

EQUITY  
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# MarketVector™ Global Defense Industry Index: New Insights One Year On

Discovering Global Leaders of the Defense Industry

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## Recent Developments in the Geopolitical Landscape

Since the launch of the [MarketVector™ Global Defense Industry Total Return Net Index \(MVDEFTR\)](#) on January 31, 2023, there have been significant changes in global security dynamics that have profoundly impacted societies and the defense and national security industries. Such evolutions warrant an update of this whitepaper, originally published in Q1 of 2023, which initially highlighted Russia's invasion of Ukraine and the state of strategic priorities around military technology.

Not only has the war in Ukraine persisted much longer than initially anticipated but the long-lasting Israel-Palestine conflict has flared up again, whose shots were heard around the world. On October 7, 2023, an assault was carried out by Palestinian militant factions from the Gaza Strip on southern Israel, marking the largest escalation in military conflict in the area since the Yom Kippur War exactly 50 years ago. In response, the Israel Defense Forces (IDF) mobilized reservists and declared war, initiating Operation Iron Swords. Over the next few months, Houthi militants in Yemen carried out 45 attacks on commercial and naval vessels in the Red Sea, posing a threat to regional security and supply chains. Following these attacks, the air forces of the US and UK directed their efforts towards targeting Houthi infrastructure, including, “underground weapons storage facilities, missile storage facilities, one-way attack unmanned aerial systems, air defense systems, [etc.].”<sup>1</sup>

Taken together these developments sparked a substantial uptick in regional tensions, and governments around the world are rolling out increased defense budgets. One notable instance of such a policy shift is Germany's intent to ramp up military expenditures, which is said to increase to nearly 3.5% of GDP, and whose defense minister pledged to hit NATO's 2% target for the next 4 years.<sup>2</sup> NATO established the guideline that member countries should aim to spend at least 2% of GDP on defense annually in 2014, but Germany has fallen short of this target since the guideline's inception up until (at least) 2022. Germany's pledge to meet this spending target in the future aligns with a broader trend among NATO members in Europe, who have escalated their defense budgets primarily as a response to Russia's full-scale invasion of Ukraine. For comparison, Russia's 2024 military expenditure is estimated at USD 140 billion which is 7.1% of GDP.<sup>3</sup>

With immense amounts of military expenditures comes overwhelming demand for military equipment linked to the major wars described in Eastern Europe and the Middle East. As such, the military industry, encapsulated by the [MarketVector™ Global Defense Industry Total Return Net Index \(MVDEFTR\)](#), has risen 76.42% since Russia invaded Ukraine on February 24, 2022, and 26.8% since Israel launched Operation Iron Swords on October 7, 2023.

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<sup>1</sup> US and UK carry out fresh strikes on Houthi targets in Yemen. Published on February 24, 2024. BBC. <https://www.bbc.com/news/world-middle-east-68395173>

<sup>2</sup> Germany Says Its Defense Spending Could Increase to 3.5% of GDP. Published on February 17, 2024. <https://www.bloomberg.com/news/articles/2024-02-17/germany-says-its-defense-spending-could-increase-to-3-5-of-gdp>

<sup>3</sup> Russia's military spending in 2024 estimated at USD 140 billion, report shows. Published on December 13, 2023. <https://www.aa.com.tr/en/world/russia-s-military-spending-in-2024-estimated-at-140b-report-shows/3081698>

The [MarketVector™ Global Defense Industry Index \(MVDEF\)](#) is unique in two main ways. The first of which is the noteworthy methodology that ensures only pure-play companies are eligible for selection, establishing targeted exposure to companies involved in serving national defense industries. This means that companies like Boeing, which don't fit the strict criteria of a pure-play, and CrowdStrike, which doesn't primarily serve the national or federal government departments, are excluded from the universe. The other interesting aspect of the index is that it is screened for social norms violations and controversial weapons involvement. Given the nature of the defense industry, it's crucial for these companies to maintain a commitment to upholding international human rights standards. Perhaps such screening is even more applicable in this sense than for broad-based equity strategies. Therefore, by combining a focused approach on pure-play entities with the integration of social norms and controversial weapons principles, MVDEF not only narrows its scope to the most relevant players in the defense sector but also aligns its investments with critical ethical standards, setting a new benchmark for responsible investing in this industry.

## Investing in the Defense Industry

Since the establishment of nation-states, and especially since the late 18<sup>th</sup> Century, governments around the world have looked to maintain a quantitative military edge as a means of deterrence and preparedness for military conflict as well as protection of economic interests. Historically and especially since World War II and the Cold War, conserving a military advantage requires enormous financial commitments including investments in research and development and massive long-term defense contracts. As national and global defense industries have privatized – a trend that accelerated from the 1970s to the present – persistent spending on military equipment and the development of new technologies presents a unique opportunity for investors.

The Russia-Ukraine and Israel-Hamas wars are the largest most recent examples of the traumas and economic burden that war and military conflict can cause. These brutal wars are undeniably a humanitarian crisis, presenting challenges for governments and investors, alike. Military supply chains are being put to the test, and governments are forced to respond quickly in what has evolved to be a costly conflict in terms of both loss of lives and finances. While it is a difficult topic to think of in financial terms, these wars serve as a reminder of the vitally important role that defense-related companies play in the economy and financial markets.

In this paper, we provide insight into how investors can navigate investment opportunities and related risks by tracking global pure-play defense companies via the [MarketVector™ Global Defense Industry Index \(MVDEF\)](#). The defense industry offers investors a versatile diversification tool that is tied to geopolitical events and trends. Short-term defense spending around international conflicts, and long-term budgeting to preserve military technological advantages work to sustain demand for military equipment and services leading to larger top and bottom lines. Additionally, military companies often have deep-rooted contracts with governments, which aids the stability of revenue streams. Finally, numerous breakthrough technological and industrial innovations of the last half century were either developed by - or initially used by - militaries or defense-related companies.

Investing in the defense industry also poses significant risks to investors, including the macro-driven nature of how supply and demand impact profits. On the supply side, critical resources and materials are typically globally outsourced which poses operational hazards as unpredictable global shocks can disrupt production. Moreover, defense companies often operate under contracts with the government, whose military budgets fluctuate (as described in the introduction).

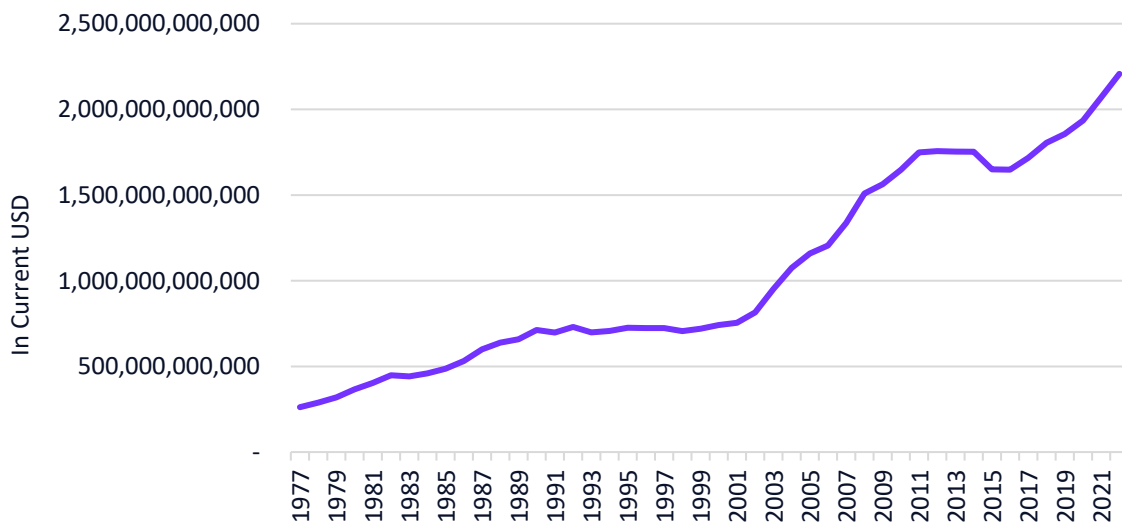
The MarketVector™ Global Defense Industry Index (MVDEF) is the first index that provides pure-play exposure specifically to companies that derive at least 50% of their revenue from the military or defense industries. The index is distinctive when compared to broader aerospace and defense indexes that also include companies primarily serving the civilian markets. The index takes a thematic approach, reaching across multiple traditional sectors to capture companies offering a variety of defense-related products and services including communications and command and control systems, unmanned vehicles, event response, information technology, cybersecurity, training and simulation software, digital forensics, and of course military equipment and arms.

## Industry Growth and Drivers

### Global Military Budget

One of the more reliable trends in global economics and politics is the persistent expansion of global military expenditures. As shown in **Exhibit 1**, from 1977 through 2021 world military expenditures in current USD terms have grown from roughly 250 billion to more than 2 trillion (we left the y-axis unscaled to demonstrate the magnitude of just how large this budget is).<sup>4</sup> In those 44 years world military spending declined only 9 times by an average of just -1.88%. From 2021 to 2022, this figure grew over 6% from 2.07 trillion to 2.2 trillion. Interestingly, member countries of the Organization for Economic Co-operation and Development (OECD) accounted for 65% of total world military expenditure in 2022.

**Exhibit 1: World Military Expenditures From 1977 to 2022**



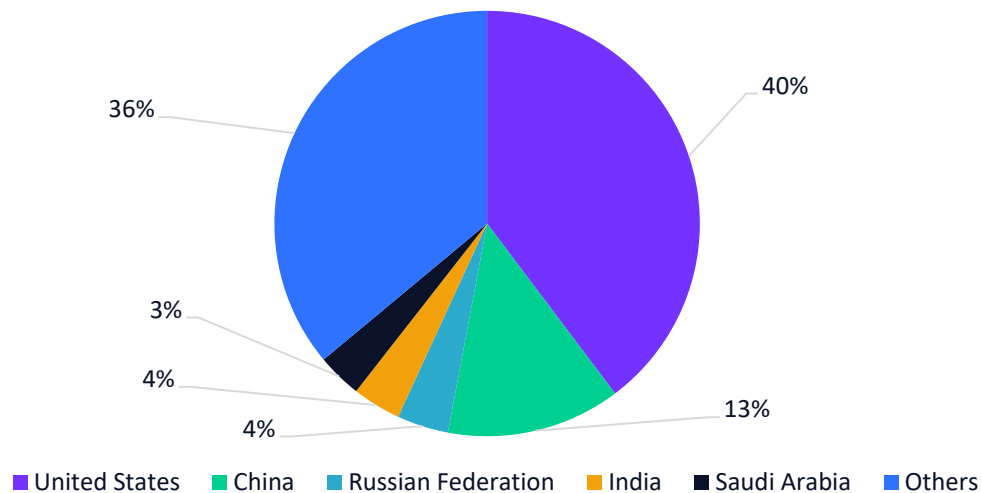
Source: Military Expenditure. World Bank.

<sup>4</sup> Military Expenditure (current USD). World Bank. <https://data.worldbank.org/indicator/MS.MIL.XPND.CD>

While military spending has risen in both peace and war times, military conflict can cause spikes in spending, while de-escalations often result in sustained or diminished military budgets. Notably, after Russia’s military expenditure had declined from 2016 to 2019, in the run-up to the Russia-Ukraine war, Russia expanded its military expenditure by about 3% to USD 65.9 billion in 2021, which was 4.1% of its GDP at the time.<sup>5</sup> Similarly, Ukraine’s military expenditure was 3.23% in 2021, while it was just 1.53% a decade prior.<sup>6</sup> Astonishingly, Ukraine’s defense spending went from about 6 billion USD in 2021 to nearly 44 billion in 2022.<sup>7</sup>

On a global level, the United States is by far the world’s biggest spender as shown in **Exhibit 2**; about 40% of the world’s military budget is derived from the United States, whose budget increased over 170% from 2000 through 2022 from about USD 320 billion to USD 870 billion (in USD real terms). To get a sense of just how large the United States' military budget is, consider that China's, the next largest, was roughly a third of the USA's, at approximately USD 290 billion.

**Exhibit 2: Distribution of World Military Budget**



Source: Military Expenditure. World Bank.

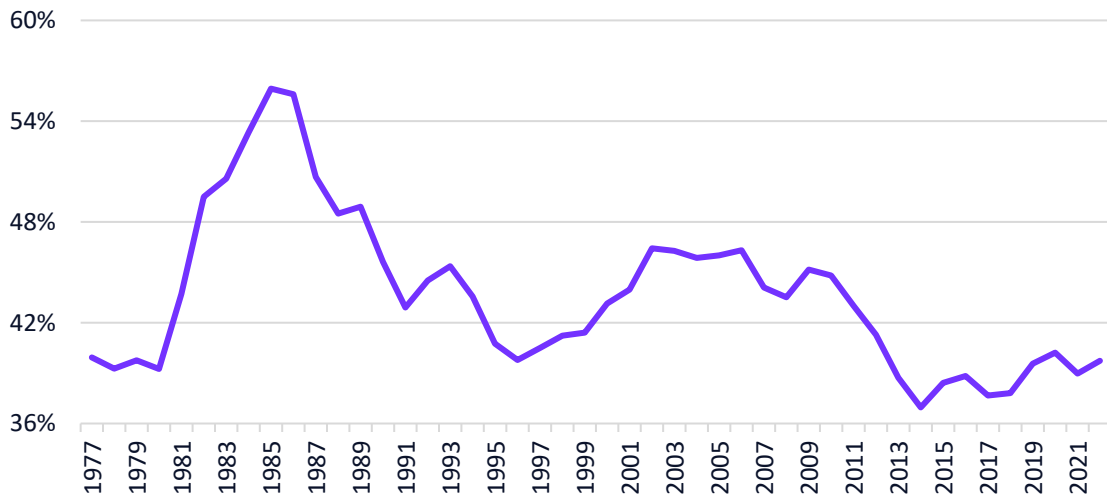
Charted in **Exhibit 3** is the United States military expenditure as a percent of the world’s military expenditure. Amid the Cold War, the USA’s military expenditure represented more than half of the world’s. As the Cold War drew to a close and the Soviet Union collapsed in 1991, the United States scaled back its military budget relative to other nations.

<sup>5</sup> World Military Expenditure Passes USD 2 Trillion for First Time. Sipri. <https://www.sipri.org/media/press-release/2022/world-military-expenditure-passes-2-trillion-first-time>

<sup>6</sup> Ukraine: Ratio of military spending to gross domestic product (GDP) from 2011 to 2021. Statista. <https://www.statista.com/statistics/810835/ratio-of-military-expenditure-to-gross-domestic-product-gdp-ukraine/#:~:text=The%20ratio%20of%20military%20expenditure,comparison%20to%20the%20previous%20year>

<sup>7</sup> See footnote 4

**Exhibit 3: US Military Expenditure as a Percent of World Military Expenditure Since 1977 to 2022**



Source: Military Expenditure. World Bank.

### Current Outlook

As previously mentioned, the current threat environment remains elevated following the ongoing wars in Ukraine and the Middle East. The US and NATO nations are tapping into equipment and aid stockpiles while securing additional resources to replenish depleted inventories. As these wars continue, sustained demand for military resources puts pressure on available supply, which in turn benefits firms operating in this space as they are pressured to ramp up production.

It is also crucial not to ignore the civil conflicts in Sudan and Myanmar, along with escalating tensions in East and Southeast Asia. Notably, the Armed Conflict Location and Event Data Project (ACLED) ranks Myanmar as the most violent of the 50 conflicts it monitors worldwide, citing an estimated death toll of at least 50,000 since the 2021 military coup, which includes at least 8,000 civilian casualties.<sup>8</sup> Although these situations represent extreme humanitarian crises, they do not have a direct impact on the national defense industry's operations.

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<sup>8</sup> Myanmar: three years of a devastating, under-reported war. Relief Web. Published February 3, 2024. <https://reliefweb.int/report/myanmar/myanmar-three-years-devastating-under-reported-war#:~:text=The%20Armed%20Conflict%20Location%20and,incluing%20at%20least%208%2C000%20civilians>

## Strategic Priorities

Defense demands are constantly evolving with modern international conflicts. The Defense Industrial Base (DIB) Sector, which is a general reference to a nation’s collection of businesses that contribute to the military-related sector, outlines areas of needed improvement and development for sustained military efficiencies. Often cited risks to defense industrial bases include materials shortages, reliance on foreign suppliers, budgeting goals, and obsolete technology. Among these risks, ensuring a technological edge is a costly endeavor that requires significant investment in research and development, as well as adaptation to keep up with the ever-changing threat landscape.

Warfare continues to evolve as technologies advance and supply-demand dynamics differ over time from country to country. The latest example is the drone warfare observed in the Russia-Ukraine war. With neither side able to penetrate air defense systems, both Russia and Ukraine have shifted to using single-use, agile drones that carry explosives and target critical units such as tanks and artillery. The extensive deployment of drones in Ukraine is anticipated to shape the future conduct of modern warfare going forward, with the objectives of maximizing tactical mobility, reconnaissance, precision, and cost-effectiveness in mind.

US military R&D increased by 24% from 2012 to 2021 while arms procurement funding fell by 6.4% over the same period, highlighting the tradeoff between investing in new technology and stockpiling existing arms.<sup>9</sup> Key drivers of R&D expenditure include those outlined to be essential by The United States Secretary of Defense for Research and Engineering: Directed Energy, Hypersonics, and Integrated Sensing and Cyber.<sup>10</sup>

### Office of the Under Secretary of Defense for Research and Engineering: Defense-Specific Critical Technology Areas

<b>Directed Energy</b>	High-power lasers and microwaves provide innovative solutions for countering a wide range of threats. The main benefits include the distance and speed of these high-energy particle beams.
<b>Hypersonics</b>	Hypersonic missiles can travel through upper-bound levels of the atmosphere at speeds of Mach 5 or greater. They are highly maneuverable making them strong tactical options.
<b>Integrated Sensing and Cyber</b>	The use of electronic warfare in cyberspace has created a highly competitive digital setting, where defending against sophisticated threats to communication resources is essential.

<sup>9</sup> IBID. World Military Expenditure Passes \$2 Trillion for First Time. Sipri. <https://www.sipri.org/media/press-release/2022/world-military-expenditure-passes-2-trillion-first-time>

<sup>10</sup> Critical Technology Areas. USD (R&E). <https://www.cto.mil/usdre-strat-vision-critical-tech-areas/>



## Military Technology Transfer

Defense-related research efforts have led in part to numerous significant innovations in modern society, ranging from cyber security to the internet and GPS to drones. While military and defense-related companies earn the vast majority of their revenue directly from defense supplies, services, and technologies, they also stand to benefit from the transfer of military technology to civilian use.

- Global Positioning System (GPS) was originally discovered by the U.S. Department of Defense (DoD) for military use and is now widely used in civilian navigation. In the 1960s the United States Navy used satellite navigation techniques to monitor submarines. Civilian use was not enabled until the 1980s, following the Korean Air Lines Flight 007 tragedy, when a commercial aircraft was shot down by Soviet Air Forces after a navigational incident.
- The Internet, which was also created by the DoD during the Cold War, was built as a means of communication between government agencies. The ARPANet was the first functional prototype that enabled multiple computers to communicate on a single network. In 1969, the first message was sent from a computer located at UCLA to one at Stanford. The message sent was “LOGIN”, however, the network crashed after the Stanford computer received the message’s first two letters ‘LO’.
- The UK’s Royal Air Force commenced in 1918. To train pilots in aerial target practice, a radio-controlled drone called the de Havilland DH82B Queen Bee was used and is considered the first modern drone.
- The microwave oven was said to be stumbled upon by a Raytheon engineer in 1945. At the time, the engineer was conducting experiments with a new type of vacuum tube called a magnetron, which was being developed for radar systems during World War II.

## Defense Company Examples

### Safran SA

Safran SA is a French multinational company that specializes in aerospace and defense. They manufacture aircraft engines, landing gear, and other aerospace systems, as well as defense products such as missiles, drones, and electronic warfare systems. Safran SA is involved in several projects and technologies in the defense industry including the production of the M88 engine, which powers the Dassault Rafale fighter jet, used by several countries' air forces, the development of the Oxygen Generating System (OGS) for the International Space Station (ISS), and the buildout of the European Space Agency's Ariane 6 rocket, which is set to become the main launch vehicle for European satellite launches. Safran reported about EUR 19.5 billion in revenue for FY 2022, with Equipment & Defense and Military Engines making up the majority of revenue.<sup>11</sup>

### Hensoldt AG

Hensoldt AG is a German company that specializes in defense and security technology. They provide a wide range of products and services, including airborne radar systems for fighter jets and airborne early warning and control (AWACS) aircraft, electronic warfare systems for military aircraft and ships, as well as cybersecurity solutions for government and industrial customers. They provide all-around military solutions for land, sea, air, space, and cyber-based warfare.

### AeroVironment, Inc.

AeroVironment, Inc. is an American company that designs, develops, and manufactures unmanned aircraft systems (UAS), electric vehicle charging systems, and related technologies. They provide a wide range of products and services for military customers, including hand-launched UAS for reconnaissance and surveillance, and tactical missile systems for use in ground combat. In FY 2022, over half of their revenue was derived from Unmanned Systems consisting of SUAS, MUAS, and UGV product lines.<sup>12</sup> In November of 2023, Israel requested to purchase 200 AVAV Switchblade 600 attack drones.<sup>13</sup>

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<sup>11</sup> Safran SA FY 2022 Results

<sup>12</sup> AeroVironment, Inc. FY 2021 Results

<sup>13</sup> US considers Israeli request for hundreds of Switchblade 600 attack drones. Published November 7, 2023.  
<https://defensescoop.com/2023/11/07/us-considers-israeli-request-for-hundreds-of-switchblade-600-attack-drones/>

## Index Design and Architecture

### Thematic Criteria

Companies in the MarketVector™ Global Defense Industry Index (MVDEF) must initially derive 50% of their revenues specifically from the military or defense industries (including related national/federal governmental departments but excluding civilian markets) related to the following products and services:

- general aerospace and defense products and services,
- communications systems and services, including satellites, unmanned vehicles, event response, security, or safety-related software,
- information technology hardware and services,
- cybersecurity software,
- training and simulation software and products, digital forensics,
- detection devices, and
- e-authentication/biometric identification.

The revenue buffer of 50% ensures that the index is comprised of pure-play defense and military companies. This threshold is unique in that it enables the MarketVector™ Global Defense Industry Index (MVDEF) to take a targeted approach to identify pure defense companies as opposed to non-pure-play companies involved in commercial aviation, such as Boeing Co, who reported about 35% of revenue from Defense, Space & Security.<sup>14</sup> The constituents, therefore, offer maximum exposure to the market segment of ‘Defense’ as opposed to the generic ‘Aerospace & Defense’.

### ESG Factors

While the debate continues on whether defense, as a whole, can be categorized as sustainable, a suitable index should still consider companies that meet certain minimum safeguards. Integrating ESG-related standards in index design serves to ensure that companies included in the MarketVector™ Global Defense Industry Index (MVDEF) are adhering to global norms on human rights standards. Screened factors include Norm-Based Research Overall Scores as well as Controversial Weapons including biological weapons, chemical weapons, cluster munitions, and depleted uranium.

One specific example of a chemical weapon that is screened for is White Phosphorus. Although it does not violate the Chemical Weapons Convention (CWC)<sup>15</sup>, the munition is considered particularly controversial due to its potential use against civilians. Likewise, the relevant ESG filter screens for Depleted Uranium. The radioactive nature of this heavy metal is poisonous, and therefore also controversial. Among other factors, these are just two filters that establish a baseline for humanitarian considerations.

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<sup>14</sup> Boeing Co FY 2021 Results

<sup>15</sup> Chemical Weapons Convention. OPCW. <https://www.opcw.org/chemical-weapons-convention>

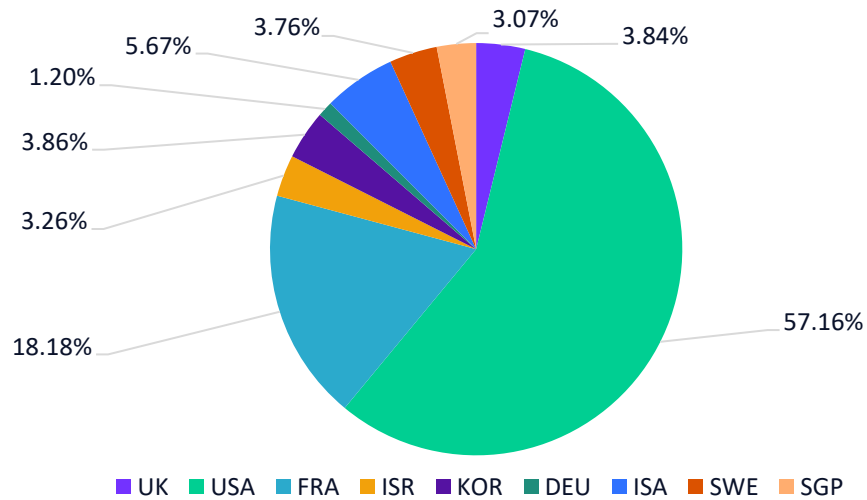
## Index Components & Weight Breakdown

Listed in **Exhibit 4** are the 28 components that comprise the MarketVector™ Global Defense Industry Index (MVDEF) as of February 23, 2024. The 5 main subthemes include Military Aircraft Manufacturing, Defense Munitions and Engineering, Defense IT and Intelligence, Military and Defense, and Naval Shipbuilding. Geographically, defense companies headquartered in the United States account for most of the weight in MVDEF, followed by France, as seen in **Exhibit 5**. These 28 components represent nine countries, making the index uniquely global.

### Exhibit 4: 28 components of MVDEF

Security Name	Subtheme	Index Weighting	Country
AEROVIRONMENT INC	Military Aircraft Manufacturing	1.49%	UNITED STATES
BABCOCK INTERNATIONAL GROUP PLC	Defense Munitions and Engineering	1.69%	UNITED KINGDOM
BOOZ ALLEN HAMILTON HOLDING CORP	Defense IT and Intelligence	8.15%	UNITED STATES
BWX TECHNOLOGIES INC	Defense Munitions and Engineering	3.75%	UNITED STATES
CACI INTERNATIONAL INC -CL A	Defense IT and Intelligence	3.53%	UNITED STATES
CHEMRING GROUP PLC	Defense Munitions and Engineering	0.80%	UNITED KINGDOM
CURTISS-WRIGHT CORP	Defense Munitions and Engineering	4.98%	UNITED STATES
DASSAULT AVIATION SA	Military Aircraft Manufacturing	3.04%	FRANCE
ELBIT SYSTEMS LTD	Defense Munitions and Engineering	3.26%	ISRAEL
HANWHA AEROSPACE CO LTD	Military Aircraft Manufacturing	2.08%	SOUTH KOREA
HENSOLDT AG	Defense IT and Intelligence	1.20%	GERMANY
HUNTINGTON INGALLS INDUSTRIES	Naval Shipbuilding	4.52%	UNITED STATES
KBR INC	Defense Munitions and Engineering	3.34%	UNITED STATES
KOREA AEROSPACE INDUSTRIES LTD ORD	Military Aircraft Manufacturing	1.79%	SOUTH KOREA
KRATOS DEFENSE & SECURITY SOLUTIONS INC	Defense IT and Intelligence	1.20%	UNITED STATES
LEIDOS HOLDINGS INC	Defense Munitions and Engineering	7.98%	UNITED STATES
LEONARDO SPA	Military Aircraft Manufacturing	5.67%	ITALY
MERCURY SYSTEMS INC	Defense IT and Intelligence	0.70%	UNITED STATES
MOOG INC-CLASS A	Defense Munitions and Engineering	1.84%	UNITED STATES
OSI SYSTEMS INC	Defense IT and Intelligence	0.98%	UNITED STATES
PALANTIR TECHNOLOGIES INC	Defense IT and Intelligence	9.32%	UNITED STATES
PARSONS CORP	Defense IT and Intelligence	2.38%	UNITED STATES
QINETIQ GROUP PLC	Defense Munitions and Engineering	1.34%	UNITED KINGDOM
SAAB AB CLASS B	Military Aircraft Manufacturing	3.76%	SWEDEN
SAFRAN SA	Military Aircraft Manufacturing	8.20%	FRANCE
SCIENCE APPLICATIONS INTERNATIONAL CORP	Defense IT and Intelligence	3.01%	UNITED STATES
SINGAPORE TECH ENGINEERING	Defense Munitions and Engineering	3.07%	SINGAPORE
THALES SA	Military Aircraft Manufacturing	6.94%	FRANCE

Exhibit 5: Weight by Country

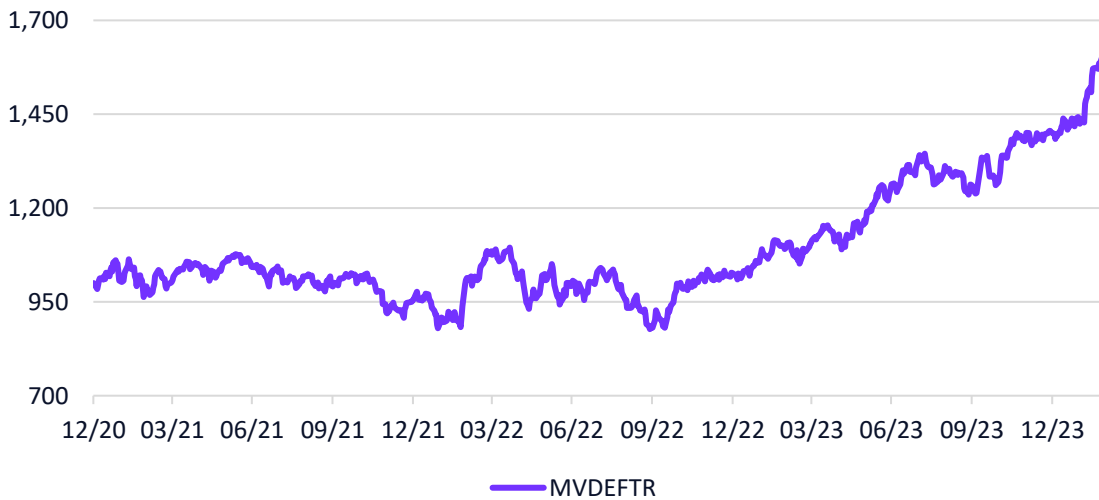


Source: MarketVector. Data as of February 23, 2024.

### Performance

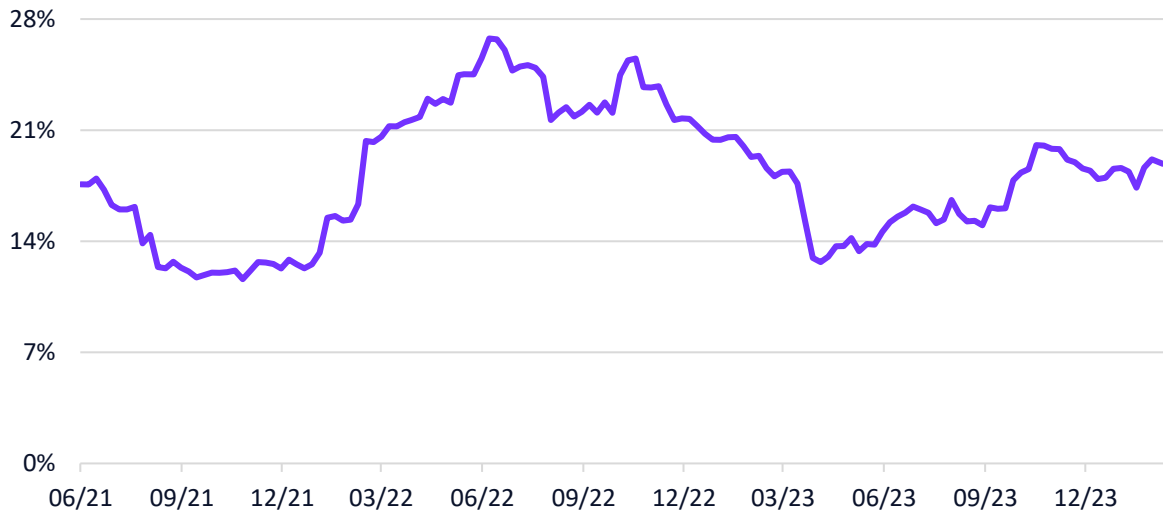
The MarketVector™ Global Defense Industry Index (MVDEFTR) has back-tested history from the end of 2020, as shown in **Exhibit 6**. Since inception, the index is up 60.54%, which is attributable to tailwinds provided by sustained defense budgeting and strong equity markets. Depicted in **Exhibit 7** is the rolling 6-month annualized volatility of MVDEFTR, using weekly data.

Exhibit 6: MVDEFTR Performance from 2020



Source: MarketVector. Data as of February 26, 2024.

### Exhibit 7: Rolling 6-Month Annualized Standard Deviation



Source: MarketVector. Data as of February 26, 2024.

## Conclusion

The global defense industry is a constantly evolving and intricate sector that attempts to maintain the safety of nations and their people through technological progress. It is heavily influenced by government contracts and global politics, driven by the constant need to fulfill the leadership's responsibility of ensuring the security of their citizens. Investing in the defense industry adds diversification to a portfolio and offers exposure to a growing global industry tied to relatively stable government contracts.

The continuous commitment to modernize military technology drives demand and innovation in an industry, where doing so can save lives. These efforts go beyond weaponry and munitions to include companies involved in a range of unique sub-sectors; Defense Electronics, such as UAVs, radar, and sonar; well as Defense Services, such as training, intelligence, cybersecurity, and simulation software. Investing in the defense sector is commonly perceived as having a degree of portfolio insurance against global instability. While this can well be the case, the sector also plays a pivotal role in international diplomacy and peacekeeping initiatives.

MarketVector maintains one of the largest families of thematic equity indexes, powered by a proprietary index classification methodology that allows our clients to target with unparalleled precision, going beyond the limitations of traditional benchmarks. The [MarketVector™ Global Defense Industry Index \(MVDEF\)](#) expands MarketVector indexes listed under the meta theme “Thematic Industrials”.

Find out more [here](#).

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Jesse Nacht is the Index Research Associate at MarketVector Indexes™ (“MarketVector”). His core responsibilities include assisting in index development and design. Having come from a trading background, Jesse holds a Series 57 Securities Trader License. He has a Master of Arts in International Economics and Finance from the International Business School at Brandeis University. Prior to this, he also received a Bachelor of Arts in Economics from the same university.

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## IMPORTANT DEFINITIONS AND DISCLOSURES

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