

**Quick Facts**

- Global defense spending increased 3.7% in 2022 to \$2.24 Trillion
- Defense budgets in European countries were up 13% to bolster defenses
- New NATO members Finland (and soon Sweden) to boost defense spending
- Backlog at Raytheon and Lockheed Martin exceeds \$300 Billion
- Boeing has a commercial aircraft backlog totaling 6.7 – 11.2 years of operation
- The Biden Administration proposed \$842 Billion defense budget is the largest ever; up \$100B from FY22
- Invesco’s Aerospace & Defense ETF (NYSE: PPA) remains near historic highs in share price, shares outstanding, and total assets, roughly \$1.9 billion

**SPADE Defense Index Statistics**

3/31/23 Close	9438.79
12/31/22 Close	9180.25

All-time Intraday High:  
6 March 2023 9656.36

All-time Closing High:  
3 March 2023 9621.25

Price Return	SPADE Defense	S&P500
<b>2023 YTD</b>	2.82%	7.03%
<b>1Q23</b>	2.82%	7.03%
<b>2022</b>	8.56%	[19.44%]

**Commentary**

In writing this quarter’s newsletter, we are going to tackle a wide-range of topics that we hope will be of interest to investors in the aerospace and defense sector. We will be addressing the following:

- In 2022, in reaction to the Russian invasion of Ukraine, defense stocks outperformed the market by nearly 30%. However, in 2023, the sector, though positive YTD, has been underperforming the broader stock market. We discuss the reasons why.
- How do we expect the aerospace and defense sector to perform over the remainder of 2023?
- Global defense spending is surging in response to Russia’s invasion of Ukraine.
- The world is becoming increasingly dangerous. Black swan events can quickly escalate and benefit holders of A&D stocks.
- The defense philosophy of a “great power competition” is getting increasing attention.

\* \* \*

The health of most sectors of the economy (and the companies that operate with them) are typically analyzed by supply, demand, general economic factors, and governing regulations. As investors in the A&D sector are undoubtedly aware, aerospace and defense companies operate under different conditions. The commercial side of

Continued on page 2

**SPADE Defense Index  
March 2023 Rebalance**

Eaton (ETN) was added to the index. Telos (TLS) was removed, its price failed to meet the index rules.

**Corporate Actions Affecting the Index During the Quarter**

None. The acquisitions of Maxar and Aerojet Rocketdyne are expected in 2Q23.

**Dividend**

Invesco’s Aerospace & Defense ETF issued a dividend of \$0.10847 on 20 March 2023. Over the past 12 months, \$0.662 was been returned.

**Licensed Products**

**Exchange Traded Fund (ETF)**

The SPADE Defense Index has been licensed to Invesco and serves as the underlying index for the Invesco Aerospace & Defense ETF (NYSE Arca: PPA).

**A Morningstar 4-Star Fund**

**Options Trading**

Options on the Invesco Aerospace and Defense ETF (ticker: PPA) began trading in November 2019.

### Commentary (continued from page 1)

the business has longer than typical business cycles than other sectors but can still be impacted by issues related to inflation and interest rates, and GDP growth. However, general economic factors for the government-focused part of the business, especially defense, is secondary; and more dependent on the political interpretation of global and local stability, in particular events that impact our security.

For investors at this time, the question is, “where in the defense cycle are we—is it time to buy, hold, or sell?” To answer this, one should consider (a) how great is the wall of worry? and (b) what, how, and should the US react? Factoring in the information we discuss below, we are led to believe that the defense cycle is still in the early innings; the impact of which will be felt in the coming quarters and into 2024 and 2025.

#### The world is becoming increasingly dangerous

It is hard not to read the news and listed to the rhetoric coming from around the world to not come to the conclusion that the global situation is deteriorating and the world becoming a more dangerous place.

- UN Secretary-General Antonio Guterres has warned that, “the risk of conflict between major powers is at a historic high, and the UN is under greater strain than any time since it was founded in 1945.”
- The deputy chair of Putin’s security council, Dmitry Medvedev, told a conference in Moscow that “a new world war was not inevitable but the risks of a nuclear confrontation were growing.”
- Vladimir Putin calls the war with Ukraine, “an existential battle with an aggressive and arrogant West” and that this is the most dangerous decade since WWII.

In the US, it is impossible to ignore the risk posed by some members of Congress who either support Russia or have political fatigue on the topic. Also fatigued are the news media, who has reduced reporting on the continued atrocities being committed by Russian troops since the early days of the war. Both could lead to increased Russian aggression and Chinese actions against other sovereign nations.

Additionally, there are a number of “black swan” type events that are becoming increasingly more believable. While these would likely lead to declines in the broader

stock market, they could result in increased defense sector spending. These include a geopolitical event between China and Taiwan, Russia using a nuclear device inside Ukraine, Russia invading a Baltic nation, Israel attacking Iranian nuclear program facilities, or China openly supplying weapons to Russia.

#### So, what role should the US play?

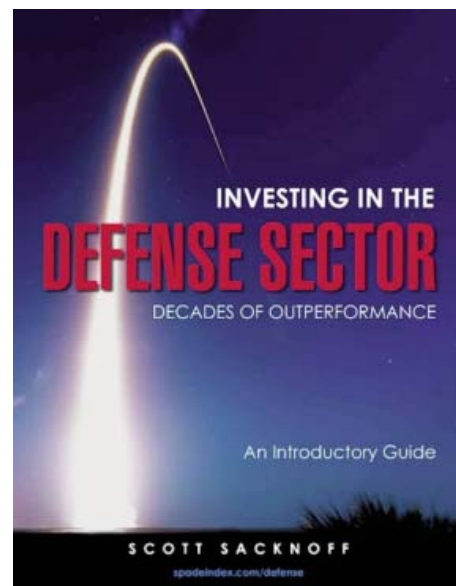
A military philosophy “buzzword” gaining increased attention is called the “great-power competition.” In simple terms, it is determining what role the United States should play in other regions of the globe, whether it be militarily, political, or economic. Where should the US be involved? How should it get involved? What interests are worth pursuing?

Since WWII, the United States has been considered a world superpower that initially competed against

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*Investing in the Defense Sector*

[https://spadeindex.com/Files/Investing\\_Defense\\_Sector\\_Guide.pdf](https://spadeindex.com/Files/Investing_Defense_Sector_Guide.pdf)



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**Commentary** (continued from page 2)

Russian interests globally, but has more recently been defined as democracy vs autocratic nations.

How, when, and where to engage is not a 100% clear decision. Since the Russian invasion of Ukraine, the US has provided more than \$50 billion in military aid to Ukraine in an effort to thwart the hostile actions led by Russian President Vladimir Putin against a western-aligned democracy. This amounted to roughly 2.2% of total US spending on Defense in 2022. Yet this support is not absolute, as direct engagement or use of US and NATO military service personnel is not currently authorized nor has been advanced long-range missiles or jet aircraft.

Meanwhile, in China, since taking power more than a decade ago, Chairman Xi Jinping has stated his intent to create “an authoritarian new world order orchestrated from Beijing.” In their view, Russia should play a supporting role (offering energy and raw materials to China) with other nations (North Korea, Iran, Saudi Arabia, and Syria, as well as countries in Africa and Asia) encouraged to be founding members—an alliance against the US and European democratic nations. Recent actions by OPEC reducing oil production to keep prices high, will positively impact the flow of money into Russia and counter Western sanctions.

**How will Russia/Ukraine end?**

It is a question on many minds. We see a back-and-forth battle that lasts at least through 2023. At a guess, the conflict is likely to end in one of four ways:

- (1) Russia figures out how to properly deploy its quantity of equipment and personnel advantages to overwhelm Ukraine (something to date they have failed to do);
- (2) The war escalates either by the entrance of a new party, such as China, or direct engagement by NATO;
- (3) The Wagner Group decides it is in interest to overthrow Vladimir Putin. A group of oligarchs and/or the military fed up with sanctions and threats engineer a coup. Putin’s serious health issues are confirmed. Each could lead to a change of leadership and policy changes.
- (4) An extended conflict, similar to that which happened in Crimea or Afghanistan, leads to a stalemate.

For those so inclined, one such long-read on the “great-power competition’ was recently published by AEI.com (39 pages), “Stress Testing American Grand Strategy II: Critical Assumptions and Great-Power Rivalry,” by Brands, Feaver, and Inboden. We don’t completely agree with all 17 points discussed and the analysis, but it is an interesting read.

**What this means for investors**

***A surging market for defense products and services***

The Russian invasion led to significant increases in defense spending, especially in the United States and Europe. For FY24, the Biden Administration has proposed the largest, nominal dollar, peacetime budget ever—adding nearly \$100 billion from the FY2022 levels to sustain our military advantages and invest in new technologies and capabilities; a total of \$842 billion is proposed.

According to SIPRI, total global defense spending rose 3.7% in 2022 to \$2.24 Trillion (a historic high). European spending to bolster defense was up 13%. Ukraine’s was up 640% (not including aid provided by the West). Russia’s budget was up 9.2% (although they stated this is highly uncertain given the increasing opaqueness of financial authorities there.)

Meanwhile, revenues from the US foreign military sales (FMS) program increased by more than 49% in 2022 while direct commercial transfers of weapons increased 48.6% driven by aid packages to Ukraine.

***Defense sector stock returns***

2022 saw the SPADE Defense Index gain by 8.56% while the S&P500 declined by 19.44%; an outperformance of 28%!

However, as of 4/5/23 per Morningstar, YTD the SPADE Defense Index has gained an additional 2.28% while the

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**PPA Dividend History**

YTD	\$0.108	2016	\$0.708		
2022	\$0.647	2015	\$0.501		
2021	\$0.426	2014	\$0.215	2009	\$0.202
2020	\$0.598	2013	\$0.383	2008	\$0.145
2019	\$0.651	2012	\$0.444	2007	\$0.055
2018	\$0.444	2011	\$0.199	2006	\$0.051
2017	\$0.363	2010	\$0.155	2005	\$0.022

**Commentary** (continued from page 3)

S&P500 is up 6.18%. It seems counterintuitive that defense stocks would underperform considering all the increased military spending, but a look inside how those returns are happening tells a different story. Mega-caps are once again in the driver's seat. The four most valuable companies, which comprise nearly 15% of the total market, have gained between 18.9% and 50.6% YTD. Excluding these firms, it is a vastly different story:

**YTD returns (as of 4/5/23 per Morningstar)**

	Value	Core	Growth
Large	0.49%	2.82%	15.51%
Mid	-2.72%	0.65%	6.09%
Small	-4.14%	3.21%	7.04%

	Return	Index Weight
Apple	26.2%	5.63%
Microsoft	18.9%	4.70%
Amazon	20.4%	2.70%
Tesla	50.6%	1.40%

**There are other factors limiting defense sector stock performance during the early part of 2023.**

1. It is taking time for military contracts to be let that support the war in Ukraine and to replenish efforts to refill the stocks of the US and its allies. A number of development contracts were delayed as DoD contracting personnel shifted their attention toward addressing wartime needs.
2. The large US arms makers are taking longer to boost production; even forcing companies to buy machinery from overseas to manufacture artillery shells in order to fulfill contracts.
3. Supply chain issues for key components, such as rocket motors, are hindering efforts to produce more arms. This has impacted the ability of firms such as Lockheed Martin and Raytheon to supply items like the Guided Multiple Launch Rocket System (GMLRS) and the Javelin missile.
4. Workforce constraints and the ability to find skilled workers is limiting firm's as they attempt to expand/handle a surge in business.
5. A fixable manufacturing issue for commercial aircraft, impacted in the short-term the share prices of Boeing and its supplier base, many of which have defense operations. Boeing has since stated that the problem will have minimal impact on its production goals for the year.
6. 2022 saw large inflows into defense ETFs and substantial gains in defense stocks. For example, the Invesco

Aerospace and Defense ETF (NYSE: PPA) saw shares held by investors grow from 9M to 23M over the past year. As such, a pause from investors (for PPA, inflows are up an additional 4% YTD) is not unexpected.

**So, what do we believe this means for the rest of 2023?**

Assuming that there is no debt ceiling impasse that leads to a default (who knows what happens to an economy and stock market in complete freefall), we believe that aerospace and defense stocks will outperform in 2023.

1. SPADE Defense Index component companies received more than 20 prime contracts in excess of \$1 billion and more than 75 contracts in excess of \$100 billion during the early months of 2023. The US Department of Defense has been very active and this represents a significant increase in volume of awards from that seen in late 2022.
2. Backlog at defense firms is significant and growing
  - a. Raytheon Technologies reported a \$180 billion backlog (\$71 B in defense, and \$109 B in commercial aerospace). This amount is greater than its current market cap.
  - b. Lockheed Martin has a \$150 billion backlog and recently was awarded several large contracts including a \$4 billion award from Australia to build a defense satellite and ground station architecture for a program known as JP 9102.
  - c. Boeing has a commercial business backlog equivalent to between 6.7 and 11.2 years of production.
3. Stock returns by large growth tech stocks (Apple, Microsoft, Amazon, Tesla) is unlikely to maintain its pace of outperformance. This can provide a drag on the broad market rally and benefit A&D stocks comparatively.
4. Commercial airline passenger and cargo traffic has returned to pre-pandemic levels. Carriers and transport companies are placing previously delayed contracts for new aircraft; some valued at tens of billions of dollars. The possibility of a forthcoming recession as interest rates rise does not appear to have slowed these new orders.

**Conclusion**

The three major sources of revenue for companies held by the SPADE Defense Index—defense at home and abroad, commercial aircraft production, and space activities—are all experiencing growth. After a year in which the Index outperformed the broader US stock market by 28%, a slowdown in gains is not unusual. Barring a change in the political environment, a debt ceiling crisis, or an unforeseen black swan event, we

## Commentary (continued from page 4)

expect that in the coming quarters (through 2024 and perhaps 2025), the growth in defense spending around the globe will benefit the top lines of companies involved

with aerospace and defense and the benchmark SPADE Defense Index as well.

## By the Numbers

**\$842B** President Biden proposed budget for DoD in FY24.

**~\$50B+** Boeing from Air India. Boeing (737Max and 787) and its competitor Airbus (A320neos) will split a 500 aircraft order.

**\$35B** Boeing from Riyadh Air for commercial aircraft

**\$5.2B** Raytheon Tech (Pratt and Whitney) from the F-35 Joint Program Office for 287 F135 engines.

**\$3.2B** Jacobs from NASA. To manage launch infrastructure and maintain ground systems at Kennedy Space Center.

**\$3.2B** Nine firms, including SAIC and L3 from the Defense Logistics Agency. Sharing a maximum contract for services in support of Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance Gateway to Sustainment contract. These are five-year base contracts with five one-year option periods.

**\$2.50B** Boeing from JAL Airlines. 21 – 737 Max aircraft.

**\$2.25B** Boeing from the USAF, The ninth lot of KC-46A Pegasus aircraft, a 15-plane order. They have completed 68 Pegasus aircraft to the Air Force

**\$1.95B** Boeing from US Army and its allies. 184 AH-64E Apache helicopters with a total potential contract value of \$3.8B if future options are exercised.

**\$1.79B** General Dynamics Information Technology from the US Army for flight simulation training services.

**\$1.78B** Boeing from EVA Air, five Boeing 787 Dreamliner.

**\$1.62B** Boeing from the US Air Force. Minuteman III Intercontinental Ballistic Missile guidance subsystem support.

**\$1.47B** General Dynamics from the US Army. Manufacture large-caliber metal projectiles and mortar projectiles.

**\$1.295B** Huntington Ingalls from the US Navy. A modification for the procurement of the detail design and construction of the Amphibious Transport Dock ship, LPD 32, the third LPD 17 Flight II ship.

**\$1.23B** Raytheon from the US Army. Patriot Missile System fire units.

**\$1.2B** Boeing from US Air Force. Rapid prototype of E-7A Wedgetail aircraft.

**\$1.2B** Gulfstream (General Dynamics) received two contract modifications from the USAF for support and logistics of C-20 and C-37 aircraft.

**\$1.18B** Lockheed Martin Space from the US Navy. Contract modification provide program management, engineering development, systems integration, long lead material, and special tooling and equipment in support of missile production.

**\$1.03B** Booz Allen Hamilton was among seven firms awarded a modification from DARPA, the Defense Advanced Research Projects Agency. It has a combined \$183,000,000 ceiling increase for high-level technical and analytical support services and increases the multiple award contract from \$850,000,000 to a maximum amount of \$1,033B.

**\$994M** Boeing from the US Air Force. For C-32A and C-40B/C aircraft contractor logistics support services. This contract provides for program management, aircraft base and depot maintenance, engine maintenance, modifications, and modification support.

**\$994M** General Dynamics and American Ordnance from the Army for 155mm ammunition rounds. (2/15)

**1Q23 Leaders**

1	Axon International	35.51%
2	Alleghany Tech	32.15%
3	Palantir	31.62%
4	Kratos Defense	30.62%
5	OSI Systems	28.72%
6	AAR Corp	21.49%
7	Iridium	20.49%
8	Transdigm	17.06%
9	CAE	17.01%
10	Sprit Aerosystems	16.66%

**1Q23 Laggards**

1	Northrop Grumman	[15.38%]
2	Leidos	[12.48%]
3	Booz Allen	[11.32%]
4	Honeywell	[10.82%]
5	TTM Technologies	[10.54%]
6	Huntington Ingalls	[10.26%]
7	Planet Labs	[9.66%]
8	General Dynamics	[8.02%]
9	L3 Harris	[5.72%]
10	Oshkosh Truck	[5.68%]

**Morningstar Says:**

PPA is a Four-Star Fund \*\*\*\*  
Avg Risk in the Industrials Category

**2023 YTD Results**

1	Axon International	35.51%
2	Alleghany Tech	32.15%
3	Palantir	31.62%
4	Kratos Defense	30.62%
5	OSI Systems	28.72%
6	AAR Corp	21.49%
7	Iridium	20.49%
8	Transdigm	17.06%
9	CAE	17.01%
10	Sprit Aerosystems	16.66%
11	Hexcel	15.97%
12	Parker Hannifan	15.50%
13	Moog	14.80%
14	Mercury Computer	14.26%
15	General Electric	14.09%
16	Teledyne Tech.	11.87%
17	Boeing	11.52%
18	Heico	11.33%
19	Triumph Group	10.17%
20	Ducommun	9.51%
21	Eaton	9.17%
22	BWX Technologies	8.54%
23	Ball Corp	7.76%
24	Howmet	7.51%
25	Aerovironment	7.00%
26	Viasat	6.92%
27	Curtiss Wright	5.55%

28	KBR	4.26%
29	Elbit Systems	3.76%
30	Comtech	2.80%
31	Kaman	2.51%
32	Leonardo DRS	1.49%
33	Woodward	0.79%
34	Aerojet Rocketdyne	0.13%
35	Textron	[0.24%]
36	Maxar	[1.31%]
37	CACI	[1.43%]
38	Jacobs Engineering	[2.13%]
39	Lockheed Martin	[2.83%]
40	Raytheon Tech.	[2.96%]
41	SAIC	[3.13%]
42	Parsons	[3.26%]
43	V2X	[3.80%]
44	Keysight Tech.	[5.61%]
45	Oshkosh Truck	[5.68%]
46	L3 Harris	[5.75%]
47	General Dynamics	[8.02%]
48	Planet Labs	[9.66%]
49	Huntington Ingalls	[10.26%]
50	TTM Technologies	[10.54%]
51	Honeywell	[10.82%]
52	Booz Allen	[11.32%]
53	Leidos	[12.48%]
54	Northrop Grumman	[15.38%]

**ETF Statistics (NYSE Arca: PPA)**  
**Invesco Aerospace & Defense**

Exchange / Ticker Symbol: NYSE / PPA  
 Assets (3/31/23) \$ 1.9B  
 Closing Price (3/31/23) \$80.55  
 Dividend Yield\* 1.07%  
 1Q23 Volume 19,445,000  
 Turnover\* 26%  
 Morningstar Rating \*\*\*\* (4-Star)

source: \* Morningstar & \*\* Yahoo Finance 3/31/23

Capture Ratio*	3-Yr	5-Yr	10-Yr
Upside	88	97	105
Downside	68	90	71

Portfolio Price / Earnings*	23.03
Portfolio Price / Book*	3.09
Portfolio Price / Sales*	1.68
Portfolio Price / Cash Flow*	16.23
Beta (3-year) *	0.88
Alpha (3-years)*	4.86
R-squared (3 years)*	53.73
Long-Term Earnings*	10.52%
Historical Earnings*	0.74%
Sales Growth*	0.29%
Cash Flow Growth*	5.62%
Book Value Growth*	6.91%

source: \* Morningstar 3/31/23

## By the Numbers

**\$895 M** Raytheon. The US State Dept ok'd the Australian government purchase of 200 Tomahawk Block V and up to 20 Tomahawk Block IV All Up Rounds.

**\$677.2 M** Textron Aviation from the US Naval Air Systems Command. An initial order of 10 T-54As under a program to replace T-44C Pegasus aircraft.

**\$656.8M** Sikorsky, a Lockheed Martin Co., from the US Army. Foreign military sale to Australia of the UH-60M aircraft.

**\$650.4M** Raytheon from the US Navy. The production and delivery of low-rate initial production (LRIP) Lot III Next Generation Jammer (NGJ) Mid-Band (MB), to include 15 NGJ-MB LRIP ship sets (2 pods per ship set), 11 for the Navy and four for the government of Australia, as well as to provide associated spares, support equipment, non-recurring engineering and associated data.

**\$522.3M** Northrop Grumman and Global Ordnance from the US Army for ammunition.

**\$522.3M** Northrop Grumman and Global Military Products from the US Army for 155mm ammunition rounds.

**\$506M** Javelin (a joint venture of Raytheon and Lockheed) received clearance for the acquisition by Australia of 63 extended-range Advanced Anti-Radiation Guided Missile system AARGM-ETs.

**\$481.6M** General Dynamics from the US Army. Sustainment of Prophet Enhanced detecting systems.

**\$474M** Lockheed Martin Space from the US Navy. To exercise options for Trident II (D5) missile production and deployed systems support. This contract award also benefits a foreign military sale to the UK.

**\$464M** Northrop Grumman from the US Air Force. For Battlefield Airborne Communications Node E-11A (BACN E-11A) platform maintenance and main operating base contractor logistics support establishment.

**\$463M** Argon ST (a division of Boeing) from the US Navy. Procures various Multi-Intelligence Sensor Development Sensor Suite production unit components for fielding in various manned and unmanned

aircraft, as well as associated engineering support for the Navy, Foreign Cooperative Partners and Foreign Military Sales customers.

**\$400M** Kratos Unmanned Aerial Systems from the US Air Force. R&D for Advanced Aerospace Systems Technology Research program. This contract has multiple awardees to be awarded at different dates. The primary objective of the program is to conduct research toward the development, demonstration, integration, and transition of new aerospace vehicle technologies, designs, and integrated systems that will provide advanced capabilities to the US Air Force.

**\$400M** Aurora Flight Sciences (a division of Boeing) from the US Air Force. A shared indefinite-delivery/indefinite-quantity for research and development for the Advanced Aerospace Systems Technology Research program. This contract has multiple awardees to be awarded at different dates.

**\$380M** L3 Harris from the US Navy. Build, repair and sustain the Cooperative Engagement Capability System (CEC) which protects ships and aircraft from air-based attacks.

**\$352M** Northrop Grumman from the US Marine Corps. Next generation handheld targeting system.

**\$320M** Lockheed Martin from the US Navy. This modification adds scope to provide non-recurring engineering in support of the production of one F-35A, one F-35B, and one F-35C new flight science test aircraft to replace aging flight science test aircraft for the Air Force, Marine Corps, Navy, and non-U.S. Department of Defense participants.

**\$320.3M** Raytheon Missiles and Defense from the US Air Force. For StormBreaker (SDBII, GBU-53/B) production Lot 9.

**\$287M** Curtiss-Wright Defense Solutions Inc. from the US Air Force for commercial supplies and services to sustain the High-Speed Data Acquisition System; specifically designed for flight test users, and flight test related commercial hardware, software, and firmware, technical support, repair, and training services will be provided.

**\$279M** SAIC from the Defense Logistics Agency. One \$99M and two \$90M contracts for facilities maintenance, repair, and operations supplies at various military bases

**Total Return**  
(Annual %)

	SPADE Defense Index
1-Yr	3.81%
3-Yr	18.18%
5-Yr	8.24%
10-Yr	14.51%
15-Yr	11.13%
Inception	11.28%

Through 3/31/2023  
(Morningstar)

**Index Performance (ex div)**

	SPADE Defense Index	S&P500	Alpha (bps)
YTD	2.82%	<b>7.03%</b>	[421]
2022	<b>8.56%</b>	[19.44%]	2800
2021	6.61%	<b>26.89%</b>	[2028]
2020	[0.73%]	<b>16.26%</b>	[1699]
2019	<b>38.49%</b>	28.88%	961
2018	[8.15%]	<b>[6.24%]</b>	191
2017	<b>28.92%</b>	19.43%	949
2016	<b>17.95%</b>	9.53%	842
2015	<b>3.23%</b>	[0.73%]	396
2014	<b>11.77%</b>	11.39%	38
2013	<b>48.27%</b>	29.60%	1867
2012	<b>16.30%</b>	13.41%	289
2011	[2.75%]	<b>[0.00%]</b>	[275]

	SPADE Defense Index	S&P500	Alpha (bps)
2010	9.62%	<b>12.78%</b>	[316]
2009	21.71%	<b>23.45%</b>	[174]
2008	<b>[38.03%]</b>	[38.49%]	46
2007	<b>22.17%</b>	3.53%	1864
2006	<b>19.33%</b>	13.62%	571
2005	<b>5.30%</b>	3.00%	230
2004	<b>20.47%</b>	8.99%	1148
2003	<b>37.27%</b>	26.38%	1089
2002	<b>[2.87%]</b>	[23.37%]	2050
2001	<b>0.94%</b>	[13.04%]	1488
2000	<b>4.98%</b>	[10.14%]	1512
1999	15.31%	19.53%	[422]
1998	6.63%	26.67%	[2004]

**Price Return by Decade (ex div)**

	SPADE Defense	S&P500	Alpha (bps)
<b>2010-2019</b>	<b>310.26%</b>	<b>189.73%</b>	<b>12,053 (120.53%)</b>
<b>2000-2009</b>	<b>97.07%</b>	<b>-24.11%</b>	<b>12,118 (121.18%)</b>

**About the SPADE Defense Index**

The SPADE Defense Index (NYSE: DXS) provides an investment benchmark for the value that the market ascribes to companies involved with defense and its homeland security, and space components.

The Index is designed to reflect the broad diversity of activities that is representative of companies involved with the sector—naval vessels, military aircraft, armored vehicles, helicopters, drones and remotely piloted vehicles, missiles and missile defense, command and control, secure communications, battlespace awareness, intelligence and reconnaissance, and space systems, as well as national/homeland security activities including border security, biometric screening systems, and military cybersecurity efforts.

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SPADE Indexes specializes in designing and managing equity benchmarks for ETF and other products.

**Rules**

The SPADE Defense Index was designed to be RIC (registered investment company) compliant for the purpose of enabling financial products. Companies are required to meet an eligibility criteria that includes market valuation (>\$250M), listing on a major U.S. exchange, and have sufficient liquidity. Importantly, each firm must be considered systematically important to the defense of the United States and that their defense business is systematically important to the revenues and health of the firm. We follow an enhanced modified market cap methodology that employs the True Cap™ strategy, which enables the index to more accurately handle firms with diversified operations.

Full details are available at: [www.spadeindex.com/defense](http://www.spadeindex.com/defense)

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