Federal Funding of Civilian Space Research and Development

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Overview

- How Space Policy Is Made
- Brief History of the U.S. Space Program
- The Federal Budget
- Commercial Space Development
- Outlook

How Space Policy is Made
A Brief History

- Childhood
  - Cold War
    - Kennedy’s Decision
    - Apollo & Skylab
- Adolescence
  - Post Apollo
    - Shuttle & Station
    - Hubble & Mars Observer
- Adulthood
  - Post-Cold War
    - Internationalism
    - Commercialization

April 12, 1961
- Yuri Gagarin Orbits Earth
April 20, 1961
- JFK Memo to LBJ:
  “Do we have a chance of beating the Soviets by putting a laboratory in space, or by a trip around the moon, or by a rocket to land on the moon and back with a man? Is there any space program which promises dramatic results in which we could win?”

October 30, 1968
- Bureau of the Budget Memorandum:
  “The resource requirements of the Viet Nam war and of pressing domestic needs...have tended to push the civil space program down the scale of national priorities.”
  “The manned lunar landing is very likely to occur in late CY1969, thereby ending what is generally considered the major cause of urgency...”

August 12, 1971
- Memorandum to President Nixon from Caspar Weinberger (then Deputy Director of OMB):
  “America should be able to afford something besides increased welfare, programs to repair our cities, or Appalachian relief and the like.”

NASA Spending

Dollars VS.
Percent of the Federal Budget

Constant 1993

The Policy Process

Space policy formulation and execution is actually the result of two processes: a policy process that establishes programmatic goals, and a budgetary process which allocates funding to space activities.
The Budget Process

- President Submits Budget
  - The President’s Request
- Congress Responds
  - Budget Resolution
  - Basic Structure: Entitlements, Interest on National Debt, and Revenue Projections
  - Discretionary Budget (Including Defense)
  - **No Presidential Signature Required**
- Appropriations and Tax Committees
  - Write Bills to Spend within caps and maintain revenue neutrality
  - **Presidential Signature Required: The Law of the Land**

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R&D and the Balanced Budget

![Diagram showing discretionary caps for non-defense and defense spending over years 1997 to 2002.](chart.png)
Recent NASA Budgets

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NASA BUDGET PLANS REQUESTED OF CONGRESS ($Billions) 1990-1998
Commercialization Initiatives

Commercialization initiatives are advanced by NASA, the White House, Congress, and sources outside the government (private research organizations, academia, and industry, for example).

White House
National Space Policy

Commercial Space Legislation
Commercial Space Act of 1997
Space Commercialization Promotion Act of 1996
Space Business Incentives Act of 1995

NASA
NASA Strategic Enterprises
NASA Strategic Management Processes
Privatization Initiatives
Cooperative Development Programs
NASA Commercialization Team

Industry/Other
Potomac Institute Report
Boeing ISS Utilization Plan

Commercial Space Defined

● NASA’s view:
  ○ Commercialization means non-NASA entities pay to use NASA-owned space assets or where privately-owned space assets are financed solely on the basis of demand by non-NASA users (like satellites).

● Private Sector view:
  Commercialization means non-NASA entities invest risk capital to own and operate space assets for use by NASA and others, where:
  NASA is motivated to reduce life-cycle costs and use firm, fixed-price contracts to acquire services and functionality from private owners.
  The private company is motivated to assume risk and win NASA’s business by virtue of lower prices compared with NASA’s anticipated life-cycle costs under traditional CPAF contracts.

Commercial Space

- Commercialization does not begin after the private user market develops, as NASA says.
- Commercialization starts when NASA contracts as though it were a private user and behaves as a private customer would.
- View commercialization as a process that has already begun.
- Examples:
  - Mars Pathfinder/Surveyor
  - Spacehab
  - United Space Alliance
Commercialization Dilemma

Government provides guaranteed fee even when the contractor assumes no financial risk

Private Investors Demand Higher Returns, Commensurate With Risk

CPAF vs. FFP

Cost-Plus Award Fee
- All costs paid plus fee ("profit") on costs

Firm, Fixed Price
- All costs paid by contractor at risk. "Profit" is based on return on investment, not cost of the program.

Adulthood?

- Will the Governments of Planet Earth be empowered by their citizens to invest vast sums of taxpayer appropriated funds?
  - If so, when?
- Under what circumstances will risk capital venture into human space projects?

Circumstances

- Greatly reduced risk
  - Government agrees to behave as customer and contribute demand for end-items in lieu of taxpayer funds
- Greatly reduced "overhead cost"
  - Government invests in lowering the cost and boosting the reliability of launch systems
Greatly increased reward
  — Space as a tax haven (?)

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The Acid Test

X-33 Reduce the Cost to Low-Earth Orbit from $10,000/lb to less than $1000/lb
  Entirely new operational concept
  High flight rate
Thrust to Weight Ratio
  Lighter vehicle
  Better fuel
Cooperative Agreements
  NASA pays for technological risk reduction
  Industry assumes ordinary business risk
Will industry abandon its old ways?
  Assume Risk?
  Compete against its own, existing, cost-plus systems under contract?