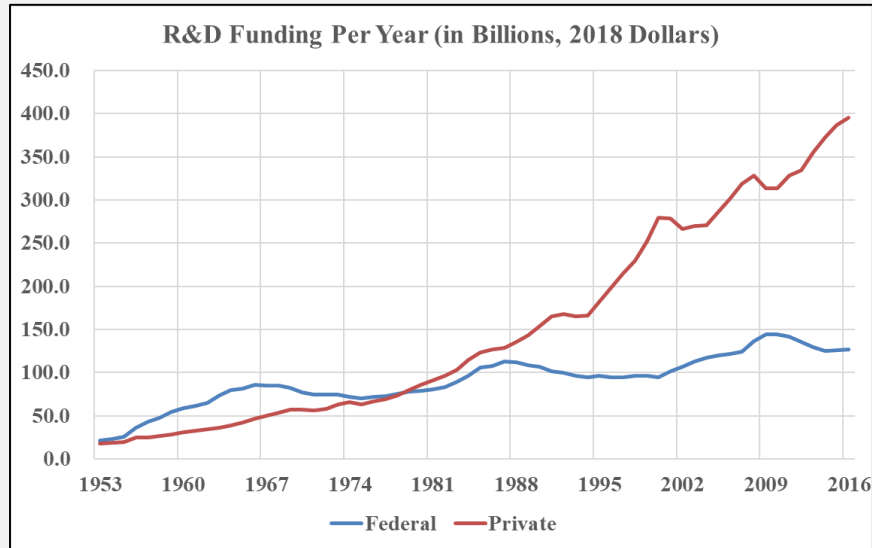


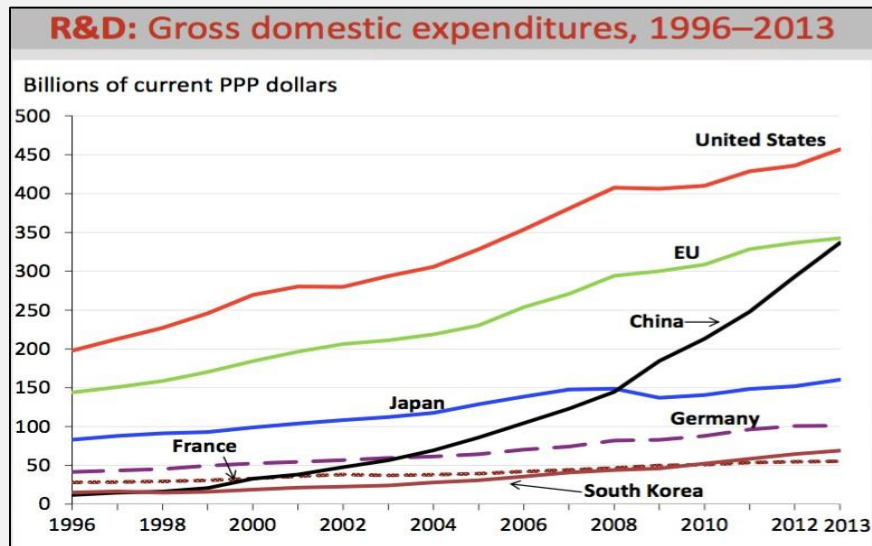


# Intro to Private Sector Financing (PSF)

# Challenge: Finding more R&D funding sources



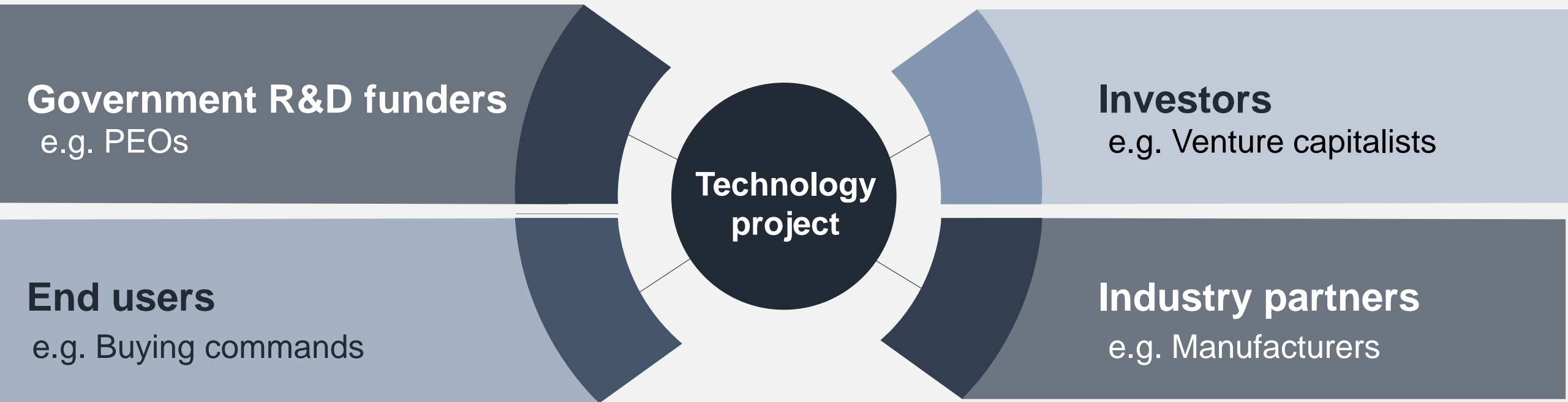
USG R&D funding is falling while private sector funding is rising, producing new capabilities faster



Competitors are forging ahead



# PSF adds flexibility to project funding



**Converging multiple sources of capital to rapidly deliver capability**

# Government has always used private capital...

## Raises private capital

Government sells bond in exchange for cash from investors

## Pays back bond

Government pays investors back, principal plus interest, once the loan comes due

## Government



## Investor

**Lends money to the government**  
Investor buys government bond

**Receives investment return**  
Investor gets paid back by government plus an investment return



# ...and it's done it well.

## Description & Impact

## Financing approach



- OT program with cutting-edge venture-funded semiconductor company

- DARPA funding: \$4M
- Prior co-funding: \$12M



- Robotic Servicing of Geosynchronous Satellites (RSGS) program to improve resilience for U.S. space infrastructure

- DARPA funding: \$400M
- Private co-funding: \$200M



- Commercial Operations and Support Savings Initiative Sustainment program for upgrade of system components
- \$100M RDT&E OTA funding gave \$3+B savings

- Private investment in exchange for monetized operational savings



- Launch vehicle & cargo spacecraft OTA
- 300%+ cost savings vs. legacy contracting

- NASA funding: \$396M
- Private co-funding: \$450M+



- Small business Terran Orbital collaborated with Lockheed on nanosatellite sales to USG
- Financing enables Terran to expand manufacturing

- Lockheed Martin funding: ~\$1-5M
- Private co-funding: \$36M

# Key Financial Concepts

- 1 Investments are “assets” – a sequence of cash flows over time
- 

Cash flows are more valuable when...

- 2
    - ...they are larger, or costs are lower
    - ...they have an acceptable level of risk
    - ...they arrive nearer in time
- 

- 3 Investors will contribute more money if they perceive that the value of an asset is high



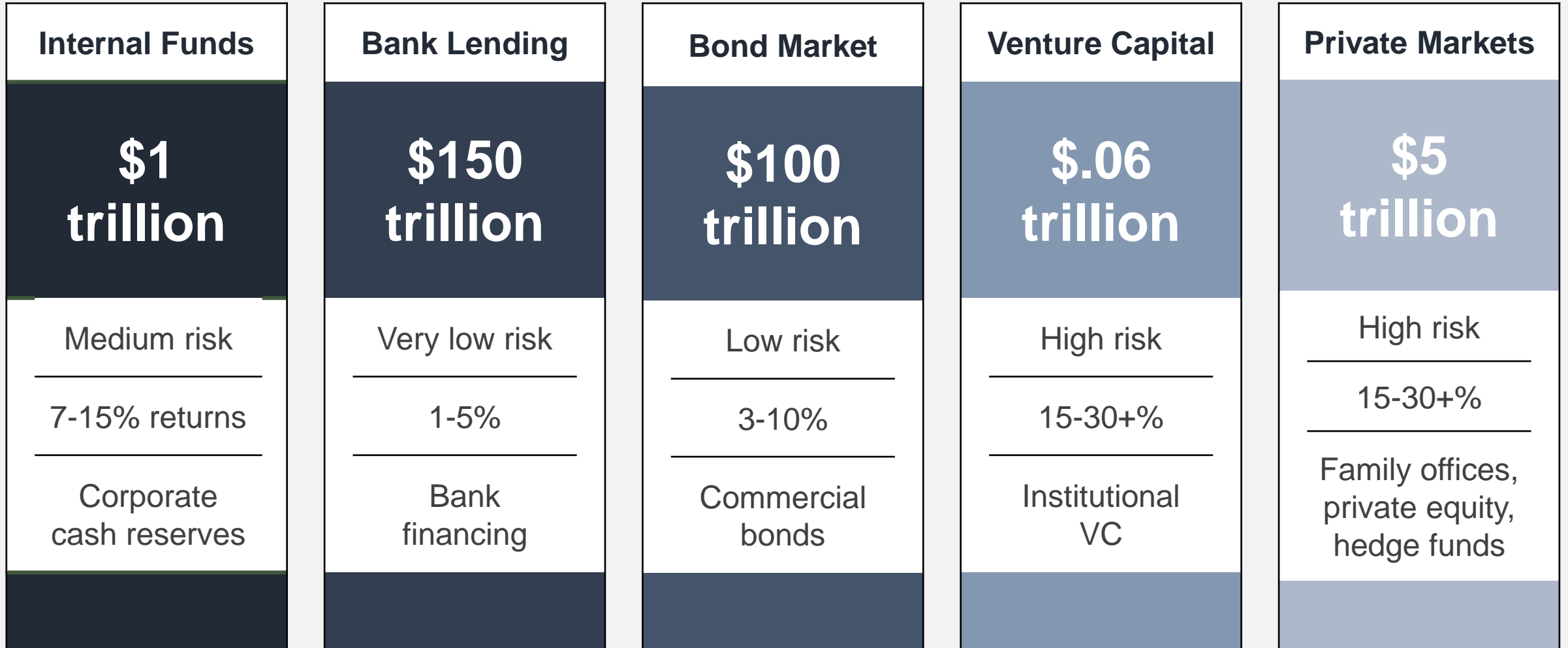
# Sources of private sector financing

- 1 Internal corporate funds: self-finance
- 2 Bank lending: take out a loan
- 3 Venture capital: sell shares (seed to series B companies)
- 4 Private markets: sell shares
- 5 Bonds / credit market: sell bonds
- 6 Public markets: sell shares, conduct IPO



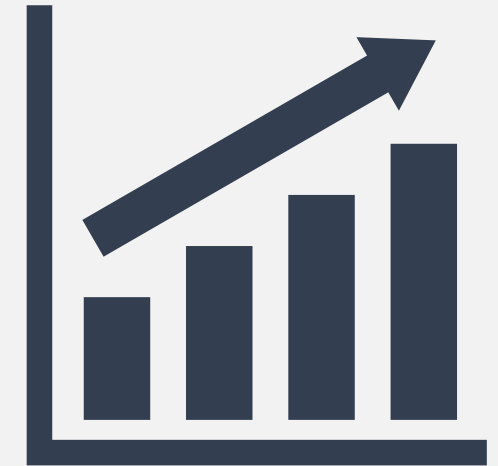
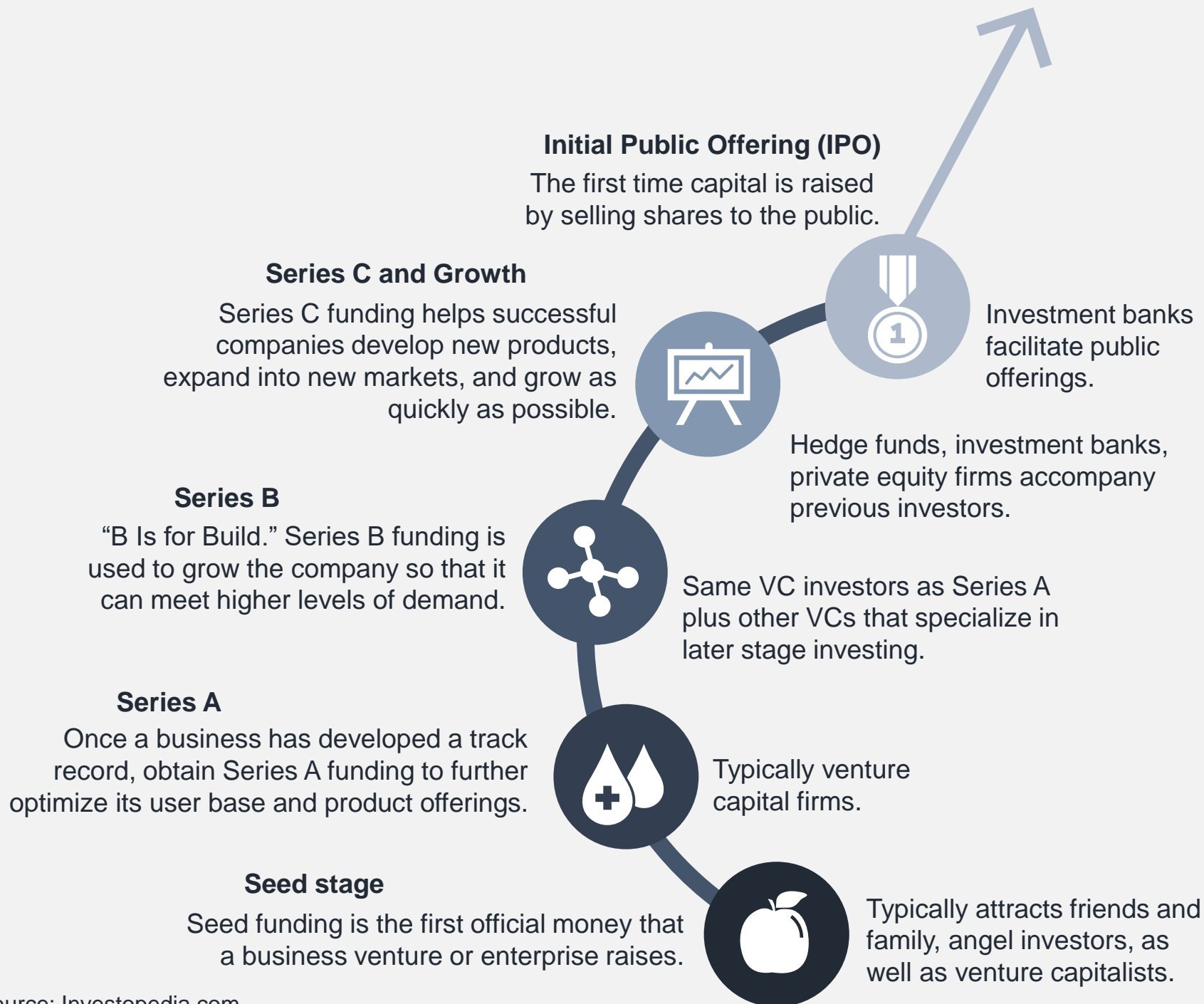
# Types of investors

Different investors have different risk appetites, return targets, and levels of available capital





# Capital in the life of a company



# PSF to support government-priority projects

## Typical equity

- ▶ Medium to long-term equity investments to fund project companies

## Pay-for-success

- ▶ Investments to fund individual project stages. Returns based on milestone success payments or prizes

## Royalty return

- ▶ Investors receive royalties from product sales to government or commercial markets

## Innovation bonds

- ▶ Government R&D funds securitized as bonds

## Full project investments

- ▶ Advance agreements for multi-stage projects to finance the next tranches as project stages are completed

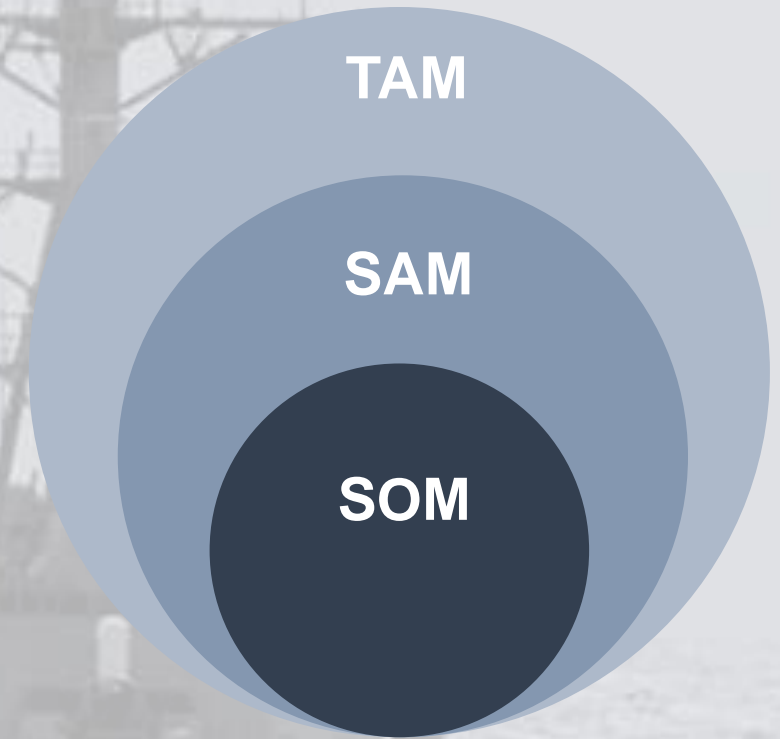
## Project portfolio

- ▶ Debt, equity or royalty investments in portfolios of multiple projects aiming at one or more target products



# Information that investors need

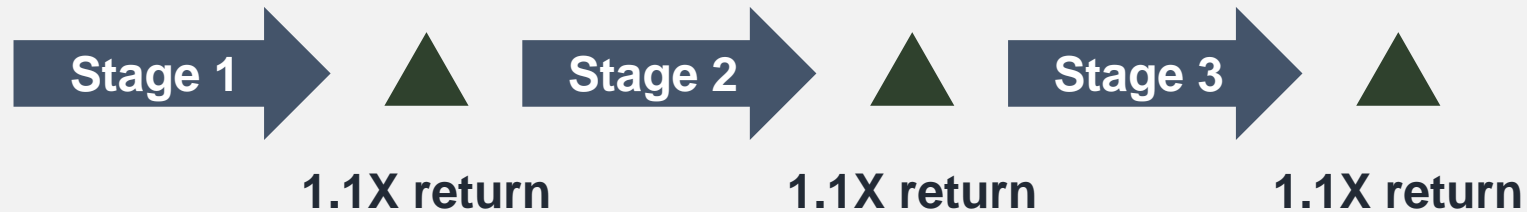
- Size of government & commercial market
  - Also known as total addressable market (TAM)
  - Describe the market need
- Potential government buying assurances/estimates
  - When will government money be available
  - Specific customer adoption plan
- Key company information:
  - Revenues and/or earnings before interest, taxes, depreciation, and amortization (EBITDA)
  - Assets and liabilities
  - Company past performance
  - Company management



**Investors are looking for companies with great ideas as well as a strong strategy for turning ideas into a successful, money-making business.**

# How it can work: a sample deal

- 3 parties: Government R&D funder, company, investor
- Investor pays company to perform science on day one
- Government R&D funder pays investor:
  - On science success: 110% of commercial science cost
  - On science failure: pay nothing, or agreed partial amount

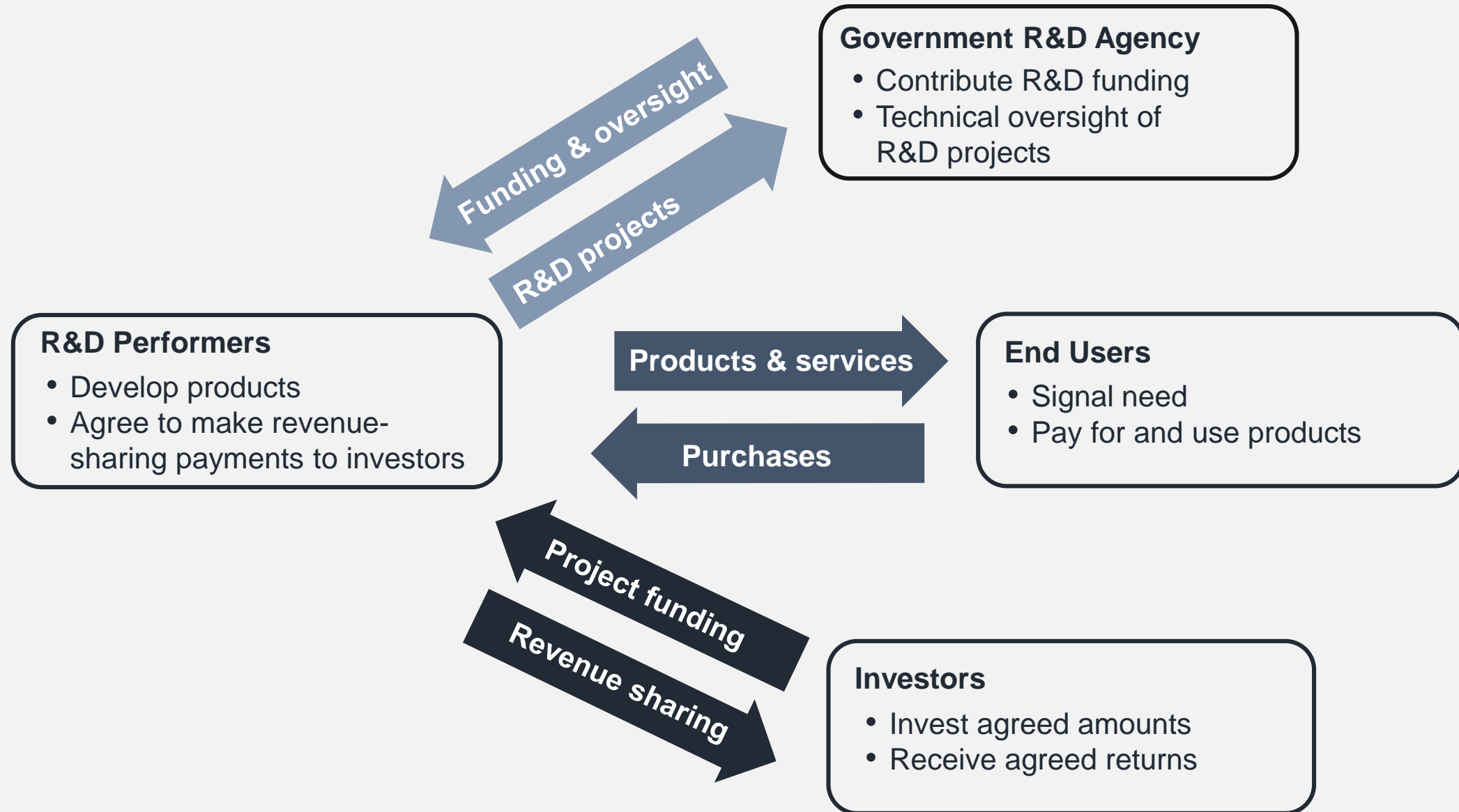


## Legacy R&D approach (e.g. FAR cost-plus)

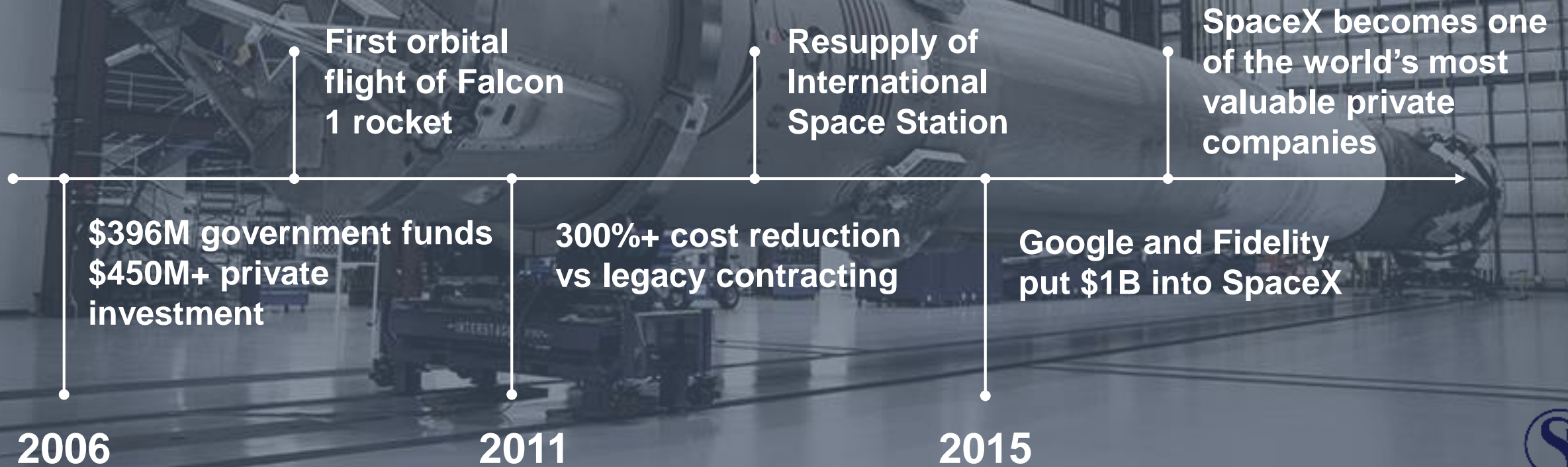
- 2 parties: Government R&D funder, company
- Government R&D funder pays company to perform work:
  - On science success: 100% of science cost + ~30% admin burden & + ~30% time
  - On science failure: pay same as for success



# Addressing everyone's interests



# SpaceX: Commercial Orbital Transportation Services Timeline



# SpaceX Other Transactions Agreement

## Key aspects

- Repeated rounds of private financing
- Financing milestones treated the same as technical milestones



SPACE ACT AGREEMENT  
BETWEEN  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
AND  
SPACE EXPLORATION TECHNOLOGIES CORP.  
FOR  
COMMERCIAL ORBITAL TRANSPORTATION SERVICES DEMONSTRATION  
(COTS)

### BACKGROUND

A. NASA has established the Commercial Crew/Cargo Project Office at the Johnson Space Center as part of the Exploration Systems Mission Directorate. The objectives of the Commercial Crew/Cargo Project are to:

- implement U.S. Space Exploration policy with an investment to stimulate commercial enterprises in space,
- facilitate U.S. private industry demonstration of cargo and crew space transportation capabilities with the goal of achieving reliable, cost effective access to low-Earth orbit, and
- create a market environment in which commercial space transportation services are available to Government and private sector customers.

B. This SAA represents Space X and NASA's commitment to conducting the initial development and demonstration phase of the Commercial Crew/Cargo Project. Specifically, the Space X innovative approach to meeting the goals of the project is outlined in Appendix 1.

### ARTICLE 1. AUTHORITY

This Agreement is entered into by the National Aeronautics and Space Administration, located at 4<sup>th</sup> and E Streets, SW, Washington, D.C. (hereinafter referred to as "NASA" or Government), and Space Exploration Technologies Corp., (hereinafter referred to as "SpaceX" or "Participant") with a place of business at 1310 E. Grand Avenue, El Segundo, CA 90245. NASA's authority to enter into this Agreement is in accordance with the authority set forth in Sections 203(c)(5) and 203(c)(6) of the National Aeronautics and Space Act of 1958, as amended and NPR 1050.1G. This agreement will be implemented by NASA at the Lyndon B. Johnson Space Center in Houston, Texas.





Questions?

