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Venture Capital and Strategic Investment for Developing Government Mission Capabilities

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Summary

The Chief of the Research and Engineering Division at the Joint Improvised Explosive Device Defeat Organization (JIEDDO) asked RAND to review previous experience with U.S. government-sponsored venture capital initiatives, and the ways they developed mission-oriented capabilities. In particular, he was interested in understanding how they were organized and how they operated, and whether and how they influenced private-sector actors to adapt their innovations for government purposes. In response to this request, RAND performed a two-pronged analysis of government venture capital and strategic investment methods. One track examined the practical experience of three prominent government venture capital/strategic investment initiatives. The second track created a game-theoretic model to explain the balance of selected economic incentives that such initiatives can use to spur innovation. The microeconomic analysis of the second track helps to shed light on the differences observed in the examples of the first track, and it lays an analysis foundation that can be used to structure and manage elements of future initiatives.

In the first track, RAND identified three recent instances of U.S. “government venture capital” initiatives that provided the most significant support for discovery and development of new technology-based mission capabilities: In-Q-Tel (IQT), the Rosettaex Technology and Ventures Group (RTVG), and OnPoint Technologies (OPT). These are government because private investment was intended to be an important component of their business model. They are strategic in having focused on achieving the long-term aims and interests of mission-focused U.S. government agencies. Each of these initiatives provided innovative private companies with financial support and advice so they could tailor emerging commercial products and service offerings to address a mission objective of the U.S. government. This mission-oriented strategic investment purpose distinguishes these initiatives from private venture capital firms, and this report subsequently uses the term government strategic investment (GSI) rather than “government venture capital.” The case studies of IQT, RTVG, and OPT were conducted through a combination of literature reviews and discussions with individuals directly involved.

In the second track, RAND assumed a GSI formed with a given budget, and built an economic model to explain how the government should think about one specific policy element: the portion of government funding reserved for development of prototypes relevant to government. Although numerous other incentives influence the development of innovations within GSI (e.g., market sizes, information rights), the model focuses solely on the one element described.

Qualitative analysis of cases led to the following observations:
1. **In the three GSI cases examined, mission-oriented innovation was of equal or greater importance than generating financial return.** In each instance, significant effort was devoted to creating an organizational and legal framework that would provide direct benefit to accomplishing government mission objectives. Each GSI expended substantial effort to establish and maintain a good impedance\(^1\) match between the private company providing the solution and its U.S. government investor/customer. In each case, there was an investment management organization to facilitate the match, turn expressions of customer need into investment proposals, conduct due diligence, and manage resources for both investment and development work programs.

2. **GSI participation in venture capital investments has provided government with additional information about technology-focused market sectors and companies.** The ability to participate directly in risk capital transactions has allowed the GSI investment managers to become part of the information sharing between entrepreneurs and private venture capitalists. The degree to which this information has translated into effective adoption of new technologies varies by case, and is not specifically evaluated in this research.

3. **GSI initiatives rely on the operational flexibility afforded by Other Transaction (OT) authority** (or “OT-like” authorities in the case of IQT) as a statutory foundation for both the contractual relationship with their sponsoring government agency investor, and the contractual relationship they enter with private companies. OT authorities have allowed GSI investment managers great flexibility to combine investment with mission need-oriented prototype programs in ways that are specifically suited to the needs of individual companies—on matters ranging from accounting practices and financial reporting to payments and intellectual property rights. Specific care is taken to structure the flow of government information rights consistent with Federal Acquisition Regulations to facilitate eventual scale adoption of prototypes.

4. **GSI initiatives rely in a significant way on a government-to-private sector “interface” function** that performs one or more of the following tasks: (1) providing contract administration, (2) identifying and “translating” investor mission-oriented needs into a form suitable for use by GSI investment managers, and (3) facilitating scale adoption of private company prototype solutions by mission-oriented government customers. These interface functions are performed by government employees and serve to ensure that inherent government responsibilities dovetail appropriately with responsibilities discharged by GSI managers. GSI personnel do not have the organizational knowledge or breadth of expertise to assimilate all potential customer needs, and the interface organization typically includes employees of the government agency investor.

5. **The GSI’s responsibility to government customers adds significant difficulty to the task of investment management.** The GSI must not only serve routine investment portfolio functions, such as identifying opportunities and negotiating and monitoring investments, but must also facilitate a good impedance match between government customers and the private companies in which the GSI invests, and do so in a way that does not confuse public and private responsibilities.

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\(1\) Impedance matching is the process of designing the input of a destination component to maximize power transfer from a source component. The term has specific technical meanings in electrical engineering, acoustics, optics, and mechanics, but can be applied to any situation where energy is transferred from a source to a destination.
6. **GSI need staff with private market capabilities to serve investment management functions.** It is difficult to overstate the importance of the quality and experience of the GSI investment management personnel. They serve a variety of functions, from devising investment hypotheses to monitoring and harvesting investments. Even though staff monetary compensation for some GSI is lower than in private venture capital, the credibility necessary for staff to operate as peers in private investment transactions depends on them having skills equivalent to their private sector counterparts.

Economic modeling analysis led to the following observations:

1. **It is possible to systematically assess selected incentives to which private firms will respond** by channeling incremental technology development efforts toward government-specific prototypes—as opposed to private sector–specific prototypes. This suggests a method for resource allocation that can be used both to design aspects of future GSI and to choose among incentive mechanisms, depending on the degree to which the government and the innovating firm are sensitive to the specificity of an envisioned prototype. These sensitivities are likely to vary by technology and mission application area.

2. **The desired balance of GSI financial support between equity investment and contractual support depends on likelihood of sale in government and commercial markets.** In some situations, there will be a large difference in the likelihoods of selling a particular innovation to government versus commercial customers. In other instances, the difference in these likelihoods will be small. The flexibility inherent in OT authorities allows the GSI to balance its investment/contract offers to provide incentives for private companies to tailor innovation to address government mission objectives.

3. **The GSI initiatives in the case studies illustrate a range in the balance between equity investment and contractual support,** with OPT having most heavily emphasized the former, RTVG having most heavily emphasized the latter, and IQT having pursued a mixed strategy. Although this report does not examine the comparative effectiveness of these approaches, the economic analysis presents a framework within which to consider the suitable balance for future GSI initiatives. A more complete model would also consider incentives associated with information transfer, since these transfers are an important feature of GSI.