

CHIPS Industrial Advisory Committee: Organization / PPP Working Group

NSTC Innovation Fund - Team Readout

11/8/23

Agenda

- Investment Fund: Charge and Approach
- Semiconductor Investment Backdrop
- Executive Summary: Investment Fund Principles
- NSTC Innovation Fund Recommendations
- Deliberation & Voting

IAC Organization PPP Working Group

Charge for July – November 2023

- Provide recommendations for how the investment fund for the NSTC could be best structured to meet the goals of the program and the statutory charter.
- Recommendations could include input on the scale of the program, goals, focus areas, and how best to partner with the private sector.

“Creation of an investment fund with the private sector to support startups as well as collaborations between new ventures, academia, and established companies, with the goal of commercializing innovations that contribute to the domestic semiconductor ecosystem”



*NSTC Vision and Strategy
April 26, 2023*

IAC Organization / PPP Working Group



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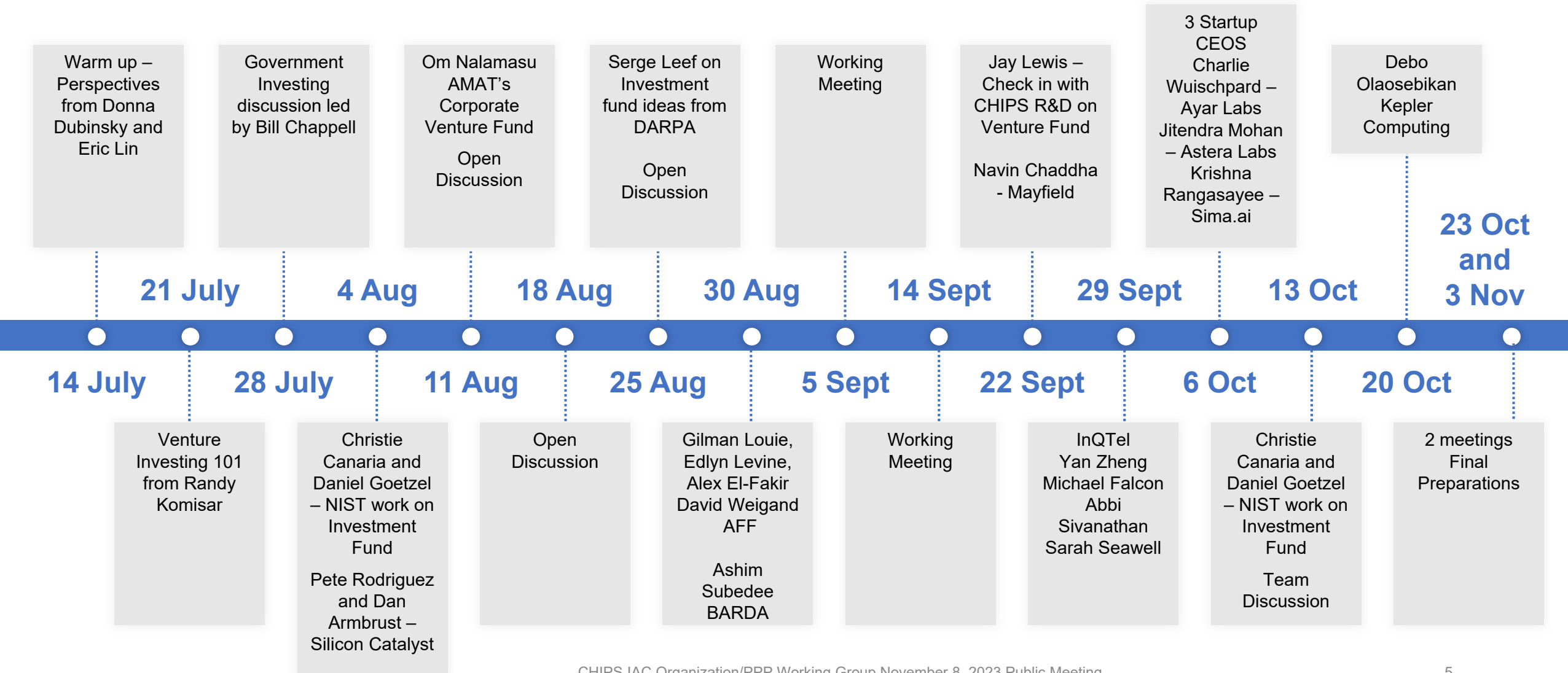
Ben Davis
DFO

Tamiko Ford
DFO

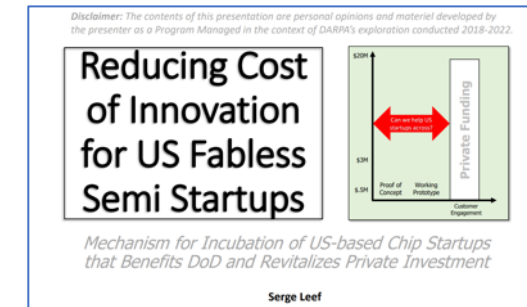
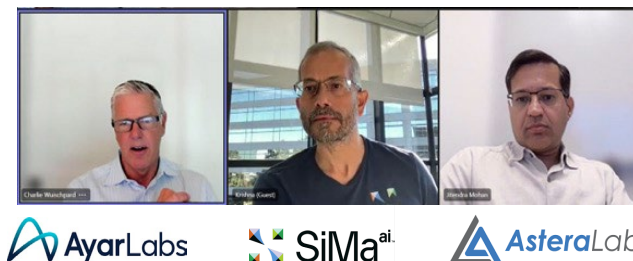
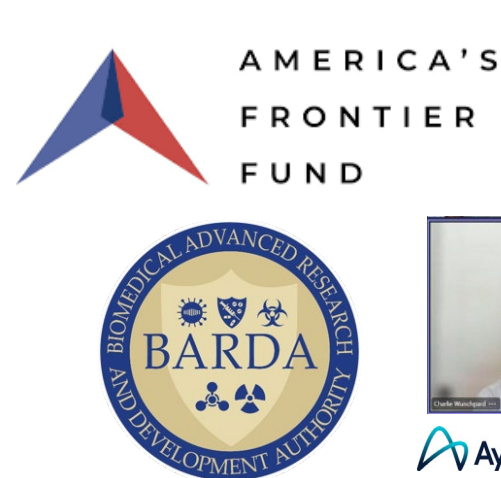


Eric Forsythe
CRDO

Innovation Fund - 17 Meetings and Briefs



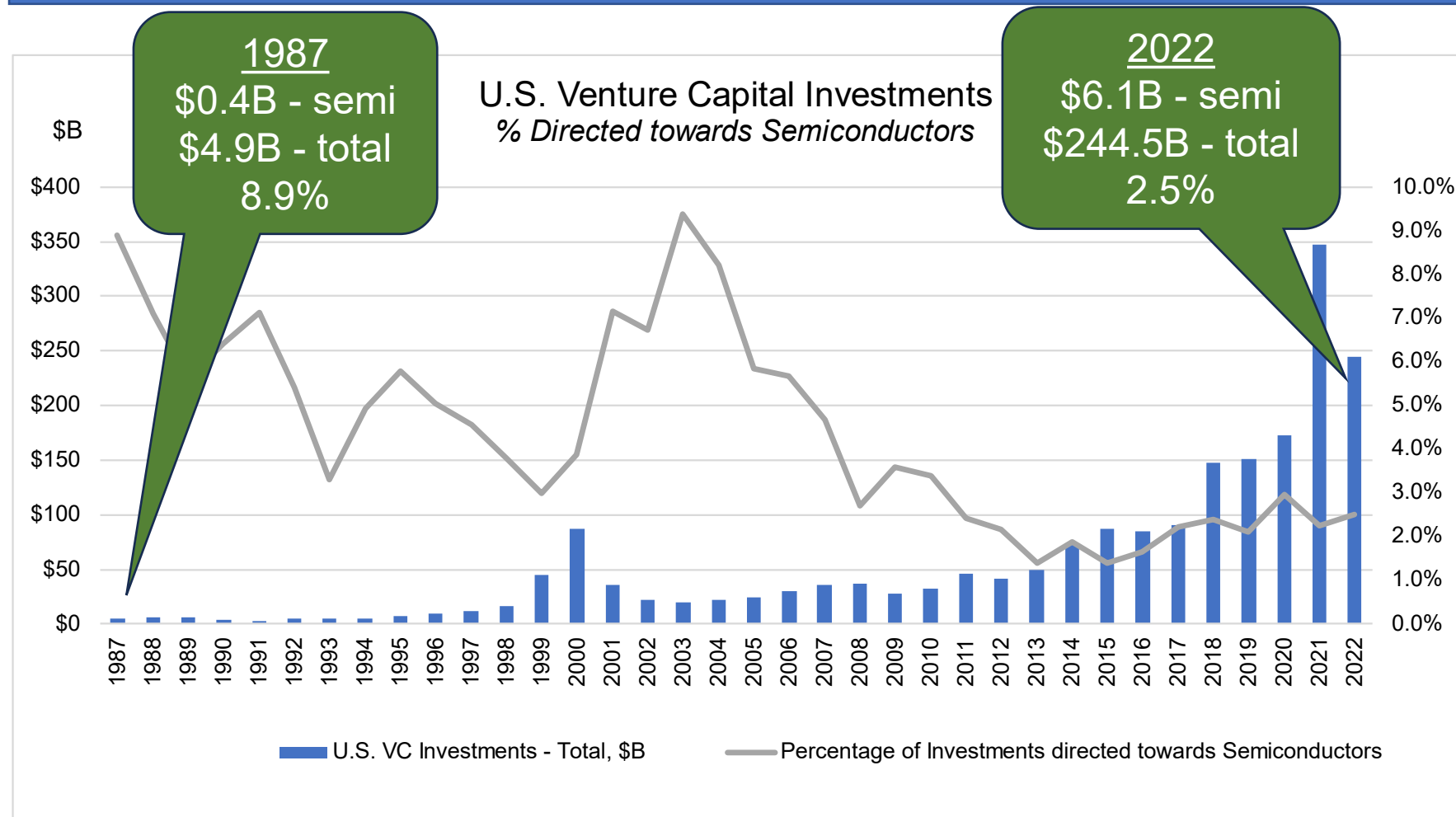
Working Group Briefs



Our own perspectives, plus

- Incubators
- Government investment vehicles
- Corporate VC
- Startup CEOs
- VC
- NIST

Semiconductor Investments: Market failure?

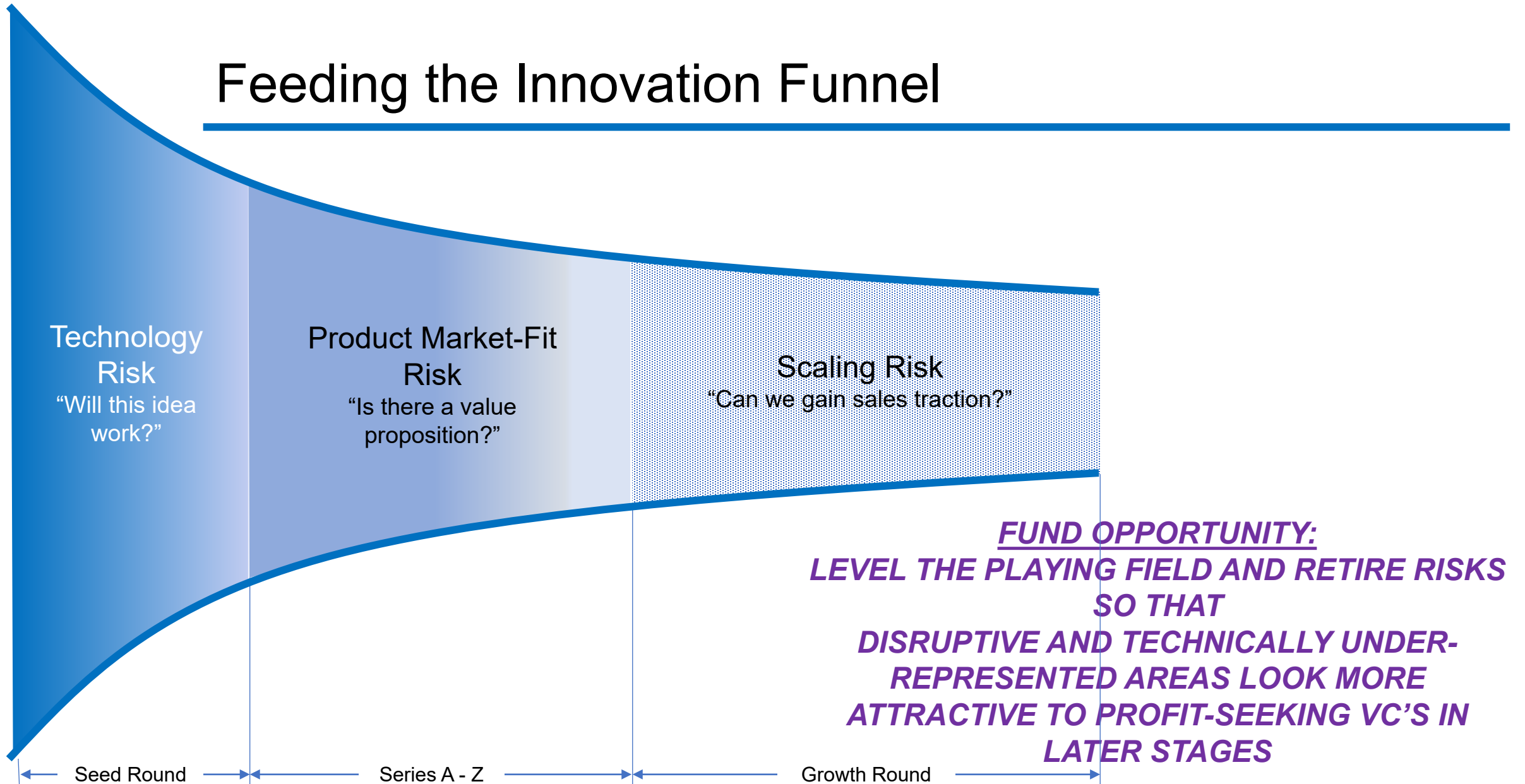


The investment market failure

- Venture investment soared
- Semiconductor investments less attractive compared to alternatives
- Reasons cited:
 - Innovation failure rate
 - Capital investment
 - Time to liquidity
 - Payout returns

Sources: 1987-1996 Data (Total, Semi): NSF, Venture Economics Investor Services, October 1998; 1997-2003 Data (Total, Semi): NSF, Dow Jones VentureSource, 2014; 2004-2022 Data (Total): National Venture Capital Associations (NVCA); Pitchbook, 2023; 2004-2022 Data (Semi): Pitchbook, Deloitte, December 2021

Feeding the Innovation Funnel



The Fund has the *opportunity* to be ...



Uniquely different from any other fund, supporting national and economic security interests.



It should be “**tech forward**” to focus on disruption beyond what the market would pursue. This investment has to be paired with technical depth that only a lab actively analyzing state of the art research would have. Through this depth of expertise, the fund needs to build credibility that its insight is beyond the typical investor, and therefore it can ...



Guide the investment community to areas they wouldn't be comfortable investing in. The focus on disruption needs to be paired with a strong understanding of areas of national importance that VCs shy away from, and ...



Operations that allow a **tolerance for failure** commensurate with taking outsized risk, lower returns on investment are therefore expected.



Because the uniqueness comes from **leveraging NSTC expertise** and technical insight, the fund should wait to be established until after the NSTC function is operational.

NSTC Innovation Fund Principles – Short Form



Uniquely different



Tech Forward



Guide the Investment
Community



High risk tolerance



Leverage NSTC Expertise

Recommendations

Org / PPP Working Group Proposals

Recommendation 9-1

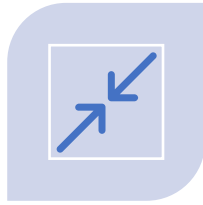
Adopt a vision for a different kind of fund



INCREASE THE NUMBER
OF "SHOTS ON GOAL"



INVESTMENTS SHOULD BE
TECHNOLOGY-DRIVEN,
NOT GEOGRAPHY DRIVEN



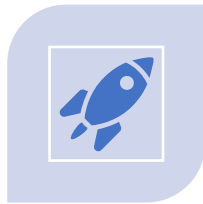
FOSTER MORE NEW *HIGH
RISK*, INNOVATIVE, AND
POTENTIALLY *DISRUPTIVE*
OR *GROUND-BREAKING*
TECHNOLOGIES



EXPECT LOWER RETURNS,
AND SUSTAINING
INVESTMENT WILL BE
NEEDED



DON'T BE *AFRAID TO FAIL*,
OR CUT SUPPORT QUICKLY



FOCUS ON *ACCELERATION*

This is not a profit-driven fund, and also not an evergreen model – it will need ongoing support

- Increase the number of entrepreneurs willing to step up to hard challenges in microelectronics
- Support firms that take more risk and have a higher failure rate
- These are bets that investors who are focused on maximizing returns would not normally take; guide the investment community by de-risking and signaling
- Ventures might be in important niche areas, and have middling returns, but are strategically vital

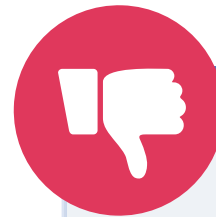
Leverage naming of fund to set tone and expectations

The NSTC Innovation Fund



Setting a Positive Tone for...

- Risk tolerance for leapfrog innovations
- Long-term value-creation
- Fail often to succeed occasionally
- National, economic, social, security benefits



Avoiding...


- Focusing attention on winners and losers
- Short term ROI calculations

Make the Innovation Fund Segmented, Not Monolithic

Shots on Goal

Disruptive potential
High risk of failure

~55%

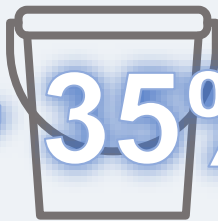


- Disruptive, game-changing potential
- High risk of failure
- No or few conditions on the applicability and reach of the innovations
- Employ “financial options”

Market Gap

Proof of commercial potential

~35%



- Trying to establish product market fit
- Facing gaps in the market
- Longer gestation technologies, delays in demonstrating product market fit, facing dry spells in venture funding cycles

Later Growth/Scaling

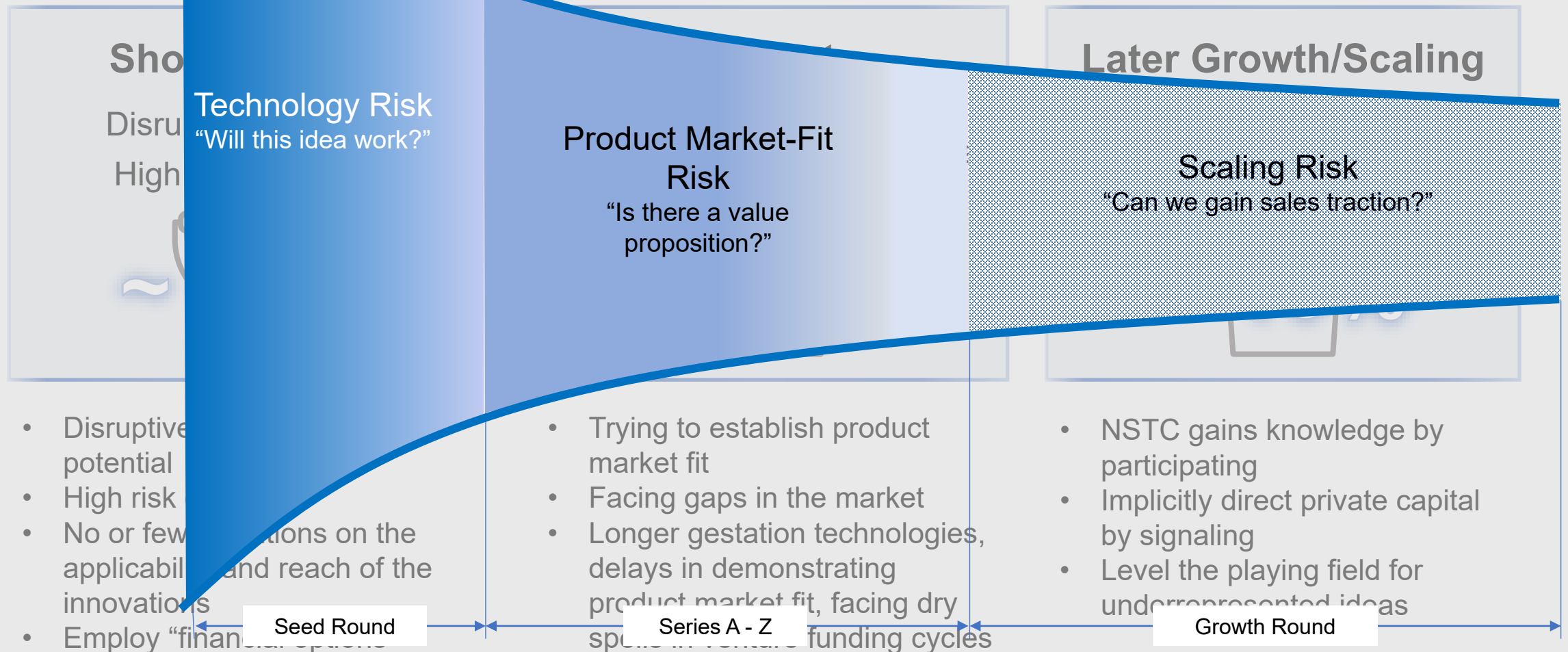
Marketability demonstrated
Lower failure rate

~10%

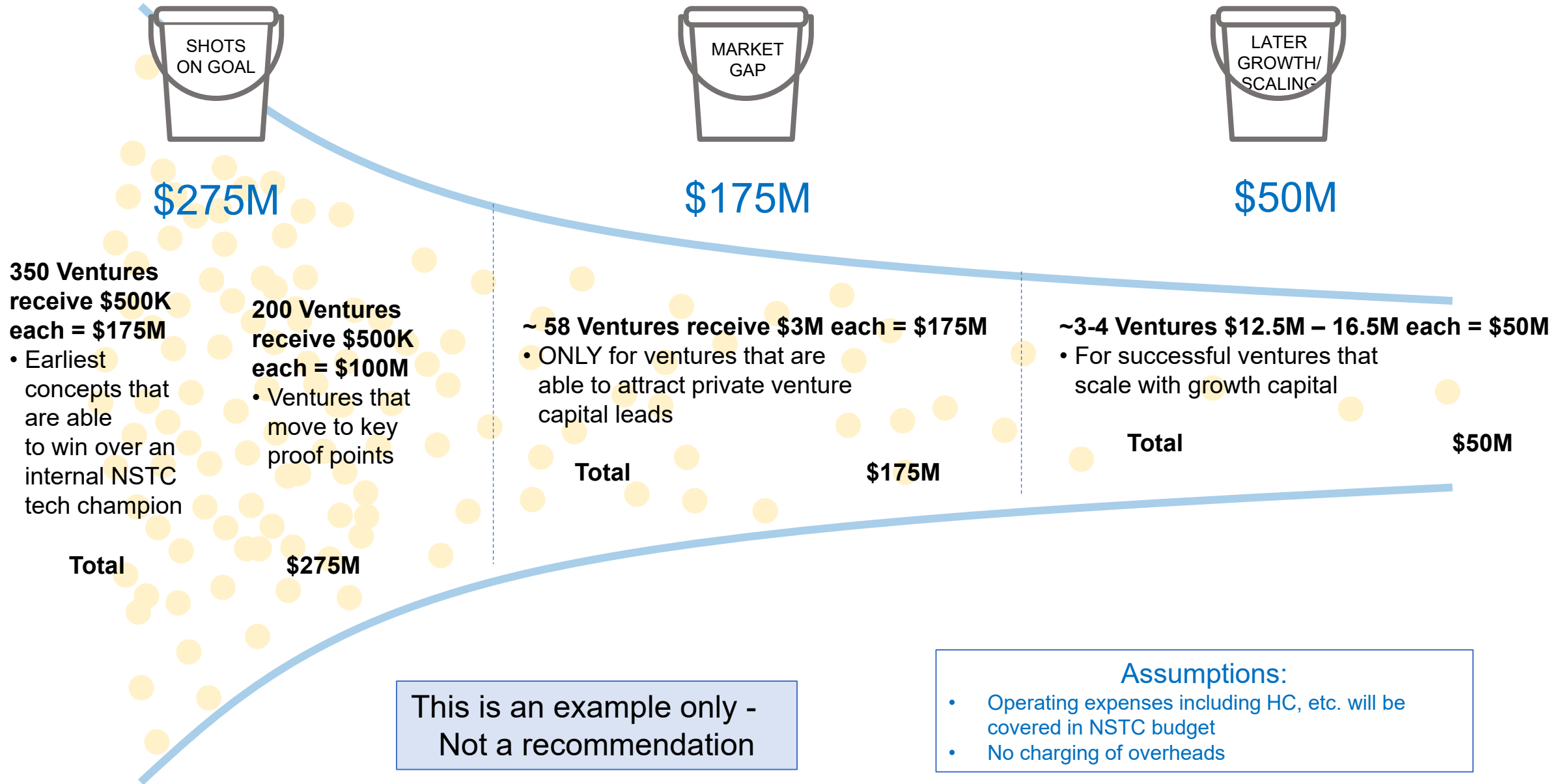


- NSTC gains knowledge by participating
- Implicitly direct private capital by signaling
- Level the playing field for underrepresented ideas

Make Innovation Fund Segmented, Not Monolithic



Notional Illustrative Example: \$500M Fund



Early Breakout Potential: Make SAFE Investments



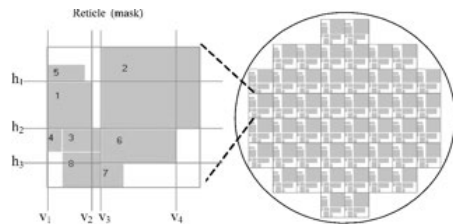
Ventures that demonstrate proof points of breakout potential

- Grant a robust package of resources, support, introductions and \$ in return for a **Simple Agreement for Future Equity** (SAFE)
 - SAFE agreements do not initially value the venture, rather they convert the nominal value of Innovation Fund services and dollars contributed in the first priced round of private VC investment
 - They also grant the right to invest in later rounds
- Successful ventures that proceed to scale with a Growth Round would be invested in on market terms
- SAFE agreements should provide for warrants that would vest in the event of windfall returns above a threshold returns multiple of Series A (say 5x)

Recommendation 9-4

Include non-cash vehicles as a currency for investments

NSTC Silicon Aggregation Services



Access to facilities secured through Section 9902 Grants and NSTC Tech Centers



NSTC Ecosystem Design Infrastructure



88 FR 17451 investment tax credits



Focus on assistance that de-risks investments and help startups *gain access* and *accelerate* their work – lab access, multi-project wafer runs, EDA, IP and foundry enablement, access to deep scientific and technical expertise at NSTC Tech Centers, universities and national labs, mentoring, DoD Microelectronics Commons hubs and cores, etc.

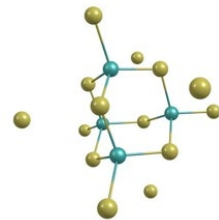
Recommendation 9-5

Target under-represented technical areas + ecosystem

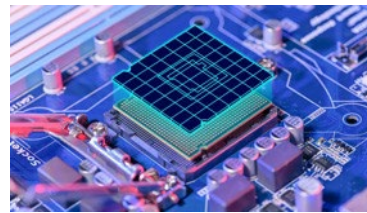
Metrology for Next-Generation Microelectronics



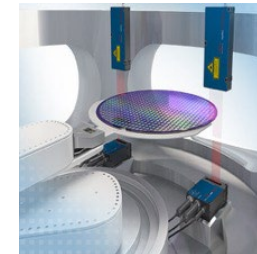
Novel Materials



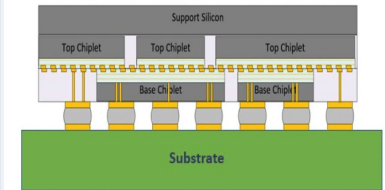
Simulation Modeling Tools



Production Tools



Packaging



Maximize deal flow from under-represented technical areas, including those that serve economic and national security interests

The committee specifically calls for the fund to seek high-risk technical challenges that are farther out on the risk/reward frontier than traditional venture investors might be willing to fund at inception

Look at the broader ecosystem and think strategically for the long term

Critical materials, tools, metrology, address 3D scaling challenges

Recommendation 9-6

Avoid barriers to leveraging the Innovation Fund



Refrain from imposing strict conditions on where recipients may receive companion or subsequent funding (domestic and allied sources encouraged).

Instead **provide a mechanism for case-by-case review**

Don't over-prescribe now – This is more likely to produce undesirable results. Wait until specific situations are fully understood

Recommendation 9-7

Develop and maintain ability to judge technical merit

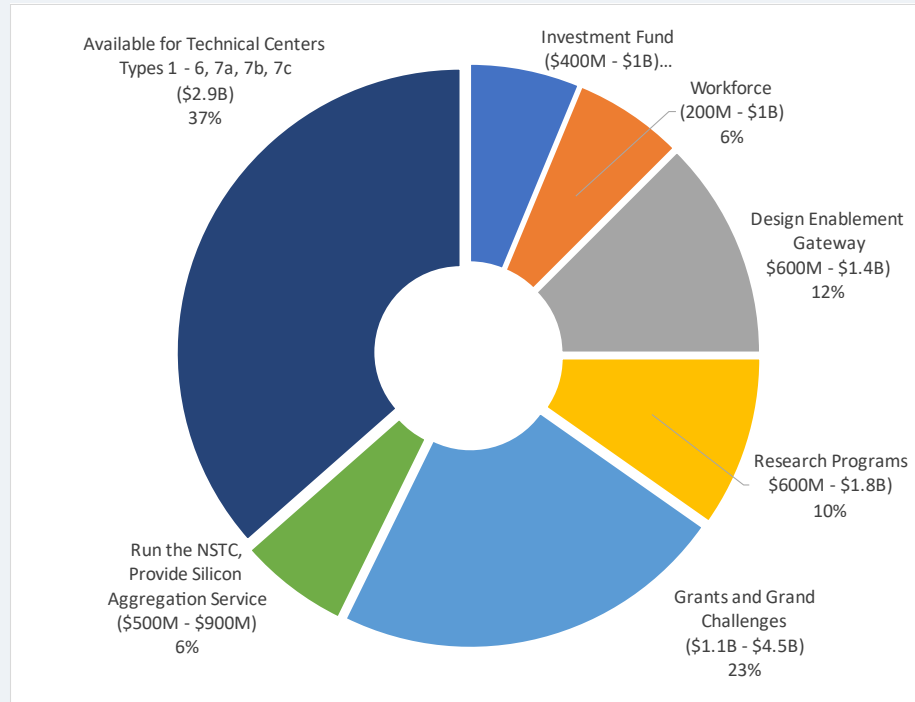


In addition to staffing the Innovation Fund with professional investment managers, this strategy requires deep technical expertise

- From NSTC Investment Fund staff, and NSTC/NAPMP Technical Advisory Boards
- Identify promising but disruptive and under-invested ideas, separate them from the bad ideas

Recommendation 9-8

Exploit synergies with NSTC wrap-around services



Graphic shown at June 2023 IAC meeting
By Sequencing Working Group.
Notional illustrative breakdown of NSTC fund distribution
NOT A RECOMMENDED ALLOCATION

- NSTC Design Enablement Gateway
- Silicon aggregation services
- NSTC Tech Center resources
- NAPMP Services

Wrap-around services will accelerate start-ups' progress and reduce risk for their investors

Innovation Fund's impact may be greatly enhanced when used in conjunction with the other wrap-around services that the NSTC will deliver

Also leverage DoD Microelectronics Commons Hub and Core Infrastructure

Recommendation 9-9

Domicile the Innovation Fund within NSTC or as affiliate

Domicile within the NSTC, or potentially spin out as an affiliated entity

- So much of the value that the NSTC can provide is through its network of strategic partners and its access to resources
- Don't seek external solicitations to manage the money or entrust the fund to a for-profit private investor to administer

NSTC can convene the investment community and highlight opportunities

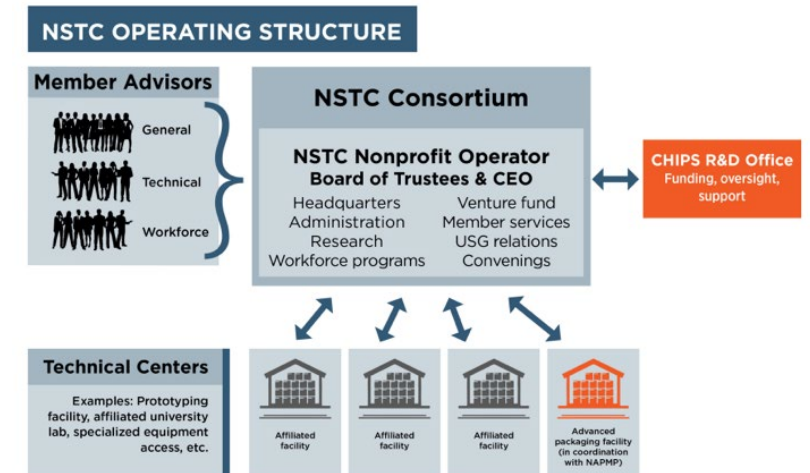
- Guide the investment community by signaling and de-risking certain investments

SBIR investments should be coordinated

- Run them out of CHIPS R+D Office to maximize coordination with NSTC
- Avoid putting this in a general SBIR bucket

“Better together” strategy outweighed benefits of capabilities and expertise that 3rd party firms/entities might bring

- Risk that contracted operator might drift towards driving profitability



Stage start-up of the Innovation Fund



May be advantageous to delay startup of the Innovation Fund until a later time, after the NSTC is up and running and has a clearer sense of where technology gaps, shortfalls, disruption opportunities or other priorities have emerged

- With time, the NSTC's infrastructure and in-kind services will take shape and impact how later investments will be structured.
- Sequencing of NSTC capabilities needs to be carefully considered; Innovation Fund is strategic but might not need to be an early priority



NSTC should engage startups early

- NSTC should hire initial staff in Innovation Fund early
- Start projects, grand challenges, and other programs *immediately* to start tech development
- Convene startups and investors
- Institute mentoring
- Start-ups seeking immediate support can avail themselves of NSTC wrap-around services

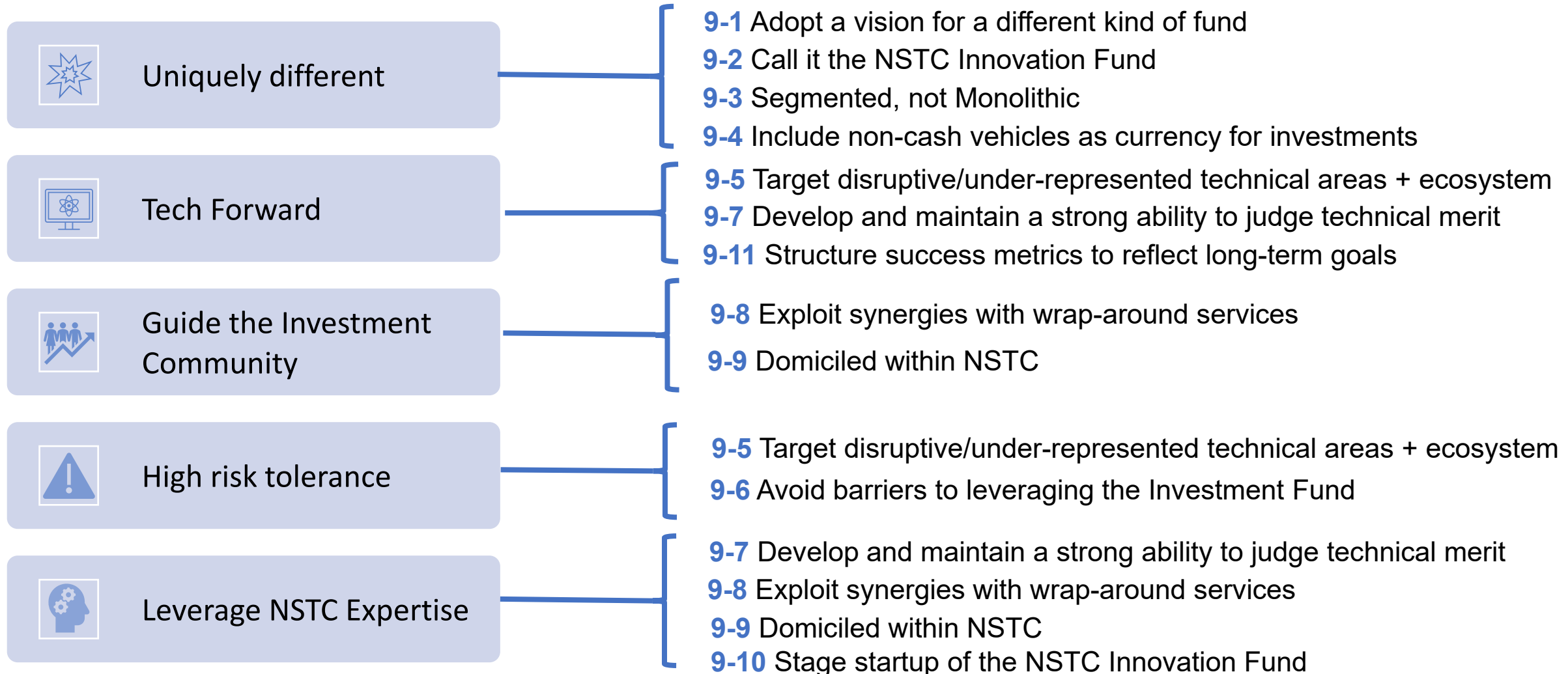
Structure success metrics to reflect long-term goals



- **Demonstrate responsible spending of taxpayer dollars.** Will need additional funding down the road.
- **Measurement to cover short and long-term goals will be difficult in early years.** Likely will not have solid view for 5+ years, commercial impact may be a decade or longer.
- **Economic and National security metrics.** Developed by NSTC leadership.
- **Avoid chasing returns.** With a time-limited fund that does not have assured future funding, management will be tempted to chase cash returns. This would undermine vision for fund set forth here. Perhaps only allow Innovation Fund to “bank” returns from disruptive innovations, with incremental returns shielded from NSTC to avoid chasing early returns.
- **Provide a “shield” to keep it centered on mission.** A major reason DARPA has been successful is that DOD protects it from redirection. The proposed fund needs similar protection.
- **Possible measures might include:**
 - Number of additional “shots on goal”
 - Heat map that reflects health of ecosystem and investments that address gaps.
 - How Innovation Fund is working within NSTC to convene industry stakeholders.



Summary of Recommendations – NSTC Innovation Fund





Voting

Org / PPP Working Group Proposals



Recommendation 9-1

Adopt a vision for a different kind of fund



Recommendation 9-2

Leverage naming of fund to set tone and expectations



Recommendation 9-3

Make the Innovation Fund Segmented, Not Monolithic



Recommendation 9-4

Include non-cash vehicles as a currency for investments



Recommendation 9-5

Target under-represented technical areas + ecosystem



Recommendation 9-6

Avoid barriers to leveraging the Investment Fund



Recommendation 9-7

Develop and maintain ability to judge technical merit



Recommendation 9-8

Exploit synergies with NSTC wrap-around services



Recommendation 9-9

Domicile the Innovation Fund within NSTC or as affiliate



Recommendation 9-10

Stage start-up of the Innovation Fund



Recommendation 9-11

Structure success metrics to reflect long-term goals