SPACE TRANSPORTATION MATERIALS AND STRUCTURES TECHNOLOGY WORKSHOP

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G. F. WRIGHT: PERSONAL HISTORY IN ENTRY SYSTEMS

- 1963 - 1970 - ENTRY MATERIALS DEVELOPMENT AND TESTING
  - HEAT SHIELD MATERIALS - C/C, ORGANICS
  - RADAR WINDOW MATERIALS - CERAMICS

- 1971 - 1980 - AEROTHERMAL ANALYSIS OF REENTRY VEHICLES
  - ANALYSIS OF BOTH BALLISTIC AND MANEUVERING VEHICLES
  - CONTINUED MATERIALS TESTING
  - PARTICIPATE IN CODE DEVELOPMENT

- 1980 - PRESENT - PROGRAM MANAGER FOR SEVERAL AEROSPACE PROGRAMS
  - SPACEPLANE - MANNED MANEUVERING VEHICLES
  - SHRV - HYPERSONIC RESEARCH VEHICLE
  - NUBE - HIGH ALTITUDE SOUNDING ROCKET
  - STARMATE - HIGH ALTITUDE SOUNDING ROCKET
  - SEAM - SPACECRAFT TO MEASURE LOCAL SPACECRAFT ENVIRONMENTS
  - HYFLEX - HYPERSONIC FLIGHT EXPERIMENT

- PROFESSIONAL SOCIETIES

  AIAA - ASSOCIATE FELLOW

  ASTM - MEMBER, COMMITTEE E-21 ON SPACE SIMULATION (FORMER CHAIRMAN)

  CHAIRMAN, SUBCOMMITTEE E-21.08 ON THERMAL PROTECTION

CURRENT PROGRAMS

MATERIALS & STRUCTURES FOR HYPERSONICS

- NASP SUPPORTS MOST PROGRAMS (100M + FOR MATERIALS)
  - AVAILABILITY OF MATERIALS DATA TO GENERAL COMMUNITY
    - DEVELOP MATERIALS DATABOOK OF THESE MATERIALS
    - NASP TASK?
    - NASA PROJECT?

- NASA - GENERIC HYPERSONICS
  - DESIGN PRIMARILY TO ADDRESS FLOW ISSUES
  - SUITABLE TESTBED FOR NEW MATERIALS AND TECHNIQUES
    - REQUIRES DATA ON MATERIALS AND FASTENERS

BASIC TECHNOLOGY NEEDS
MATERIALS & STRUCTURES FOR HYPERSONICS

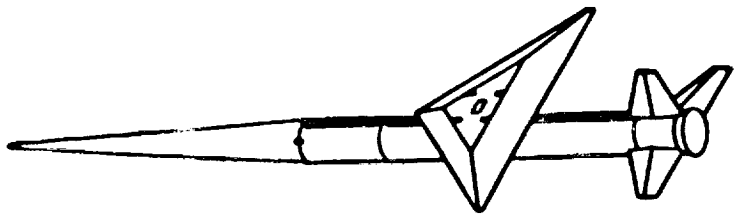
- MATERIALS DEVELOPED FOR TEMPERATURES ABOVE 4000° F
  - REUSABLE
  - FABRICABLE IN LARGE ENOUGH COMPONENTS TO BE USEFUL FOR VEHICLE CONSTRUCTION
  - TAILORABLE PROPERTIES; MODULUS, THERMAL EXPANSION
  - FASTENERS WITH TECHNIQUES DEVELOPED FOR USE
- MATERIALS FOR CONTINUOUS SERVICE ABOVE 4000° F IN LARGE SIZES
  - STANDARDIZED FASTENER SYSTEMS
  - COOLING TECHNOLOGY FOR NOSETIPS, LEADING EDGES, ETC.
  - BUILT INTO STRUCTURE
  - COMMUNICATION OF DATA AND TECHNOLOGY ON MATERIALS AND STRUCTURES. CENTRAL CLEARING HOUSE.
- INSTRUMENTATION FOR FLIGHT VEHICLES
  - TEMPERATURE - HOT SURFACES
  - HEATING RATE - HOT SURFACES
  - BLT MEASUREMENT - HOT SURFACES
  - STRAIN - HOT SURFACES

PAYOFF AREAS

MATERIALS AND STRUCTURES FOR HYPERSONICS

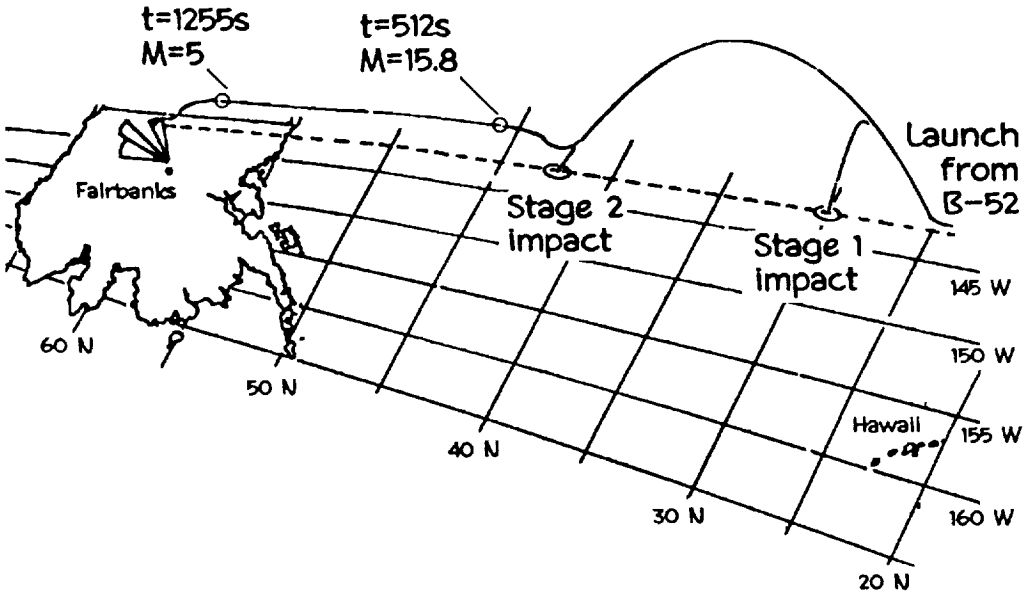
- CENTRALIZED DATA SYSTEM
  - COMPUTERIZED NETWORK OR UPDATE SYSTEM
  - HANDBOOK OF DATA
- STANDARDIZED MEASUREMENT SYSTEMS FOR HOT SURFACES
- ATTACHMENT TECHNIQUES
- SIZE ISSUES

Two-Stage Pegasus with a 213' Payload

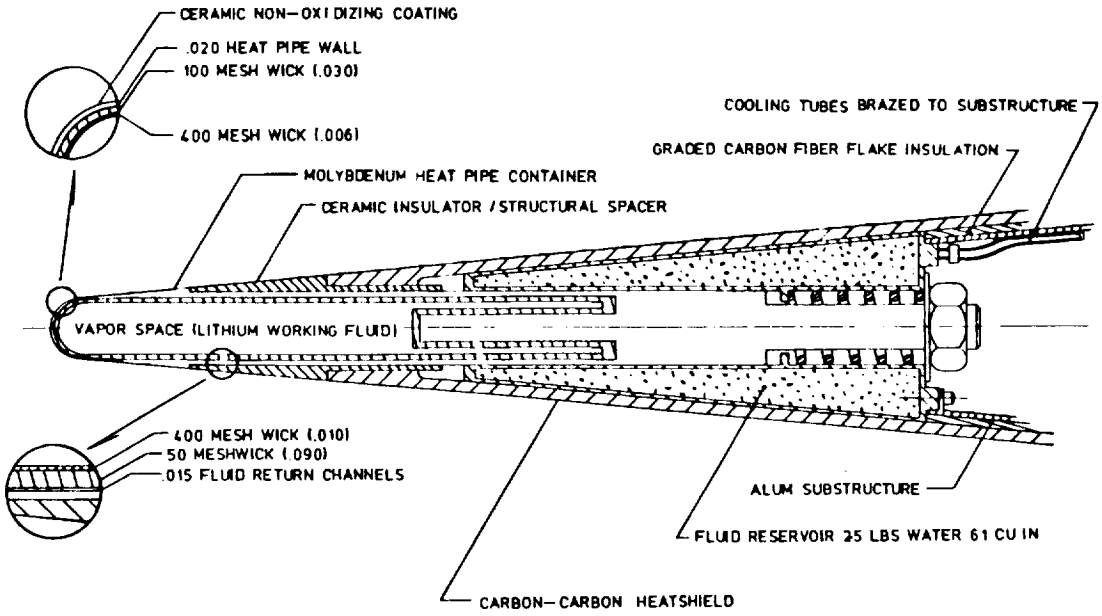


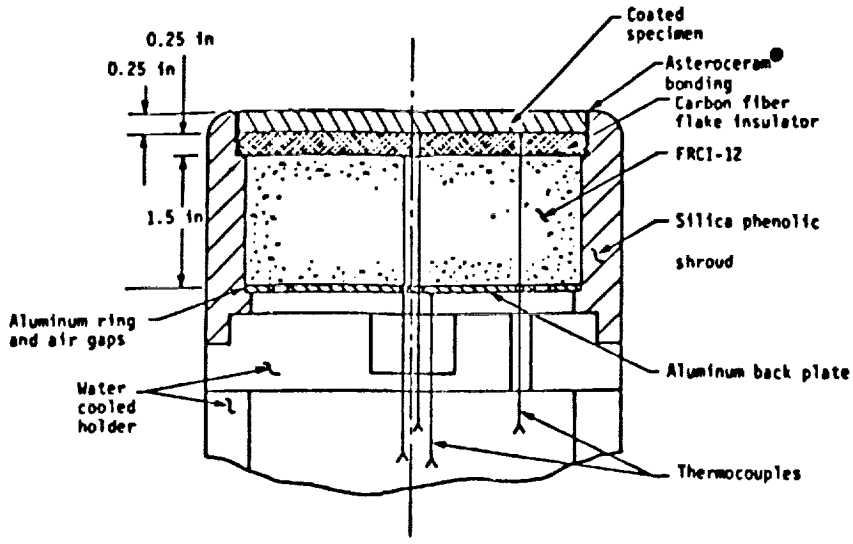
Proposed SWERVE/Pegasus launch profile

with parachute recovery at Poker Flat Research Range



NOSE TIP HEAT PIPE PROPOSAL





Sketch of the Proposed Test Model Design.

10.3.13 Rigid Fibrous Ceramics for Entry Systems
by Ronald P. Banas, Lockheed Missiles & Space Company, Inc.