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Assessing the Impact of Department of Defense Weapons Systems on the Defense Industrial Base

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Assessing the Impact of Department of Defense Weapons Systems on the Defense Industrial Base

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Abstract

From fiscal year (FY) 2013 through FY 2023, the Department of Defense (DoD), on average, directed nearly 20% of spending into 400+ weapons systems (also referred to as equipment systems, major systems, or equipment programs). The DoD designates something as an equipment program (EP) based on factors including mission criticality; the extent to which system capabilities depend on a combination of hardware, software, and equipment elements; and the level of resourcing required.

In this paper, we leverage public data from the Federal Procurement Data System (FPDS) to analyze more than $800 billion in DoD funding allocated for EPs from FY2013–FY2023. We explore the features of these contract awards, and the pool of entities that received this funding. We examine the challenges faced by the DoD in delivering EP capabilities on time and on budget and explore possible causes for these cost and schedule overruns. We offer a series of recommendations for new policies and protocols that will enable the DoD to better manage these programs and ensure they serve as a strategic boon to the military's critical mission priorities.

Introduction

The concept of a "weapon system"—also referred to as an "equipment program" (EP) or "major system"—emerged in the Department of Defense (DoD) in the 1950s. They refer to mission critical, technically complex items that depend on a combination of hardware, software, and equipment elements (Fox, 2011). Since 1970, the Government Accountability Office (GAO) has reported on ballooning costs associated with EPs, and the share of the defense budget allocated to EPs grew significantly starting in the 1980s. From fiscal year (FY) 2013 through FY 2023, the DoD directed nearly 20% of procurement dollars into 400+ weapons systems annually.

Despite efforts to reform acquisition policy and increase program oversight, EPs remain plagued by cost overruns, scheduling delays, and routinely failing to reach technological milestones (GAO, 2024). In this paper, we leverage public data to analyze more than $880 billion in DoD funding allocated for EPs between FY2013 and FY2023, with the goal of understanding how resourcing for EPs reflects DoD mission priorities, and the extent to which this resourcing has contributed to broader trends in the defense industrial base. We also consider the role of EPs in today's world, particularly given the proliferation of low-cost weapons technologies like drone swarms and the threat of cyber-attacks. We offer recommendations for improving the management, oversight, and resourcing of EPs to ensure they meet their objectives and most effectively respond to the current, dynamic threat landscape.

Background: EP Investment

To analyze data pertaining to weapon systems, we aggregated contract award data from the Federal Procurement Data System (FPDS), the centralized, real-time database for government procurement transactions. We then filtered the data to isolate contracts funded and awarded by the DoD from FY2013 through FY2023. FPDS contains a structured field for EP, so we then isolated contracts awarded and funded by the DoD for which that field was completed. Figure 1 shows the total DoD procurement outlays annually (contracts funded and awarded by the DoD), and the share of these outlays associated with an EP.

FY	Total DoD Procurement (Funded & Awarded)	Total DoD EP Procurement	Total DoD Non-EP Procurement	% Total DoD Procurement on EPs
2013	$269,017,594,888	$78,207,054,095	$190,810,540,794	29%
2014	$256,118,674,160	$65,748,247,606	$190,370,426,554	26%
2015	$246,499,913,917	$59,781,559,745	$186,718,354,172	24%
2016	$272,614,429,221	$71,262,605,215	$201,351,824,006	26%
2017	$298,820,054,772	$76,382,601,753	$222,437,453,019	26%
2018	$351,276,245,245	$79,910,910,067	$271,365,335,177	23%
2019	$386,118,124,062	$84,853,729,518	$301,264,394,543	22%
2020	$436,878,063,385	$110,928,352,549	$325,949,710,836	25%
2021	$401,837,146,161	$71,019,308,770	$330,817,837,391	18%
2022	$377,897,271,584	$68,343,434,135	$309,553,837,450	18%
2023	$521,941,878,995	$116,384,440,405	$405,557,438,590	22%

Figure 1. DoD EP Procurement Spend as a Share of DoD Procurement, Annually

We then grouped the EP-associated contract actions by EP to isolate the unique EPs funded during our analysis period. More than 100 EPs had a negative or $0 spend associated with them, so we filtered for those with positive total obligations.[1] **From FY2013 through FY2023, the DoD funded 440 distinct EPs.** Figure 2 shows the count of unique EPs that received funding in each year.

[1] Negative or zero balances can occur for several reasons, including instances in which there were de-obligations and/or if the timing of payments required readjustment.

FY	Count EPs >$0
2013	247
2014	222
2015	205
2016	179
2017	185
2018	167
2019	148
2020	142
2021	152
2022	181
2023	242

Figure 2. Count of EPs by Year

We observed significant variability in the procurement funding received by different EPs. To explore this distribution, we grouped EPs by total procurement funding during our analysis period and split them into bins. As shown in Figure 3, while hundreds of EPs have received less than $100 million in total DoD procurement, the majority of EP spend is concentrated in the multi-billion-dollar weapons systems.

Total DoD Obligations to Individual EPs, Binned, FY2013–FY2023	Count EPs	Total Obligations Within Bin, FY2013–FY2023	%Total EP Obligation
$0 to $100,000	38	$1,244,003	0.0001%
$100,001 to $10.00M	143	$333,696,056	0.0377%
$10.01M to $15.00M	14	$164,473,492	0.0186%
$15.01M to $100.00M	71	$3,088,036,706	0.3493%
$100.01M to $500.00M	59	$14,909,087,532	1.6864%
$500.01M to $1.000B	26	$18,439,306,018	2.0857%
$1.01B to $10.00B	73	$280,189,888,103	31.6933%
> $10.00B	16	$566,940,194,467	64.1287%
	Total	$884,065,926,377	

Figure 3. Total DoD Obligations to EPs by Bin

Figure 4 provides a list of the 16 EPs that received more than $10 billion in DoD contracts during our analysis period, including a brief description of the program.

EP	Description	Total Obligations, FY2013–FY2023
F-35	Joint Strike Fighter program; largest DoD procurement initiative in history	$193,684,357,325
MISSILE DEFENSE AGENCY SUPPORT	Encompasses ballistic missile development and sustainment	$73,315,797,734
SSN 774	Virginia-class submarine	$54,081,887,858
DDG 51	Arleigh Burke-class destroyers	$26,971,995,363
TRIDENT II MISSILE	Three-stage, solid-fuel, inertially-guided submarine-launched ballistic missile	$26,690,118,950
KC-46A	Aerial refueling and strategic military transport aircraft	$25,718,471,267
C-130J	Tactical airlift	$24,798,475,323
P-8A	Multi-mission maritime patrol and reconnaissance aircraft	$22,352,861,892
V-22	Vertical takeoff aircraft	$20,261,130,937
LCS	Littoral combat ship	$16,800,964,672
CVN 78	USS Gerald R. Ford aircraft carrier	$16,085,769,254
GMLRS/GMLRS AW	Guided Multiple Launch Rocket System/Alternative Warhead	$14,213,226,852
E-2D AHE	Hawkeye early warning aircraft	$14,155,874,423
NSSL	National Security Space Launch program	$13,999,811,494
MRIC	Medium Range Intercept Capability	$13,795,895,289
EA-18G	Electronic warfare aircraft	$10,013,555,833

Figure 4. EPs in Receipt of More Than $10 Billion, FY2013–FY2023

EP Suppliers: Prime Contractors and Future Research

Next, we were interested in understanding the pool of entities that received EP contracts. We recognize that a significant share of EP contract dollars trickle down to lower-tier suppliers, and we recommend future research incorporate second- and third-tier supplier data. While we have access to subcontract award data from USASpending, it is not as comprehensively reported as prime contractor data. For the purposes of this paper, we opted to focus our analysis on the prime contract awards associated with EPs to establish higher-fidelity baseline metrics to understand this pool of funding.

To identify the companies that performed as prime contractors on EP contracts, we joined the Unique Entity Identifier (UEI) for each EP-associated contract action. Because many entities have won multiple EP contracts, the number of distinct UEIs is significantly lower than the number of contract actions. So, we grouped the contracts by their UEIs and filtered for distinct UEIs. Many large USG contractors operate with multiple UEIs, so we then manually joined UEIs for entities clearly associated with the same parent company.

For the last 30+ years, the defense industrial base has experienced significant consolidation. Many of the largest DoD suppliers have combined, with prominent acquisitions including but not limited to:

- Northrop Grumman acquiring Orbital ATK
- Lockheed Martin acquiring Sikorsky
- Raython merging with United Technologies
- L3 Harris acquiring Aerojet Rocketdyne

For the purposes of our analysis, we reviewed the parent companies with the most in EP awards and, in instances when we were aware of acquisition events, we consolidated the companies to a parent company (the acquirer). For instance, we merged Orbital ATK data with Northrop Grumman, and treated Northrop Grumman as the parent. In future research, we recommend analyzing the full list of suppliers for acquisition events and comprehensively merging them accordingly.

In instances where two primes formed a joint venture, we treated the joint venture as its own entity. Doing so established an important distinction between mergers, wherein one supplier ceases to exist upon acquisition by another, and instances in which two large corporations team together and collectively expand their market share.

As a final step, we filtered the entities to exclude those with less than $1,000 in total EP-associated contract awards during our analysis period.

Using this methodology, we identified 5,677 companies in receipt of EP-associated contract awards from FY2013 through FY2023. Of these, 31 companies received more than $1 billion in EP contract obligations during our analysis period. These 31 companies are shown in Figure 5.

Company	Total EP Obligations, FY2013–FY2023
LOCKHEED MARTIN	$325,775,571,468
BOEING	$106,539,237,903
GENERAL DYNAMICS	$76,773,885,401
RAYTHEON	$70,673,827,378
NORTHROP GRUMMAN	$45,188,718,754
HUNTINGTON INGALLS INC	$43,586,145,027
RTX CORPORATION	$34,816,197,577
BELL BOEING JOINT PROJECT OFFICE	$16,814,755,793
UNITED LAUNCH SERVICES LLC	$12,550,261,676
BAE SYSTEMS	$10,949,171,046
GENERAL ATOMICS	$10,045,561,769
OSHKOSH DEFENSE LLC	$7,509,296,463

TEXTRON	$7,422,797,922
GENERAL ELECTRIC	$6,780,981,312
ALTUS LLC	$6,175,240,351
L3HARRIS	$5,888,520,692
ROLLS-ROYCE	$4,491,107,655
THE CHARLES STARK DRAPER LABORATORY INC	$4,228,047,194
BECHTEL GROUP INC	$3,416,990,216
BECHTEL PARSONS BLUE GRASS A JOINT VENTURE	$3,279,476,001
LEIDOS	$3,161,722,506
MARINETTE MARINE CORPORATION	$2,597,768,554
DATA LINK SOLUTIONS LLC	$2,260,784,585
JACOBS SOLUTIONS	$2,120,243,764
ROCKWELL COLLINS	$2,036,122,964
PARSONS GOVERNMENT	$2,028,913,569
VIASAT INC	$1,870,841,569
HONEYWELL INTERNATIONAL INC	$1,794,148,371
AIRBUS US SPACE & DEFENSE INC	$1,725,905,650
AM GENERAL LLC	$1,527,618,805
INTREPID LLC	$1,096,217,819

Figure 5. Companies in Receipt of $1 Billion+ in EP Contract Obligations, FY2013–FY2023

These 31 companies collectively received over $824.7 billion in EP contracts during our analysis period. ***Their EP obligations represent more than 93% of all funding allocated to major weapons systems.***

Vendor Location

Next, we wanted to understand the geographic composition of the EP supplier base. For each EP company, we joined location data from FPDS and grouped the companies by state (which includes Washington D.C., Guam, Puerto Rico, and "Foreign Domicile"). For companies with associated entities in multiple locations, we counted them towards all their affiliated states. As shown in Figure 6, for more than half of all states in the United States, EP vendors based there received more than $1 billion in EP obligations from FY2013 through FY2023.

State	Total EP Obligations, FY2013–FY2023	Count of Companies
TEXAS	$247,720,372,425	310
CONNECTICUT	$102,983,367,768	103
CALIFORNIA	$68,478,507,576	756
WASHINGTON	$52,797,191,229	107
ARIZONA	$50,816,898,480	103
MASSACHUSETTS	$40,340,952,261	177
VIRGINIA	$37,854,945,792	620
FLORIDA	$33,206,498,316	380
ALABAMA	$28,021,098,009	225
GEORGIA	$25,979,526,143	162
MISSISSIPPI	$24,660,803,858	13
COLORADO	$23,098,395,659	180
MARYLAND	$20,408,024,233	287
MISSOURI	$19,292,534,913	83
PENNSYLVANIA	$17,488,340,482	191
MAINE	$13,679,585,307	7
NEW YORK	$11,899,040,803	272
WISCONSIN	$10,391,228,263	53
NEW JERSEY	$8,018,859,612	153
FOREIGN DOMICILED COMPANY	$7,443,502,691	412
UTAH	$7,169,025,909	70
INDIANA	$6,821,952,309	65
MICHIGAN	$5,861,095,984	116
IOWA	$4,344,003,861	26
KENTUCKY	$3,373,241,948	39
OKLAHOMA	$2,429,407,965	59
TENNESSEE	$2,117,022,861	70
OHIO	$1,683,778,766	171
ALASKA	$1,079,751,795	97

OREGON	$1,036,814,499	34
ILLINOIS	$1,006,151,785	123
MINNESOTA	$796,069,508	58
KANSAS	$694,035,251	45
NEW HAMPSHIRE	$675,129,427	48
DISTRICT OF COLUMBIA	$590,062,144	57
HAWAII	$402,782,320	60
RHODE ISLAND	$397,886,704	18
VERMONT	$343,351,638	12
NEBRASKA	$325,905,972	23
SOUTH CAROLINA	$291,468,733	48
NORTH CAROLINA	$261,939,746	90
NEW MEXICO	$220,870,745	60
NEVADA	$199,173,064	25
LOUISIANA	$194,657,159	32
IDAHO	$124,485,410	27
WYOMING	$86,013,002	5
UNKNOWN	$69,800,195	58
WEST VIRGINIA	$59,474,712	9
MONTANA	$48,596,200	17
SOUTH DAKOTA	$15,979,145	9
DELAWARE	$12,005,277	17
GUAM	$11,419,653	4
ARKANSAS	$9,172,269	16
NORTH DAKOTA	$2,511,921	8
PUERTO RICO	$578,815	1

Figure 6. EP Obligations by Company Location

Next, we wanted to explore the distribution of EP funding geographically, by place of performance. As shown in Figure 7, for more than half of all states, EP-associated contract actions generated more than $1 billion from FY2013 through FY2023.

State	Total EP Obligations, FY2013–FY2023	Count of Companies
TEXAS	$245,703,261,538	392
CONNECTICUT	$103,546,096,630	120
CALIFORNIA	$65,241,164,831	872
WASHINGTON	$54,379,427,806	152
ARIZONA	$51,697,040,676	161
MASSACHUSETTS	$39,431,327,923	192
VIRGINIA	$33,402,833,607	784
FLORIDA	$32,872,362,877	416
ALABAMA	$32,787,442,440	504
COLORADO	$28,249,642,443	229
GEORGIA	$25,859,021,760	568
MISSISSIPPI	$24,969,074,007	32
MISSOURI	$18,353,049,992	138
MARYLAND	$17,062,662,205	311
PENNSYLVANIA	$16,022,653,679	198
MAINE	$13,625,615,419	32
NEW YORK	$13,026,229,281	279
FOREIGN PERFORMANCE LOCATION	$11,521,691,713	690
WISCONSIN	$10,091,781,012	64
NEW JERSEY	$8,232,738,091	202
UTAH	$7,339,249,418	100
INDIANA	$6,599,433,795	98
MICHIGAN	$5,361,100,442	130
IOWA	$4,270,715,296	45
KENTUCKY	$3,466,299,929	63
OKLAHOMA	$2,164,069,019	120
OHIO	$1,672,251,952	219
DISTRICT OF	$1,562,930,809	243

COLUMBIA		
HAWAII	$1,035,298,083	130
KANSAS	$885,462,461	85
ALASKA	$874,358,958	148
ILLINOIS	$843,020,898	133
NEW HAMPSHIRE	$743,635,576	50
MINNESOTA	$704,530,944	54
SOUTH CAROLINA	$572,728,826	65
NEW MEXICO	$475,277,947	124
OREGON	$397,328,733	59
RHODE ISLAND	$395,911,130	24
VERMONT	$347,029,400	14
ARKANSAS	$279,747,777	34
NEVADA	$228,765,189	73
NEBRASKA	$223,287,526	76
NORTH CAROLINA	$195,561,899	87
GUAM	$143,087,546	39
WEST VIRGINIA	$134,465,667	14
TENNESSEE	$93,768,631	72
LOUISIANA	$87,728,270	41
MONTANA	$80,177,383	38
WYOMING	$76,220,925	30
SOUTH DAKOTA	$63,643,598	33
NORTH DAKOTA	$51,464,989	29
IDAHO	$47,994,039	40
PUERTO RICO	$32,677,550	11
DELAWARE	$23,560,059	23
NORTHERN MARIANA ISLANDS	$20,269,176	6

Figure 7. EP Obligations by EP Contract Place of Performance

High-Stakes Contracts and a Handful of Suppliers with Tremendous Influence

This analysis demonstrates that a handful of suppliers (31) are at the helm of the most significant EPs. These programs not only account for nearly 20% of DoD procurement dollars, but also serve to represent the most complex and sophisticated American defense capabilities. We recognize there are valid reasons for the DoD to rely on a small number of companies for its largest, most complex weapons systems. By design, few companies possess the combined resources, technical expertise, and experience to meet the requirements for these programs. In addition to having access to top technical talent, these firms must be extraordinarily well capitalized to manage the costs associated with designing, producing, and delivering complex systems. They must also have the ability to rapidly and securely identify and integrate thousands of lower-tier, often globally-distributed, suppliers. And they must have extensive knowledge of and experience working with the USG and DoD.

However, reliance on such a small number of suppliers poses significant security risks. To the extent a major supplier experiences production issues or otherwise cannot perform, the DoD has no alternatives. Changes to the global threat landscape mean relationships maintained by these large firms with lower-tier suppliers internationally can suddenly become problematic. Given the contract dollars at stake, these prime contractors may not be aptly incentivized to proactively elevate potential conflicts/security risks.

Thus, Congressional oversight is critical. Yet the fact that these programs drive such significant revenue into so many states arguably gives them—and their suppliers—political cover.

Consequences: Cost and Schedule Overruns

It is not surprising, then, that cost overruns, delays, and production issues have plagued many of the largest weapons systems. For instance:

- The F-35 program delivered aircraft 10 years behind schedule and 80% over budget (La Monica, 2023). As of April 2024, estimated sustainment costs for the fleet through 2088—$1.6 trillion—were 44% higher than estimates produced in 2018 (DiMascio, 2024).
- The Virginia-class submarine program has existed since FY1998. Production has never managed to reach two boats per year, as the program intended, and, since 2022, has not exceeded 1.2 boats per year (Congressional Research Service, 2025). Estimated cost overruns exceed $17 billion, and the rapid expansion of China's maritime fleet means the production shortfalls pose a significant national security risk (Suciu, 2024).
- According to a January 2025 Congressional Budget Office Report, costs for the Navy's Arleigh Burke destroyers have ballooned from $2.1 billion per hull to $2.5 billion per hull. Costs are expected to continue to rise, while production delays routinely range from six months to more than two years (Congressional Budget Office, 2025).
- A 2017 GAO report looking into the Navy's Ford-class aircraft carriers found that production costs for the initial ship were $2 billion more than estimated. They concluded that the cost estimate for the second aircraft carrier was "not reliable and does not address lessons learned from the performance of the lead ship" (GAO, 2017, p. 18).
- The Air Force's KC-46 program has resulted in $7 billion in cost overruns and multi-year delays (Losey, 2024).

Conflicting Interests: Returns vs. National Security

Another important consideration, in light of the persistent cost and performance issues associated with EPs, is the fact that the majority of the largest EP suppliers are publicly traded companies. Figure 8 denotes which of the EP suppliers with $1+ billion in EP procurement are publicly traded.

Company	Is Publicly Traded?
LOCKHEED MARTIN	Yes
BOEING	Yes
GENERAL DYNAMICS	Yes
RAYTHEON	Yes
NORTHROP GRUMMAN	Yes
HUNTINGTON INGALLS INC	Yes
RTX CORPORATION	Yes
BELL BOEING JOINT PROJECT OFFICE	Joint Venture between Boeing & Textron (two public companies)
UNITED LAUNCH SERVICES LLC	Technically private, but 50/50 JV between Boeing & Lockheed Martin (two public companies)
BAE SYSTEMS	Yes
GENERAL ATOMICS	No
OSHKOSH DEFENSE LLC	Yes
TEXTRON	Yes
GENERAL ELECTRIC	Yes
ALTUS LLC	No
L3HARRIS	Yes
ROLLS-ROYCE	Yes
THE CHARLES STARK DRAPER LABORATORY INC	No, nonprofit
BECHTEL GROUP INC	No
BECHTEL PARSONS BLUE GRASS A JOINT VENTURE	No (but Parsons is)
LEIDOS	Yes
MARINETTE MARINE CORPORATION	No
DATA LINK SOLUTIONS LLC	Technically private, but JV between Collins and RTX (two public companies)

JACOBS SOLUTIONS	Yes
ROCKWELL COLLINS	Yes
PARSONS GOVERNMENT	Yes
VIASAT INC	Yes
HONEYWELL INTERNATIONAL INC	Yes
AIRBUS US SPACE & DEFENSE INC	Yes
AM GENERAL LLC	No
INTREPID LLC	No

Figure 8. List of Publicly Traded EP Suppliers with $1+ Billion in EP Procurements

The fact that these firms serve as the backbone of the largest and most significant weapons systems in America does not absolve them of their fiduciary obligation to maximize shareholder value. How, then, do these suppliers balance the need to maximize shareholder value if and when doing so may not align with America's defense and national security needs?

For instance, if a changing threat landscape requires a supplier to abandon production in a certain part of the world and manufacture elsewhere: from the perspective of shareholder value, it could be better for the supplier to fight this change and/or delay implementing the new procedures, rather than swiftly pursue the new course of action. Likewise, EP contracts can extend years or even decades. With no explicit stipulations from the government that the prime contractor integrate innovative new technologies over the course of the contract, what incentive does the prime have to do so? In fact, if new innovations have the potential to reduce the government's dependency on legacy aspects of the prime contractor's system, they could be incentivized to thwart the diffusion of innovation, which could come at great cost to America's national security.

This misalignment also presents itself for many of the large private companies that supply to the DoD. For instance, AM General is owned by a private equity (PE) firm. Generally speaking, PE funds are incentivized to leverage balance sheets, reduce headcount, and otherwise increase profitability to generate a higher internal rate of return (IRR). These objectives may not align with the best interests of a defense end-user. Furthermore, there can be limited transparency into the investors that contribute to PE funds, known as limited partners (LPs). As such, there is a risk of nefarious LPs gaining information about critical defense technologies, and otherwise putting American security at risk via their investments.

To the extent the DoD continues to direct substantial contract dollars into major weapons systems while relying on a small number of companies for the delivery of these capabilities, these misaligned incentives must be addressed. We recommend that the DoD, the current administration, and policymakers establish a task force focused specifically on weapons systems. One major focal point for this task force should be addressing the fundamental disconnect between the needs of the military, the best interests of the external suppliers it relies on, and the taxpayers that fund this work.

The Role of EPs Today

DoD stakeholders and policymakers must address the inherent supply chain risks and performance issues that have plagued EPs. However, they must also consider a bigger-picture

question: What role should large-scale weapons systems play in today's world, given how asymmetric warfare has transformed the battlefield?

For instance, low-cost drone swarms have the ability to handicap or even down multibillion-dollar assets. Based on our analysis of annual procurement allocations for EPs, this new reality does not appear to have materially impacted resourcing for EPs. In what ways, then, is the DoD responding? The largest defense contractors exert tremendous influence over the development of defense technologies. Given that they stand to lose billions in revenue if the DoD changes course on investing in large-scale weapons systems, what other voices can participate in this conversation to ensure it remains objective? For many people that devote years in military or civil service, the logical next step in their career is to work for a defense contractor—their skills are transferable, and they understand the customer. However, to the extent that people are concerned about career opportunities after service, it is critical to consider how this "revolving door" may affect their objectivity in evaluating performance and making contracting decisions.

Regardless of changes to the threat landscape, major weapons systems remain critical to American military dominance, both tactically and defensively. It is essential that stakeholders involved in resourcing and delivering these systems protect their integrity at all costs. Doing so demands difficult conversations about the relationship between the public and private sectors, and what new incentives and rules should be implemented to ensure parties' priorities align.

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