HIGH SPEED CIVIL TRANSPORT STUDIES

STUDY MANAGEMENT

AERONAUTICS DIRECTORATE (R.V. HARRIS)

ADVANCED VEHICLES DIVISION (C.M. JACKSON)

PROGRAM MANAGER (C.E.K. MORRIS)

NASA IN-HOUSE STUDY TEAM

(S.M. DOLLYHIGH - LaRC)
(W.C. STRACK - LeRC)
(T.L. GALLOWAY - ARC)

NAS1-18378 MONITOR (R.W. KOENIG)

PROPULSION MONITORS

(S.J. MORRIS - LaRC)
(W.G. STRACK - LeRC)

DOUGLAS MANAGER (D. GRAF)

ENGINE SUBCONTRACTORS

BOEING MANAGER (F. Brame)

ENGINE SUBCONTRACTORS

CONTRACT SPECIALIST: E. ARROWOOD
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CONTRACT SPECIALIST: E. ARROWOOD

NASA HQ.: J. McCARTHY
HIGH-SPEED, CIVIL TRANSPORT STUDIES

Contracts Overview

CONTRACTS
- TWO CONTRACTS: BOEING & DOUGLAS
- TASK ASSIGNMENTS
- COST SHARING ON MANHOURS

MAGNITUDE: TOTAL MANHOURS AVAILABLE

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60,000 - BOEING
64,000 - DOUGLAS
44,000 (UNFUNDED)
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TASK ISSUANCE PERIOD, YEARS
HIGH-SPEED, CIVIL TRANSPORT STUDIES

SCOPE OF STUDIES

2 < M < 25

JP < FUEL < H₂

A< STRUCTURES < ?

VCE < PROPULSION < LACE

MINIMUM < SONIC BOOM < UNCONSTRAINED

$0 < TICKET SURCHARGE < $??

NONE < INFRASTRUCTURE CHANGES < NEW AIRPORTS

TECHNOLOGY NEEDS

CONCEPTS

M’S

FUELS

STRUCTURES

ENGINES

MARKET WINDOWS
HIGH-SPEED TRANSPORT TECHNOLOGIES

Contract Tasks Plan

**PHASE I**
1. VEHICLE TECHNOLOGIES
2. COMMERCIAL VALUE
3. SPECIAL FACTORS (NON-VEHICLE TECHNOLOGY)

**PHASE II**
4. VEHICLE-CONCEPT RATING

**PHASE III**
5. VEHICLE-CONCEPT DEVELOPMENT
6. COMMERCIAL VALUE
7. NATIONAL ISSUES; TECHNOLOGY NEEDS; SPECIAL FACTORS
HIGH-SPEED, CIVIL TRANSPORT STUDIES

Contract Task Elements

TASK 1 - INITIAL TECHNOLOGY ASSESSMENT

- VEHICLE-CONCEPTS DEFINITION (M = 2 TO 25)
- PERFORMANCE EVALUATION

TASK 2 - INITIAL COMMERCIAL-VALUE STUDY

- "SHOULD COST" & "WILL COST" ECONOMICS
- MARKET STUDY
- SCHEDULING STUDY
HIGH-SPEED, CIVIL TRANSPORT STUDIES

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HIGH-SPEED, CIVIL TRANSPORT STUDIES

Contract Task Elements

TASK 3 - SPECIAL FACTORS ASSESSMENT

- UNCONVENTIONAL FUELS
- ENVIRONMENTAL CONCERNS (INCLUDES BOOM)
- AIR TRAFFIC CONTROL SYSTEM
- AIRPORT INFRASTRUCTURE
- RELIABILITY, SAFETY, AND MAINTAINABILITY
- SPECIAL AIRLINE PROCEDURES
- CERTIFICATION
HIGH-SPEED, CIVIL TRANSPORT STUDIES

Contract Task Elements

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HIGH-SPEED, CIVIL TRANSPORT STUDIES

Contract Task Elements

TASK 4 - VEHICLE-CONCEPT SELECTION STUDY

- SENSITIVITY STUDIES
- VEHICLE CONCEPT RANKING: BENEFIT FUNCTIONS & RISK FACTORS

TASK 5 - VEHICLE CONFIGURATION DEVELOPMENT

- HIGH-SPEED & SUBSONIC CONCEPT DEVELOPMENT
- MISSION-PERFORMANCE ANALYSES
- DATA PACKAGE FOR NASA
HIGH-SPEED, CIVIL TRANSPORT STUDIES

Contract Task Elements

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HIGH-SPEED, CIVIL TRANSPORT STUDIES

Contract Task Elements

TASK 6 – Refined Commercial-Value Study

• TASK-2 REWORK & ROI
• SENSITIVITY STUDIES: PERFORMANCE EFFECTS ON ECONOMICS

TASK 7 – National Issues and Technology-Needs Definition

• TASK-3 REWORK
• MULTINATIONAL ORGANIZATIONS; FINANCING; BALANCE OF TRADE
• NASP RELATIONSHIP
• TECHNOLOGY NEEDS AND PLANS
HIGH-SPEED, CIVIL TRANSPORT STUDIES

Contract Task Elements

TASK 6 - Refined Commercial-Value Study

- TASK-2 Rework & ROI
- Sensitivity Studies: Performance Effects on Economics

TASK 7 - National Issues and Technology-Needs Definition

- TASK-3 Rework
- Multinational Organizations; Financing; Balance of Trade
- NASP Relationship
- Technology Needs and Plans
HIGH-SPEED, CIVIL TRANSPORT STUDIES

Contract Task Elements

TASK 8 – PROPULSION SUBCONTRACTING TASK

• AIRFRAMER SUBCONTRACTS FOR ENGINE DATA
• CONTRACTOR HAS RESPONSIBILITY TO OBTAIN DATA TO SATISFY TASK OBJECTIVES

CONTINUED INTERACTION WITH AIRLINE INDUSTRY AND ASSOCIATED ORGANIZATIONS
HIGH-SPEED, CIVIL TRANSPORT STUDIES

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Vehicle Concept Matrix: Fuel & Speed

High-Speed, Civil Transport Studies
HIGH-SPEED, CIVIL TRANSPORT STUDIES

NASA In-House Program Elements

- AERODYNAMICS
- PROPULSION
- UNCONVENTIONAL FUELS
- STRUCTURES/MATERIALS
- CONTROL SYSTEMS
- AIRCRAFT SYSTEMS
- CONFIGURATION DEVELOPMENT
- MISSION PERFORMANCE & SIZING
- NOISE & SONIC BOOM
- THERMAL MANAGEMENT
- ECONOMICS
- AIR-TRANSPORT-SYSTEM INTERFACE
HIGH-SPEED, CIVIL TRANSPORT STUDIES

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HIGH-SPEED, CIVIL TRANSPORT STUDIES

Study Guidelines

- STUDY COVERS THE FULL RANGE OF VEHICLE CONCEPTS
- NASA AND CONTRACTORS SHARE IN DEFINING TASKS
- PREVIOUS STUDIES DO NOT BIAS PRESENT WORK
- AIRLINE INDUSTRY AND ASSOCIATED ORGANIZATIONS CONSULT AND INTERACT
HIGH-SPEED, CIVIL TRANSPORT STUDIES

PROGRAM MANAGEMENT
(LANGLEY)

AMES   LEWIS   LANGLEY

BOEING CONTRACT

DOUGLAS CONTRACT

ENGINE SUBCONTRACTORS
HIGH-SPEED, CIVIL TRANSPORT STUDIES

PROGRAM MANAGEMENT (LANGLEY)

AMES  LEWIS  LANGLEY

BOEING CONTRACT

DOUGLAS CONTRACT

ENGINE SUBCONTRACTORS
HIGH-SPEED, CIVIL TRANSPORT STUDIES

Vehicle Concept Matrix: Fuel & Speed

- H$_2$
- CH$_4$
- JP-X
- JP

Mach Number

0  6  12
HIGH-SPEED, CIVIL TRANSPORT STUDIES

Vehicle Concept Matrix: Fuel & Speed

Mach Number
HIGH-SPEED, CIVIL TRANSPORT STUDIES

Hub - Spoke Concept

- USES NEW HUBS: SUPersonic HUB-TO-HUB
- ALLEVIATES PROBLEMS: AIRport NOISE, SONIC BOOM, SPECIAL FUELS REQUIREMENTS
HIGH-SPEED, CIVIL TRANSPORT STUDIES

OBJECTIVES

• IDENTIFY MARKET WINDOWS: MISSION, CONCEPTS,....
• ENABLE PLANNING BY NASA & OTHERS

METHOD

• TWO SEPARATE CONTRACTS: CONTRACTOR CONFIDENCE IN BOTH STUDY QUESTIONS AND ANSWERS
• IN-HOUSE STUDIES: FOCUSED ON SELECTED TASK ELEMENTS

STATUS

• CONTRACT STUDIES IN PHASE I
• ORAL REPORTS DUE IN JULY FOR PHASE I
• IN-HOUSE TEAMS IN PLACE
HIGH-SPEED, CIVIL TRANSPORT STUDIES

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