## Silicon Valley Participation in the Defense Industrial Base

Given the emphasis on information and robotics technology, it should come as little surprise that Silicon Valley is a key player in the Third Offset strategy discussed in section X.X. Sec. Carter (2015) unveiled part of that strategy during his Drell Lecture at Stanford University. During that speech he noted a "long history of partnership" but also detailed recent strains:

"At times, we also eyed each other warily – like when Bobby Inman faced off against Martin Hellman and Whit Diffie over public-key encryption and commercialization; or during the controversy over the Clipper [chip] in the 1990s; and, more recently, after the actions of Edward Snowden" (para 15).

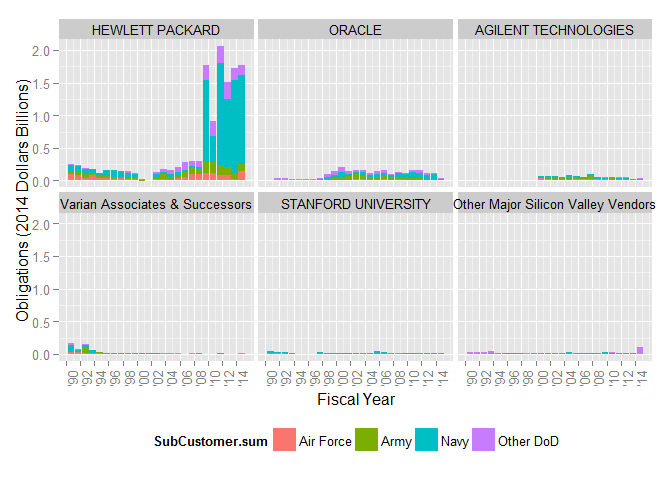
One reason that Sec. Carter puts such emphasis on the need to "renew the bonds of trust and rebuild the bridge bridge between the Pentagon and Silicon Valley" (para 16) is simply that it's where many of the high technology companies are located. The Valley's top firm, Apple Computer, has XX billion in cash on hand, greater than the total market valuation of the top five Defense Firms.[[1]](#footnote-1) However, Sec. Carter also made reference to the economic importance of geography when describing why Silicon Valley is not just a shorthand for the location of the headquarters of a range of prominent vendors:

"The reason that Silicon Valley is so successful is that it has the right people in it but there’s proximity as well – there’s an ecosystem out here.  Everyone’s in the same general area, which not only helps forge relationships, but also helps spread new ideas.  And that geographic proximity, coupled with strong links between academia and industry, has made this entire region a nexus for innovation" (para 43).

While Sec. Carter's established the importance of DoD-Silicon Valley partnerships and cited a variety of success stories, but he did not provide overall metrics as to the state of the relationship. As Figure 1 below shows, prime contract obligations top Silicon Valley vendors total less than 3 billion a year, never amounting to more than 1 percent of DoD contract spending. There was a large and sustained increase starting in 2009, driven by Hewlett Packard's acquisition of Electronic Data Systems which had a been a significant defense contractor.[[2]](#footnote-2)

Beneath the top-line trends, three points stand out about the relationship between the DoD and major Silicon Valley vendors: the narrowness of the base, the persistence of those contractors that have overcome the barriers to entry, and the avoidance of cuts due to drawdown or the budget caps.

Figure 1 Defense Contract Obligations to Major Silicon Valley Vendors, 1990-2014



### Narrow Silicon Valley Base

Figure 1 shows the contract obligations going to thirty-plus vendors on this paper's Silicon Valley Index. That index is made up of Stanford University, publicly traded companies that made it into the top 30 Silicon Valley between 2013 and 2015.[[3]](#footnote-3) Of those thirty plus major vendors only five had a quarter billion of more in total obligations since 1990. Hewlett Packard’s dominance is further emphasized by the fact that the number three company, Agilent Technologies, spun off from Hewlett Packard in November of 1999. The approximately hundred million dollar spike in other major Silicon Valley vendors in 2014 was driven by Cisco Systems, which if sustained could quickly allow that company to join the ranks of Oracle and Agilent Technologies.

Unsurprisingly, Silicon Valley contractors are overwhelmingly focused in Electronics and Communications systems (86 percent of obligations). The secondary category is other R&D and knowledge-based services (5 percent of obligations), which are the predominant service provided by Stanford University throughout the study period and the other major Silicon Valley vendors in the first half of the nineties. Hewlett Packard had a significant presences in the facilities and construction and missiles and space systems space that was largely inherited by Agilent Technologies after the spinoff. Facilities and construction services includes management of research facilities, and so still remains in the high technology domain and across all vendors accounts for just under 5 percent of obligations.

### Persistence of top Silicon Valley Contractors

Another noteworthy trend is that while companies do slowly rise and fall, there is significant stability within the top companies. Aggregated across the study period, the other major silicon valley vendors accounted for less than 3 percent of total obligations, just barely over half a billion dollars. Status as a notable DoD partner does not guarantee future business. Varian Associates obligations did begin to drop off the charts even before the company split into three parts in 1999.[[4]](#footnote-4) Nonetheless, this consistency is remarkable given the dynamism and turnover in the technology sector during this period. Figure 1 provides one clue as to the resilience of these specific vendors, each of them is selling to multiple parts of the government and not reliant on only a single major contract or customer.

This finding can illuminate the question of why Silicon Valley companies do not do more business with the Department of Defense. Loren Thompson (“Five Reasons Why Silicon Valley Won’t Partner With The Pentagon - Forbes,” n.d.) argues that efforts by DoD to bring in contracting with the government is not appealing to Silicon Valley due because they have a range of downsides while providing low profits. Thomson and Sec. Carter both identify fear of DoD policies regarding intellectual property as an important issue, though Sec. Carter emphasized that “[w]e need the creativity and innovation that comes from start-ups and small businesses, and we know that part of doing business with them involves protecting their intellectual property” (para 48). Thompson’s broader critique, which is applicable to the commercial sector as a whole, does fit with the narrowness of the base but does not explain why some Silicon Valleys have persistently contracted with the government during both contracting booms and downswings.

Other coverage of Silicon Valley leaders and commenters echo the distrust mentioned by Sec. Carter and the broader concerns about the procurement system with a particular emphasis on the pace of operations. Art Gilliland, a CEO with a cyber security firm said that his sector “often would like to work with the government, if not for the often intensely bureaucratic and expensive process it entails. Often, he says, selling into the government requires certifications that cost companies upwards of $100,000, and can take more than a year to receive” (Markowitz, 2015). This specific complaint highlights the issue of barriers to entry. For well capitalized vendors, $100,000 may be a drop in the bucket, but time is a precious commodity.

Merely having successfully completed some work with the government does not appear to be sufficient to make it into the Silicon Valley base. The category of Other Major Silicon Valley Vendors includes obligations to Google and Apple among other companies that did not result in a persistent relationship. However,

### Silicon Valley Partially Avoided Drawn down and Budget Cap Cuts

However, in aggregate the partnership grown during the drawdown. Average spending from 2010-2012 was over 190 percent higher than the 2000-2009 levels. Even during the BCA years of 2013-2014, spending was another 12 percent higher. However, a single vendor, Hewlett Packard, accounts for more than seventy percent of all obligations during the study period and is disproportionately responsible for this growth.

* SV is concerned about security and privacy after the Snowden leaks about NSA surveillance
* Government bureaucracy moves too slowly for SV
* Too much gov oversight, regulations and rules for procurement
* Too long of a process to secure a gov contract
* Expensive certifications required to work with the government
* Low margins
* Intellectual property risks
* Stifling regulations
* The Pentagon doesn’t trust market forces
* Unreliable – the Pentagon relies on the political system (Congress), which could halt or stem production

When the trends are examined at the DoD component level, they hold both good news and bad news for DoD policymakers. The good news, as shown in Figure 1, is that the major Silicon Valley vendors work with multiple parts, although Navy gets the predominant share. This means that the partnership is more broadly based than large contracts such as the Navy Marine Corps Intranet.[[5]](#footnote-5)

1. Individual companies
2. Patterns
   1. Defense predominant, HHS second, but distributed

"Over the years, I’ve seen lots of products developed here in Silicon Valley and throughout the tech community to enable boundless transformation, progress, opportunity and prosperity…across all sectors of our economy and society – commerce, health care, education, transportation, and national defense among many others.  And it’s made many things easier, cheaper, and safer (para 9).

But in recent years, it’s become clear that these same advances and technologies also present a degree of risk to the businesses, governments, militaries, and individual people who rely on them every day…making it easier, cheaper, and safer to threaten them (para 10).

The same Internet that enables Wikipedia also allows terrorists to learn how to build a bomb.  And the same technologies we use to target cruise missiles and jam enemy air defenses can be used against our own forces – and they’re now available to the highest bidder.  Whether it’s the cloud, infrared cameras, or the GPS signals that provide navigation for ride-sharing apps, but also for aircraft carriers and our smart bombs – our reliance on technology has led to real vulnerabilities that our adversaries are eager to exploit (para 11)

"The first of these trends is the evolutions we’re seeing in technology – that you all know very well about (para 19).

But second, there’s been an evolution for us of where technology comes from.  When I began my career, most technology of consequence originated in the United States, and much of that was sponsored by the government.  Now much more technology is commercial, and the technology base is global (para 20).

Globalization and commercialization have, in turn, led to more competition, which is good, because it leads to more innovative thinking.  That’s driven a third trend, which is that the competition for talent has become much more aggressive – and I’ll have more to say about that later, because that matters a lot to me as Secretary of Defense" (para 21).

MIT radiation lab - varian

"Consider the historic role that DoD and government investments have played in helping spur ground-up technology innovation – both in this Valley, and on this campus.  Some examples are well known.  Vint Cerf ‘fathered’ the Internet while a Stanford assistant professor and also a researcher at DARPA.  GPS – I don’t know whether Jim Spilker is here – likewise began as a defense-driven project, as did, in an earlier era, jet engines and communications satellites.  And even today, Stanford continues to be among the top university recipients of federal R&D spending. (para 27)

But other examples we hear less about.  Work on Google’s search algorithm was funded by a grant from the NSF, National Science Foundation.  And most technologies used throughout Silicon Valley – including many that Apple brilliantly integrated into the iPhone – can be traced back to government or DoD research and expenditures.  The developers of multi-touch worked together through a fellowship funded by the National Science Foundation and the CIA.  iOS’s Siri grew out of not only decades of DARPA-driven research on artificial intelligence and voice recognition, but also a specific DARPA project funded through SRI to help develop a virtual assistant for military personnel.  And Google’s self-driving cars grew out of the DARPA Grand Challenge" (para 28).

**Making Silicon Valley: Innovation and the Growth of High Tech, 1930-1970**

 By Christophe Lécuyer

Concerns:

One concern I’ve heard about is the worry that the government will insist on taking intellectual property, and then reveal proprietary information to the public and to competitors.  Let me assure you that we understand and appreciate industry’s right to intellectual property.  And DoD has a long history of successfully protecting companies’ proprietary information, and we respect the fact that IP is often the most important and valuable asset a company holds, and that businesses cannot be forced to sell their IP to the government.  We understand all that.  We need the creativity and innovation that comes from start-ups and small businesses, and we know that part of doing business with them involves protecting their intellectual property. (para 48)

"We want to partner with businesses on everything from autonomy to robotics to biomedical engineering; from power, energy, and propulsion to distributed systems, data science, and the Internet of things.  Because if we’re going to leverage these technologies to defend our country and help make a better world, the Department of Defense cannot do everything in all these areas alone.  We have to work with those outside. (para 53)

And the same is true, finally, with cybersecurity – we’re going to have to work together on this one." (para 54)

"This approach reflects two goals.  First, keeping the Internet open, secure, and prosperous.  And second, assuring that we continue to respect – and protect – the freedoms of expression, association, and privacy that reflect who we are as a nation" (para 59)

For this first look at Silicon Valley contracting, the study team created a dataset that included the top 30 publically traded silicon valley companies from 2013-2015 as well as Stanford University.[[6]](#footnote-6)

And last to ensure our cyber operations are appropriate and effective, we’re going to work more closely with our law enforcement partners at the FBI, with Homeland Security, and elsewhere.  There are clear lines of authority in our government about who can work where, so as adversaries jump from foreign to U.S. networks, we need our coordination with our government to operate seamlessly. (para 55)

## Methodology

The list of Silicon Valley vendors was generated by using a published list of the top 150 Silicon Valley Publicly Traded Companies. The study team culled a list of companies that reached the top 30 from 2012 to 2014.

1. Has Andrew said this publically or can we run down a source? [↑](#footnote-ref-1)
2. The merger was completed in August of 2008 and was incorporated into CSIS's data starting FY2009 (“HP News Release: HP Completes $13.9 Billion Acquisition of EDS,” n.d.). [↑](#footnote-ref-2)
3. These companies were identified using the SV150 list published in the San Jose Pheonix for the years 2013-2015 (“SV150: Searchable database of Silicon Valley’s top 150 companies for 2015 - San Jose Mercury News,” n.d.; Willis & Davis, 2014; Willis, 2013). Two sibling companies of Verian Medical Systems were also included: Varian Inc. and Varian Semiconductor Equipment. Taken together, these three companies [↑](#footnote-ref-3)
4. While Varian Medical Systems remains a major Silicon Valley player, its two sibling companies Varian Inc and Varian Semiconductor Equipment were purchased by Agilent and Applied Materials. [↑](#footnote-ref-4)
5. "The Navy Marine Corps Intranet (NMCI) is the Department of the Navy’s (DON) shore-based enterprise network in the continental United States and Hawaii... NMCI represents about 70 percent of all DON IT operations and is second only to the Internet in size" (“About NMCI,” n.d., para. 1). [↑](#footnote-ref-5)
6. Varian Inc. and Varian Semiconductors were also included despite not being in the top 30 list. There ranks were unavailable in the 2013 to 2015 period because they were acquired by sample vendors Agilent and XXXX respectively. In addition, these two firms were once part of Varian Associates along with the top 30 contractor Varian Medical Systems. Because this analysis is primarily interested in Silicon Valley participation and not their merger and acquisition structure, these companies are included for the little over a decade in which they were independent. The creation of the silicon valley sample is discussed in greater detail in the methodology section. [↑](#footnote-ref-6)