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Process Innovation Pilots: Lowering Early-Stage Barriers to Entry and Survival

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Process Innovation Pilots: Lowering Early-Stage Barriers to Entry and Survival

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Abstract

The Department of Defense (DoD) defines innovation as "the process in which new capabilities are provided to the nation's warfighters to create or sustain an enduring advantage." This "enduring advantage" exists when DoD acquisition processes are faster or exceed adversary rates, resulting in stable evolutionary capabilities, and large, efficient, and profitable firms with dominant market shares.

When faced with an urgent need for innovation, the defense market is left with few options other than incremental evolution or novel adaptation of existing systems and capabilities.

Small early-stage firms often create new capabilities. While they comprise over 70% of U.S. firms, their work can be disruptive and unable to gain defense market entry or sales. Without sustained revenue (sales), these firms fail to thrive, and responses include acquisition, asset divestiture, or refusing to enter the defense market.

However, small firms can establish business models and strategies adapted to changing demands or conditions. This provides opportunities to address emergent "short-term" needs faster than existing market providers or acquisition process capabilities.

This paper highlights challenges to defense market entry and pilot initiatives by the Defense Advanced Research Projects Agency (DARPA) to improve small firm survival and growth.

Keywords: small firm defense market and innovation barriers

Introduction

The Defense Innovation Board defined innovation as "the ability to rapidly develop and integrate new systems and technology, and employ them at the speed and scale necessary to maximize warfighter mission capabilities" (Bloomberg et al., 2024, p. 13). Underlying this definition are assumptions about speed (time to market), scale (product volume), and quality (capability maximization).

The Defense industrial base (DIB) is defined as "the network of organizations, facilities, and resources that provides the U.S. government—particularly the Department of Defense (DoD)—with defense-related materials, products, and services" (Nicastro, 2024). This industrial base is where speed, scale and quality become real.

The DIB provides goods and services within the U.S. defense market, a highly competitive environment complicated by regulations, as well as technological, and geopolitical factors (OUSD(A&S), 2022). The DIB shrinkage is a long-term trend, arguably starting after World War II (Holley, 1989). Nicastro (2024) divides the DIB into *commercial* and *nonprofit and*

public sectors. Research examining DIB shrinking commonly focuses on *commercial* sector concentration and may not reflect the overall scale and diversity of the DIB.[1]

This paper uses Porter's (2008) Five Forces model to summarize defense market dynamics, supported by references to peer-reviewed literature, and summarizes prior research on competition and entry barriers to the defense market, and by proxy, into the DIB. It then reviews recent financial and procurement data to find evidence for or against these barriers and examines some current approaches to increasing the DIB commercial sector. Two efforts addressing small business DIB entry and survival are summarized.

Background

Michael Porter (2008) identified five "forces" or factors that shape markets and strategies: existing competitors' rivalries (competition), product or service substitution threats, buyer and supplier bargaining power, and new entrant threats. The first four forces organize the barriers seen by potential DIB entrants.

The Defense Market and Competition

The DIB exhibits characteristics inherent in the defense market. In 1969, no less an authority than John Kenneth Galbraith noted that large defense firms, given their m*arket concentration, regulation*, and *specialized products*, acted more like public utilities than private firms and argued for their nationalization.

The federal market as reflected in the Federal Acquisition Regulation values competition and fairness (GSA, 2025). A shrinking DIB is perceived as a threat to competition; however, market concentration can create cost or performance efficiencies for a given demand (Savagar et al., 2024). Larger markets have more substitutes and production sources and increased innovation due to demand price elasticity (Desmet & Parente, 2010). Covarrubias et al. (2020) found that market concentration is a common proxy for competition, reflecting increased competition when shrinkage is due to decreased margins, and the opposite when shrinkage is due to rent-seeking and competition barriers. Further, Jain et al. (2025) found less competitive markets are less resilient to exogenous shocks. Figure 1 compares competition rates for FY1982–1984, FY2002–2004, and FY2022–2024.

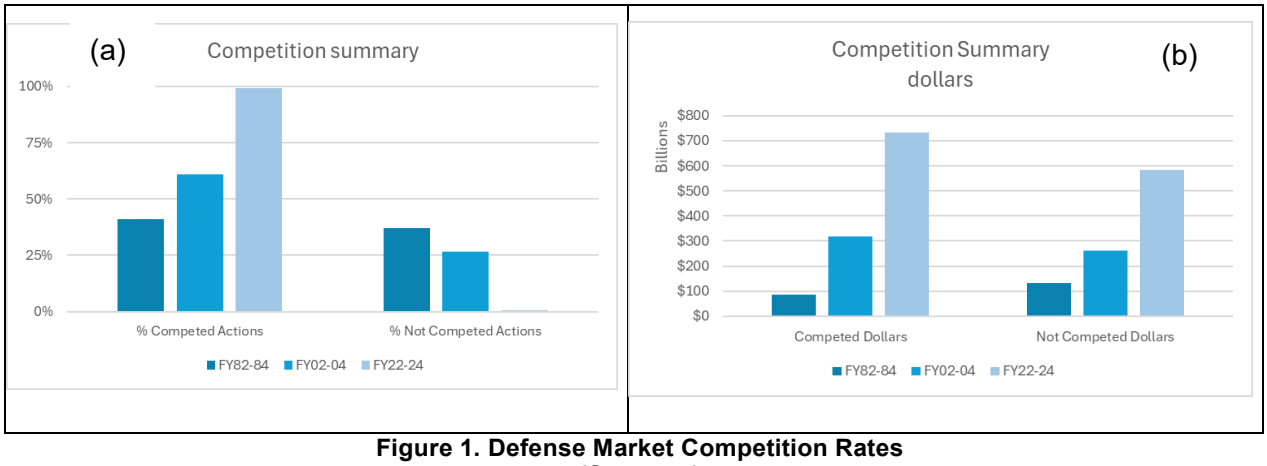

Figure 1. Defense Market Competition Rates (Sam.gov)

[1] There is evidence of "rightsizing" initiatives in the public (Austin, 2023) and non-profit DIB sectors (Nicastro, 2024), suggesting similar shrinkage albeit for different causes.

By FY2022–2024, Figure 1(a) shows almost all actions were competed, but Figure 1(b) shows almost 45% of all award dollars were not competed, implying intense competition for these large not-competed contract awards and an enormous advantage for incumbent firms.

Product or Service Substitution Threats

Some new entrants bring innovative technology to the defense market. Grieco and Manning (2023) argued that technological superiority is insufficient: "any military advantage … will be determined by how military organizations" use the technology.

Capability requirements[2] bound most DoD acquisition programs and procurements. When explicit, these requirements define market product performance expectations and measure what it will take to compete in the market.

The defense market has premier products and services with *limited alternatives*.[3] Substitutes for such products and services are often threats to incumbents. Ethiraj and Zhou (2019) found that increasing market *substitutability* will incentivize incumbents to establish defensive strategies and barriers to market entry, and *complementarity* will reduce incentives for deterrent strategies. Product or service *substitution*, where a competitive but differentiated product or service takes market share can bring new entrants into the DIB, but is likely simpler if the entrant provides complementary benefit to the incumbent.

Supplier and Buyer Bargaining Power

New entrants as suppliers or buyers have limited bargaining power. The government is the primary buyer in the defense market. Herr (1973) found government procurements have "specialized needs" (*requirements*) and "volumes" (*quantity*) resulting in few capable firms, effectively shrinking the DIB, increasing buyer power, and increasing barriers to entry (Herr, 1973), including expertise, legal and accounting regulations (Riddell, 1985).

Capability matters in the DIB and may require unique *expertise, facilities,* and *supply chains*. The difficulty and cost associated with creating and sustaining such capabilities results in a lack of competition and isolation from the larger commercial sector (Allen & Berenson, 2024).

The buyer (government) can encourage diversification or subsidize alternative sources, but these affect incumbent and new entrant profitability. If production costs rise or the market becomes price sensitive,[4] new entrants may decide to exit the defense market (Blank, 2019) based on revenues and profit (Etemadi & Kamp, 2021).

Entry into the DIB requires successful navigation of a legal and regulatory thicket, created with the best intentions. Concerns about the difficulty in understanding cost reasonableness and cost basis resulted in cost-based management processes and Cost Accounting Standards (Greenwalt, 2021). Additional barriers emerged in response to novel threats (such as cybersecurity) and financial pressures (multi-year research and development expense amortization; Halcrow & Jones, 2022).

Entrants determine if there is a demand signal for their product or service. Price and market size are common demand signals. However, in the defense market, both are unreliable as they are determined by seller and buyer constraints (such as budgets, procurement

[2] See https://aaf.dau.edu/aaf/mca/requirements/.

[3] Consider submarines or advanced aircraft as examples.

[4] For example, if the buyer constrains orders, adds cost efficiency requirements, or changes risk share.

objectives, and production capacity) and not market forces. Opportunities must be recognized and agreed to by both buyer and seller.[5]

Barriers to Market Entry and Innovation

Market entry barriers are commonly divided into economic or *structural* barriers and *behavioral* or strategic barriers (Furlan, 2025). The literature has several perspectives on market entry barriers: a competition-based view (Porter, 2008), the DoD view of barriers to entry into the DIB (OUSD[A&S], 2022), and the small business view (Stewart & Van Steenburg, 2024). Porter (2008) takes a structural view, while the DoD and the industry views emphasize both behavioral and structural aspects. Interestingly, none of these highlight incumbent strategies related to contracts, pricing, and product differentiation. Table 1 summarizes key barriers from these three perspectives.

Table 1. Common Barriers to Market Entry (cited sources)

Competition view: Five Forces Barriers to Entry (Porter, 2008)	DoD view: DIB Barriers to Entry (OUSD[A&S], 2022)	Industry view: Small Business Barriers to Entry (Stewart & Van Steenburg, 2024)
• Supply-side economies of scale • Demand-side benefits of scale ("*network effects*") • Customer switching costs • Capital requirements • Size-independent incumbency advantages ("brand," "location," "experience") • Unequal access to distribution channels	• Low margins • Low and unpredictable demand • Little incentive to add new capabilities • Restrictions in non-defense market sales • Supply chain capacity • Competition limited by mergers and acquisitions • Non-commercial business processes and regulations • Substandard technical data • Unique materials • Quality standards • Bespoke requirements • Limited sales volume	• Complex *and protracted* procurement practices (time to award) • Federal budget processes (cash flow) • Non-compliance risk • Contracting burden • Cybersecurity cost of entry Risk of Intellectual Property transfer to competitors • Lack of small business *institutional support*

These market technical and regulatory barriers, and economic constraints frame the competitive challenge of market entry and suggest that incumbents enjoy substantial protections against new entrants. Table 2 summarizes three perspectives on DoD innovation barriers.

[5] Successful new entrants often use novel strategies, such as novel arrangements for commercial products or services (such as the Civil Reserve Air Fleet and privatized military housing).

Table 2. DoD Innovation Barrier Summaries (cited sources)

Defense Innovation Board barriers to innovation (Bloomberg et al., 2024)	Public innovation barriers (Uyarra et al., 2014)	Organizational barriers (Anthony et al., 2019)
• Status quo (lack of leadership) • Management of (personnel, physical, industrial) security • Limited access to Sensitive Compartmented Information Facilities (SCIFs) • Outdated SCIF security standards • Limited duration clearances • Insufficient security clearance investigation support • Burdensome DoD contracting requirements • Intellectual property not shared • Insufficient market research prior to award • Burdensome security requirements on non-traditional firms • Self-imposed dual use constraints • Accessible SBIR performance data	• Excessive perceived economic risk • Too high innovation costs • Cost of finance • Availability of finance • Lack of qualified personnel • Lack of information on technology • Lack of information on markets • Market dominated by established enterprises • Uncertain demand for innovative goods or services • Regulation	• Low priority (time, incentive, resources) • Not client-driven • Experiment (risk) averse • Lack curiosity, knowledge, experience • Status quo culture “inertia” • lack of support/ infrastructure

There are some differences, with an emphasis on security barriers, contracting and innovation barriers, economic (market) constraints, and cultural (organizational) barriers.[6]

In these tables, market entry and innovation barriers “rhyme” – they are different but distinct aspects of the complexity of introducing disruptive technology into the defense market and into use.

The literature suggests a few thematic barriers common to both market entry and innovation: resources (people, capital, expertise), market or innovation resistance to change (incentivizes to remain at the status quo), and time. The next section examines the DoD market and the DIB using public data to highlight structural factors affecting strategies for market entry and innovation.

[6] DARPAConnect (https://www.darpaconnect.us/home) offers mentoring and training to help overcome some of these barriers to entry.

Discussion

A firm considering doing business with the government has significant publicly available information about the government as a buyer. The U.S. government buys an enormous range of goods (products) and services, some of which are defense related. Public spending data is available on USAspending.gov.[7] For example, Figure 2 shows a ranked query of government spending by departments ("agencies") for fiscal year (FY) 2023 to FY2025.

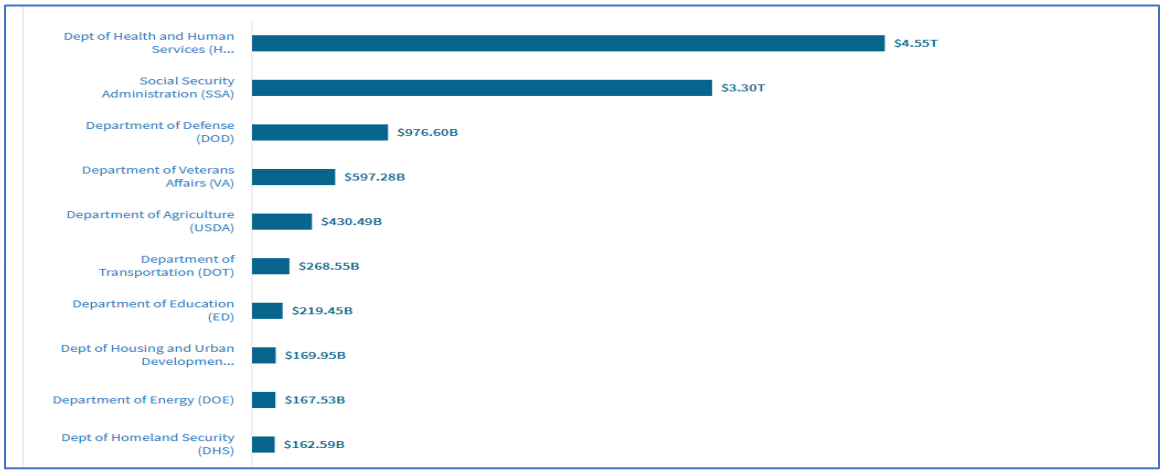

Figure 2. Top 10 U.S. Department Spending, FY 2023–2025 (USAspending.gov)

Health and Human Services spending is dominated by Medicare and Medicaid, and the Social Security Administration is dominated by outlays to Old Age and Survivors Insurance (OASI).[8] The DoD ranks third in this view. DIB commercial sector firms are often ranked by contract awards or revenues. Figure 3 shows the top 10 recipients (prime contractors) of DoD funding from FY2023 to FY2025.

In Figure 3, Lockheed Martin Corporation and the Boeing Company are both listed twice.

[7] Award posting is delayed 30 days in general, 90 days for DoD awards "for operational reasons" (https://onevoicecrm.my.site.com/usaspending/s/article/FAQ-I-understand-the-Department-of-Defense-reports-their-financial-data-on-a-different-schedule-than-other-agencies-Do-they-also-report-award-data-on-a-different-schedule).

[8] See USAspending.gov; drill down by agency.

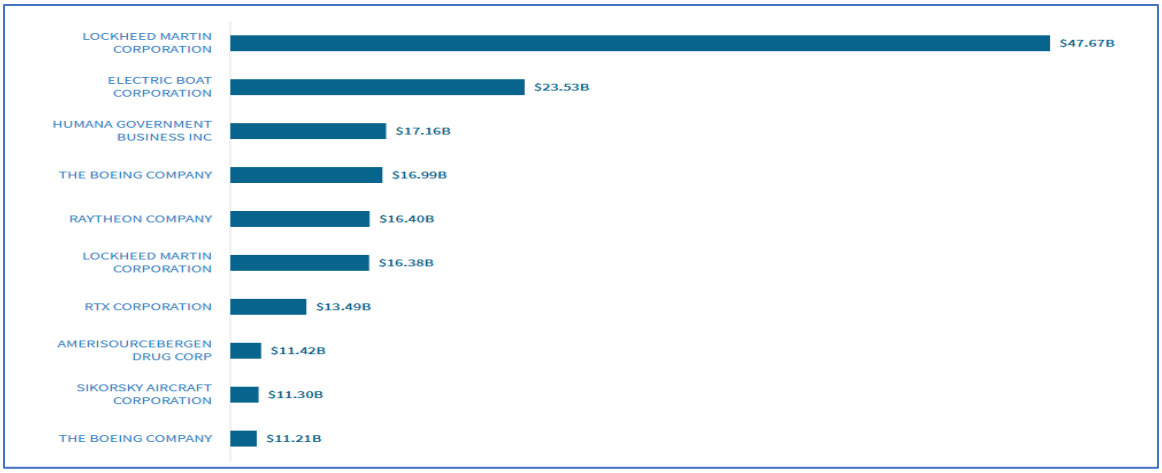

Figure 3. Top 10 DoD Funding Recipients, FY2023–2025 (USAspending.gov)

Humana Government Business is a subsidiary of Humana, Incorporated[9], and provides administrative services (TRICARE) and arranges health care services for active duty and retired service members and their dependents through Humana Military. Interestingly, Northrop Grumman is missing from this top 10 list. Figure 4 shows the top 10 search results for FY2023–2025 Northrop Grumman awards.

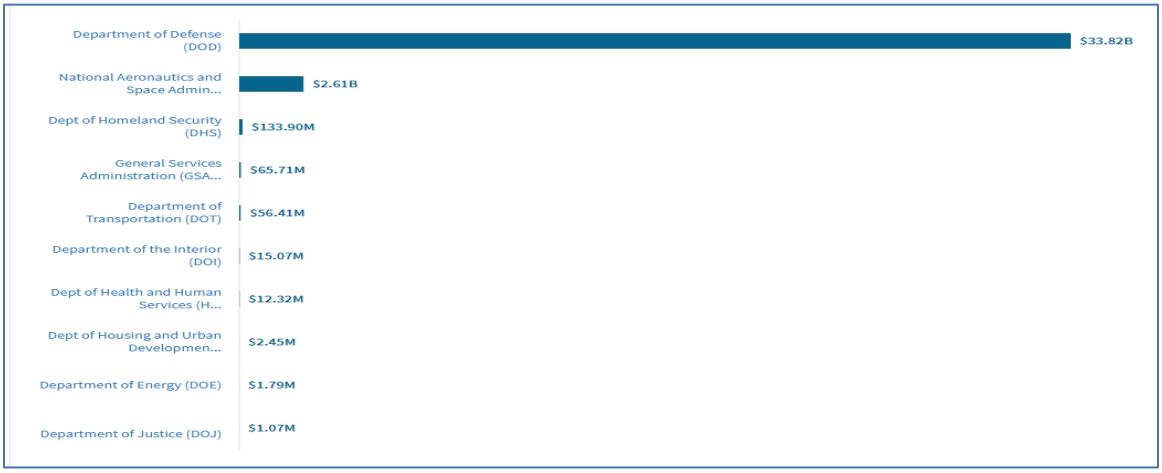

Figure 4. Top 10 Northrop Grumman by Agency FY2023–2025 (USAspending.gov)

Note that the largest defense industry corporations (such as the "Top Five") are complex businesses with revenues in multiple government market sectors. Additionally, these firms sell both goods and services in these sectors.

Procurements of goods vary with market segments; the *market size* is measured by the quantity (Q) of items ordered (or sold) and the budgeted or obligated amounts (P) and reflect market complexity. Table 3 summarizes the Army aviation platform procurement market size for FY2023 to FY2025.

[9] See Humana's most recent 10-K at https://humana.gcs-web.com/node/39556/html.

Table 3. Army Aviation Procurement Market Summary 2023–2025
(OUSD[C], 2025)

Budget Line Item (BLI)	Q.FY23	P.FY23.$M	Q.FY24	P.FY24.$M	Q.FY25	P.FY25.$M
AH-64 Apache Block IIIA Reman	38	$956.991	42	$939.298	31	$570.655
AH-64 MODS		$85.840		$113.127		$81.026
Aviation ASSURED PNT		$66.294		$67.383		$69.161
CH-47 Cargo Helicopter Mods (MYP)		$49.357		$20.689		$15.825
CH-47 Helicopter	9	$406.647	6	$240.359	10	$699.698
Comms, Nav Surveillance		$68.815		$74.912		$61.362
Degraded Visual Environment				$16.838		$3.839
Future UAS Family				$53.453		$149.059
GATM Rollup		$14.683		$8.924		$4.842
Gray Eagle Mods2		$133.038		$14.959		$23.865
MQ-1 PAYLOAD		$72.700		$13.650		$14.086
MQ-1 UAV	12	$350.000				
MULTI SENSOR ABN RECON		$20.924				
Network And Mission Plan		$42.450		$32.418		$49.862
SMALL UNMANNED AIRCRAFT SYSTEMS		$6.725		$20.769		$69.573
Spectrum Army SUAS		$3.873				
UAS MODS				$2.258		$2.265
UH-60 Black Hawk L and V Models	21	$178.658	26	$153.196		
UH-60 Blackhawk M Model (MYP)	35	$1,058.629	24	$853.246	24	$825.394
Utility Helicopter Mods		$39.346		$35.879		$34.565
Funding (P) and platform buys (Q)	115	$2,950.925	98	$2,186.099	65	$2,095.747
Funding (P) without platform buys (Q)		$604.045		$475.259		$579.330

Three DIB companies (Boeing [AH-64, CH-47], General Atomics [MQ-1] and Sikorsky [Lockheed Martin] [UH-60]) are "airframe" manufacturers[10] (system integrators) and account for about *80%* of budgeted amounts and *all* major platform orders/sales. This shows that there are complementary but imperfect substitutes in this market. Pallante et al. (2023) found that defense research and development spending stimulates (crowds-in) private sector research and development spending and employment of skilled workers. Table 4 shows the USAspending.gov results for large business-related Army aviation research and development.[11]

Table 4. Army Aviation R&D Obligations, Not Small Business FY2023–2025

	Fiscal Year							
	2023		2024		2025		Total OBL.N	Total OBL.$
R&D FUNDING BY RECIPIENT - ARMY AVIATION	OBL.N	OBL.$	OBL.N	OBL.$	OBL.N	OBL.$		
OTHER THAN SMALL BUSINESS	93	$1,033,154,649	87	$1,281,367,608	12	$9,874,699	192	$2,324,396,956
BELL TEXTRON INC	18	$597,800,120	19	$876,836,754	1	$3,954,000	38	$1,478,590,874
DYNCORP INTERNATIONAL LLC	1	$0	1	$0			2	$0
GENERAL ATOMICS AERONAUTICAL SYSTEMS, INC.	1	$999,915					1	$999,915
GENERAL ELECTRIC COMPANY	26	$146,738,895	14	$125,733,889	1	$0	41	$272,472,784
HII MISSION TECHNOLOGIES CORP	14	$17,743,763	15	$17,423,152	1	$320,699	30	$35,487,614
HONEYWELL INTERNATIONAL INC.	1	-$116,061	1	$0			2	-$116,061
KBR WYLE SERVICES, LLC			1	$242,052			1	$242,052
LEIDOS, INC.	1	$498,000	1	$200,000			2	$698,000
LONGBOW LLC	1	$0					1	$0
NORTHROP GRUMMAN SYSTEMS CORPORATION			1	$49,911,825			1	$49,911,825
PAR GOVERNMENT SYSTEMS CORPORATION			3	$7,362,833			3	$7,362,833
RAYTHEON COMPANY	1	$236,722,341	1	$178,140,565			2	$414,862,906
ROCKWELL COLLINS, INC.	6	$2,618,100	3	$1,725,000	2	$0	11	$4,343,100
SIKORSKY AIRCRAFT CORPORATION	17	$24,382,711	22	$22,413,512	7	$5,600,000	46	$52,396,223
TEXTRON SYSTEMS CORPORATION	4	$5,616,570	4	$1,378,026			8	$6,994,596
THE BOEING COMPANY	1	$0					1	$0
VANDERBILT UNIVERSITY	1	$150,295	1	$0			2	$150,295

Note in Table 4 that airframe and engine manufacturers, and subcontractors were awarded over 90% of this funding.[12] Table 5 summarizes concurrent small business Army aviation-related research and development awards.

[10] On the eve of World War II, the U.S. aircraft industry consisted of four distinct groups: aircraft (airframe) manufacturers, engine manufacturers, subcontractors, and commercial item vendors (Holley, 1989).

[11] Obligations are a useful proxy for labor employment as research and development is labor intensive. This data was downloaded in February 2025. Posted FY2025 obligation amounts lag actual obligations and do not reflect full year totals. Product and Service Codes (AC11-AC17, AC24, AC31-AC33) were used to label research activities.

[12] While obligation data is incomplete as of this paper, Army research and development remains associated with platforms in procurement but reflects additional commercial and noncommercial performers.

Table 5. Small Business Army R&D Obligations, FY2023–2025 (USAspending.gov)

	Fiscal Year 2023		2024		2025		Total OBL.N	Total OBL.$
R&D FUNDING BY RECIPIENT - ARMY AVIATION	OBL.N	OBL.$	OBL.N	OBL.$	OBL.N	OBL.$		
⊞ OTHER THAN SMALL BUSINESS	93	$1,033,154,649	87	$1,281,367,608	12	$9,874,699	192	$2,324,396,956
⊟ SMALL BUSINESS	19	$33,736,481	30	$10,668,808	7	-$8,441	56	$44,396,848
ADVENTIUM ENTERPRISES, LLC	2	$1,365,581	2	-$1,917,650			4	-$552,069
AEROVIRONMENT, INC.	3	-$1,871,023	2	-$4,637			5	-$1,875,660
AIRFOILS INC			1	$0			1	$0
CHEROKEE NATION ARMORED SOLUTIONS, LLC	2	$848,000	8	$1,087,910			10	$1,935,910
DEFENSE SYSTEMS AND SOLUTIONS			1	$0			1	$0
ELECTRA.AERO INC.			2	$1,899,168	1	$0	3	$1,899,168
HFE INTERNATIONAL, LLC	1	$369,682					1	$369,682
KAREM AIRCRAFT, INC.	1	$0					1	$0
MATERIALS ENGINEERING AND TECHNICAL SUPPORT SERVICES CORP.			3	$974,953			3	$974,953
MERCURY MISSION SYSTEMS LLC	1	$0					1	$0
MODERN TECHNOLOGY SOLUTIONS, INC.			2	$3,216,079			2	$3,216,079
PHYSICAL SCIENCES INC.	1	$0	1	$0			2	$0
PIASECKI AIRCRAFT CORP	2	$6,367,345	3	$2,840,393			5	$9,207,738
THORPE SEEOP CORP	1	$0					1	$0
WAVEFRONT RESEARCH, INC			1	$1,999,845			1	$1,999,845
XL SCIENTIFIC LLC			1	$325,000			1	$325,000
XWING, INC.			2	$247,748			2	$247,748
Y-TECH SERVICES, INC.					1	-$8,441	1	-$8,441
YULISTA SUPPORT SERVICES LLC	5	$26,656,896	1	$0	5	$0	11	$26,656,896
Grand Total	112	$1,066,891,130	117	$1,292,036,416	19	$9,866,258	248	$2,368,793,804

The small business segment is smaller; while having different performers, it still exhibits market concentration (for example, Piasecki Aircraft Inc. and Yulista Support Services LLC) but does represent more vendors. Note no small business has annual funding for these PSCs.

Table 6 shows a similar analysis performed using the same data filtered for Army awards coded with NAICS[13] 336411 (Aircraft Manufacturing).

Table 6. NAICS 336411 Army Summary (USAspending.gov)

Army (336411)	Prime	Sub-awardees	Small business sub-awardees
Award FY count (23, 24, 25)	**(1, 0, 0)**	**(22, 117, 0)**	**(0, 11, 0)**
count in dataset	**6**	**128**	**11**
2023 ($M)	$2,273.000	$412.120	
2024 ($M)		$637.500	$25.540
2025 ($M)			

The award FY count row in each column shows the number of awardees in FYs 2023, 2024, and 2025. Table 6 shows award funding for a single prime (Bell Textron, Inc.) in FY 2023.[14] Sub-awardees in FY2024 included firms from all four groups, and 11 small businesses received funding awards for mostly commercial (vendor group) work in 2024.

Tables 3 through 6 show a few of the challenges program offices and firms meet delivering required capabilities with episodic funding. Walter (2019) found that DoD requirements and funding processes collectively push "suppliers toward *homogeneity*, making future *transitions more difficult* and creating a thermostatic pattern of innovation.[15]. In other words, the DIB is exposed to this innovation pattern. When faced with an urgent need for innovation, the DoD will create a demand signal in the defense market. The structural and behavioral barriers described above incentivize incremental evolution or novel adaptation of existing systems and capabilities.

[13] NAICS: North American Industry Classification System.

[14] Prime manufacturers are "airframe manufacturers" following Holley's categorization.

[15] A thermostatic pattern is when a process responds to achieve a set objective (like a temperature – cooling when above and heating when below the setpoint). Also referred to as a demand signal.

If this is true, then increased supplier *diversity* should make transition *easier* and *change the pattern of innovation.* The prior tables imply that this diversity will likely not come from the dominant market firms. There is evidence that in the DIB, a supplier will cannibalize profitable product lines – for example, AH-64 REMAN is cannibalizing new AH-64 sales providing marginal market diversification (see Table 1). In the defense market, such a strategy may protect market incumbents and affect pricing strategies for both products (De Giovanni & Ramani, 2018).

The DoD cites small businesses as a source of new DIB entrants and innovation (OUSD[A&S], 2022). Small business innovative research (SBIR) awards are an imperfect measure of entry into the DIB. Rovito (2025) showed that small business success (effectively, becoming a profitable business) is related to annual revenue, the number of SBIR Phase I and Phase II awards and total SBIR investments. Phase II awards follow a Phase I award and are an indicator of DoD interest; average awards in a 3-year epoch are used to de-noise data and show general population trends. Figure 5 shows SBIR Phase I and Phase II unique and 3-year average award counts for FY2015 to FY2025.

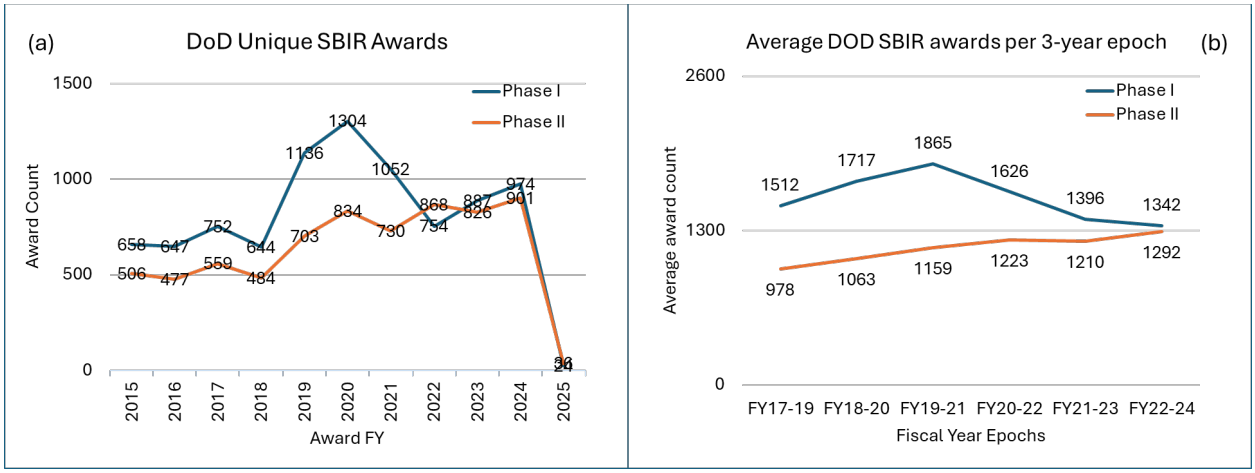

Figure 5. DoD SBIR Awards FY2015–2025 (SBIR.gov)

Figure 5a shows the general trends of unique (meaning differing firms) SBIR awards. The peak in 2020 was related to Covid-19, and the drop in 2025 is due to a continuing resolution. Figure 5b takes a 3-year average of awards and focuses on FY2017 to FY2024. These are all reported DoD SBIR awards; aviation-related awards would be a subset of this population.

Many small businesses receive multiple awards per year (Bresler & Bresler, 2020). From FY2015 to FY2025, 4,632 unique small businesses received one or more SBIR awards. Table 7 summarizes SBIR awards by fiscal year for all DoD.

Table 7. SBIR Award Summary FY2015–2025 (SBIR.gov)

DOD.SBIR.FY	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Phase I											
Total FY awards	1132	1213	1451	1173	1912	2065	1617	1197	1373	1455	26
Unique firm award count	658	647	752	644	1136	1304	1052	754	887	974	24
No award to firm	3974	3985	3880	3988	3496	3328	3580	3878	3745	3658	4608
% SB with award	14.2%	14.0%	16.2%	13.9%	24.5%	28.2%	22.7%	16.3%	19.1%	21.0%	0.5%
% SB without award	85.8%	86.0%	83.8%	86.1%	75.5%	71.8%	77.3%	83.7%	80.9%	79.0%	99.5%
Phase II											
Total FY awards	790	739	983	780	1172	1238	1068	1363	1200	1313	37
Unique firm award count	506	477	559	484	703	834	730	868	826	901	36
No award to firm	2872	2901	2819	2894	2675	2544	2648	2510	2552	2477	3342
% SB with award	15.0%	14.1%	16.5%	14.3%	20.8%	24.7%	21.6%	25.7%	24.5%	26.7%	1.1%
% SB without award	85.0%	85.9%	83.5%	85.7%	79.2%	75.3%	78.4%	74.3%	75.5%	73.3%	98.9%

Table 7 shows that about one in five (yellow highlight) small firms in the dataset received an SBIR Phase I or Phase II award in any year. The table also shows that some firms had multiple awards in a year (consistent with Bresler and Bresler). These two results show that firms need either a *second* product market or aggressive *business developmen*t to stay in business and be an active (government-funded) member of the DIB.

Time is the great enemy – it is a measure of the constant drain of resources and of missed opportunities. There is a time from starting a company to your first sale. When working with the government, time from solicitation to first payment can run to months, increasing firm debt. Small firms often must borrow to continue operations. Small firms often fail as revenues fall short of that needed to sustain operations.

Pitch days are a commercial-type process for rapidly screening offerors; offers are made quickly, in hours not months. An early pitch day trial was the U.S. Army Combat Capabilities Development Command's Ground Vehicle Materials Flash-to-Bang (GVM F2B) Pitch Day in July 2019, which invited National Advanced Mobility Consortium members to propose innovative research to an existing other transaction agreement (TACOM, 2019). This pilot, while focused on trying an innovative acquisition process, established key attributes: a target population, use of a rapid acquisition instrument, and focused solicitation and award. The Air Force ran several pitch days over the past 7 years, including a small business set-aside two-step Commercial Solutions Opening solicitation and award for base operations and support innovative projects (673d Air Base Wing, 2022). DARPA recently ran a pitch day "pilot" to learn how to accelerate time from solicitation to award.[16]

The DARPA AI Biotechnology Pitch Day was sponsored by DARPA's Biological Technology Office and focused on technologies at the "intersection of artificial intelligence and biotechnology" (DARPA-BTO, 2024).[17] Figure 6 summarizes the overall activity schedule.

[16] See https://www.darpa.mil/news/2024/same-day-awards.

[17] See DARPA-SCA-24-01 for the original and updated solicitation.

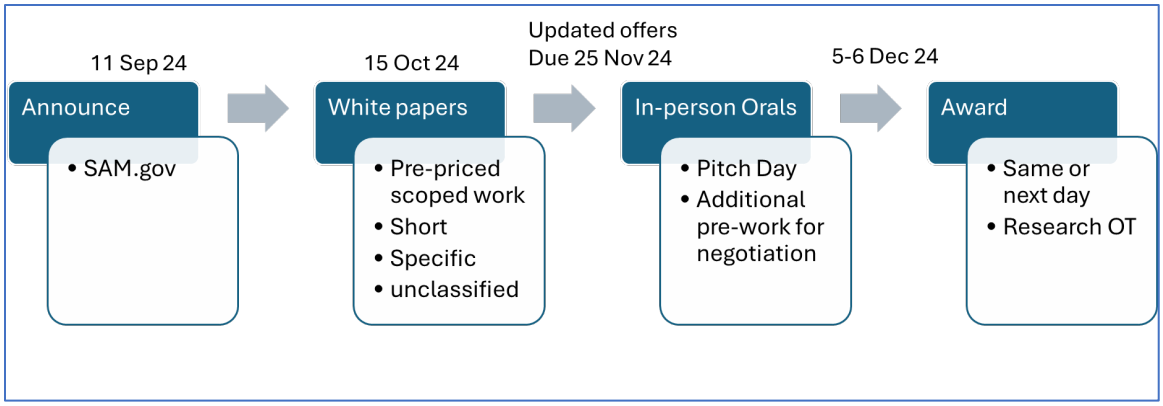

Figure 6. Pitch Day Summary (DARPA-SCA-24-01)

Pitch Day was structured to minimize time from proposal to award by focusing on funding research within this intersection. It featured other transactions for research awards with limited durations (less than 6 months), limited funding levels (less than $300,000), and without specific follow-on acquisitions. All proposed efforts were unclassified, with three pre-negotiated objectives and award levels (DARPA-BTO, 2024). Specific proposal formats in a three-stage process reduced the administrative burden on proposers and focused the evaluation and award team on *pitch day execution*. Seventy-seven proposers were invited to attend Pitch Day, and 42 awards were made, with nearly 70% being first-time performers (DARPA, 2024).

Generating early revenues is critical to performer viability. This is a fundamental challenge with small business DIB entry – earning enough revenue to continue operations. There are alternatives to sales, such as debt, dilutive capital (venture funding) or selling assets (such as intellectual property).

DARPA recently enhanced its small business mentoring processes by creating the Commercial Strategy Office (CSO) to protect emergent DARPA-funded technologies from adversarial capital (foreign acquisition) and assist small performer firms with the development and execution of viable business plans (DARPA-CSO, 2025). CSO includes:

- The Embedded Entrepreneur Initiative (EEI), which embeds a successful entrepreneur ("commercialization expert") within performer teams to help build and execute go-to-market strategies;
- Commercial Accelerators, which provide firms access to commercial expertise, ecosystems, and investor networks;
- Tiger Teams, which help firms create high impact solutions to DoD and commercial problems; and
- Venture Horizons, which connects top-tier private investors with DARPA program managers and performers increasing the impact of DARPA programs (DARPA-CSO, 2025).

These work collectively to mature small business investments into successful and sustainable firms. Differing from the Office of Strategic Capital (Austin, 2025), the DARPA CSO seeks to pair *private* investment capital with performers to accelerate breakthrough technologies to market while *protecting early investment and entry* into the defense market.

Conclusions and Future Work

The Department has multiple programs to sustain and improve the productive capacity of the DIB. These programs are complementary, serve specific performer segments and offer differing value propositions to the DoD.

Defense market entry and innovation are dominated by structural and behavioral barriers. However, small firms are likely new market entrants but require support to grow from small technical performers into profitable members of the DIB. Revenue growth is key to profits and growth. Two approaches addressing time to earned revenue and guided growth to commercialization were presented. Future work should include additional efforts focused on reducing barriers to and increasing incentives for small firm market entry and innovation.

Disclaimer

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