

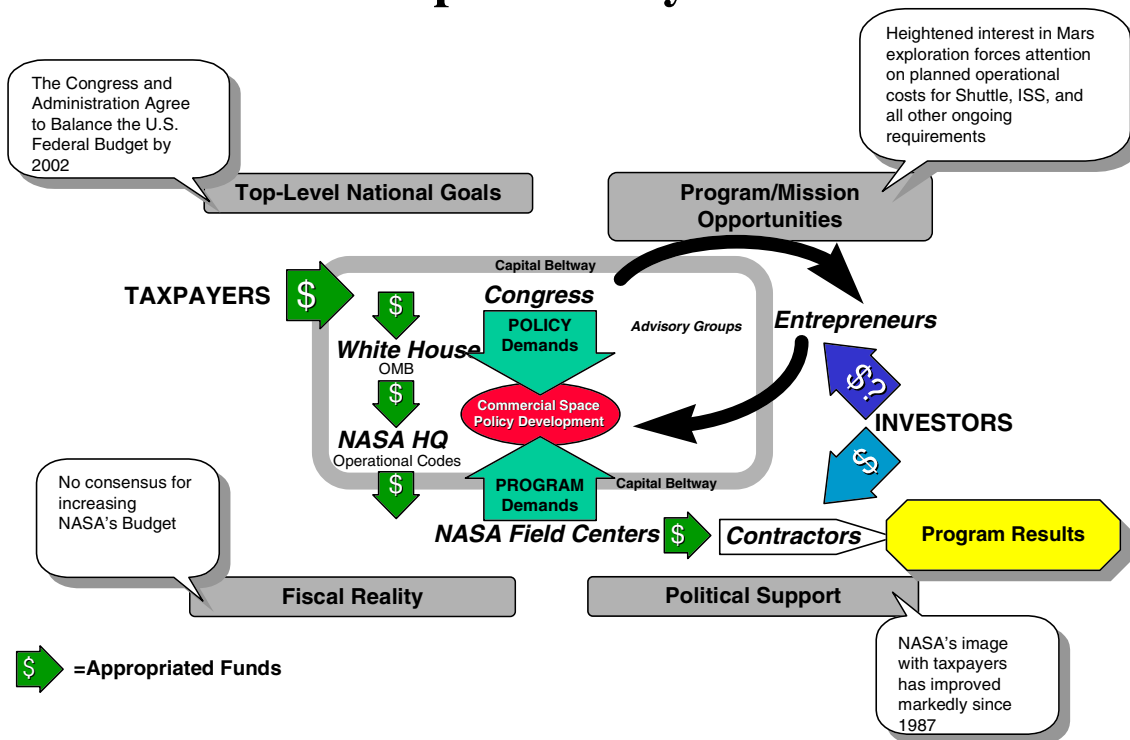
# Federal Funding of Civilian Space Research and Development

Nick Fuhrman  
September 22, 1997

## 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**

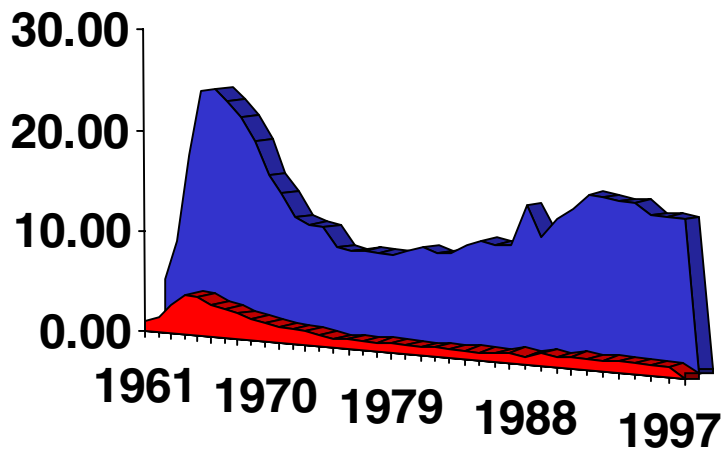
•Memorandum to President Nixon from Caspar Weinberger (then Deputy Director of OMB):

“America should be able to afford something besides increased welfare, programs to repair our cities, or Appalachian relief and the like.”

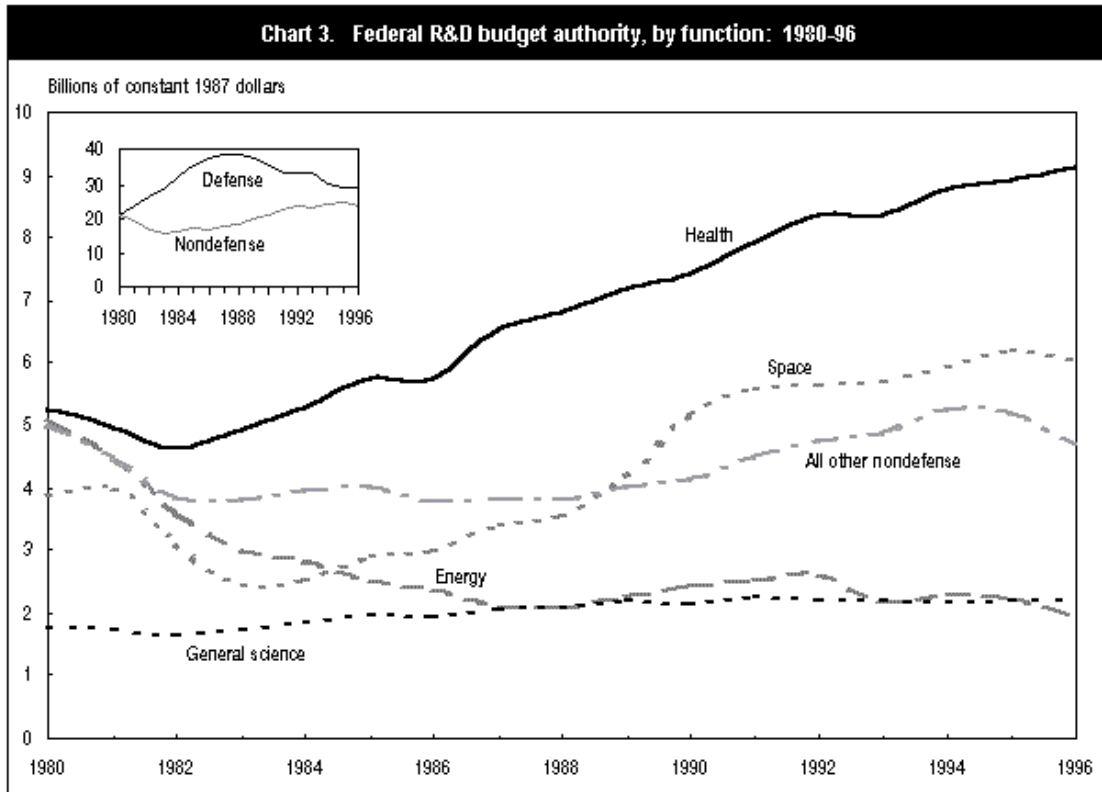
## NASA Spending

Constant 1993

Dollars VS.  
Percent of the Federal Budget



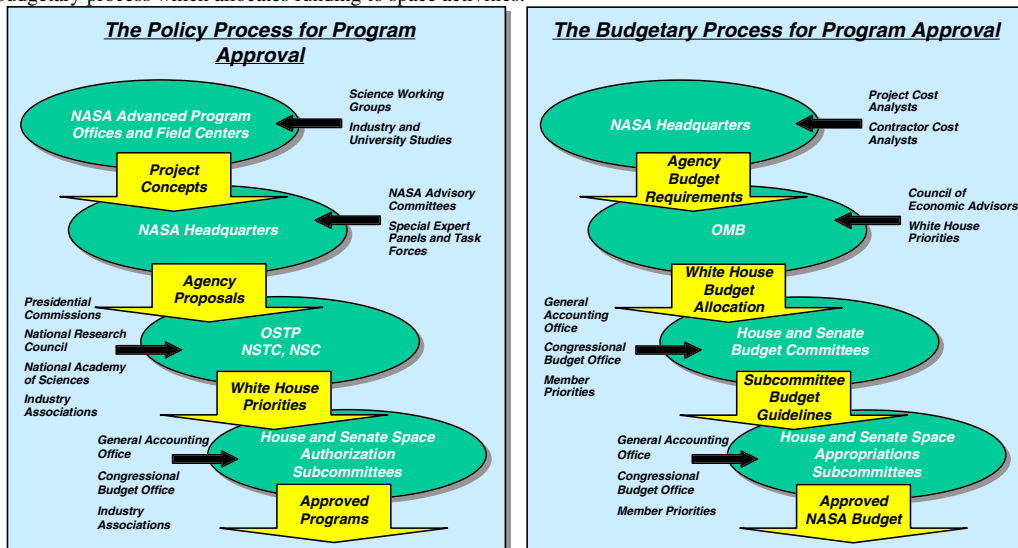
# Federal R&D



SOURCE: National Science Foundation/SRS; table C-23

## 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.

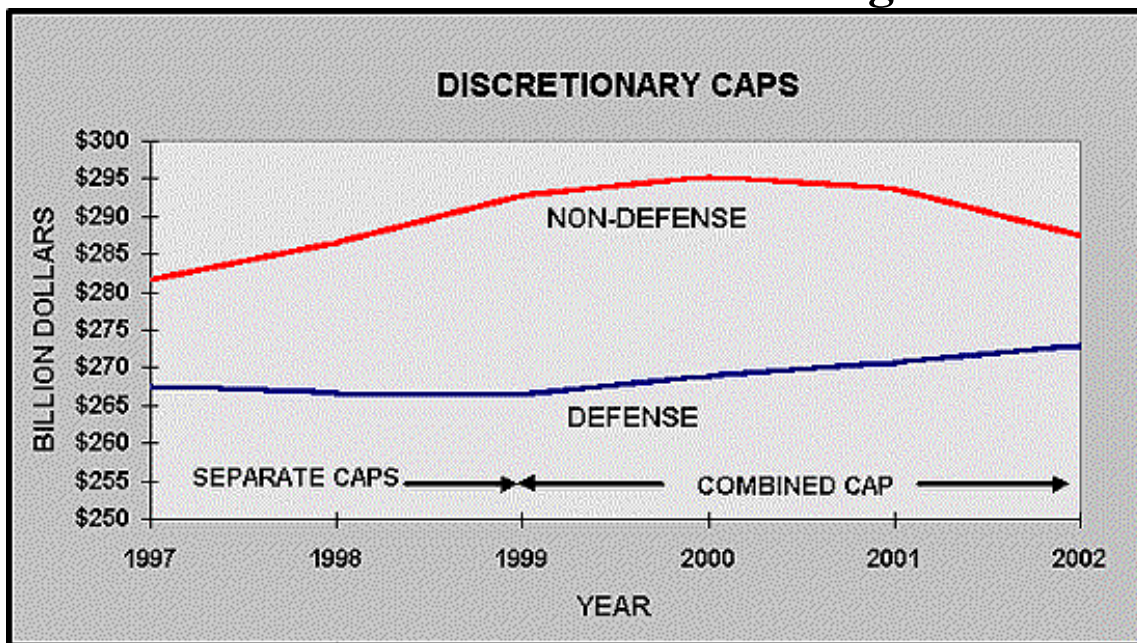


# The Budget Process

- 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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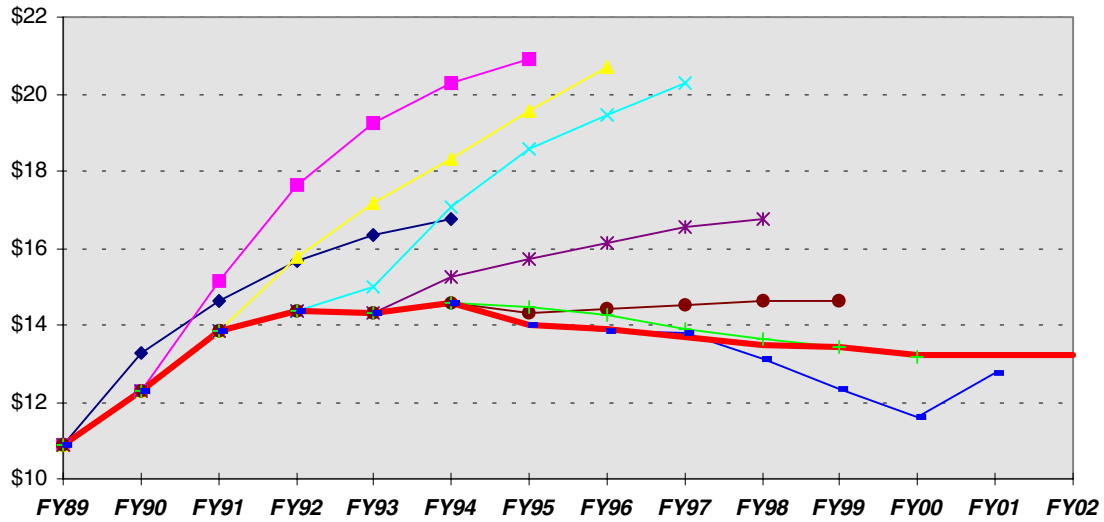
## R&D and the Balanced Budget



# Recent NASA Budgets

NASA REQUESTS	CONGRESSIONAL APPROPRIATIONS													
	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02
FY1990	10.9	13.27	14.64	15.67	16.36	16.76								
FY1991	10.9	12.3	15.13	17.64	19.26	20.26	20.93							
FY1992	10.9	12.3	13.87	15.75	17.17	18.3	19.58	20.71						
FY1993	10.9	12.3	13.87	14.35	14.99	17.06	18.59	19.47	20.27					
FY1994	10.9	12.3	13.87	14.35	14.32	15.27	15.71	16.14	16.54	16.76				
FY1995	10.9	12.3	13.87	14.35	14.32	14.55	14.3	14.4	14.5	14.6	14.6			
FY1996	10.9	12.3	13.87	14.35	14.32	14.55	14.46	14.26	13.9	13.65	13.41	13.17		
FY1997	10.9	12.3	13.87	14.35	14.32	14.55	14	13.82	13.8	13.1	12.36	11.62	12.74	
FY1998	10.9	12.3	13.87	14.35	14.32	14.55	14	13.88	13.71	13.5	13.41	13.2	13.2	13.2

**NASA BUDGET PLANS REQUESTED OF CONGRESS  
(\$Billions) 1990-1998**



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## 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

### Industry/Other



Potomac Institute  
Report

Boeing ISS  
Utilization Plan

### Commercial Space Legislation



Civilian Space Authorization  
Act of 1997

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

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## 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.

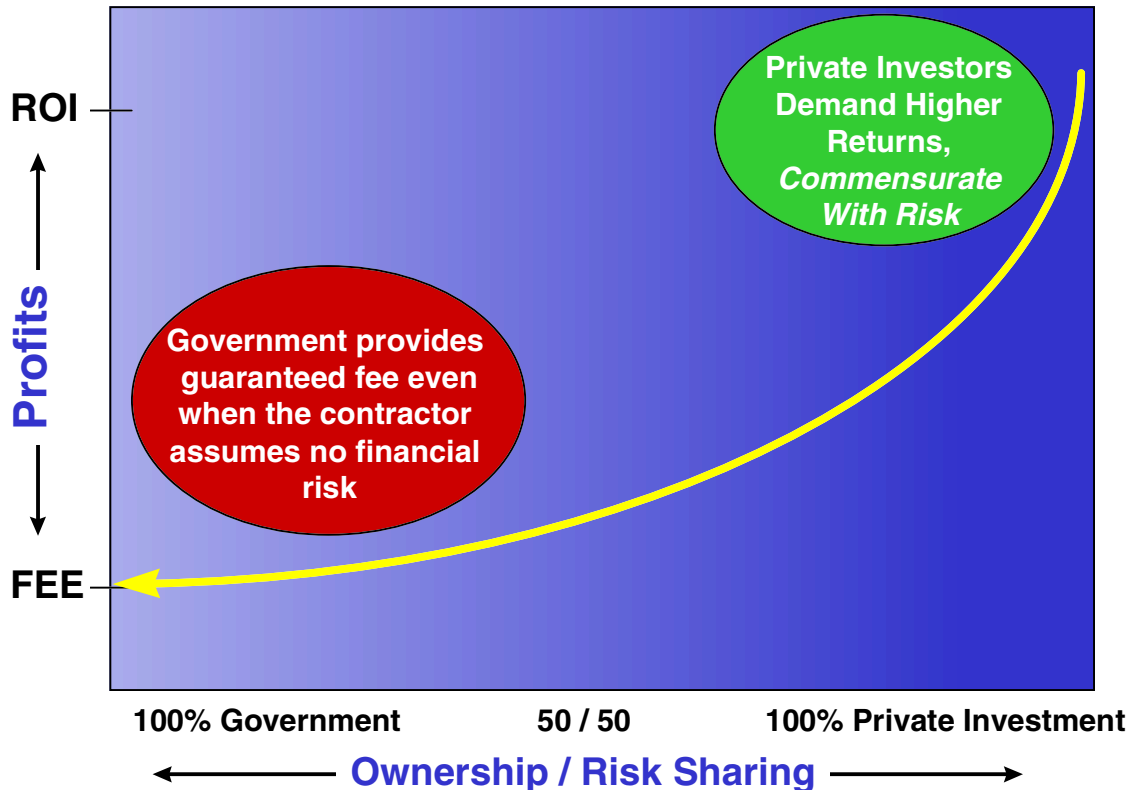
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## Commercial Space

- 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

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## Commercialization Dilemma



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## 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.

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## 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?
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## 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?