRSA)
- IDA LRSA Study
- National Aerospace Initiative (NAI)

Emerging NGC 2020-Plus Vision

Supersonic and Sustained CONUS and Regional-Based Global Strike Leveraging Space and Minimal In-Theatre Assets

Quiet Supersonic Platform Initiative (RFI 00-18)

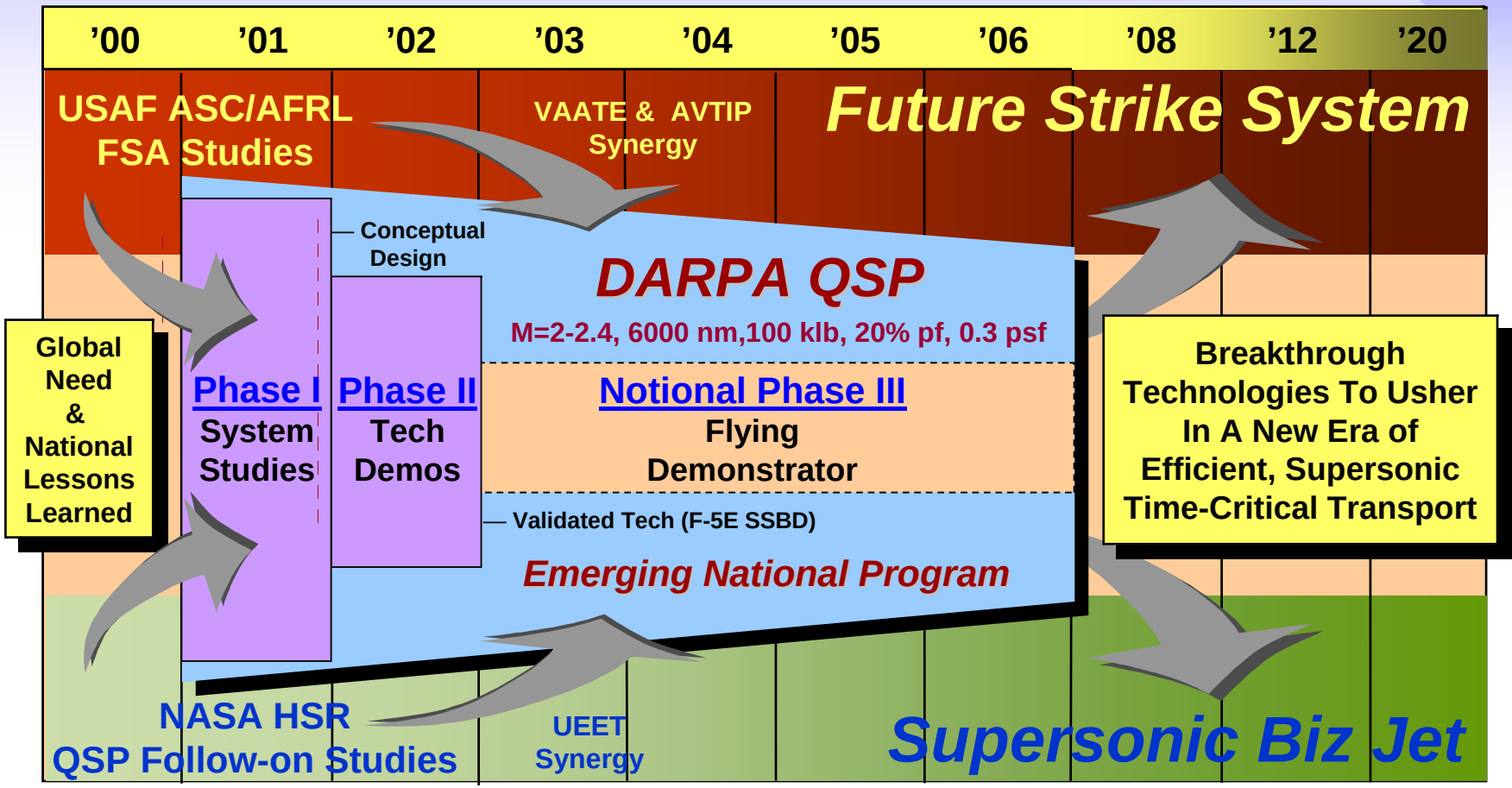
Overview

The Quiet Supersonic Platform (QSP)...is directed towards the development of a vehicle capable of long range missions with sustained supersonic flight with low takeoff noise and mitigated sonic boom. Highly integrated vehicle concepts will be explored to simultaneously meet the cruise range and noise level goals. Advanced airframe technologies will be explored to minimize sonic boom and vehicle drag. High performance propulsion systems will be developed to permit long-range supersonic flight with low takeoff and cruise noise levels.

Program Plans

- **Develop technologies for long range supersonic aircraft having low sonic boom and noise signature, range augmentation through low vehicle drag, and advanced propulsion systems.**
- **Develop highly integrated systems concepts for a supersonic long range aircraft.**

NGC Proposed Program Vision



DARPA Initiative Provides Opportunity to Focus Resources and Position Nation for Future, Realizable Long-Range, Supersonic Aircraft for Military and Civil Application

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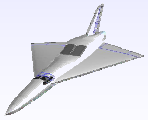
Phase I Development of Design Requirements

	DARPA QSP	***Military Strike***	***Business Jet***	***Dual-Relevant***
Sonic Boom	0.30 lb/ft^2	--	very low	0.30 lb/ft^2
TOGW	100,000lb-class	fallout	100,000lb-class	100,000lb-class
Range	6000 nm	QSP-consistent	4k – 6k nm	6000 nm
Cruise Speed	M = 2 - 2.4	QSP-consistent	M ≥ 1.8	M = 2.2
Payload	20% TOGW	QSP-consistent	6k – 8k lb	20,000 lb
TO Noise	Stage 3	Stage 3	Stage 4	Stage 3
Cruise L/D	11	--	--	11
Cruise TSFC	1.05	--	--	1.05
Engine T/W	7.5	--	--	7.5
Takeoff BFL	--	8000 ft	6500 ft	7000 ft
X-wind Land	--	30 kts	30 kts	30 kts
Cruise Alt	--	≥ 60,000 ft	45k – 65k ft	60k – 65k ft

Candidate Concepts

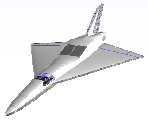
Exotic Concepts

G



- *Thermal Keel*
- *Swept-Wing Laminar Flow*

J



- *Dynamic Energy Addition*

L

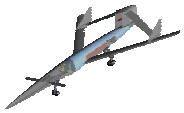
- *Shock Focusing*

Boom Shaping

P

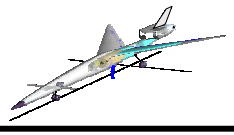
- *Laminar Flow*
- *Boom Shaping*

Q



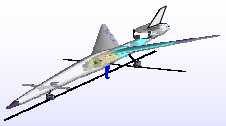
- *Swept-Wing Laminar Flow*
- *Boom Shaping*

N



- *Swept-Wing Laminar Flow*
- *Boom Shaping*

R



- *Swept-Wing Laminar Flow*
- *Boom Shaping*

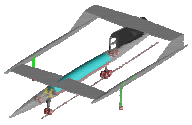
Thin Wings

C

- *Laminar Flow*

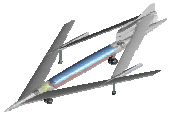
Multiple Wings

K



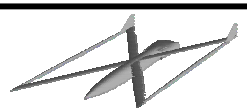
- *Tandem-Wing*
- *Laminar Flow*

E



- *Joined-Wing*
- *Swept-Wing Laminar Flow*

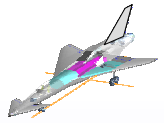
F



- *X-Wing Config.*
- *Swept-Wing Laminar Flow*

Delta & Arrow Wings

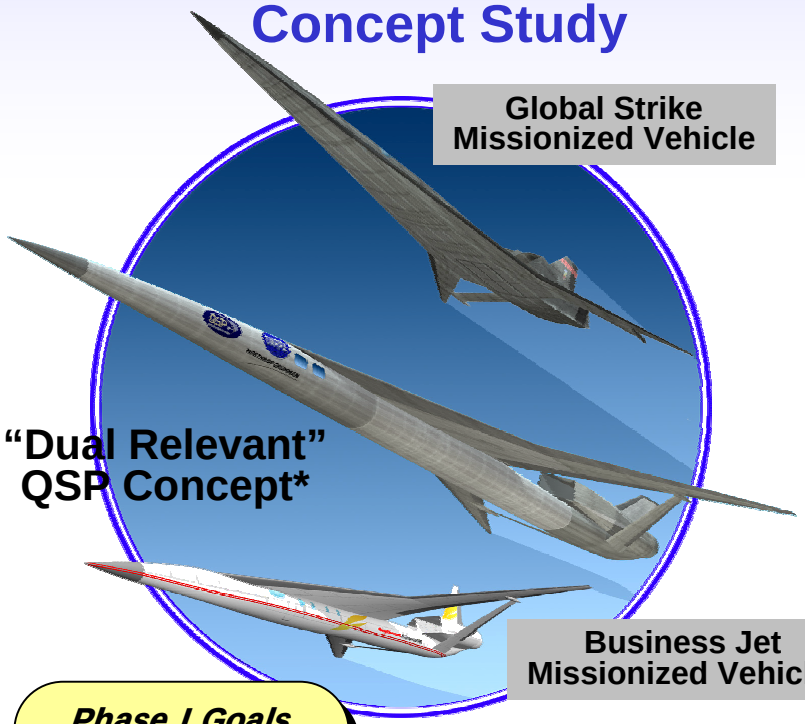
H



- *Swept-Wing Laminar Flow*

QSP Phase I & II System Studies

Phase I (CY 2000/1)
Concept Study



Phase I Goals

Boom	0.30 psf
TOGW	100 klb-class
Range	6000 nm
Speed	M = 2 - 2.4
Payload	20 klb

* Body Length 156'
Height 21'
Span 58'

Key Technologies
- Low Boom Shaping
- Joined Wing, Laminar Aero
- Top-Mounted Inlet
- Synthetic Vision
- Adv. Sandwich Composite
- Adaptive Cycle Engine

Phase II (CY 2002/3)
System Validation

Phase II Goals

Range	6000 nm
Payload	20 klb
Speed	M = 2 - 2.4
TOGW	125 klb-class
Boom	0.50 psf

Key Activities
- Definitive CONEMP Study
- Detailed Vehicle & Subsystem Definition
- Six Wind Tunnel Tests
- High Fidelity CFD
- Adv. Composite Manufacturing Demo
- F-5 Shaped Sonic Boom Flight Test

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