CRGunn/1-19-83/

SPACE LAUNCH POLICY ON COMMERCIALIZATION OF
EXPENDABLE LAUNCH VEHICLES

In consonance with the President's National Space Policy (NSDD-42) goals to "expand the United States private-sector investment and involvement in civil space and space related activities" and the principle to "encourage domestic commercial exploitation of space capabilities, technology and systems for national economic benefit" the following subset of policies relating to the Nation's space transportation systems are established:

(1) Within the transition of the United States Government (USG) spacecraft to the Shuttle, USG shall encourage and facilitate the purchase or use by the private sector of those USG Expendable Launch Vehicles (ELV) designs, processes, procedures, tooling, ground support equipment, facilities and property that will be excess to USG needs after the transition to the Shuttle.

(2) The USG shall not recover ELV development, production or facility sunk costs.

(3) The USG shall provide on a reasonable, reimbursable basis, those support services that can only be secured from the USG and that are necessary for the conduct of commercial ELV launches.

(4) All United States commercial ELV launches shall be conducted from USG national ranges.

(5) The USG shall have priority access for national security and launch opportunity critical missions to joint use USG facilities and support services.

(6) NASA and DOD shall be the Government agencies responsible for:

- o determining those ELV designs, processes, procedures, tooling, ground support equipment and facilities that are excess to the USG needs;
- o determining those support services and the reasonable reimbursable bases that the USG shall provide that are necessary for ELV commercial launches from the USG National Ranges;
- o determining those jointly used tooling, ground support equipment and facilities and the reasonable reimbursable bases that the USG shall provide that are necessary for ELV commercial launches;
- o determining the transition means and schedules for turning over or sharing USG ELV facilities and properties;
- o determining the cost of residual inventory of flight and ground software and hardware, propellants and other USG ELV spares and supplies excess to the USG needs;
- o providing technical advise and assistance in operations, regulation, or licensing of commercial ELV's on a reasonable reimbursable basis.

(7) The _____ shall be the lead Government Agency responsible for:

- o licensing and regulating commercial ELV enterprises
- o negotiating sale, lease or use of USG facilities and property identified by NASA and DOD for joint use or excess to USG needs.
- o negotiating agreements and cost for USG provided support services necessary for ELV commercial launches
- o coordinate and facilitate all USG actions pertinent to commercial ELV launches.

(8) Licensed ELV commercial enterprises shall:

- o comply with USG national and international laws and treaties
- o comply with USG and applicable State security, safety and environmental requirements and regulations
- o maintain all tooling, ground support equipment, facilities and properties used or leased from the USG at the same level of readiness and repair (less normal wear and tear) as when turned over for use.
- o indemnify the USG against laibilities for damage/ injury or fatalities to persons and property of other nations.

(9) The USG shall not be liable for damages caused by USG support services, joint use facilities or properties sold, leased or used by licensed ELV commercial operators.

Notwithstanding the USG policy to encourage and facilitate private sector ELV entry and competition with the Space Shuttle, which is the United States' primary launch vehicle for U.S. Government, commercial and foreign payloads, the USG intends to vigorously seek and secure agreements and contracts for Space Shuttle launches from all potential sectors, national and foreign, government and private.

January 20, 1983

TO: MC/Director, Customer Services

FROM: MOG/Director, Space Shuttle Operations

SUBJECT: Commercialized ELV Impact on Space Shuttle

The Interagency Space Launch Policy Working Group is now addressing issues surrounding the commercialization of space transportation. Phase I of these efforts are directed to determining the benefits to the U.S. Government derived from commercialization of Expendable Launch Vehicles. As you are aware, there are proposals before NASA to commercialize Delta and Atlas Centaur and before DOD to take over the Titan. The Working Group would like your assessment of existing or potential missions any or all of these ELV's might capture that otherwise would most probably fall to Space Shuttle. Also, since U.S. commercial ELV's would be in competition with Space Shuttle, what impact might they have on the Space Shuttle other than reducing flight rate, e.g., force Space Shuttle to:

- comparable commercial pricing;
- commercialize at the same time in order to preclude the U.S. Government from competing in the same "market" as the private sector;
- abandon the commercial and foreign market to U.S. ELV.

Your thought and perspective would be most helpful to the Working Group. A discussion of these issues with the Group would be appreciated at your earliest convenience.

C. H. Gunn

COMMERCIALIZATION OF SPACE TRANSPORTATION

CHARTER

Develop national policy options to encourage and enable commercialization of existing and new space transportation systems and elements of both Expendable Launch Vehicles (ELV) and the Space Shuttle Space Transportation System (STS).

TASK PLAN

- Phase I--Expendable Launch Vehicles
  - Define concepts and criteria for commercialization
  - Examine existing and proposed commercialization ventures

    -Basis for venture and projected viability
    -Benefit to private sector
    -Benefit to Government
    -Necessary Agreements/Guarantees/Approvals/Regulations/ Legislation
    -Potential impact upon:

      -National Security
      -National Economy
      -Foreign Competition
      -STS Program
      -International Treaties/Laws

  - Examine commercialization task team studies of remote sensing to meteorology by DOC/NASA and STS by NASA
  - Examine proposed legislation on commercialization
  - Draft policy options
  - Criteria--January 28, 1983
  - Review of Commercialization Ventures and Government Studies--February 18
  - Draft policy options--March 4
- Phase II--Space Shuttle
  - Review of Commercialization Ventures and Government Studies--March 25
  - Draft policy options--April 8
- Interagency Coordinated Proposed NSDD to IG--April 22
  - Working Group Report--June 1983

SSI

SPACE
SERVICES
INC OF AMERICA

Corporate Headquarters
[illegible]
[illegible] Texas 77001
713-[illegible]

Government and Public Affairs
Suite 300
2550 M Street N W
Washington D C 20037
202-659-0988

7173

December 7, 1982

Vice President George Bush
Old Executive Office Building
Washington, D.C.

Dear George:

I've enjoyed updating you on SSI and the future of private industry in space operations. Now I'd like to bring to your attention an emerging governmental issue that I believe is of primary concern to all firms undertaking commercial space operations.

I've always been able to report that the government has been responsive to SSI requests for assistance and permissions and that the government has not been an obstacle to private space firms. However, as SSI has evaluated the business opportunities in space, the pattern of government activities has begun to loom as a major roadblock.

To explain, the federal government is making a number of budgetary and policy decisions that will fundamentally affect the ability of private firms to conduct space business. For example, the federal government is considering: building a fifth Shuttle Orbiter; finalizing the future of the Landsat remote sensing satellite system; and permitting civilian use of the NAVSTAR global positioning system. Each of these decisions could substantially undercut a potential private sector business: a fifth Orbiter might well impair the market and funding for private sector operation of expendable launch vehicles; a government-subsidized competitor in remote sensing or navigation/positioning probably would dry up investment funds for private projects in these areas. Yet, each decision is proceeding with little more than a perfunctory nod toward the private sector.

Before such critical decisions--and others to follow--are made, I believe the federal government must examine its policy on private enterprise in space. Important questions must be answered, foremost among them:

- To what extent and under what conditions will the federal government compete with existing or potential private business activities in space?

- If federal activities not essential to national security--however valuable--preempt private activities, will the government fund such operations?

o Will NASA and other federal agencies focus on very high-risk, long-term research projects that the private sector cannot undertake, or will federal agencies establish and operate space systems that constitute--in fact if not in intent--competitors for private space businesses?

o Is the government willing to assume the risks as well as the benefits of truly private space commercial activities--i.e., is the government willing to accept the fact that although any given private sector initiative may succeed spectacularly, such a business also could encounter delays or actually fail?

Until such questions are answered and policy priorities clarified, the federal government and potential investors in private sector space operations cannot make coherent, cohesive decisions on federal government space activities vis-a-vis private ones. But upcoming decisions virtually may dictate the future of private space businesses that already have expended--or soon will expend--funds invested by American taxpayers in pursuit of free market profits.

Consequently, I hope that you and the President's science advisers will consider implementing an overarching policy that will define the role of the federal government in space as noncompetitive with commercial activities. I believe such action would be both completely consistent with the recently announced Presidential space policy and critical to the viability of the emerging private sector space operations industry. I would appreciate the opportunity to schedule a time to discuss this matter personally with you. I look forward to hearing from you.

Sincerely,

David

David Hannah, Jr.

SPACE TRANSPORTATION SYSTEMS

NASA AND COMMERCIALIZATION

PRESENTATION TO THE ADMINISTRATOR

JANUARY 1983

THREE CATEGORIES OF EXPRESSIONS OF INTEREST

I. NEW SYSTEMS AT NEW SITES.

II. SYSTEMS AND ACTIVITIES COMPLEMENTARY TO STS.

III. EXISTING ELV SYSTEMS.

REVIEW APPROACH

I. DISCUSSIONS CONDUCTED WITH INTERESTED PARTIES:

SSI	FAIRCHILD	AEROJET
ARC TECH	ORBITAL SYSTEMS	LTV
TRANSPACE	McDONNELL DOUGLAS	ROCKWELL
GENERAL DYNAMICS	ORBITAL SYSTEMS LTD	DOD
MARTIN	ASTROTECH INC.	DOC
FEDERAL EXPRESS	GRUMMAN	BATTELLE
SPACE TRANS. CO.	BOEING	ECON

II. REVIEW CONDUCTED OF APPLICABLE LAWS, POLICIES, ETC.

III. REVIEWED IN DETAIL THE SERVICES CURRENTLY PROVIDED AND DETERMINED KEY DECISIONS AND ACTIONS REQUIRED TO IMPLEMENT EACH CATEGORY.

NEW SYSTEMS AT NEW SITES

DOMESTIC

1. SSI - CONESTOGA VEHICLE - MATAGORDA ISL., HAWAII
2. ARC TECHNOLOGY - (HYBRID-UNNAMED) - 200 MI OFF WEST COAST
3. PROJECT PRIVATE ENTERPRISE - VOLKS ROCKET - VARIOUS

NASA ACTIONS

PROVIDE TECHNICAL ADVICE AND SUPPORT TO STATE, FAA, AND FCC.

PROVIDE TECHNICAL ADVICE AND SUPPORT AS AGREED TO BY NASA.

FOREIGN

1. ESA/ARIANESPACE ARIANE - FRENCH GUIANA
2. GERMAN - ORTRAG - VARIOUS

NEW SYSTEMS AT NEW SITES

OTHER GOVERNMENT REQUIREMENTS

STATE DEPARTMENT - EXPORT LICENSE, NOTIFICATION OF LAUNCH

FAA - AUTHORIZATION TO UTILIZE AIRSPACE (FAR EXEMPTION)

FCC - FREQUENCY UTILIZATION

AT&FA - REGISTRATION OF ROCKET

NORAD - NOTIFICATION OF LAUNCH

SYSTEM PROPOSALS COMPLEMENTARY TO STS

ACTIVITY UNDERWAY

1. PAM D - McDONNELL DOUGLAS
2. MATERIALS PROCESSING - McDONNELL DOUGLAS

INITIATED ACTION

1. FIFTH ORBITER - SPACE TRANS. CO. (FEDERAL EXPRESS)
2. SRM-1X - ORBITAL SYSTEMS INC.
3. MARKETING - GRUMMAN, BOEING, USBI, MDAC, ROCKWELL, ETC.
4. PAYLAOD PROCESSING - ASTRO TECH INTERNATIONAL INC.

PLANNED ACTIONS

1. LEASE SATELLITE - FAIRCHILD
2. MATERIALS PROCESSING - GTI
3. MATERIALS PROCESSING - BALL AEROSPACE SYSTEMS
4. MATERIALS PROCESSING - JOHN DEERE & CO.
5. MATERIALS PROCESSING - DUPONT
6. MATERIALS PROCESSING - INCO
7. MATERIALS PROCESSING - UNION CARBIDE CORP.

NASA ACTIONS

REVIEW PROPOSALS, DETERMINE MERIT, DETERMINE IF COMPETITION REQUIRED

COORDINATE INTERAGENCY REQUIREMENTS

IF APPROVED ENTER JEA, MOU, OR CONTRACT AS REQUIRED

EXISTING ELV SYSTEMS

1. CENTAUR - GENERAL DYNAMICS, SSI
2. DELTA - TRANSPACE
3. TITAN - SPACE TRANS CO. (MOU WITH MARTIN, UTC, AEROJET)

NASA ACTIONS

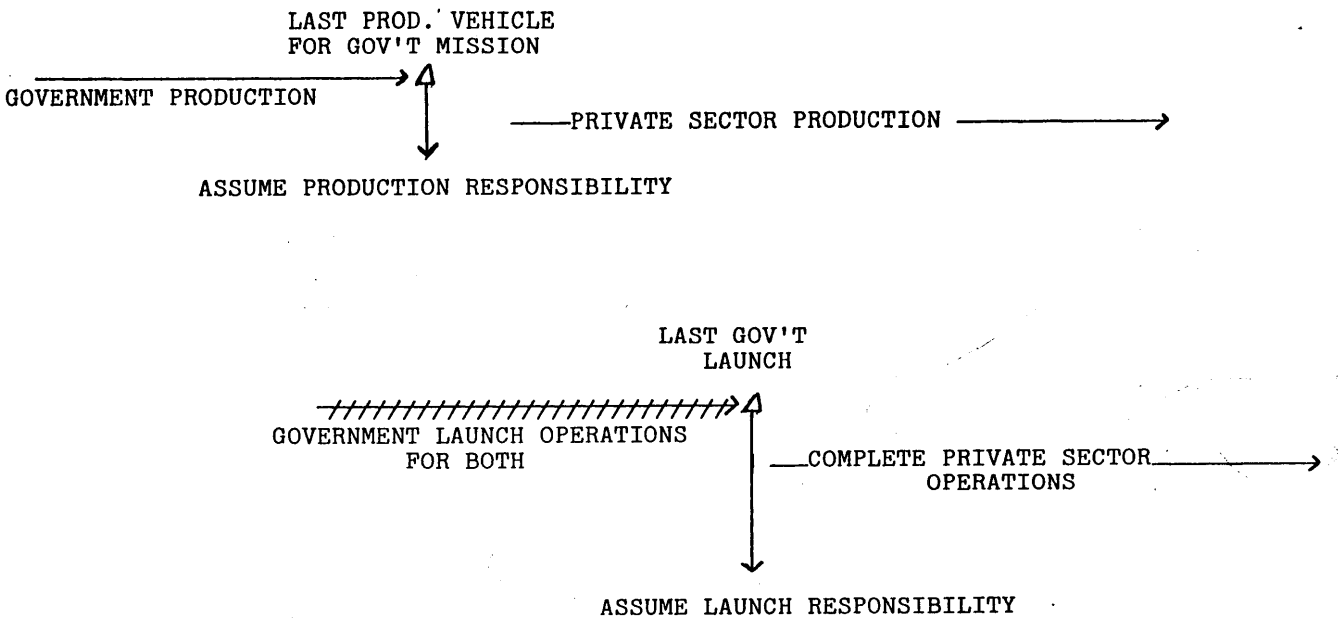
DECISIONS REQUIRED

INITIATE COMPETITION (AS DESIRED)

PLAN TRANSITION (DOD MISSIONS, NASA AND OTHER U.S. GOV'T MISSIONS, C&F MISSIONS)

PROVIDE TECHNCIAL ADVICE/ASSISTANCE IN LICENSING TO STATE, FCC AND FAA

TYPICAL TRANSITION PLAN



DOD/NASA DECISIONS REQUIRED FOR

GOVERNMENT OPERATED SYSTEMS

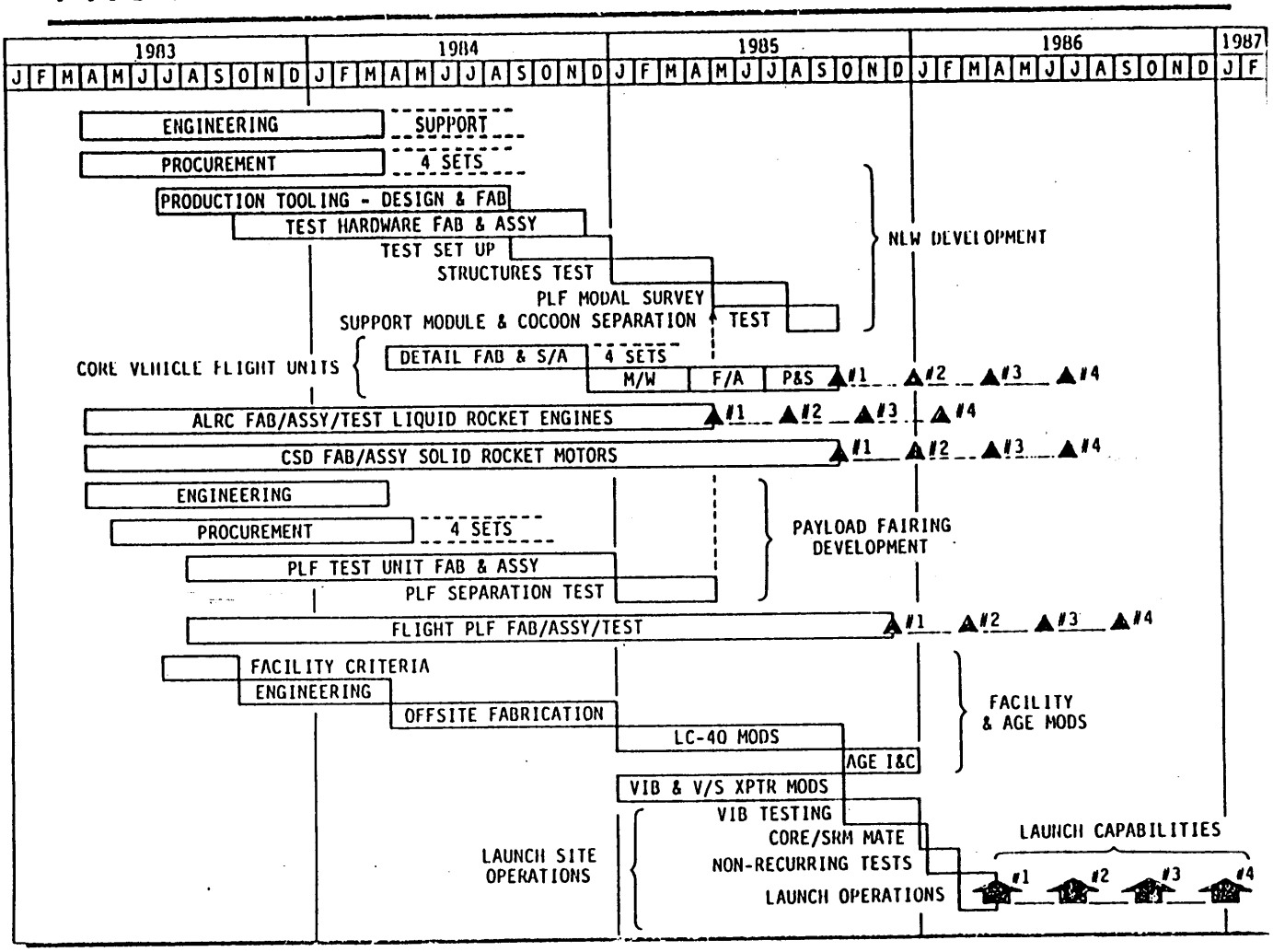
HARDWARE AND PRODUCTION CAPABILITIES

- 0 "SUNK" R&D COST RECOVERY ON CAPABILITY DEVELOPMENT
- 0 RENTAL, LEASE, OR USE PERMIT OF PRODUCTION AND PLANT TOOLING, TEST EQUIPMENT DRAWINGS, PROCESSES AND PROCEDURES, ETC.
- 0 SALE OF GOVERNMENT SPARE PARTS INVENTORIES AND OVERHAUL AND REPAIR CAPABILITIES (EXCEPTION REQUIRED)
- 0 MONOPOLY VS FREE MARKET

LAUNCH SITE CAPABILITIES

- 0 "SUNK" R&D COST RECOVERY ON CAPABILITY DEVELOPMENT
- 0 LEASE, RENTAL OR USE PERMIT SYSTEM UNIQUE FACILITIES TEST EQUIPMENT AND GSE
  - CONTROL OF MODIFICATIONS
- 0 USE OF LAUNCH SOFTWARE (INCLUDING TEST AND LAUNCH PROCEDURES)
- 0 JOINT USE OF CERTAIN OTHER FACILITIES
- 0 GOVERNMENT PROVIDED OPERATIONAL SUPPORT
- 0 GOVERNMENT PROVIDED BASE SUPPORT
- 0 SCHEDULING PRIORITIES
- 0 SAFETY REQUIREMENTS
- 0 MONOPOLY VS FREE MARKET

PROGRAM PLAN



HARDWARE/PRODUCTION CAPABILITIES - TITAN

CATEGORIES OF GOVERNMENT PROPERTY REQUIRED TO SUPPORT FABRICATION, TEST, AND SHIPMENT OF VEHICLES

FACILITIES SUPPORT EQUIPMENT, I.E., CHEMICAL MILLING FACILITY, COMPRESSOR HOUSE AND VERTICAL TEST FACILITY

HARDWARE PRODUCTION TOOLS, SPECIAL TOOLING, TEST TOOLING AND SPECIAL TEST AND HANDLING EQUIPMENT

MACHINE TOOLS

AIR FORCE COMMERCIAL EQUIPMENT

ALL DOCUMENTATION USED DURING DESIGN, FABRICATION AND TEST.

LAUNCH SITE CAPABILITIES - TITAN

NEEDED FOR USE, MODIFICATION, CONTROL AND MAINTENANCE

VERTICAL INTEGRATION BUILDING (VIB)

LAUNCH COMPLEX 40 IN ITS ENTIRETY

TITAN TRANSPORTER SETS (4)

RAILROAD ROLLING STOCK

SRM SUPPORT FRAME AND STEMS

SOLID MOTOR ASSEMBLY BUILDING (SMAB) AND SRM SUPPORT AREAS

PAYLOAD PAIRING PROCESSING FACILITY

LC-41 PROPELLANT CONDITIONING EQUIPMENT

MECHANICAL AND ELECTRICAL AGE, TEST TOOLS FOR TITAN, SRMs AND ENGINES

OFFICE SPACE, SHOPS, AND WAREHOUSES

LIFE SUPPORT EQUIPMENT

SPARES FOR REAL PROPERTY INSTALLED EQUIPMENT

LAUNCH SITE CAPABILITIES - TITAN

JOINT USAGE

SKID STRIP

VIB BAYS, OFFICE SPACE, GN_2 FARMS AND DIESEL GENERATORS

RAILROAD TRACKS

PROPELLANT STORAGE AREAS

WAREHOUSE OFFICE SPACE

SMAB HIGH BAY, SLING STORAGE AND CRANE

ORDNANCE STORAGE AND TEST AREAS

ASSUMPTIONS ON DECISIONS REQUIRED BY USG

HARDWARE AND PRODUCTION CAPABILITIES

- 0 "SUNK" R&D COSTS WILL NOT BE RECOVERED
- 0 NOMINAL LEASE, RENTAL OR USE PERMIT CHARGES UTILIZING A STANDARD COMPUTATION PROCESS WILL BE ASSESSED FOR SYSTEM UNIQUE PRODUCTION AND PLANT CHECKOUT AND TESTING TOOLING AND EQUIPMENT
- 0 USE OF GOVERNMENT DRAWINGS, PROCESSES, PROCEDURES, ETC. WILL BE ALLOWED WITHOUT CHARGE BUT WITH RESTRICTIONS
- 0 GOVERNMENT INVENTORIES OF SPARE PARTS, MATERIALS AND ASSOCIATED CAPABILITIES EXCESS TO USG REQUIREMENTS WILL BE SOLD TO THE OPERATOR (EXCEPTION REQUIRED)

LAUNCH SITE CAPABILITIES

- 0 "SUNK" R&D COSTS WILL NOT BE RECOVERED
- 0 NOMINAL LEASE, RENTAL OR USE PERMIT CHARGES UTILIZING A STANDARD COMPUTATION PROCESS WILL BE ASSESSED FOR SYSTEM UNIQUE CAPABILITIES, E.G., LAUNCH PAD, BLOCKHOUSE, GSE AND RELATED EQUIPMENT
- 0 USG WILL CONTINUE TO PROVIDE SUPPORT TO PRIVATELY OPERATED SYSTEMS IN ACCORDANCE WITH AGREED TO SIRD, PRD, PSP, ETC.
- 0 CHARGING FOR GOVERNMENT SERVICES AND SUPPORT AT THE LAUNCH SITE WILL BE ON STS PRICING BASIS FOR SUPPORT TO PRIVATE SECTOR ACTIVITIES
- 0 USG MISSIONS WILL HAVE PRIORITY ACCESS TO USG FACILITIES (SCHEDULING ONLY)
- 0 PRIVATE OPERATOR WILL ASSUME COMPLETE RESPONSIBILITIES FOR OPERATION AND MAINTENANCE OF LAUNCH COMPLEX
- 0 PRIVATE OPERATOR MUST COMPLY WITH USG SAFETY AND ENVIRONMENTAL REQUIREMENTS

APPENDIX E

SUPPORT SERVICES AT ETR

The capability of the following support services is available for each mission to be launched from ETR.

Support Service	Available from		Available to	
	KSC	USAF	Vehicle	Payload*
Off-loading, loading flight hardware, and GSE at CCAFS	X	X**	-	X
Intrasite (ETR) transportation, handling, and storage of hardware and GSE	-	X	X	X
Use of a payload processing facility and a hazardous processing facility (DSTF and/or ESA-60) including industrial environmental control and clean room capability	X	X	X	X
Use of existing RD and voice communications capability, hardware data lines, and closed-circuit TV among the launch pad, blockhouse, Delta TM facility (Hangar AE), flight hardware processing facilities, including the DSTF, and flight hardware unique ground station on site	-	X	X	X
A 24-hour-day security of site perimeter, interior guard support, processing facilities, and launch complex and intrasite escort security	-	X	X	X
Office Space	X	X	X	X

*Payload is defined as all property provided by the User, including but not limited to the spacecraft, upper-stage, attach fittings, and spin table.

**User aircraft refueling available on a reimbursable basis (to USAF) as an optional service.

APPENDIX E (continued)

Support Service	Available from		Available to	
	KSC	USAF	Vehicle	Payload*
Safety support - participation in ground safety reviews, site procedure reviews, and operations monitoring for hazardous operations	X	X	X	X
Supply of minor quantities of hazardous materials (chemicals), nitrogen (gas, liquid), helium (gas), freon, and hydrazine	X	-	X	X
Fluids sampling and analyses	X	-	X	X
Photographic services	-	X	X	X
Technical shops support	-	X	X	X
Use available NASA test and equipment and calibration services on a noninterference basis	X	-	X	X
"Scape" support, including support of payload propellant "cart" operations	X	-	X	X
Ordnance storage and handling including receiving inspection, bridgewire checks, leak tests, motor buildup, motor cold soak, and X-ray and propellant handling and storage	X	-	X	X
Emergency medical services, fire protection	-	X	X	X
Coordination and planning of site activities, universal documentation system support, technical library services	X	-	X	X
Spin testing in DSTF	X	-	X	X

*Payload is defined as all property provided by the user, including but not limited to the spacecraft, upper-stage, attach fittings, and spin table.

IMPLEMENTATION ASSUMPTIONS - LAUNCH SITE

PRIVATE SECTOR DEDICATED FACILITIES (E.G., COMPLEX 17) AND EQUIPMENT

- OPERATOR RESPONSIBLE FOR CONFIGURATION CONTROL, OPERATION AND MAINTENANCE
- OPERATOR RESPONSIBLE FOR AWARENESS OF AND COMPLIANCE WITH REGULATIONS (OSHA, KSC, RANGE)
- TEST INTEGRATION WITH KSC AND RANGE WOULD BE DONE BY OPERATOR
- OPERATOR RESPONSIBLE FOR UNIQUE SPARES
- OPERATOR RESPONSIBLE FOR PREPARATION OF PRD'S AND SIRD'S INCLUDING PAYLOAD REQUIREMENTS

IMPLEMENTATION ASSUMPTIONS - LAUNCH SITE

GOVERNMENT FACILITIES AND SERVICES

- OBTAIN USE OF COMMON SUPPORT CAPABILITIES

  I.E., RANGE SUPPORT - NEGOTIATE WITH ESMR

  KSC SUPPORT - NEGOTIATE WITH KSC - HANGAR AE, TM STATION, MDC, COMPUTER SUPPORT PAYLOAD PROCESSING FACILITIES, ETC.

- ESTABLISH WORKING AGREEMENTS ON JOINT USE FACILITIES

  COMPLEX 36 BLOCKHOUSE, DSTF, ETC.

- NASA LAUNCH SYSTEM TEST TEAM WOULD NOT BE INVOLVED IN LAUNCH PROCESSING
- NASA/RANGE WOULD MAINTAIN OVERALL SCHEDULE CONTROL AND INTEGRATION
- KSC SAFETY WOULD NOT BE INVOLVED IN LAUNCH PROCESSING, RANGE SAFETY WOULD MAINTAIN INVOLVEMENT, AS NEGOTIATED
- KSC QUALITY CONTROL WOULD NOT BE INVOLVED IN LAUNCH PROCESSING
- NASA WOULD CONTROL FACILITY CONFIGURATION OF JOINT USE FACILITIES

LEGAL REVIEW

INTERNATIONAL LAW

NON-GOVERNMENTAL SPACE ACTIVITIES INCLUDING LAUNCH OPERATIONS ARE NOT PROHIBITED BY INTERNATIONAL LAW.

GOVERNMENT HAS A RESPONSIBILITY UNDER INTERNATIONAL LAW TO REGULATE NON-GOVERNMENTAL SPACE LAUNCH OPERATIONS

- 0 PRIVATE LAUNCH OPERATIONS ARE REGULATED THRU AD HOC APPLICATION OF NONSPECIFIC STATUTORY AUTHORITY
- 0 CURRENT REGULATORY SCHEME HAS PROVEN TO BE ADEQUATE BUT IF COMMERCIAL LAUNCH OPERATIONS PROLIFERATE A REVISED REGULATORY SCHEME MAY BE NEEDED

GOVERNMENT IS LIABLE FOR DAMAGE OUTSIDE THE UNITED STATES CAUSED BY PRIVATE LAUNCHES ORIGINATING IN UNITED STATES TERRITORY

LEGAL REVIEW

REGULATION

THE CURRENT SYSTEM WORKS BUT HAS SHORTCOMINGS

- NO SPECIFIC CRITERIA FOR APPROVAL/DISAPPROVAL
- NO MECHANISM FOR ACTUAL SUPERVISION/PAYLOAD VERIFICATION
- ARMS EXPORT CONTROL ACT PROBABLY CANNOT BE APPLIED TO SUB-ORBITAL TEST FLIGHTS AND SOUNDING ROCKETS LAUNCHED/RECOVERED ENTIRELY WITHIN U.S. (NO LEGAL DEFINITION OF "SPACE" OR WHAT IS "OUTSIDE U.S.")

LEGISLATION TO CHANGE REGULATORY SCHEME WAS INTRODUCED IN 97TH CONGRESS

- CANNON BILL WOULD MAKE FAA THE LEAD AGENCY
- AKAKA BILL WOULD MAKE COMMERCE THE LEAD AGENCY

LEGAL REVIEW

CATEGORY III OPERATIONS

NASA HAS AUTHORITY TO LEASE OR ALLOW THE USE OF ITS REAL AND PERSONAL PROPERTY IN SUPPORT OF COMMERCIAL SPACE ACTIVITIES

- 0 NOT UNLIMITED AUTHORITY
- 0 FISCAL RESTRICTIONS
- 0 POLICY CONSIDERATIONS

CURRENT LAW REQUIRES THAT NASA RECEIVE ONLY MONEY AS CONSIDERATION FOR A LEASE

- 0 MONEYS DERIVED FROM RENTALS MUST GO TO TREASURY
- 0 MILITARY DEPARTMENTS HAVE A PARTIAL EXEMPTION

NASA MAY LEASE LAND AND REQUIRE LESSEE TO REMOVE AT HIS OWN EXPENSE BUILDINGS AND IMPROVEMENTS, OR PROPERTY LEFT ON PREMISES BECOMES PROPERTY OF THE UNITED STATES WITHOUT COMPENSATION THEREFOR.

LEGAL REVIEW

CATEGORY III OPERATIONS

A NUMBER OF LEGAL RESTRICTIONS OR ISSUES NEED TO BE CONSIDERED BY FIRMS INTERESTED IN COMMERCIAL SPACE OPERATIONS

- ANTITRUST
- PATENT LICENSING
- GOVERNMENT PERMISSION DOES NOT IMPLY LEGAL AUTHORITY TO ORCHESTRATE PROCESS

CRITERIA FOR COMMERCIALIZATION

COMMERCIALIZATION OF NOT INHERENTLY GOVERNMENTAL ACTIVITIES SHOULD:

- ENHANCE THE ECONOMIC BASE OF THE COUNTRY,
- LEAD TO EXPANDED TAX REVENUES,
- BENEFIT BOTH THE GOVERNMENT AND THE PRIVATE SECTOR,
- BE DONE IN AN ENVIRONMENT OF AN OPEN MARKETPLACE,
- ENCOURAGE FREE ENTERPRISE, AND
- ENCOURAGE HEALTHY COMPETITION ON BOTH A DOMESTIC AND INTERNATIONAL SCALE

CONCEPTS BEARING ON COMMERCIALIZATION

DEFINITION OF COMMERCIALIZATION: PRIVATE SECTOR MANAGEMENT AND OPERATION OF AN ACTIVITY AS A BUSINESS FOR PROFIT.

GOVERNMENTAL ACTIVITY	VS	NON-GOVERNMENTAL ACTIVITY
GOVERNMENT OPERATIONS	VS	PRIVATE SECTOR OPERATIONS
GOVERNMENT R&D	VS	PRIVATE INDUSTRY R&D
GOVERNMENT COST	VS	GOVERNMENT SAVINGS
TAX REVENUES	VS	TAX INCENTIVES
OPEN MARKETPLACE	VS	MONOPOLY
FREE ENTERPRISE	VS	GOVERNMENT SUBSIDY
PARTIAL COMMERCIALIZATION	VS	COMPLETE COMMERCIALIZATION
GRADUAL COMMERCIALIZATION	VS	IMMEDIATE COMMERCIALIZATION
GOVERNMENT INVESTMENT	VS	PRIVATE INVESTMENT

CRITERIA FOR EVALUATION OF PROPOSALS

FEASIBILITY

- DEMONSTRATES TECHNICAL AND MANAGEMENT CAPABILITIES
- DEMONSTRATES FINANCIAL CAPABILITIES

BUSINESS PLAN

- BASIC TERMS AND CONDITIONS
- GUARANTEES NEEDED (I.E., INDEMNIFICATION, ETC.)
- PROPOSED LEASES AND/OR PURCHASES FROM GOVERNMENT
- GOVERNMENT SUPPORT NEEDED
- SPECIAL INCENTIVES REQUIRED
- RECOMMENDED REGULATION
- TIMEFRAME OF TRANSITION
- OTHER FACTORS

BENEFITS TO THE GOVERNMENT

ADDRESSES FOREIGN SECTOR CONCERNS

ADDRESSES NATIONAL SECURITY CONCERNS

I. INTRODUCTION

As a result of a number of requests from industrial organizations, venture capital firms and others on the subject of commercializing various space transportation services, the Administrator of NASA requested a study of what NASA is required to do or make available to the various proposers for their implementation. In order to complete this action, a complete review of the question of commercialization of space transportation services and some of the implications of these actions were reviewed. This report contains the results of this review.

II. BACKGROUND

A. DEVELOPMENT AND EVOLUTION OF LAUNCH SYSTEMS

The United States Government began the development of Intercontinental Ballistic Missiles (ICBM) and Intermediate Range Ballistic Missiles (IRBM) in the 1950's. In the late 1950's and early 1960's, the adaptation of certain of these systems to space use, as space boosters, began. At that time, these systems were clearly utilized for governmental purposes. These systems have evolved into the present national stable of Expendable Launch Vehicles (ELV's).

Today's space launchings and operations are presently conducted by two Government agencies, the Department of Defense (DOD) specifically the Air Force (AF) and the National Aeronautics and Space Administration (NASA). A division of responsibilities between these agencies has evolved in a manner consistent with the Space Act to the point that, in general, the AF is the launch operations manager for the national security sector, including foreign defense system launches; and NASA is the launch operations manager for the civil sector, including other foreign launches. This evolution of responsibilities has resulted in a corolary responsibility for certain space launch vehicle systems, i.e., the Air Force is systems manager of Titan and Atlas E/F systems and NASA is systems manager of Scout, Delta and Atlas/Centaur systems. There have been and continue to be

instances of cross-utilization of systems (i.e., a DOD vehicle for a NASA launch and vice versa) by the two agencies and these variations will be discussed in sub-paragraph 3 of this section.

1. DOD Institution for Current ELVs

The Air Force, as a launch agent for the DOD, conducts launch operations from two launch sites, Cape Canaveral Air Force Station (AFS) at the Eastern Space and Missile Center (ESMC) and Vandenberg AFB at the Western Space and Missile Center (WSMC). Titan systems are launched from both sites and the Atlas E/F system is launched from Vandenberg AFB. Launch vehicle hardware is procured by a System Program Office (SPO)-Space Launch and Control Systems of Space Division, Air Force Systems Command, and the vehicles are launched by the Space and Missile Test Organization (SAMTO) also under Space Division. Most spacecraft are procured through the various System Program Offices (SPO's) of the various branches and organizations or of Space Division for AF needs and on orbit support is provided the Satellite Control Facility in conjunction with the appropriate SPO, or by the using organization.

The resources for the conduct of these operations come basically from direct annual appropriations with some reimbursable funding coming through NASA for the use of the national ranges for non-DOD missions, for Department of Commerce (NOAA) missions at the Western Test Range for Atlas E/F launchings, and for NASA

missions utilizing DOD launch systems. Figure 1-1 describes in block diagram form the Department of Defense institutional arrangement for the conduct of expendable launch and space operations.

2. NASA Institution for ELVs

NASA conducts launch operations from three sites within the United States. Cape Canaveral AFS (CCAFS) at the ESMC, from Vandenberg AFB (VAFB) at the WSMC and from Wallops Island, VA., also on the East Coast to meet DOD, NASA and civil sector needs. NASA operates the Delta launch system from the Cape Canaveral AFS and from Vandenberg AFB; the Scout launch system from Wallops Island and Vandenberg AFB; and the Atlas/Centaur launch system from Cape Canaveral AFS. These systems are procured by NASA Project Offices similar to AF SPO's (responsible for overall systems management, procurement and launch) at the Goddard Space Flight Center, the Langley Research Center and the Lewis Research Center, respectively. Launch operations at VAFB and CCAFS are managed by the Unmanned Launch Operations Division of the Kennedy Space Center which is responsible to the appropriate Project Management Center.

DOD ELV INSTITUTION

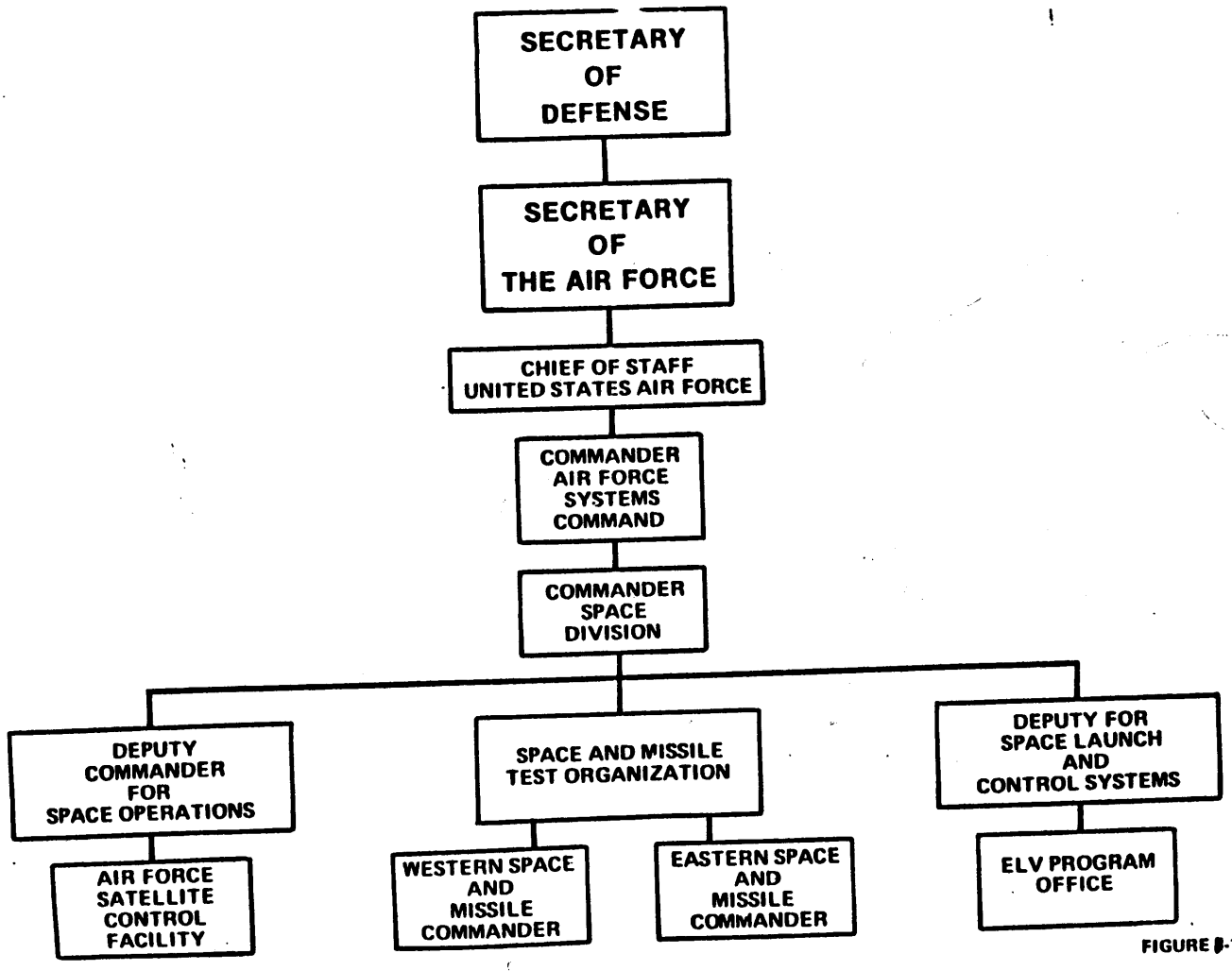


FIGURE B-1

Resources for the conduct of these operations come from a direct appropriation for the NASA missions still planned on ELVs (most NASA missions are planned for Shuttle) and reimbursable funding coming from other Government agencies and commercial users of ELVs. Figure 1-2 describes in block diagram form the NASA institutional arrangement for the conduct of expendable launch operations.

NASA ELV INSTITUTION

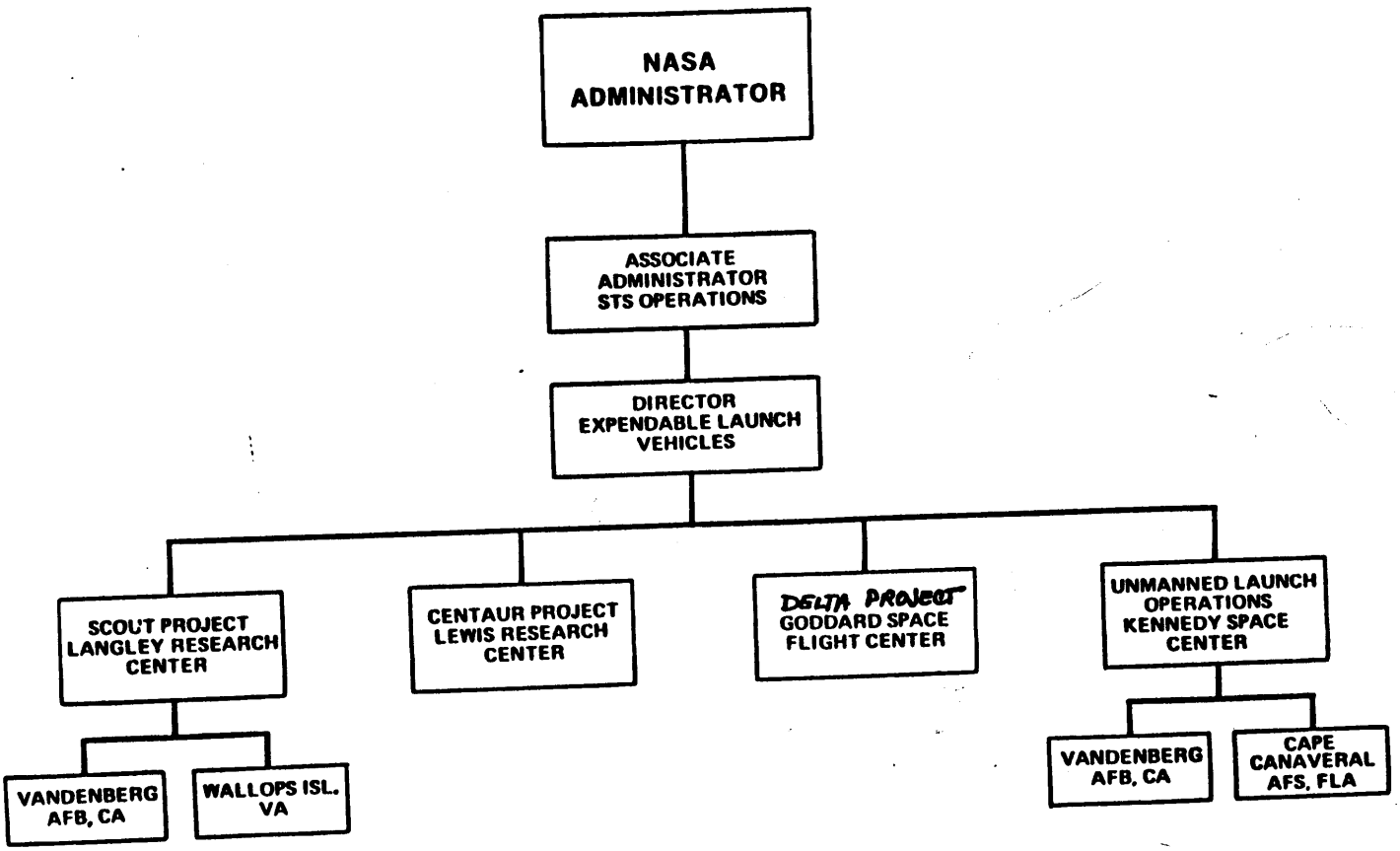


FIGURE 4-2

3. DOD Institution for Shuttle

The major Shuttle activities underway within the DOD are the development of the Inertial Upper Stage (IUS), the site construction and activation of the VAFB launch facility, and planning for the operation and use of the system for national security missions (Figure 1-3). Space Shuttle site activation for the Vandenberg site is under the System Program Office of Space Launch and Control Systems. Shuttle launch processing, turnaround and landing operations at VAFB will be conducted by the Space and Missile Test Organization. Flight operations will initially be conducted at the Johnson Space Center under Air Force direction using Air Force and NASA personnel. These operations are planned to be transferred to the Air Force Consolidated Space Operations Center (CSOC) when it is activated, currently planned for 1987.

4. NASA Institution for Shuttle

Space Shuttle Orbiters are developed and procured by the Johnson Space Center which also has the responsibility for system management of the development of the overall Space Transportation System and for space flight operations. The Shuttle Solid Rocket Boosters, the External Tank, and the Orbiter Propulsion System development and procurement are the responsibility of the Marshall Space Flight Center. Launch and landing activities are the responsibility of the Kennedy Space Center. Kennedy and

Marshall are responsible to Johnson as the System Management Organization. Figure 1-4 describes in block diagram form the NASA institutional arrangement for the conduct of launch and space operations.

DOD STS INSTITUTION

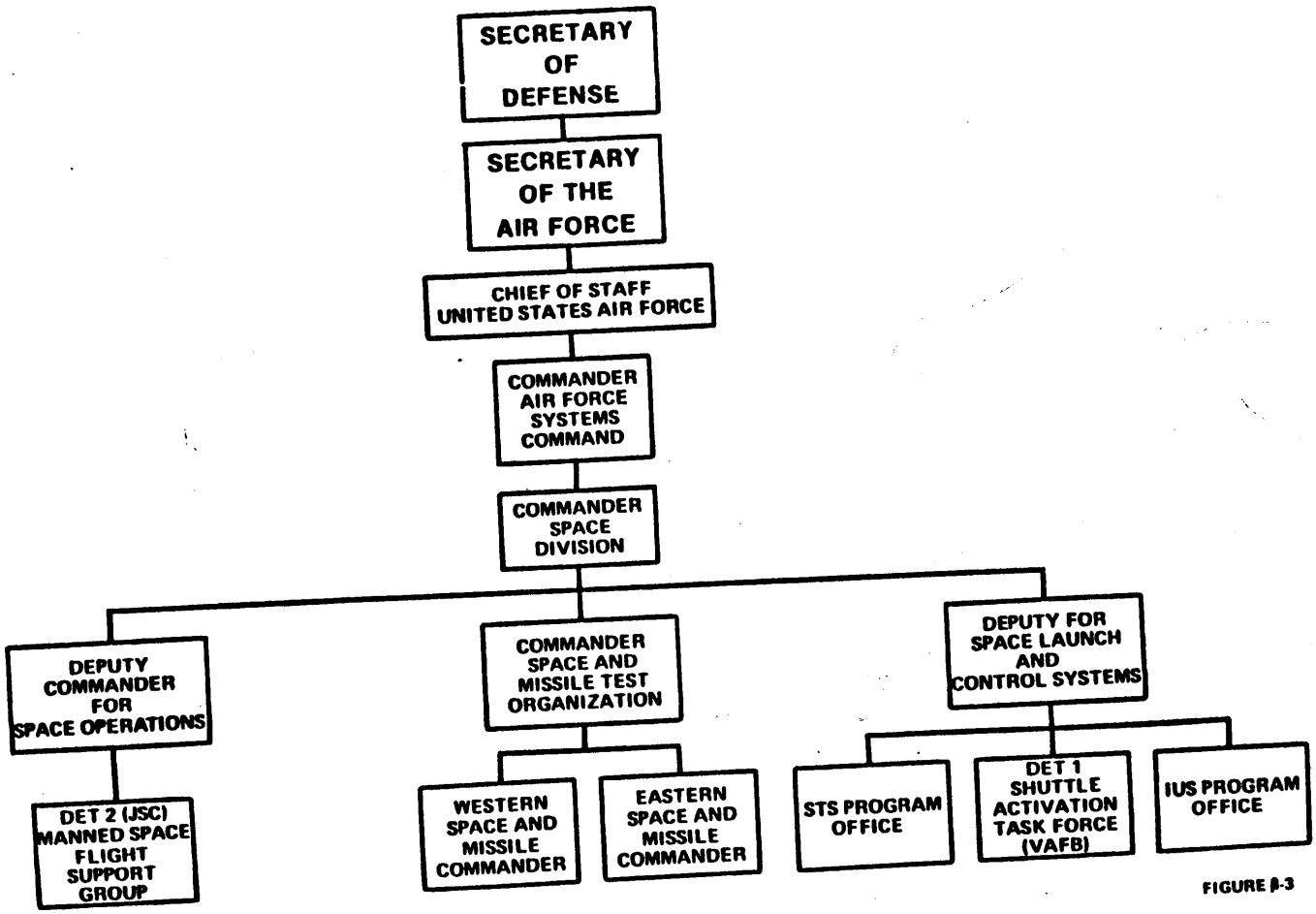


FIGURE B-3

5. Current NASA Shuttle Operations

The Space Shuttle is presently prepared for launch in a manner which is similar to the launch of an expendable vehicle. Launch preparations and vehicle checkout are performed by the Kennedy Space Center. Mission operations and flight planning are conducted by the Johnson Space Center. At launch, when the Shuttle reaches a point designated "tower clear", direct operational control is transferred from Kennedy to the Johnson Space Center and is retained by Johnson throughout the mission to the point of "wheels stop" on landing. Direct operational control is then returned to Kennedy.

NASA INSTITUTION FOR SHUTTLE

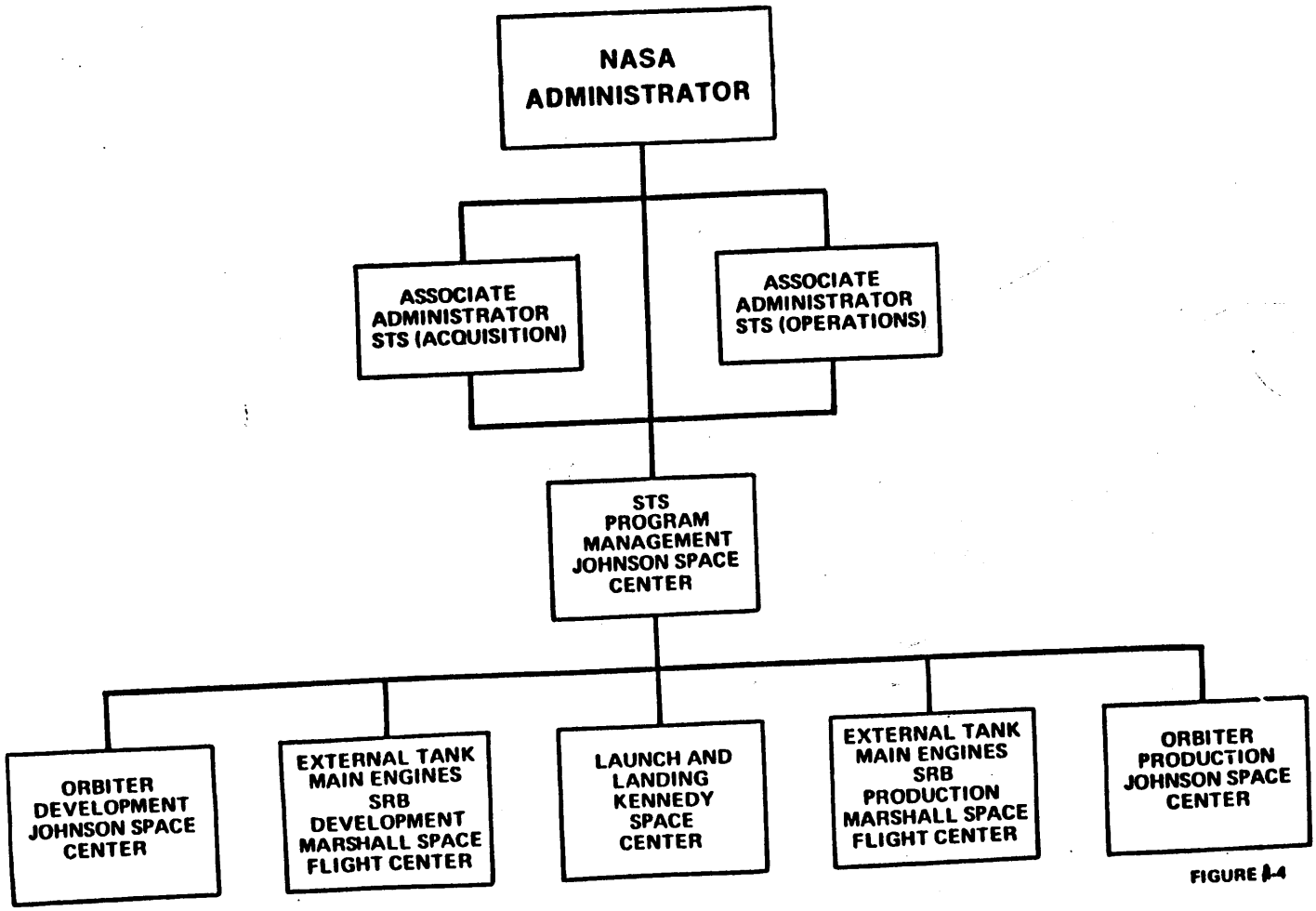


FIGURE 8-4

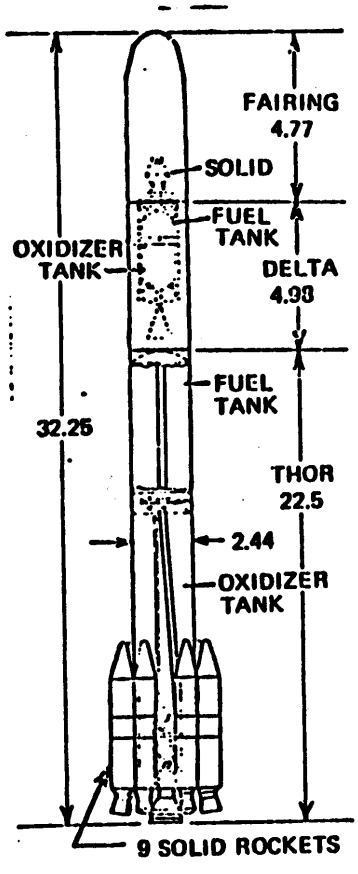
6. Summary System Descriptions

DELTA - 3914

First Stage - The basic first stage of the Delta is a modified Thor. The Thor stage has been lengthened 24 feet to a length of 89 feet and the original engine replaced with the H-1 engine developed for Apollo Saturn 1 vehicle. These engines also burn LOX and RP-1 and develop a thrust of 200,000 lbs. In addition, nine thrust augmentation solid rockets Castor II's or Algol II's are used in conjunction with the first stage. The Thor booster is guided by the Delta second stage.

Second Stage - The second stage of the Delta vehicle evolved from the second stage of the Vanguard vehicle. Early versions used the Aerojet AJ-118 liquid propellant engine (Inhibited Red Fuming Nitric Acid (IFRNA) and unsymmetrical Di-methyl Hydrazine (UDMH) storable propellants) and the United Technology FW-4 third stage motor. The vehicle was always guided through the second stage initially using a BTL radio guidance system and later a strap-down inertial guidance system. Later versions of the stage, although encased in a 96 inch diameter fairing, retain an earlier version propellant tank diameter of 65 inches. A new engine is used on the current versions of the stage, the TRW TR-201, which is an adaptation of the Apollo Lunar Module Descent Engine (LMDE).

DELTA



METERS X 3.281=FEET

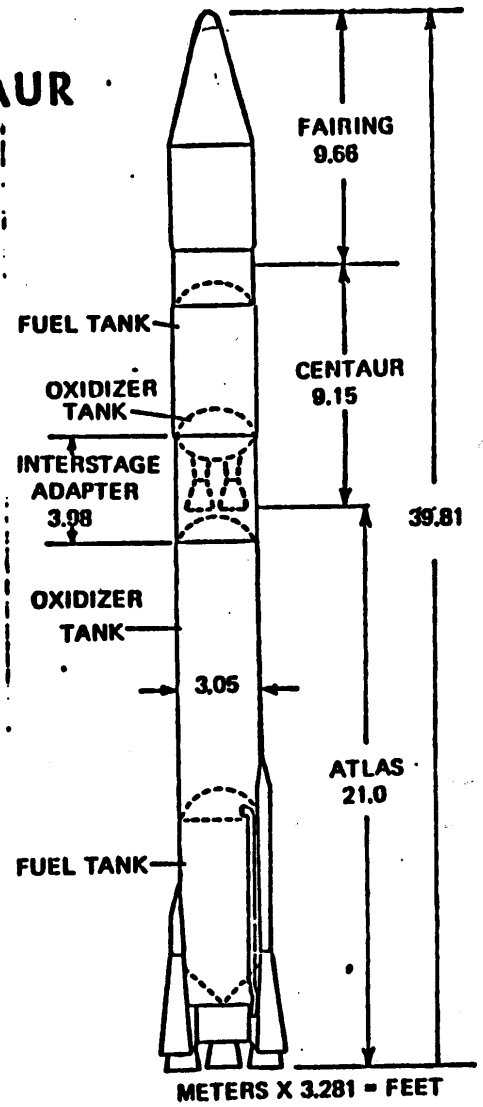
Third Stage - A spin-stabilized third stage solid rocket motor is the final stage of the Delta vehicle. Although various motors, i.e., FW-4, TE-364-3, TE-364-4, etc., have been used as the Delta upper stage, a new version has been developed for utilization with either Delta or Shuttle. Using the spin table (usually mounted to the front of the second stage) and the TE-364-4 motor the dual compatible stage is called the Spin Stabilized Upper Stage (SSUS)-D, a larger version is called the Payload Assist Module (PAM)-D.

ATLAS CENTAUR

First Stage - An Atlas booster designated the SLV-3C is the first stage of the Atlas-Centaur booster. The major differences in the SLV-3C are that guidance is received from the upper stage and the front of the Atlas retains the 10 feet diameter (rather than a taper to a diameter at the top of 54 inches as is normal for Atlas vehicles) and it is four feet longer. The SLV-3C Atlas engines develop a total of 500,000 lbs. of thrust in the booster and sustainer engines.

Second Stage - In the late 1950's ARPA sponsored a contract with Convair to build a stage, named Centaur, which would burn hydrogen and oxygen as propellants because of the high specific impulses which would result. The stage was to use a pair of RL-10 engines from Pratt and Whitney which produced approximately 15,000 lbs. each. ARPA passed this activity to NASA in 1958.

ATLAS/CENTAUR



THE TITAN FAMILY

In the 1950s, while the Atlas ICBM was being developed, a parallel development of the Titan was underway. It was a slightly more ambitious undertaking than Atlas because the second stage required starting at altitude. The structure of the Titan was built by the Martin Company and the propulsion system by Aerojet. The Titan had the same 10 feet diameter as the Atlas, but did not utilize the light balloon structure of the Atlas. The original version of the Titan ws not used in the space program.

The Titan II was the follow-on version of the missile and despite the similarity of name represented a considerable development in design. The Titan II used storable propellants (N204 and UDMH) instead of LOX and RP-1. The Titan I was radio guided and the Titan II was all inertial. The Titan II had a first stage thrust of 430,000 lbs. and a second stage thrust of 100,000 lbs. The overall length of the Titan II was 103 feet. A modified version of this ICBM was used as the Gemini launch vehicle in the manned space flight program.

Titan IIIB

The Titan IIIB is an operational space launch version of the Titan II used exclusively from Vandenberg. It uses an Agena D as a third stage (24B). The Agena stage built by Lockheed uses storable propellants and was designed for restart in space. This vehicle has been used in relatively low orbits for classified military purposes although several have been used in eccentric orbits close to the pattern of the Soviet Molniya Communications Satellites. The primary differences between the 24B and the 34B are the shroud systems and the guidance systems. The 24B is radioguided through the Agena stage and the 34B is inertially guided from the Agena.

Titan IIIC

The Titan IIIC is composed of the Titan core vehicle carrying a third stage called the transtage and two very powerful solid rocket boosters strapped to the first stage. This vehicle has only flown from ETR.

Solid Rocket Boosters (SRB) - These boosters have the same 120 inch diameter as the storable liquid propellant Titan. The SRBs are assembled from transportable separate segments which bolt together at the assembly and checkout facility. Five segments make up the standard booster and the total thrust of each booster

is 1,200,000 lbs. They are manufactured by United Technology and are equipped with a parallel smaller tank with pressurized gas to provide thrust vector control for steering.

Transtage - The third stage of the Titan-IIIC, also built by Martin, uses two modified AJ-10-138 engines built by Aerojet, once used on the Delta second stage. The Transtage thrust is approximately 16,000 lbs. from the two motors. The great advantage of the stage is its ability to make a large number of starts and stops, enabling it to serve during the boost stage and thereafter as a space tug to move payloads to new orbits. It also uses N204 and UDMH as a space tug to move payloads to new orbits. It slso uses N204 and UDMH as propellants.

TITAN IIID

This vehicle, used only at Vandenberg, superficially resembles the Titan-IIIC in that it has the same Titan core and two large SRB strap-ons. However, it uses radio guidance rather than inertial guidance and it does not carry the Transtage.

TITAN 34D

The newest class of Titan vehicles called the 34D. In this vehicle the SRBs will have five and one-half segments and vehicle is capable of using the one or two stage version of the Inertial Upper Stage (IUS) developed for the Shuttle. The Titan 34D/RGS

is the Vandenberg version which is radio guided without a third stage and the Titan 34D/IUS is the Cape Canaveral version, with IUS third stage.

SPACE SHUTTLE

In September 1969, a Space Task Group was appointed by the President of the United States to study the Future course of US Space research and exploration. The Group recommended that "...the United States accept the basic goal of a balanced manned and unmanned space program. To achieve this goal, the United States should develop new systems of technology for space operation....through a program directed toward development of a new space transportation capability....".

The Space Shuttle was to be a true aerospace vehicle: it would take off like a rocket, maneuver in Earth orbit like a spacecraft, and land like an airplane. The Shuttle was designed to carry heavy loads into Earth orbit. Other launch vehicles have done this, but they could be used only once (ELV's), each Shuttle Orbiter may be reused more than 100 times.

The Shuttle would permit the checkout and repair of unmanned satellites in orbit or their return to Earth for repairs that cannot be done in space. Interplanetary spacecraft would be placed in Earth orbit by the Shuttle, together with an upper stage such as the Inertial Upper Stage (IUS), to accelerate the

spacecraft into deep space. The IUS could also be used to boost satellites to higher Earth orbits than the Shuttle's maximum altitude which is approximately 600 miles.

The Space Shuttle has three main units: the Orbiter, the External Tank (ET), and two Solid Rocket Boosters (SRB's). Each booster rocket has a sea level thrust of 2,600,000 lbs.

The Orbiter is the crew and payload-carrying unit of the Shuttle system. It is 121 feet long and has a wingspan of 79 feet. It is about the size of a DC-9 and weighs approximately 150,000 lbs. The Orbiter can carry approximately 65,000 lbs. in its 15 feet by 60 feet payload bay. The Orbiter's three main liquid rocket engines each have a thrust of 470,000 lbs. They are fed propellants from the External Tank which is 154 feet long and 28.6 feet in diameter. At lift-off, the tank holds 1,550,000 lbs. of propellants, consisting of liquid hydrogen (fuel) and liquid oxygen (oxidizer). The External Tank is the only part of the Shuttle that is not reusable.

B. THE DEVELOPMENT OF THE COMMERCIAL AND FOREIGN MARKET SEGMENT

In 1963, NASA launched the first satellite for a commercial entity, TELSTAR, for AT&T. NASA provided this launching service under a contract with AT&T as allowed by the provisions of paragraphs 203(c.), (5) and (6) of the National Aeronautics and Space Act of 1958. In 1965, NASA launched Early-bird for the

International Telecommunications Satellite Organization (INTELSAT) in accordance with the provisions of the Communications Satellite Act of 1962 and the Space Act. This was the first of a series of thirty launches performed by NASA for INTELSAT through 1981. The growth of domestic communications satellite activity began in the late 1960's and has continued through the 1970's to the present time. Since the late 1970's, approximately seventy-five percent of spacecraft launching requirements (mostly communications) have been to geosynchronous orbit.

In 1968, NASA launched the first scientific satellite on a reimbursable basis, HEOS-A, for the European Space Research Organization (ESRO, subsequently renamed the European Space Agency, ESA). This launching was followed by several scientific and experimental communications satellite launchings for ESRO, other countries, and consortia of countries. This type of launching activity was authorized by the Space Act and endorsed by the President's Launch Policy of 1972. In this Launch Policy, the President announced that the United States would provide, on a non-discriminatory, cooperative or reimbursable basis, satellite launch assistance to other countries and international organizations.

NASA policies, procedures and practices in the launching services area were evolutionary from 1961, the beginning of the TELESTAR (AT&T) activity. In 1973, NASA began a comprehensive review of

its expendable vehicle policies which resulted in a major change in two areas: (1) In the reimbursement area, NASA Policy Directive (NPD) - 8610.5 was issued and established an "All reasonable cost" basis for expendable vehicle reimbursement. And (2), in the launching contract area, revised third party liability provisions were established. There was a significant clarification of contract provisions but the other basic policies remained unchanged. One important point should be made at this time, these policies were devised when the U.S. had a virtual monopoly on launching services.

In the latter half of the 1970's, NASA began to develop the policies, procedures for non-government users of the Space Shuttle. These activities assumed that: ELV's would be phased out when the Space Shuttle became operational, the commercial and foreign market segment would transition to the Space Shuttle as would all of the government missions, and within the United States launching activities would remain principally a governmental activity.

C. THE INITIAL COMPETITOR

In 1961, three separate European agencies were created to deal with different aspects of space. The European Launcher Development Organization (ELDO), was aimed at developing a jointly funded launcher, eventually named the "Europa". ELDO was basically a coordinating body for separate national projects; a

British first stage (the Blue Streak IRBM), a French second stage, a West German third stage, Italian test satellites, Belgian downrange guidance systems and Dutch telemetry links. As a result of problems caused in part by inadequate coordination, none of the 11 test launches of Europa, the last of which took place in 1971, succeeded in placing a payload in orbit. In 1973, the Europa project was cancelled in favor of a new project, the French-dominated Ariane which was eventually undertaken as a program by the ESA.

To date, the Ariane has completed five test launches (three successes and two failures). Ariane has booked 8 spacecraft launchings for 5 customers during what it calls the "promotional phase". Firm launching contracts have been signed with 12 customers (including 3 U.S. firms: GTE, Western Union, and Southern Pacific) for the launching of 17 additional spacecraft. European programs are underway which will result in additional spacecraft launchings. A total of 35 firm bookings for spacecraft (3 in the development phase) launchings for 15 customers. Customer interface procedures and practices are generally patterned after those developed within NASA by the Delta Project.

The development and promotional phase launchings are an ESA responsibility and the remaining are the responsibility of Arianespace, a commercial entity established to provide launching services. ESA plans to transfer totally the responsibility for

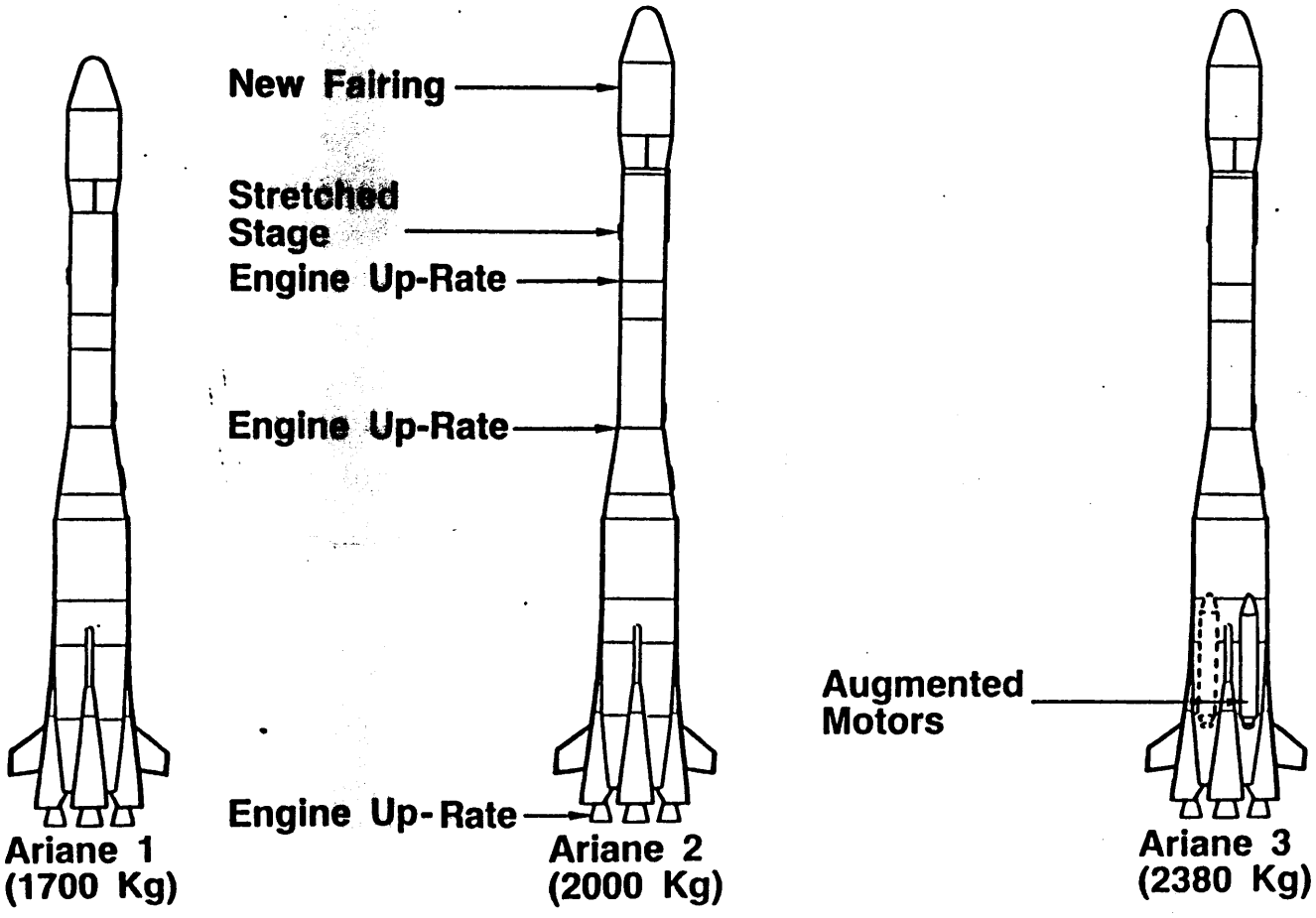
production, marketing, and launching of operational Ariane vehicles and their uprated versions to Arianespace. ESA will retain the responsibility for developing the uprated versions of the Ariane family of vehicles, Figure 1-5.

The Arinae system was designed primarily to satisfy the demand for placing space systems into geosynchronous orbit. The reliability of the Ariane system is yet to be proven, but Arianespace has demonstrated the ability to convince the user community of the viability of its technology, and that the user community should consider all systems to be nearly equal in this respect.

All ESA spacecraft within the performance envelope of Ariane will be launched by Ariane. Likewise, all U.S. government spacecraft will be launched by U.S. launchers. It can be safely assumed that spacecraft to be launched by the member countries of ESA and Arianespace participants will normally be launched by Ariane.

The competitive arena then becomes defined as: (1) private and public organizations of the United States, (2) private and public organizations of "developed nations", excluding those with their own launch capability, (3) private and public organizations of developing nations, and (4) international organizations, such as Arabsat or INTELSAT.

ARIANE NO. 1, 2 & 3 CONFIGURATIONS



Arianespace has established a goal for a market share of 25 to 30% of the launches in the western world (50 to 60 launches in the 1980's). It should be noted that the goal should be considered a minimum since it would not be a difficult task to increase both production and launch rates to a higher level to support a launch rate of up to 20/year. NASA, on the other hand, has not established market share goals or objectives unless one considers its projected mission model of 331 Shuttle missions in ten years to be such.

D. NATIONAL POLICIES

1. Legislation

The basic legislative authority for NASA space transportation activities is the National Aeronautics and Space Act of 1958, Public Law 85-568, normally referred to as the Space Act. Section 102(c) of the Space Act states that the aeronautics and space activities shall be to contribute materially to one or more of several enumerated objectives. The third objective states:

> "The development and operation of vehicles capable of carrying instruments, equipment, supplies, and living organisms through space."

In utilizing this capability, NASA performed the launch of the TELSTAR spacecraft, designed for experimental communications purposes, on a reimbursable basis for a non-Government entity in 1963. The authority for this action on a reimbursable basis is Paragraph 203(c)(6) of the Space Act which states:

> "to use, with their consent, the services equipment, personnel and facilities of Federal and other agencies with or without reimbursement and on a similar basis to cooperate with other public and private agencies and instrumentalities in the use of services, equipment and facilities...."

Under the provisions of the Communications Satellite Act of 1962, usually referred to as the Comsat Act, NASA is required "to furnish to the corporation (COMSAT), on request and on a reimbursable basis satellite launching and associated services...." Under this provision NASA began to provide launching services to COMSAT in 1965.

The principles of making U.S. launching capabilities to commercial and foreign entities evolved from the legislative basis described above. These principles have been embodied in national policy since 1972.

2. APPLICABLE TREATIES

The United States of America is a signatory party to several treaties which establish principles regarding the use and exploration of outer space. The Department of State (DOS) is the agency generally responsible for negotiating and executing such agreements. In addition, DOS is generally responsible for dealing with foreign governments concerning administration of and compliance with the terms of international treaties.

The most important general international obligation associated with private commercial space activities is contained in what is commonly known as the Outer Space Treaty. Article VI of that treaty reads as follows:

> States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the moon and the other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the moon and

> other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.

"Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies," Article VI, 18 U.S.T. 2410, T.I.A.S. No. 6347, (entered into force with respect to the United States, October 10, 1967).

A provision of the Outer Space Treaty also declares that the U.S. Government is liable for damages to foreign countries, citizens and corporations resulting from launch activities from U.S. territory by private companies. Article VII reads as follows:

> Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the moon and other celestial bodies.

More specific provisions which impose similar liability on governments for damages caused by space objects launched by non-governmental activities are contained in the "Convention on International Liability for Damage Caused by Space Objects," 24 U.S.T. 2389, T.I.A.S. No. 7762 (entered into force with respect to the United States, October 9, 1973).

General international treaty obligations of the United States which apply to activities in outer space also exist with respect to peaceful uses, nuclear weapons, weapons of mass destruction, and environmental modification techniques having widespread, long-lasting or severe effects. See Outer Space Treaty, supra, Articles III, IV; "Charter of the United Nations and Statute of the International Court of Justice," as amended (October 24, 1945); "Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques."

The United States Government has also agreed to register all space objects launched from United States territory on an international registry. "Convention on the Registration of Objects Launched into Outer Space," 128 U.S.T. 695, T.I.A.S. No. 8480 (entered into force with respect to the United States December 3, 1968). State is responsible for complying with this registration obligation.

These treaties impose obligations on the United States Government, but not directly on U.S. individuals and corporations. If U.S. individuals and corporations cause damage to foreign interests, State would be responsible for responding at a governmental level to foreign claims.

3. POLICY SUMMARY

The U.S. Government developed its launching capabilities for its own purposes. Through an evolutionary process outlined above, this capability has been made available to commercial and foreign entities requesting these services. This activitiy has grown to the point that it constitutes between 30 and 40 percent of the launching requirements. It is this non-U.S. Government launching requirement that is the principle focus of the numerous expressions of private sector interest received by NASA and the DOD.

Before it became a part of national policy that the U.S. would encourage domestic commercial exploitation of space activities under appropriate U.S. Government authorization and supervision, precedents had been established by NASA concerning commercial ventures associated with space transportation. The commercial aspects of the development of the 3914 configuration of the Delta expendable launch system in the early 1970's was the first of these precedents, and the most recent is the Payload Assist Module (PAM) upper stage system (discussed later in Section III).

The National Space Policy announced by President Reagan in July 1982 establishes the expanding of private sector investment and involvement in civil space and space related activities as a basic goal of United States space policy. However, that Policy also makes several other relevant statements concerning space transportion and the Space Transportation System (STS). One of these is that the STS, for the near term, is to be managed and operated by the Government, although the flexibility to transition to an alternative institutional arrangement at a later time should be maintained. Another is that expendable launch vehicle operations shall be continued by the United States Government until the capabilities of the STS are sufficient to meet its needs. The Policy is "mute" on the subject of expendable systems beyond the time frame described above, and therefore does not endorse or prohibit their turnover to the private sector.

The two principle and conflicting interpretations of existing policy are as follows:

One interpretation is that the STS has been developed and funded to meet the requirements of the U.S. Government and excess capacity will be made available to commercial and foreign users. This interpretation would allow for private sector operation of ELV's after Government phase-out (for Government missions) to meet the needs of the commercial and foreign users,

as well as private sector investment in increased STS capacity for these commercial and foreign missions.

On the other hand, there are those who interpret the policy to state that ELV's will be phased-out completely and should not be allowed to compete privately operated or otherwise with the Space Shuttle. Under this interpretation, it is firmly believed that continuation of ELV's will increase STS costs to its Government users by diluting the utilization of and contributions to the base costs of the STS by the commercial and foreign customers. There are complications and/or conflicts that arise under current policy that arise as a result of the operation of expendable systems by the private sector. For example, economic studies have concluded that the economic viability of the STS, when compared to ELV's is dependent on having a minimum of 300 to 360 flights over the period under study. There is no practical way that this can be accomplished without an increase in, and a very high utilization of the STS by the commercial and foreign market segment. Therefore, there are those who believe that the existence of commercial or other competitive launch systems would have a significant impact on the achievement of STS program objectives, as well as result in an undesirable competition between the Government and the private sector for these missions.

III. CATEGORIES OF EXPRESSIONS OF INTEREST IN PRIVATE SECTOR ACTIVITIES

NASA has received several statements of interest from the private sector concerning commercial operation of various aspects of space transportation. Each of these statements of interest represents a reasonably unique situation; however, for convenience, we have divided them into three categories: new vehicles at new sites, systems and activities complementary to the STS, and existing ELV systems (Figures 3-1 thru 3-3). The following discussion describes each of these categories and provides a summary discussion of the decisions associated with each.

A. NEW SYSTEMS AT NEW SITES

On September 8, 1982, Space Services Inc. (SSI) conducted the first major private sector launching from a privately operated launch site. SSI is engaged in a project to design and operate the first commercial space launch service. Another firm, ARC Technology, is also engaged in the design and development of a new launch system which will be launched from an ocean site. Although these categories of proposal present the same type of fundamental policy problems or issues that Category III presents, they are separated because the principle involvement of the Federal Government in this case is a regulatory one. The approval process and federal government involvement in initial SSI launching activity were as follows:

NEW SYSTEMS AT NEW SITES

DOMESTIC

1. SSI - CONESTOGA VEHICLE - MATAGORDA ISL., HAWAII
2. ARC TECHNOLOGY - (HYBRID-UNNAMED) - 200 MI OFF WEST COAST
3. PROJECT PRIVATE ENTERPRISE - VOLKS ROCKET - VARIOUS

NASA ACTIONS

PROVIDE TECHNICAL ADVICE AND SUPPORT TO STATE, FAA, AND FCC.

PROVIDE TECHNICAL ADVICE AND SUPPORT TO THE POTENTIAL OPERATOR AS AGREED TO BY NASA.

FOREIGN

1. ESA/ARIANESPACE ARIANE - FRENCH GUIANA
2. GERMAN - OTRAG - VARIOUS

FIGURE 3-1

SYSTEM PROPOSALS COMPLEMENTARY TO STS

ACTIVITY UNDERWAY

1. PAM D - McDONNELL DOUGLAS
2. MATERIALS PROCESSING - McDONNELL DOUGLAS

INITIATED ACTION

1. FIFTH ORBITER - SPACE TRANS. CO. (FEDERAL EXPRESS)
2. SRM-1X - ORBITAL SYSTEMS INC.
3. MARKETING - GRUMMAN, BOEING, USBI, MDAC, ROCKWELL, ETC.
4. PAYLAOD PROCESSING - ASTRO TECH INTERNATIONAL INC.

PLANNED ACTIONS

1. LEASE SATELLITE - FAIRCHILD
2. MATERIALS PROCESSING - GTI
3. MATERIALS PROCESSING - BALL AEROSPACE SYSTEMS
4. MATERIALS PROCESSING - JOHN DEERE & CO.
5. MATERIALS PROCESSING - DUPONT
6. MATERIALS PROCESSING - INCO
7. MATERIALS PROCESSING - UNION CARBIDE CORP.

NASA ACTIONS

REVIEW PROPOSALS, DETERMINE MERIT, DETERMINE IF COMPETITION REQUIRED

COORDINATE INTERAGENCY REQUIREMENTS

IF APPROVED ENTER JEA, MOU, OR CONTRACT AS REQUIRED

FIGURE 3-2

EXISTING ELV SYSTEMS

1. ATLAS/CENTAUR - GENERAL DYNAMICS, SSI
2. DELTA - TRANSPACE
3. TITAN - SPACE TRANS CO. (MOU WITH MARTIN, UTC, AEROJET)

NASA ACTIONS

DECISIONS REQUIRED

NEGOTIATION TRANSITION PLAN (DOD MISSIONS, NASA AND OTHER U.S. GOV'T MISSIONS, C&F MISSIONS)

NEGOTIATE CONTRACTUAL ARRANGEMENTS

PROVIDE TECHNICAL ADVICE/ASSISTANCE IN LICENSING TO STATE, FCC AND FAA

FIGURE 3-3

1. Regulatory Permissions (see Appendix A for a detailed discussion)

a. The Federal Aviation Administration (FAA)

By letter, dated March 16, 1982, SSI requested an exemption from Part 101, Subpart C, and any other provisions of the Federal Aviation Regulations (FAR's) that would limit, restrict or otherwise prohibit SSI from launching a Conestoga I vehicle from Matagorda Island, Texas, into a suborbital space flight. On September 1, 1982, the FAA granted an exemption from the FAR's for the proposed launch with three exceptions. First, the launching was cleared through a smaller corridor than requested. Second, a more stringent abort criteria was applied. Third, the launch was not exempt from the FAR's clear weather requirements. The FAA also issued an order designating temporary restricted airspace and appropriate notices to airmen and notices to mariners concerning the launching.

It is not clear that the FAA will have a comparable role in each such proposal. For example, one proposal calls for launching outside U.S. territory off International Airways and presumably outside the jurisdiction of the FAA.

b. The Department of State (DOS)

On April 16, 1982, SSI requested any authorization necessary from the DOS as a precondition of the Conestoga I launching. On September 7, 1982, the DOS issued a letter approving the launching under the Arms Export Control Act subject to the following conditions and limitations:

1. This authorization is confined to the proposal prototype launch only. Subsequent launches of this type will require a separate review and approval.

2. The authorization is based on the understanding that the SSI has agreed to comply with certain safety requirements imposed by NASA and the FAA on the Conestoga launch.

3. This authorization is subject to the understanding that SSI has obtained insurance in the amount of $100 million for any damages that may arise in connection with the launch.

4. SSI agrees to indemnify the United States Government for any damages and expenses that might arise in connection with the Conestoga launching, including any payments for which the United States may be responsible under any treaty.

c. The Federal Communications Commission (FCC)

On May 18, 1982, SSI submitted an application for an experimental radio license on FCC Form 442, "Application for New or Modified Radio Station Authorization under Part 5 of FCC Rules Experimental Radio Services (Other than Broadcast)". On August 23, 1982, the FCC granted SSI's request for frequencies on FCC Form 450B, "Experimental Radio Construction Permit and License."

d. Alcohol, Tobacco and Firearms (ATF)/Internal Revenue Service

On July 2, 1982, SSI requested advice by letter concerning the import of meteorological test rockets from the Federal Republic of Germany. Upon receipt of a verbal response that ATF registration was necessary, SSI filed ATF Form 7 and 4587 and IRS Form 111 on August 17, 1982. On August 20, 1982, SSI's registration was approved and an import license was issued.

2. Other Government Actions

a. National Aeronautics and Space Administration

NASA provided technical advice to the DOS, FCC, and FAA on the SSI requests for licenses. NASA also agreed to provide, at SSI's request and on a reimbursable basis, two Minuteman I M58A-1 rocket motors, one of which was used to power the Conestoga I launching. In addition to conducting a review of the technical and safety aspects of the proposed launching, the agreement with NASA

for the rocket motors included provisions on insurance and indemnification of the United States, its agencies, employees and contractors.

b. North American Air Defense Command (NORAD)

NORAD has a responsibility to notify the Soviet Union in certain specific circumstances associated with missile/rocket launches. NORAD also performs a "computation of miss between orbits" (COMBO) which is a NORAD term for the calculation process by which it is determined that a launching will not interfere with other orbiting satellites. SSI responded to NORAD requests for information and established a telephone connection from the launch control complex at the launch site to NORAD. Other potentially interested countries are notified of any launching through the DOS.

3. Observations

a. NASA involvement in activities such as that described above are limited to acting in an advisory capacity (technical and safety) to the regulatory agencies, DOS, FAA, and FCC. NASA may, at NASA's discretion, provide support to the

private firm when requested. Appendix A outlines in more detail the basis and requirements for this category based on the precedent established by the SSI launching. Although there are many ways that this process of regulation can be improved, e.g. the establishment of a "lead agency", those subjects will not be discussed as a part of this review.

B. SYSTEMS AND ACTIVITIES COMPLEMENTARY TO THE STS

As indicated in Section II, private sector investment in certain aspects of space transportation began in the early 1970's with private sector development of the Delta 3914 configuration. This activity was successful and was a prototype for subsequent agreements such as the Payload Assist Module (PAM) upper stage agreements between McDonnell Douglas and NASA. A Memorandum of Understanding has been signed between Orbital Systems Corporation and NASA for the private sector development and operation of a different upper stage called the SBM-IX. Figure 2-1 shows a listing of proposals under consideration and the required NASA actions.

1. Upper Stages in the STS

In December 1976, NASA and McDonnell Douglas reached an agreement for McDonnell Douglas to fund procurement and production of the Delta Class Spin Stabilized Upper Stage (SSUS-D, eventually renamed PAM) entirely on its own. Under the terms of the agreement, McDonnell Douglas could market the upper stage hardware and services commercially, as well as to NASA, and NASA is not required to purchase any units. The NASA McDonnell Douglas agreement on SSUS-D (PAM) was conditional on a successful conclusion of a NASA/Industry agreement that the Atlas Centaur class SSUS would be developed privately as well. NASA, Boeing and McDonnell Douglas continued talks until agreements were reached on that upper stage.

2. Joint Endeavor Agreements

NASA has initiated a joint (NASA/Industry) approach to stimulate industry participation in space activities which utilize space technology with a primary application in the industrial community. Guidelines for this effort were published in both the Federal Register and Commerce Business Daily.

The agreements generally specify:

- Private sector responsibility for ground-based research and development of ground and flight hardware for experiments and technology demonstrations,

- Private firms would retain commercial patent and data rights commensurate with participation,

- NASA is responsible for STS services and general purpose support equipment, and

- NASA will receive scientific and engineering data.

The terms and conditions of specific joint endeavors are negotiated on a case by case basis and are commensurate with the risk involvement and investment of all parties.

3. Exceptional Payloads

As a part of NASA's private sector user development activities, NASA has an exceptional payloads clause in its current pricing policy. If an individual or company has a new commercial use

of space, their payload(s) can be flown at about half price because of the exceptional opening of a new commercial area. Proposals with experimental or innovative uses of space which offer the potential of great public value may also receive special pricing consideration from the NASA Administrator under the exceptional payload clause.

C. EXISTING ELV SYSTEMS

NASA has received several expressions of interest in the private sector operation of existing Government developed and operated expendable systems on a commercial basis. These proposals request transfer of the existing government capabilities to the private sector for operation. The systems would be operated primarily for the commercial and foreign market segments. From a NASA point of view this Category of proposal is the most complicated of the three Categories to deal with because of the requirement for extensive Government (NASA) involvement in the establishment and operations by the private sector of these systems.

First tier decisions required by the Government are:

1. The use of government facilities and property

a. Hardware and Production Capabilities

A major decision associated with both production and launch capabilities is concerned with the recovery of "sunk" cost associated with the development of these capabilities and systems. A second decision or set of decisions concerns the rental, lease or use permit for production and plant tooling, test equipment, production processes and procedures, and program unique spares. The final major decision associated with this capability is associated with the issue of system monopoly versus free market use of the system. A decision in favor of the latter would greatly complicate the situation.

b. Launch Site Capabilities

There are two aspects of the launch site capabilities that are variables with respect to each of the existing systems:

(1) Program Unique Facilities and Equipment.

These facilities and equipment, assuming the answer to "sunk" costs is equally applicable, will be rented, leased, or a use permit issued in accordance with the policies, procedures, and practices which are established.

(2) Joint Use Facilities and Equipment

The government must authorize use of these facilities on a shared, reimbursable basis and work out appropriate scheduling arrangements. This class of facilities includes such NASA facilities as: Hangar AE, TM Station, Mission Directors Center, Computer Support, Payload Processing Facilities, Delta Spin Test Facility, etc.

2. Government Provided Support

At the launch site, it is necessary that government activities provide support to the operation and maintenance of program unique facilities and to launch operations. This support will be provided by two sources:

a. Range Support provided by the DOD, Eastern Space and Missile Center includes mandatory operations and base support and several support activities which may be considered discretionary.

b. NASA Support provided by the Kennedy Space Center (KSC) will normally be associated with the joint use facilities and related services described above. Discretionary support may be negotiated and agreed to by KSC and the private sector operator or operators.

IV. DISCUSSION - BASIC CONCEPTS OF COMMERCIALIZATION

As the United States private sector begins to look closer at the application of space technology and the space environment to business ventures, it will come into apparent conflicts with on-going government activities. In general, current national policy, enunciated by the Presidential Space Policy statement of July 4, 1982, supports increasing commercial applications. Although the policy statement does not say so, the private sector has chosen to interpret this support to be limited only to the constraints of national security, public safety and international agreements. This interpretation does not consider that the National Aeronautics and Space Act of 1958 makes the conduct of certain activities and leadership in space a "governmental purpose." As a result, many questions raised by the private sector are destined to result in apparent conflict. For example, the question has been raised:

> To what extent and under what conditions will the federal government compete with existing or potential private business activities in space?

The question must be broken down before a complete response can be framed. Basically, the federal government has not specifically initiated any activity to compete with private business activities in space the only private business activity

is space is the communications satellite activity and there has been no direct competition between the government and private business in that area. The apparent conflict really arises when an existing government activity, such as space transportation services, or other such activities are placed in the position by the private sector of being "competitive" with new private sector proposals. A more appropriate statement might be "should private sector proposals preempt existing governmental activities initially undertaken for governmental purposes?"

NASA and other federal agencies have no intention to develop and operate systems which will compete with private business. On the other hand, it appears to be the intention of the private sector to develop and operate systems which compete with existing national government operated capabilities. NASA and the DOD have been in the space transportation area for twenty-five or more years in support of governmental purposes, including national security. It has been national policy for over eleven years that the national space transportation capabilities will be made available on a reimbursable basis, to the private sector and foreign governments. It has already been deemed appropriate for the United States Government to compete with foreign private sector entities, e.g., Arianespace. "Why should it (the U.S. Government) not compete with domestic private sector entities who choose to enter an existing arena creating a competitive situation with the government?" Therefore, national policy, with respect to commercialization of launch systems, must recognize

that, although the role of the federal government in space activities is intended to be a non-competitive one with domestic private sector activities, the federal government presently finds itself either in a position of preventing the entry of the private sector into the space transportation area; or allowing private sector entry and competing with the private sector. The latter alternative would appear to be the more desirable compromise, especially when one considers the real cost of the "entry fee" into the space transportation area by the private sector and the national investment in the STS. A possible criteria for the commercial space transportation activities is that they should:

- be financially self sustaining (subsidy not required),
- enhance the economic base of the nation,
- lead to expanded tax revenues,
- benefit both the government and the private sector,
- be done in the environment of an open marketplace,
- encourage free enterprise, and

- encourage healthy competition on both a domestic and international scale.

The following concepts could have a direct bearing on considerations of the transfer of a Space Transportation activities to the private sector:

governmental activity vs nongovernmental activity
government operations vs private sector operations
government R&D vs private industry R&D
government cost vs government savings
tax revenues vs tax incentives
open market vs monopoly
free enterprise vs government subsidy
partial commercialization vs complete commercialization
gradual commercialization vs immediate commercialization
government investment vs private investment

The attached chart, Figure 4-1, outlines a possible Criteria for Evaluation of Proposals to operate Category III systems. While such a listing is not intended to be considered "all inclusive," it is intended to provide a "strawman" which could be a basis for considering Category III proposals with possible limited application to Category II.

CRITERIA FOR EVALUATION OF PROPOSALS

FEASIBILITY

- DEMONSTRATES TECHNICAL AND MANAGEMENT CAPABILITIES
- DEMONSTRATES FINANCIAL CAPABILITIES

BUSINESS PLAN

- BASIC TERMS AND CONDITIONS
- GUARANTEES NEEDED (I.E., INDEMNIFICATION, ETC.)
- PROPOSED LEASES AND/OR PURCHASES FROM GOVERNMENT
- GOVERNMENT SUPPORT NEEDED
- SPECIAL INCENTIVES REQUIRED
- RECOMMENDED REGULATION
- TIMEFRAME OF TRANSITION
- OTHER FACTORS

BENEFITS TO THE GOVERNMENT

ADDRESSES FOREIGN SECTOR CONCERNS

ADDRESSES NATIONAL SECURITY CONCERNS

FIGURE 4-1

A. PRICING OF GOVERNMENT SERVICES

1. Government Flexibility in Pricing Services to Outside Users

When the U.S. Government offers a service to non-U.S. Government users, it has long been understood that the government is able to employ a variety of pricing tools to maximize the public benefit from that service. When a service is offered by a U.S. Government agency on a reimbursable basis to a non-government user, it may choose to:

(1) seek a price which includes the cost of offering the service (including the recovery of the development costs of that service)

(2) offer the service at a price which reflects the cost of operating the structure through which the service is provided

(3) offer the service at a price which reflects the material cost of providing the service, exclusive of government effort expended.

The guidelines for implementation of pricing policy are found in two documents, The User Charges Statute of 1951, and Office of Management and Budget Circular A-25. The 1951 Statute gives the widest possible latitude to a governmental agency. It simply calls for taking into account both "direct" and "indirect" costs along with private value to the recipient, public value, and other relevant facts. Circular A-25 clarifies the statue by calling for a "reasonable charge" for the federal activities "which convey special benefits to recipients above and beyond those accruing to the public at large." "Reasonable charge" is not defined at all in relation to research and development, investment, and interest costs. Nor does Circular A-25 attempt to be specific about non-governmental recipients of federal services on whom a reasonable cost based user charge should be levied. In terms of a definition of the public good, Circular A-25 provides a very broad base on which to build: "no charge should be made for services when the identification of the ultimate beneficiary is obscure and the service can be primarily considered as benefiting broadly the general public."

Historically, federal agencies have determined cost reimbursement policy on the basis of an interpretation of their individual charters. (Reference Section II, par. B) The DOD has traditionally charged "direct costs" for the use of its capabilities by other government entities and on DOD programs with foreign governments and "full cost" for private sector launches on NASA vehicles from the DOD operated ranges. Nevertheless, both the DOD and NASA have wide latitude in reimbursement policies depending on their interpretations of the public good and their individual charters.

V. DISCUSSION - REQUIREMENTS OF PRIVATE SECTOR OPERATIONS

A. POLICY

There are two areas in the National Space Policy which appear to be in conflict when addressing the question of commercial or private operation of expendable systems. On one hand, the policy encourages private sector involvement in space, but on the other, the STS is the primary space launch system with a priority of cost effectiveness.

Private sector operation of expendable systems would have two basic results: competition between the STS, ergo the government, and expendable systems, i.e., the private sector, for the commercial and foreign market segment and, as a result, a reasonable probability that a maximum utilization of the STS will not be achieved and, therefore, the STS does not achieve its optimum cost-effectiveness.

A fundamental principle upon which government policy is based is that the government should not compete with its citizens. The current guidelines for the implementation of this principle are contained in OMB Circular A-76, which states that the government should not engage in commercial or industrial activities where the private sector can provide them more efficiently and

cheaply. The Circular, and the implementing guidelines, provides the procedures for the acquisition of commercial or industrial products and services needed by the government.

However, the operation of the STS does not appear to be an activity which meets the A-76 criteria, but the expendable system, under certain circumstances, could be considered as meeting the A-76 criteria for private sector operation.

Under the A-76 definitions, the services provided by the STS to commercial and foreign customers can be considered a government commercial activity by the A-76 definition in that it provides a product or service obtainable from a private source, if private sector operation of expendable systems is permitted. The creation by the government of domestic private sources for launching and associated services will definitely create significant new issues associated with A-76 which must be addressed in a policy statement on this subject.

Furthermore, a policy statement which addresses the question private sector Space Transportation Operations must consider two important factors. First, a policy statement which permits the private sector operation of expendable systems must recognize the impact of such a change in policy on existing STS program objectives. And secondly, it is quite important to recognize that a precedent has already been established by the government in permitting the private sector launching of SSI on September 9, 1982.

1. Agencies Impacted

The Category I proposals received to date primarily represent activities which will result in relatively minor impacts on WSMC operations because the proposed payloads are relatively small and they do not currently represent a significant percentage of the predicted launch rate. Category II proposals are by definition complimentary to the STS.

Category III proposals are primarily focused on ESMC and KSC capabilities and will have a greater impact on NASA STS operations. On this basis, it is reasonably safe to state that the resultant government budgetary impacts of a decision to allow private sector operation of commercial expendable systems will be felt primarily by NASA with a lesser impact on the national security sector.

B. IMPLEMENTATION DECISIONS

This section is primarily associated with the decisions required to implement the Category III type proposals.

1. **Assumptions**

a. Private sector operation of expendable systems currently operated by the Government will be permitted.

b. Existing STS pricing policy could become an issue in the resulting "competition" between the STS and privately operated ELV's unless appropriate steps are taken.

c. Extensive Government cooperation is necessary to the viability of privately operated expendable systems in Category III.

d. The Government is willing to accept the fact that each proposal for private sector operation could either succeed or fail.

e. Private sector entry into competition with activities which are essential to the government such as the STS for activities associated with the commercial and foreign payloads constitutes a business decision which is solely the responsibility of the private sector entity.

f. U.S. Government spacecraft space missions shall be designed to take advantage of the unique STS capabilities and shall utilize Category III commercial expendable systems only under unique emergency circumstances.

g. The majority of the decisions in the utilization of facilities equipment and support at the launch site will involve both the Department of Defense and NASA. A majority of the expendable system operations activity is on Air Force property.

2. Recommended Decisions

a. Cost Recovery Decisions

(1) "Sunk" capability development costs

Since the Government intends to abandon the utilization of existing expendable systems without any attempt to recover these costs, it is proposed that recovery of "sunk" costs associated with the development of these systems not be recovered (See Section on Legal Questions). These systems will

be in competition with both the STS and foreign expendable systems which are not burdened with such costs.

(2) Use of government facilities and property

Real property which includes system unique facilities and equipment should be rented, leased, or licensed through a use permit to the private sector operator. A standard computational method to be used by both the DOD and NASA which is compatible with STS pricing policy should be developed to determine the amounts to be charged for the rental, lease, or license.

Software, including designs, drawings, production procedures and processes, and launch procedures will be turned over to a principle private sector operator at no charge. This private sector operator will be responsible for the maintenance of the items.

Spare parts which support system unique production and launch capabilities and flight hardware will be sold to the primary system operator at a fair price.

(3) Government support and services at the launch site

Government support and services provided to a private sector operator of Category III expendable systems should be made available at the launch site and should be charged to the private sector operator on the same pricing basis that commercial and foreign users of the STS are charged.

This would represent a change in pricing policy with respect to expendable systems on the part of DOD and NASA. In regard to this question, the U.S. Government has two alternatives, one indicated above and the other is to raise prices to STS users to the levels currently charged to ELV's. Although either alternative is acceptable, it is unknown how the latter will affect the competitive posture of domestic ELV's with the Ariane. Most observers believe that the latter alternative will provide an advantage to the Ariane.

b. Compatibility with STS Pricing Policy

The decisions recommended above with respect to Government charges to private sector operated

systems are directly comparable to and directly linked to STS Pricing Policy. As a matter of policy, this linkage should be maintained as long as the competitive aspects between these systems exist.

c. Monopoly vs Free Market

A decision must be made concerning non-exclusive leases or multiple use license or permits for each individual expendable system versus a single operator. The single operator is by far the simpler of the two concepts to implement, but the non-exclusive lease or multiple use license or permit avoids the potential criticisms associated with a monopoly.

A system operator could be decided on a competitive basis by advertizing in Commerce Business Daily for expressions of interest. If more than one such expression is received, NASA could use the RFP process to competitively determine the primary system operator. Provisions (contractual) between the system operator and the Government could require providing tooling, equipment, facilities and services (as desired) to other licensed operators of the system.

d. Liability

System operators would be required to provide insurance which would provide coverage for the U.S. Government's liability under international treaties and domestic claims. This is one aspect of this activity which may require legislation (see Legal Issues).

e. Safety and Environmental Regulations

Private sector expendable system operators as tenants of Cape Canaveral Air Force Station will be responsible for awareness of and compliance with Air Force ground and range safety regulations. These operators will also be responsible for awareness of and compliance with OSHA, KSC and environmental regulations, as appropriate.

f. Security

Private sector system operators will be responsible for compliance with security regulations of ESMC and for providing appropriate security and safeguards associated with the unauthorized transfer of technology.

g. Scheduling

Private operators of expendable systems at the launching site (ESMC) should be afforded the same scheduling priorities as afforded currently to government operated expendable systems for commercial or SIL (ESMC term for Special Interest Launch) launchings. U.S. Government payloads and missions should be afforded priority scheduling in the use of Government operated facilities. This priority only applies to rescheduling in the case of national security or civil missions with a planetary window which would be missed.

h. Modification of Government-owned Facilities

There are legal questions concerning the modification of government-owned facilities (see Legal Issues).

i. Insurance

System operators will be required to obtain insurance with the government as a beneficiary against loss of and or damage to government property, facilities, or equipment during the conduct of their activities.

VI. DISCUSSION - LEGAL ISSUES RELATED TO SPACE LAUNCH OPERATIONS BY PRIVATE ENTERPRISES

A. International Law

1. Nongovernmental space activities including launch operations are not prohibited by international law.

a. The Outer Space Treaty of 1967 explicitly recognizes that nongovernmental space activities may occur when it places responsibility on States Parties "for national activity in outer space . . . whether such activities are carried on by governmental or nongovernmental entities . . . "and by requiring State supervision of "activities of non-governmental entities in outer space . . ." (Article VI). Furthermore, Article IX refers to "an activity or experiment planned by it [the State Party] or its nationals in outer space. . . ." This language plus rejection of the USSR's position providing for a State monopoly for the exploration and use of outer space during negotiation of the Treaty may be viewed as conclusively establishing that private nongovernmental space activity is not prohibited by international law.

b. The Outer Space Treaty does not attempt to define space "activity." Launch operations are an integral part of space activities as they are currently conducted. There is no reason to doubt that the implicit authorization of the Outer

Space Treaty extends to nongovernmental launch operations as well as other activities. Furthermore, the Convention on Liability for Damage Caused by Space Objects includes launch vehicles as "space objects" and defines launch to include an attempted launching.

c. It should be noted that Article I, paragraph one, of the Treaty provides for the use of outer space "for the benefit and in the interest of all countries . . . and shall be the province of all mankind." While it has been argued that this provision negates commercial space activity whether by governmental or nongovernmental entities, this position has not been accepted and participation of private industry in commercial space activity (e.g., communications satellites) has been taken for granted.

2. Government has responsibility under international law to regulate nongovernmental space launch operations.

a. Principle Substantive Provisions.

(1) The provisions of Article III (activities in accord with international law) and Article IV (prohibition against weapons of mass destruction/peaceful uses) apply to States as well as private entities launching under their jurisdiction.

(2) Each State is internationally liable for damage caused by objects: (1) which the State launches, (2) which the State procures the launching of, or (3) which are launched from the territory of the State (Article VII).

(3) Prior notice and international consultations are required before proceeding with space activity if there is reason to believe the activity is potentially harmful to the space activity of another (Article IX).

(4) Registration and certain launch information is required by Articles II and III of the Convention on the Registration of Objects Launched Into Outer Space.

(5) Other obligations may arise under various treaties, other international agreements or the developing international customary law of outer space.

b. Procedural requirements of regulation.

(1) Article VI of the Outer Space Treaty requires State authorization and supervision of nongovernmental space activities. The position of the U.S. Government, as enunciated by the Office of the Legal Advisor, Department of State, is that Article VI is self-executing. That is, that even in the absence of implementing domestic law, private concerns must obtain

United States Government permission prior to conducting a space launch. The State Department uses the Arms Export Control Act and its implementing regulations to provide review and authorization for private launch operations.

(2) The nature and extent of the supervision required by international law are not expressly stated in Article VI. Presumably, the supervision should be conducted in such a way as to enable the supervising state to effectively control the private launch within the limitations of international law.

c. Entities to be regulated. Article VI and Article IX of the Outer Space Treaty appear to place responsibility on a party to the treaty for the space activities of its nationals irrespective of the place from which a launch might occur. Thus, the United States is responsible for the supervision and authorization of a United States company launching into space from outside U.S. territory. With regard to the Liability Convention the situation is less clear. The State from whose territory a space object is launched is liable but another state which "procures" the launch is also liable. Whether merely granting permission to launch (i.e. authorization under the Outer Space Treaty) constitutes procuring a launch under the Liability Convention is uncertain. The status of multi-national companies is also questionable.

B. Regulation of Non-Government Launch Operations

1. Private Launch Operations are Regulated Through Ad Hoc Application of Nonspecific Statutory Authority.

a. State Department. Private launches are regulated by the State Department under the Arms Export Control Act (22 U.S.C. § 2778).

(1) Functions under the Act have been delegated to the Secretary of State (E.O. 11958), who has promulgated International Traffic in Arms Regulations (ITAR) (22 C.F.R. Parts 121-128), and administers the Act through the Office of Munitions Control, Bureau of Politico - Military Affairs.

(2) Spacecraft and related data and launching equipment are listed on the Munitions List (22 C.F.R. § 121.01). Items on the munitions list may not be exported without a license (22 C.F.R. § 123.01) and an "export" includes "taking out of the United States in any manner . . ." (22 C.F.R. § 121.19). The Department of State has concluded that a launch is an export subject to ITAR requirements.

(3) In processing an export license related to a space launch under ITAR, State has requested the input of various other agencies including NASA.

b. Federal Aviation Administration. The Federal Aviation Act (49 U.S.C. § 1301, et seq.) as interpreted by the FAA is not generally applicable to spacecraft, however, the Act grants the Secretary of Transportation authority to regulate air space (49 U.S.C. § 1348) and regulations concerning the control of airspace (14 C.F.R. Parts 71-77) administered by the FAA have been promulgated; as have special air traffic rules which apply to unmanned rockets 14 C.F.R. § 101.21.

(1) FAA regulations on unmanned rockets provide for notice requirements and prohibit rocket operations under the following conditions: if creating an aircraft collision hazard, in controlled airspace, within 5 miles of an airport, through 5/10 cloud, in less than five miles horizontal visibility, into cloud, within 1500 feet of any person not associated with the operation, between sunset and sunrise. If the rocket is operated in restricted airspace only the 1500 foot requirement is applicable (14 C.F.R. § 101.23). Operations from a restricted area require pemission from the controlling agency (14 C.F.R. § 101.5).

(2) A waiver of the above provisions may be granted (14 C.F.R. § 101.3).

(3) Establishment of permanent or long term authority for conducting unmanned rocket operations requires application for an exemption from FAA air space regulations (14

C.F.R. § 11.71). A petition for exemption may be handled under procedures for changing airspace use. The FAA's Director, Air Traffic Service (or other specified official), may require a rule-making action with provision for publication of the proposed rule in the Federal Register and the possibility of a hearing (14 C.F.R. §§ 11.61-.69). [Note: the FAA required the exemption procedure rather than granting a waiver for SSI's Conestoga I launch from Matagorda. This included Federal Register publication.]

c. NASA. Under the Space Act NASA has legal authority to issue non-economic regulations dealing with the peaceful purposes of a private launch, safety, operations of orbital and suborbital space vehicles, and, possibly, other areas as well.

(1) NASA has not previously acted as a regulatory agency and does not desire to assume such a role.

(2) NASA has been consulted by the State Department and FAA during their consideration of applications for private space launches.

d. Federal Communications Commission. The FCC assigns radio frequencies which are needed to support private launch operations. 47 U.S.C. § 151 et seq., 47 C.F.R Parts 0-99.

e. Other Government Agencies. Other government agencies (e.g., the Department of Defense) have been and will be consulted by the Department of State and FAA during the consideration of applications for private space launches. The North American Air Defense Command (NORAD), though admittedly without regulatory authority, has expressed an interest in being made aware of private rocket launches. Under the Gun Control Act, 18 U.S.C. §§ 921-928, manufacturers of certain "destructive devices" (including rockets) are required to make informational filings with the Bureau of Alcohol, Tobacco and Firearms (BATF) and pay a fee to the Internal Revenue Service (IRS) of the Treasury Department. Other government agencies may assert some interest or authority in launch operations and add additional formal or informal regulatory requirements.

2. The Current Regulatory Scheme Has Proved to be Adequate But If Commercial Launch Operations Develop and Proliferate, a Revised Regulatory Scheme May be Needed.

a. The current scheme has proved adequate both from the government and private company's perspective. The approval process is somewhat cumbersome, however, and various changes have been suggested.

b. The Outer Space Treaty as domestic law. The U.S. Government's position, as stated by the State Department, is that

Article VI is self-executing. Clearly the provisions of Article VI (authorization and supervision of non-governmental space activities) constitute obligations of the United States under international law. Whether the Treaty itself has effect as domestic law to require private entities to obtain U.S. government permission to launch space vehicles (i.e., is self-executing) has been questioned by lawyers for SSI but they have refrained from challenging the State Department's position in court on this issue as well as the applicability of the Arms Export Control Act. NASA, of course, agrees with the U.S. Government position as interpreted by the State Department on the Treaty and defers to the State Department on the interpretation of the statute which the Department is charged with administering.

c. Limits of the "export" concept. The Arms Export Control Act has long been applied to the launch of spacecraft in the sense of Payloads. With the advent of commercial launch operations the State Department now applies the Act to the launch of the booster without a payload or with only an engineering payload (e.g., export applications by SSI for the Conestoga I launch and by ARC Technologies). Lawyers for SSI have questioned whether the launch of a booster is an "export" when its explosives (propellents and destruct mechanism) are to be consummed or destroyed in the launch and its physical structure is intended to disintegrate or be recovered by the launching company. Moreover, in test launches within the borders of the

United States below a certain altitude (30-50 miles), the space-craft cannot be considered taken "out of the United States." While there is no international or domestic law definition of where outer space begins, the United States would be unlikely to concede in an international or domestic controversy that its national air space terminated below 50 miles (astronaut qualification height). The Arms Export Control Act probably provides no authority to regulate sounding rocket operations or booster test flights within the borders of the United States. Furthermore, if the rocket does not enter "outer space" the Outer Space Treaty would not be applicable.

d. Unmanned rocket flights will continue to be within the jurisdiction of the FAA even in cases where the Arms Export Control Act does not apply. The FAA does not purport to provide supervison in the sense of Article VI of the Outer Space Treaty but did undertake a thorough review of SSI's petition. There are, however, limited circumstances in which unmanned rockets could be launched under the authority of current FAA regulations without obtaining a waiver or exemption. Rocket flights outside of controlled airspace which comply with 14 C.F.R. Part 101 require only notification not permission.

e. Suggested Changes from the Private Sector. SSI's attorney have suggested that a revised regulatory scheme should contain the following elements:

(1) Recognition of the comprehensive nature of the Federal approval process and the need for national uniformity to preempt unwarranted state and local regulation;

(2) Required insurance levels based on the maximum probable accident;

(3) Range safety guidelines based on approved Federal government range safety procedures;

(4) Limiting the decision to grant or deny launch approval to consideration of the following issues: public safety, national security, insurance coverage, indemnification and balancing of competing interests of airspace users.

(5) Mandatory time limits for processing applications to assure that launches are not unduly delayed;

(6) Embodiment of the principle that approval of a private, permanent launch site, i.e., designation of restricted air space, is not a major Federal action requiring an environmental impact statement; and

(7) Procedure for an inexpensive, expedited appeal of administrative determinations.

Some of these principles were embodied in legislation introduced in the 97th Congress by Senator Cannon and Congressman Akaka.

f. Other Changes. Other changes that should be considered are implementation of specific procedures for supervision and payload verification, and, inclusion of rocket test programs and sounding rockets within a comprehensive scheme if one is promulgated.

C. COMMERCIAL OPERATIONS FROM GOVERNMENT LAUNCH SITES WITH SUPPORT OF GOVERNMENT FACILITIES AND EQUIPMENT

1. NASA has broad legal authority to lease or allow the use of its real and personal property and equipment in support of commercial space activities but this authority is not unlimited and there are fiscal law restrictions as well as policy considerations that may affect the feasibility of any given commercial proposal that involves private use of NASA facilities.

a. Space Act Authority. The Space Act provides NASA with a broad charter to direct, engage in, and facilitate space activities and to otherwise promote the peaceful utilization of space (e.g., Space Act sections 102(d), 203(a)). NASA has express authority in Section 203(c)(3) to "lease to others real and personal property" which is in addition to the property disposal authority under the Federal Property and Administration Services Act (40 U.S.C. § 471, et seq.), NASA's procedures for leasing nonexcess land are found in NPD 8813.2. Under section 203(c)(5) NASA has authority to "enter into and perform such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of its work on such terms as it may deem appropriate . . ." The legislative history refers to this as "broad authority" and the limited judicial construction of this language has applied it broadly, Lodge 1958 v. Webb, 580 F. 2d 496 (D.C. Cir. 1978).

Section 203(c)(6) provides authority for NASA to cooperate with public or private agencies in the use of services, equipment and facilities. Under this authority NASA has entered into a broad spectrum of cooperative arrangements and other agreements on a reimbursable and non-reimbursable basis.

Under the authority of the Space Act, NASA has leased a large facility to the Garrett Corporation for commercial utilization. NASA provided a rocket motor to SSI on a reimbursable basis to support its program of development of a private space launch capability. In both cases the property was determined to be non-excess. The land will revert to NASA possession in the future. The rocket motor was transferred to accomplish a Space Act purpose, the advancement of vehicle design and the demonstration of private launch capability.

b. NASA has a twenty year history of providing commercial launch services on a cost reimbursable basis under the authority of the Space Act. NASA practice in this regard is well known to Congress and has been approved by the Comptroller General. In recent years payloads launched by NASA have included commercial propulsion units such as PAMs and orbital kick motors. On legal and practical grounds it can be said that NASA's current practice in the launch services area stands as precedent for a

commercial firm providing all propulsion for a space launch (i.e., private ownership and operation of the booster and all payload assist propulsion) with the government providing ground launch support on a cost reimbursable basis. Whether such an arrangement would be commercially viable is not known. In the event, no such proposal has been received. The concept, however, stands as a model of an arrangement for which there is precedent and for which legal authority may be assumed. The more a commercial proposal departs from the established model the more thoroughly it must be scrutinized on legal grounds. (A proposal that a commercial firm provide all propulsion through acquiring one of NASA's current ELV models from the manufacturer would require NASA permission for co-production).

c. General principles related to private use of government property. There is no absolute prohibition on the private use of public property. Opinions of the Attorney General and Comptroller General have discussed the principles related to the private use of public property based on general Constitutional and policy principles rather than express authority under the Space Act. Even in the absence of express statutory authority private concerns have been allowed to cultivate federal land, construct railroad tracks across a federal reservation, use government production equipment, use government data processing equipment and other government property. A summary of the principles related to such use is as follows:

> Such decisions have held generally that the head of a Government department or agency has authority to grant to a private individual or business a revocable license to use Government property, subject to termination at any time at the will of the Government, provided that such use does not injure the property in question and serves some purpose useful or beneficial to the Government itself. The Attorney General has stated that the question as to whether the granting of such a license in any given case is beneficial to the Government is for the exercise of the judgment of the official vested with the power to grant, rather than a question of law to be determined in advance by the law officers of the Government. 47 Comp. Gen. 387, 389.

The term "injure" obviously is not to be taken literally since production equipment suffers normal wear and tear during use and the laying of railroad tracks causes some injury to land. Injury means some damage which renders the property unfit for its intended use. Fair wear and tear is permitted.

Other government policies indicate that an individual or business receiving such a license should reimburse the government for the benefit received. (OMB A-25). Generally, a government license should be offered on a nondiscriminatory (competitive) basis.

d. Limitations on NASA's statutory authority to sell property. NASA is limited in its ability to make an outright sale of ELV system assets. Despite NASA's broad statutory authority a disposition of property is governed by the Federal Property and Administrative Services (FPAS) Act and application of the procedures of that Act to a proposed commercial takeover of an operating ELV system would probably prove be be impracticable.

Outright sale of an ELV to a commercial customer also appears to require application of the FPAS Act. NASA has transferred flight components to private concerns under circumstances which might be perceived as tantamount to sale but such transfers involved non-excess property and were structured to assure a Space Act purpose was accomplished by the transfer. NASA has also acted as purchasing agent for users of NASA-provided launch services as, for example, in the purchase of explosive bolts. Such theories can be applied to commercialization proposals as long as commercial launch operations are viewed as "aeronautical and space activities" of the United States for which NASA is responsible. Property transferred without regard to its use would probably have to be considered excess to NASA's needs and subject to disposition only under the procedures of the FPAS Act.

e. Fiscal law restrictions. There are a number of restrictive fiscal laws that may play a role in the determination of whether a particular commercial proposal is legally authorized or feasible. Among those fiscal and related laws are the following:

(1) Limitations on Reimbursement

(a) 31 USC § 484 Deposit without deduction

The gross amont of all moneys received from whatever source for the use of the United States, except as otherwise provided in section 487 of this title, shall be paid by the officer or agent receiving the same into the Treasury, at as early a day as practicable, without any abatement or deduction on acount of salary, fees, costs, charges, expenses, or claim of any description whatever. . . .

(b) 31 USC § 487 Proceeds of sales of material

All proceeds of sales of old material, condemned stores, supplies or other public property of any kind except the proceeds of the sale or leasing . . . as provided in section 485 of Title 40 [the Federal Property and Administrative Services Act of 1949], or in other law, shall be deposited and covered into the Treasury as

miscellaneous receipts, on account of "proceeds of Government property," and shall not be withdrawn or applied, except in consequence of a subsequent appropriation made by law. . . .

(c) 31 USC § 489 Payment of expenses of sales from proceeds

Subject to applicable regulations under the Federal Property and Administrative Servies Act of 1949, as amended, proceeds from the sales of old material, condemned stores, supplies, or other public property of any kind, before being deposited in the Treasury, either as miscellaneous receipts on account of "proceeds of Government property" or to the credit of the appropriations to which such proceeds are by law authorized to be made, there may be paid the expenses of such sales, as approved by the General Accounting Office, so as to require only the net proceeds of such sales to be deposited into the Treasury, either as miscelleneous receipts or to the credit of such appropriations, as the case may be.

(d) 31 USC § 628 Application of moneys appropriated

Except as otherwise provided by law, sums appropriated for the various branches of expenditure in the public service shall be

applied solely to the objects for which they are respectively made, and for no others.

2. Lease

(a) 40 USC § 303b Lease of building by government; money consideration

Except as otherwise specifically provided by law, the leasing of buildings and properties of the United States shall be for a money consideration only, and there shall not be included in the lease any provision for the alteration, repair, or improvement of such buildings or properties as a part of the consideration for the rental to be paid for the use and occupation of the same. The moneys derived from such rentals shall be deposited and covered into the Treasury as miscelleous receipts.

(b) 40 USC 304g Disposition of property voluntarily abandoned to United States

In the event that any [personal] property is or has been voluntarily abandoned to any agency in such manner as to vest title thereto in the United States, it may be retained by such agency and devoted to official use only. If such agency shall not desire so to retain such property, the head thereof shall forthwith notify the [GSA] Administrator to that effect. . . .

(3) Sale or Disposal

(a) 40 USC § 484. Disposal of surplus property -- Supervision and direction

Except as otherwise provided in this section, the [GSA] Administrator shall have supervision and direction over the disposition of surplus property.

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(b) 40 USC § 485. Proceeds from transfer, sale, etc, of property -- Disposition of receipts

All proceeds under this subchapter from any transfer of excess property to a Federal agency for its use, or from any sale, lease, or other disposition of surplus property, shall be covered into the Treasury as miscellaneous receipts, exept as provided in subsections (b)-(e) of this section.

All the proceeds of such dispositions of surplus real and related personal property made by the Administator for General Services shall be set aside in a separate fund in the Treasury.

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(4) Antitrust Law

(a) 40 USC § 488 Applicability of antitrust laws to property disposal

Except as provided by subsection (c) of this section, no executive agency shall dispose of any plant, plants, or other property to any private interest until such agency has received the advice of the Attorney General on the question whether such disposal would tend to create or maintain a situation inconsistent with the antitrust laws.

o o o

If such notice is given by any executive agency other than the General Services Administration, a copy of such notice shall be transmitted simultaneously to the Administrator. Within a reasonable time, in no event to exceed sixty days, after receipt of such notification, the Attorney General shall advise the administrator and any other interested executive agency whether, so far as he can determine, the proposed disposition would tend to create or maintain a situation inconsistent with the antitrust laws.

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(5) This section shall not apply to the disposal of--

(a) real property if the aggregate amount of the original acquisition cost of such property to the Government and all capital expenditures made by the Government with respect thereto is less then $1,000,000;

o o o

(b) 40 USC § 490

(j) The [GSA] Administrator is authorized and directed to charge anyone furnished services, space, quarters, maintenance, repair, or other facilities (hereinafter referred to as space and services, at rates to be determined by the Administrator from time to time and provided for in regulations issued by him. Such rates and charges shall approximate commercial charges for comparable space and services, except that with respect to those buildings for which the Administrator of General Services is responsible for alterations only (as the term "alter" is defined in section 612 (5) of this title), the rates charged the occupant for such services shall be fixed by the administrator so as to recover only the approximate applicable cost incurred by him in providing such alterations. The Administrator may exempt anyone from the charges required by this subsection if he determines that such charges would be infeasible or impractical. To the

extent any such exemption is granted, appropriations to the General Services Administration are authorized to reimburse the fund for any loss of revenue.

(k) Any executive agency, other than the General Services Administation, which provides to anyone space and services set forth in subsection (j) of this section, authorized to charge the occupant for such space and services at rates approved by the Administrator. Moneys derived by such executive agency from such rates or fees shall be credited to the appropriation or fund initially charged for providing the service, except that amounts which are in excess of actual operating and maintenance costs of providing the service shall be credited to miscellaneous receipts unless otherwise authorized by law.

(c) Commitments Not To Exceed Appropriation.

41 USC § 12 No contract to exceed appropriation

No contract shall be entered into for the erection, repair, or furnishing of any public building, or for any public improvement which shall bind the Government to pay a larger sum of money than the amount in the Treasury for the specific purpose.

2. Current law apparently requires that NASA receive only money as consideration for a lease and that moneys derived from rentals must be deposited as miscellaneous receipts; the military departments have a partial exemption from that provision.

Under 40 U.S.C. § 303b, leases must be for money consideration only and monies received must be deposited into the Treasury as miscellaneous receipts. The restrictions of 40 USC § 303b apply "except as otherwise specifically provided by law. . . ." One section of the Space Act (Section 203(c)(11)) does expressly provide exemption from those requirements but that section deals only with VIC concession agreements. The Lewis Research Center has entered into a lease arrangement whereby a substantial part of the rental goes to defray utilities, security, and maintenance (Garrett Corp. lease at Plumbrook). The NASA General Counsel has yet to render an opinion on whether the Space Act authority to "perform . . . leases . . . on such terms as it deems appropriate . . ." constitutes an express exemption from 40 USC § 303 b.

The military departments do have lease authority (10 USC § 2667) whereby they may lease land and receive non-monetary consideration and whereby costs for utilities or services furnished to the leasee may be deducted from rent and applied to the credit of the appropriation paying for the utility or service rather than being covered into miscellaneous receipts. Military lease authority may be pertinent in the case of Atlas-Centaur and Delta since the launch sites for these vehicles are on Air Force land.

3. Notwithstanding various fiscal law restrictions, NASA may lease land and require the lessee to remove at his own expense buildings or other improvements erected during the term of the lease and failing such removal provide that improvements

or other property left on the premises shall become property of the United States without any compensation being paid therefore.

The requirement that only monetary rent may be received and excluding alteration or repair of improvements from being part of the consideration (40 U.S.C. 303b) does not mean that NASA cannot require restoration of the premises to their original condition as a condition of the lease. Restoration of the premises is part of a lessee's common law obligations and thus is not a separate part of the consideration. The failure of the lessee to restore the premises (i.e., remove improvements) and other property at the lease's termination allows the government to treat the property as abandoned and take title to it. Permanent improvements left on the land at the end of the lease term become part of the real property by operation of law.

In executing leases under the authority of 10 U.S.C. § 2667 the Air Force routinely includes such provisions. The following are standard clauses from Eng. Form 1367a, Lease of Property on a Military Reservation:

> 20. That, on or before the date of expiration of this lease or its termination by the lessee, the lessee shall at its cost vacate the leased property, remove the property of the lessee therefrom, and restore the leased property to as good order and condition as that existing upon the date of

commencement of the term of this lease, less ordinary wear and tear and damage to the leased property covered by insurance and for which the Government shall receive or has received insurance funds in lieu of having the damaged property repaired, replaced, or restored. If, however, this lease is revoked, the lessee shall vacate the leased property, remove the property of the lessee therefrom, and restore the leased property to the condition aforesaid within such time as the Secretary of the Air Force may designate. In either event, if the lessee shall fail or neglect to remove the property of the lessee and so restore the leased property, then, at the option of the Secretary of the Air Force, the property of the lessee shall either become the Property of the United States without compensation therefor, or the Secretary of the Air Force may cause it to be removed and the leased property to be so restored at the expense of the lessee, and no claim for damages against the United States or its officers or agents shall be created by or made on account of such removal and restoration work.

20. (Alternate) That, on or before the date of expiration of this lease or its termination by the lessee, the lessee shall vacate the demised premises, remove the property of the lessee therefrom, and restore the premises to as good order and condition as that existing upon the date of commencement of the term of this lease, damages beyond the

> control of the lessee and due to fair wear and tear excepted. If, however, this lease is revoked, the lessee shall vacate the premises, remove said property therefrom, and restore the premises to the condition aforesaid within such time as the Secretary of the Air Force may designate. In either event, if the lessee shall fail or neglect to remove said property and so restore the premises, then, at the option of the Secretary of the Air Force, said property shall either become the property of the United States without compensation therefor, or the Secretary of the Air Force may cause it to be removed and the premises to be restored at the expense of the lessee, and no claim for damages against the United States or its officers or agents shall be created by or made on account of such removal and restoration work.

Although 41 U.S.C. § 12 provides that no "contract shall be entered into for . . . any public improvement which shall bind the Government to pay a larger sum of money than the amount in the Treasury for the specific purpose," long standing Air Force practice has been to acquire improvements to real property through the means described above without any specific appropriation. Since the abandoned improvements become part of the real property by operation of law at no expense to the Government, 41 U.S.C. § 12 is not deemed applicable. Another statute specifically authorizes property voluntarily abandoned to the

United States to be used for public purposes (40 U.S.C. 303g). A provision which provides for payment to the owners of abandoned property (40 U.S.C. § 484(m) is probably not applicable to improvements to real property.

NASA's authority to lease non-excess land is such that it may properly follow the practice of the military departments in acquiring public improvements by the methods described above. Neither the requirement that only money be received as rent nor the requirement to deposit receipts in the Treasury without deduction (the principle differences between military and NASA lease authority) affects this result. NASA and military lease authority are substantially analogous in this regard.

4. A number of legal restrictions or issues need to be considered by firms interested in commercial space operations.

a. Anti-trust. There are possibilities for violations of the anti-trust laws associated with the commercialization of existing systems. The anti-trust laws generally prohibit monopolies, unfair competition and other anti-competitive arrangements. The mere fact of government involvement does not immunize a private company from anti-trust liability. Commercialization proposals should give due regard to possible anti-trust violations.

b. Patent Licensing. The government holds licenses for the privately developed technology used in its launch vehicles or is otherwise authorized to use the technology without charge. This same situation does not necessarily apply to a commercial firm which utilizes the technology of an existing launch system. Commercial firms need to carefully review the status of patents and licenses related to ELV technology.

c. Recovery of Sunk Costs. The Department of Defense has a policy of recovering the nonrecurring costs on commercial sales of Defense products and technology. See DAR 2-2400 and 7-10464. There is a procedure for requesting a deviation from this policy. The NASA Procurement Regulations contain no equivalent provisions and such a policy has only occasionally been applied in NASA.

Commercialization of the Titan and any other DOD administered launch system requires consideration of these provisions. Research needs to be conducted with a view toward whether this policy would apply to DOD developed systems now administered by NASA.

d. Finally, while the government can authorize commercialization of a launch system, it cannot direct associate contractors, suppliers or others to deal with the commercial

entity which is authorized to operate the system. Government permission, thus, does not imply that the government has legal authority to orchestrate the commercialization process.