

# DAY ONE PROJECT

A National Frontier Tech Public-  
Private Partnership to Spur Economic  
Growth

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## Summary

The United States government needs to radically change our national approach to the commercial growth of frontier tech technology companies (e.g. new energy production and distribution, advanced manufacturing, synthetic biology, materials, robotics, mobility, space exploration, and next-generation semiconductors). Frontier tech startups can advance our nation's future global competitive advantage, providing an opportunity to create high-tech and low-tech jobs and reshore other jobs. Coupling investment in the frontier tech innovation ecosystem with workforce training will allow the U.S. to reinvent and revitalize aspects of our declining or offshored industrial sectors and rebuild the country's manufacturing capabilities.

Currently, there is a fundamental market failure in the transition of government-funded basic frontier tech research toward commercially viable National Industrial Base companies. The U.S. government can neither fully fund nor expect the free market to independently grow high-risk and capital-intensive sections of the frontier tech National Industrial Base. The federal government provides over \$20B in applied research funding to universities, a stark contrast to the total number of frontier tech spinouts from universities, which numbered around 100 in 2019.

Unlike standard startup companies, growing frontier tech companies requires a mix of public and private capital; however, current government efforts are not coordinated with free market investment to sufficiently scale these promising companies. The U.S. government should create a \$500M fund and an administration authority that allows relevant government agencies to create public-private partnerships. This requires collaboration with private capital providers that utilizes public funding to incentivize private investment in early stage frontier tech companies. The goal is not to subsidize private investment capital in areas where the current free market system is working, but rather to identify those critical national industrial base areas where private capital is insufficiently investing and use matching grants to spur early stage private investment. This early partnership will allow increased access and collaboration between historically siloed government and venture capital innovation ecosystems. For frontier tech companies, whose growth requires both public and private capital, the U.S. must utilize our resources more efficiently to create a globally competitive future economic base.

## Challenge and Opportunity

The U.S. economy finds itself in a fragile time, as traditional employers continue to shutter or move offshore. While private capital markets are strong and our academic labs continue to lead the world in technology development, our global competitiveness in critical fields of innovation continues to fall behind. The U.S. must act with a sense of urgency to facilitate the transition of our vibrant innovation ecosystem into an engine for future growth in new frontier technologies and industries. Near-peer competitor states are executing well-orchestrated and well-financed campaigns to grow their domestic governmental and frontier tech company capabilities. Without a change in the current trajectory, China will continue to be the leading investor in the

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frontier tech new economy, draining the very intellectual property that should give the U.S. a head start, while executing strategic initiatives such as “Made in China 2025” that will further erode US leadership in technology, manufacturing, and supply chain control.

Current government strategy for investing in innovative startups can be summarized as a spreading of resources via Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR), and other similar programs across a myriad of companies, in the hopes that a one size fits all approach will enable vastly different company types to grow. While these programs have proven effective for growth trajectories within government-only product companies, for dual use technologies that require both government and commercial market growth, it is critical to align government funding around commercial success as well. Incentivizing private investments is especially important to frontier tech startups as they are significantly more capital-intensive and their growth occurs over longer periods of time, making them unattractive to typical venture capital firms that seek earlier exits. Successful growth requires a mix of government and private capital. Currently, it is incredibly difficult for early stage frontier tech startups to successfully attract both government grants and private capital, due to the vastly different nature of public and private investment.

Because of the scale of investment required, it is virtually impossible for a frontier tech company to “bootstrap” itself to commercial viability using solely government contracts, nor should they have to. Contrasted from prior decades, private capital is now investing in certain frontier tech areas at seven times the amount of federal dollars. While this has been a positive development, government intervention is needed to further incentivize private capital markets to invest in riskier, longer term companies that will be foundational to the new U.S. economy.

Unfortunately, most current government programs are often counterproductive to this goal, either not providing sufficient government funding to properly launch the company, resulting in an “addiction to government capital”, or distracting companies from a commercially viable market. In fact, certain SBIR programs explicitly exclude companies that have private capital investment. This may work for certain sectors, but it is wholly counterproductive for already challenged frontier tech companies.

Current government programs such as SBIR and STTR can be useful growth drivers. Indeed, once companies have received private capital, they will have solid footing downstream to intentionally select government programs that accelerate rather than distract from their product roadmaps. This public-private consortium would in fact facilitate a larger cadre of potentially innovative government technology suppliers, while also ensuring that these frontier tech companies have the financial support to ensure commercial viability.

Coupling government funding to private investment will push high growth companies toward raising private capital, while also incentivizing private capital markets to open their investment apertures to higher risk frontier tech companies. This is phenomenal leverage for taxpayer money, as small amounts of aligned government capital, in the early stages of company growth,

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will propel companies into the private capital markets. For example, if a \$300k government matching grant can create initial private investment, these companies are now part of the venture capital growth trajectory. For many frontier tech companies, that can mean hundreds of millions of dollars of private capital throughout their growth stages that was spurred by a relatively small government investment.

Synchronizing public and private investment in frontier tech startups, through a strategic national fund, will have both short-term and long-term impacts on the economy. In the near-term, startups in the U.S. continue to fuel critical job growth. More importantly, as traditional businesses continue to shutter or offshore, frontier tech startups will be a critical component of a new economy that provides job opportunities in the U.S., that will remain in the U.S.

A \$500M strategic fund that matches private investment with government funding will incentivize private capital to invest in a wider and riskier aperture of frontier tech companies, as well as provide the government with early engagement with next generation technologies that may serve dual use purposes. A 30% matching grant at the earliest round of private investment, capped at \$300k, would enable the federal government to spur investment in over 1,500 new frontier tech companies, whose breakthrough technologies were largely funded in academia by the government but, today, rarely see commercialization. Frontier tech companies often must raise hundreds of millions of dollars through their pre-revenue growth stage. If \$300k grants can prompt that follow-on private capital, this represents phenomenal leverage for the government and taxpayers.

## Plan of Action

A frontier tech public-private partnership will combine the proven efficacy of the traditional VC investment model to identify talent, pinpoint market opportunities, and foster company growth, along with the government's ability to strategically identify investment gaps in the National Industrial Base for the U.S. The program's hybrid nature will ensure the strengths of each participant are maximized to create companies with immense commercial value, as well as benefiting both national security and the National Industrial Base.

Several government agencies have already leaned forward to better partner with private markets, within the legal confines that exist, to try to alleviate some of the issues cited above. Programs such as NSF I-Corps, DARPA's ERI program, and Cyclotron Road are using small amounts of capital to promote early commercial engagement during the developmental stages of frontier tech companies. The Department of Defense's Defense Innovation Unit, as well as the U.S. Air Force Ventures, are examples of government efforts to better collaborate with the VC community and the associated frontier tech ecosystem therein, which DoD has identified as critical in their efforts to become a more innovative 21st century institution. Currently these efforts are fractured, underfunded, and constrained by existing government contracting law.

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This consortium would be governed by a board of representatives from frontier tech related agencies (DARPA, NSF, NIH, and ARPA-E) and a board of representatives from private capital providers (strict membership criteria around fund size and domestic capital). In this public-private consortium model, both government representatives and vetted private investors would collaborate to identify early stage frontier tech companies that fit within the government's strategic roadmap. The chair of this consortium could be an OSTP deputy CTO responsible for ensuring cross governmental coordination. Government funding would be applied only after private investment, ensuring the free markets keep skin in the game and long-term investment in the growth of these companies. In addition to the creation of the \$500M strategic fund, Congress must ensure that the agencies involved have the authority to administer this unique public-private partnership.

## Frequently Asked Questions

**How is this public-private frontier tech consortium (PPFTC) different from the SBIR/STTR Program?**

The PPFTC fundamentally addresses the need for early stage frontier tech companies to attract private capital. Having government grants tied to, but following private investment, flips the traditional strategy for spurring company growth, utilizing the different skill sets of each partner. As government funding is only provided after successful private capital is raised, the government dramatically leverages its investment by using private capital markets to identify early stage frontier tech commercial viability.

**Why can't the current SBIR program be expanded to address the problem?**

Small SBIR grants cannot adequately fund the required company growth during their early stage. The government should utilize funds to incentivize private investment to launch these frontier tech companies. This will actually benefit the SBIR program in several ways. Leveraging private capital to fund early stage company growth will allow companies to focus on their commercial and dual use product development. After this initial PPFTC investment, these companies will be better suited to provide higher levels of innovation to SBIRs, while also ensuring that these SBIRs do not distract from their company growth, but rather are additive in risk reduction and dual use product development. Having companies apply to SBIRs that are also privately funded will help ensure that the SBIRs are being used to promote company growth and product development, rather than creating "SBIR mills" whose sole revenue is dependent on government funding. Additionally, having relevant government representatives, technical and otherwise, involved at the company's founding will allow early access to historically siloed innovation ecosystems. This will promote better SBIR topic creation, as well as a contractual mechanism to leverage the great technical talent and infrastructure of our national lab system.

**Why does this have to be a centralized National Initiative?**

Early stage R&D in critical frontier tech companies is currently fragmented, often redundant, and underfunded. To be successful in a U.S. "portfolio approach" to future national industrial base companies, there must be a sufficient amount of funding available to match roughly 30% of early stage private investment. Having a central consortium will also ease friction in engaging with the government for largely technical founders who have little to no experience in government engagement. The consortium will provide a central access point for various government

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stakeholders to get exposure to non-traditional innovation ecosystems and will also provide comprehensive metrics on company success rates.

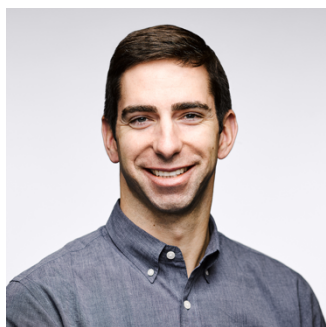
## About the Authors



**Katie Rae** serves as the CEO & Managing Partner of The Engine, a venture capital fund built by MIT, that invests in early-stage companies solving the world's biggest problems through the convergence of breakthrough science, engineering and leadership. She serves as a Board Member at Commonwealth Fusion Systems, Form Energy, Via Separations, and Lilac Solutions. Katie has advised hundreds of founders and invested in over 100 companies. She holds an MBA from Yale and BA in Biology from Oberlin College.



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**Michael Kearney** is a Senior Associate at the Engine, where he brings over a decade of operational and research experience in commercializing energy technology. Michael's background combines training in economics and systems engineering with expertise in energy technology, market development and operational experience as an entrepreneur. Michael holds a Ph.D. from MIT Sloan School of Management, where his research focused on frictions in the commercialization of science, regulatory barriers to innovation and entrepreneurial strategy. Previously, he was the 1st employee at a clean-tech startup called Ambri, where he led business development efforts for 5 years, working with customers across the United States. Michael received an M.S. in Technology and Policy from MIT and a B.A. in Mathematics and Political Science from Williams College.



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## About the Day One Project

The Day One Project is dedicated to democratizing the policymaking process by working with new and expert voices across the science and technology community, helping to develop actionable policies that can improve the lives of all Americans, and readying them for Day One of a future presidential term. For more about the Day One Project, visit [dayoneproject.org](http://dayoneproject.org).