

Military & Defense Market Overview

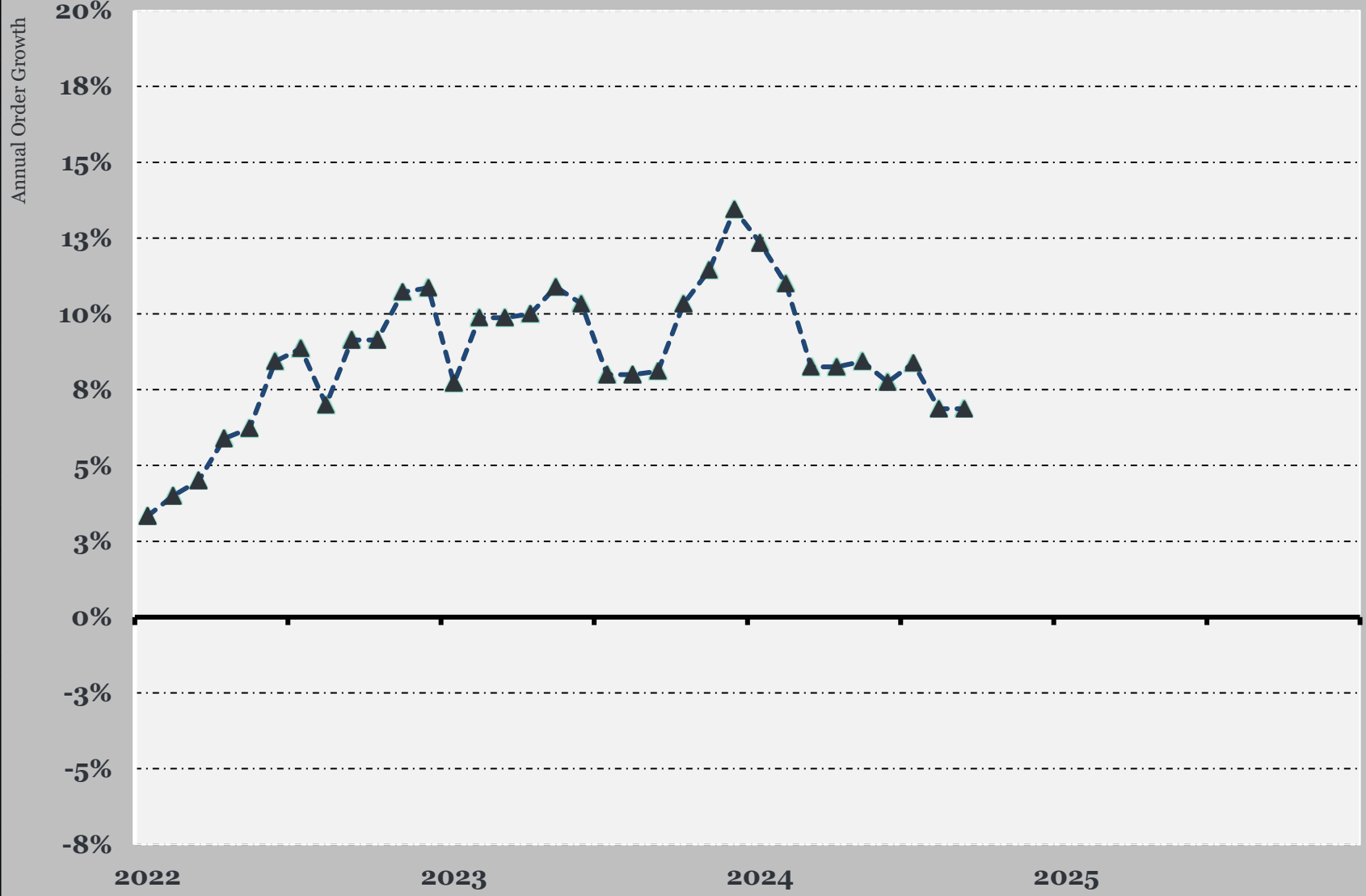
Chris Olin, Senior Research Analyst
Northcoast Research

International Titanium Association Conference (Austin, TX)

October 8, 2024

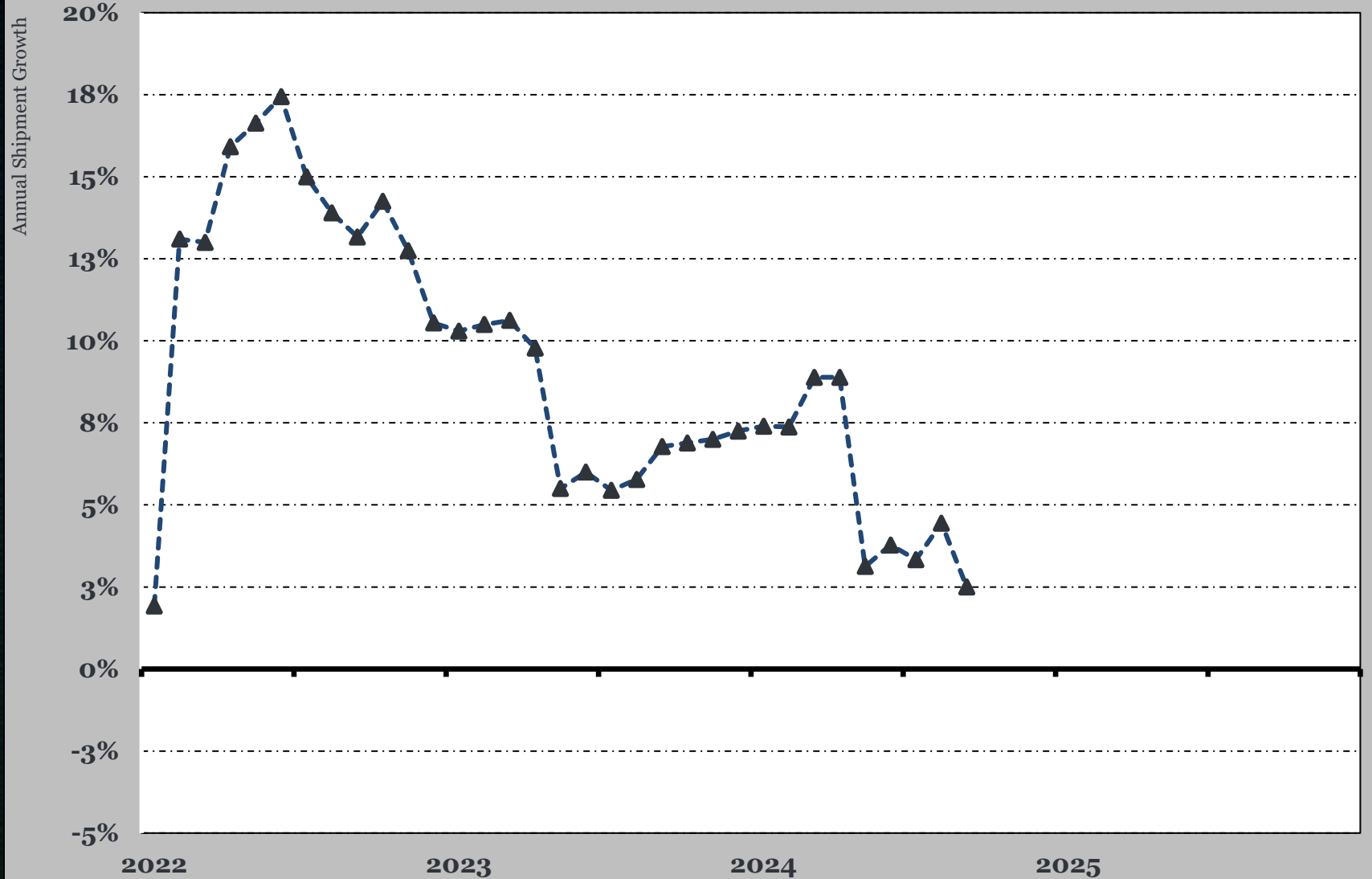
Northcoast Surveys: Aerospace & Defense Bookings

New Order Growth Reported By **Military Air OEM** Suppliers (Monthly, 2022 To Present)



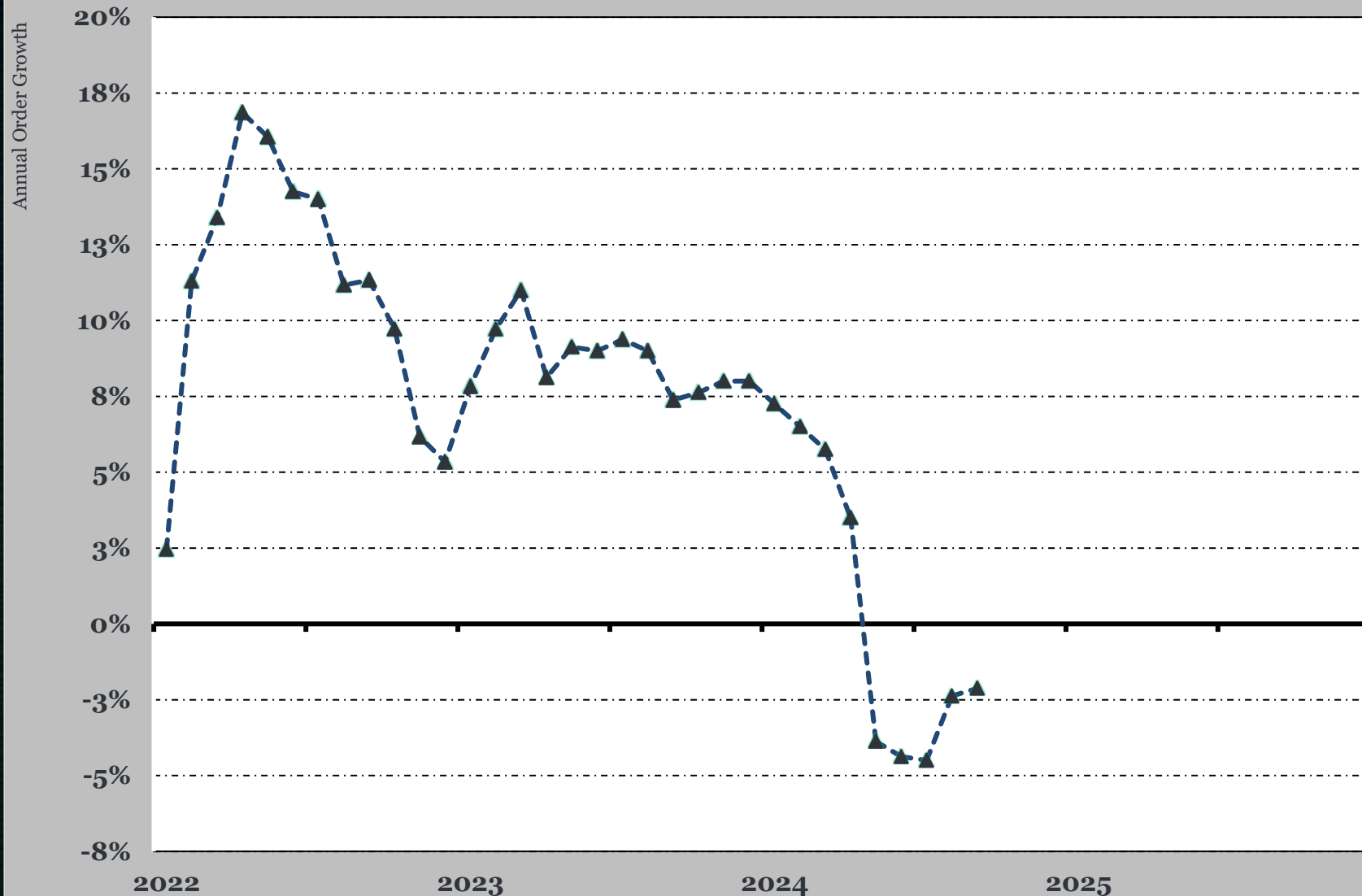
Northcoast Surveys: ST Titanium Demand Trend

Average Volume Comp Reported By All Ti Suppliers (Monthly, 2019 to Present)

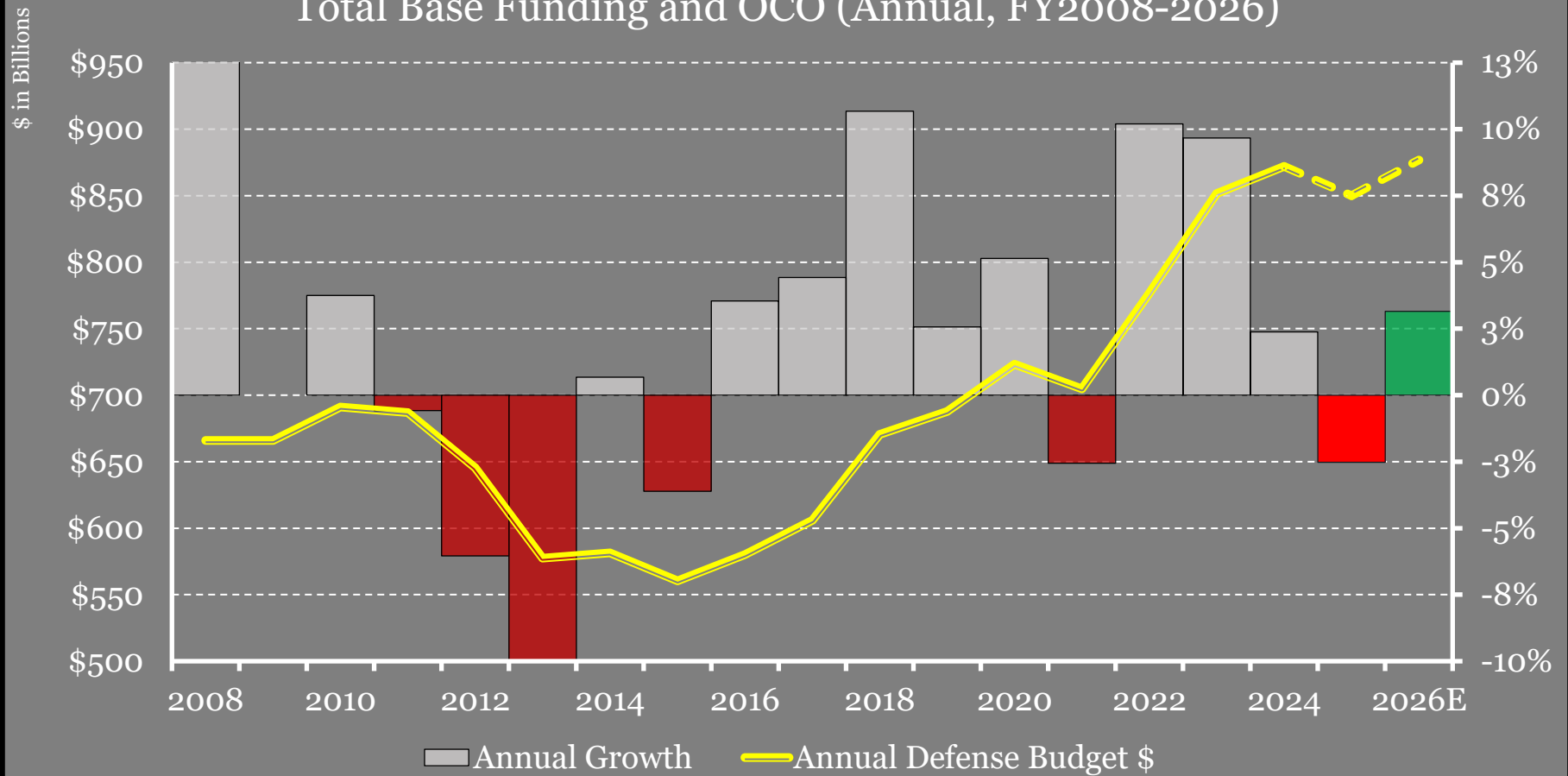


Northcoast Surveys: Aerospace & Defense Bookings

New Order Growth Reported By Boeing Supply Chain (Monthly, 2022 To Present)



US Department of Defense Spending Budget Total Base Funding and OCO (Annual, FY2008-2026)



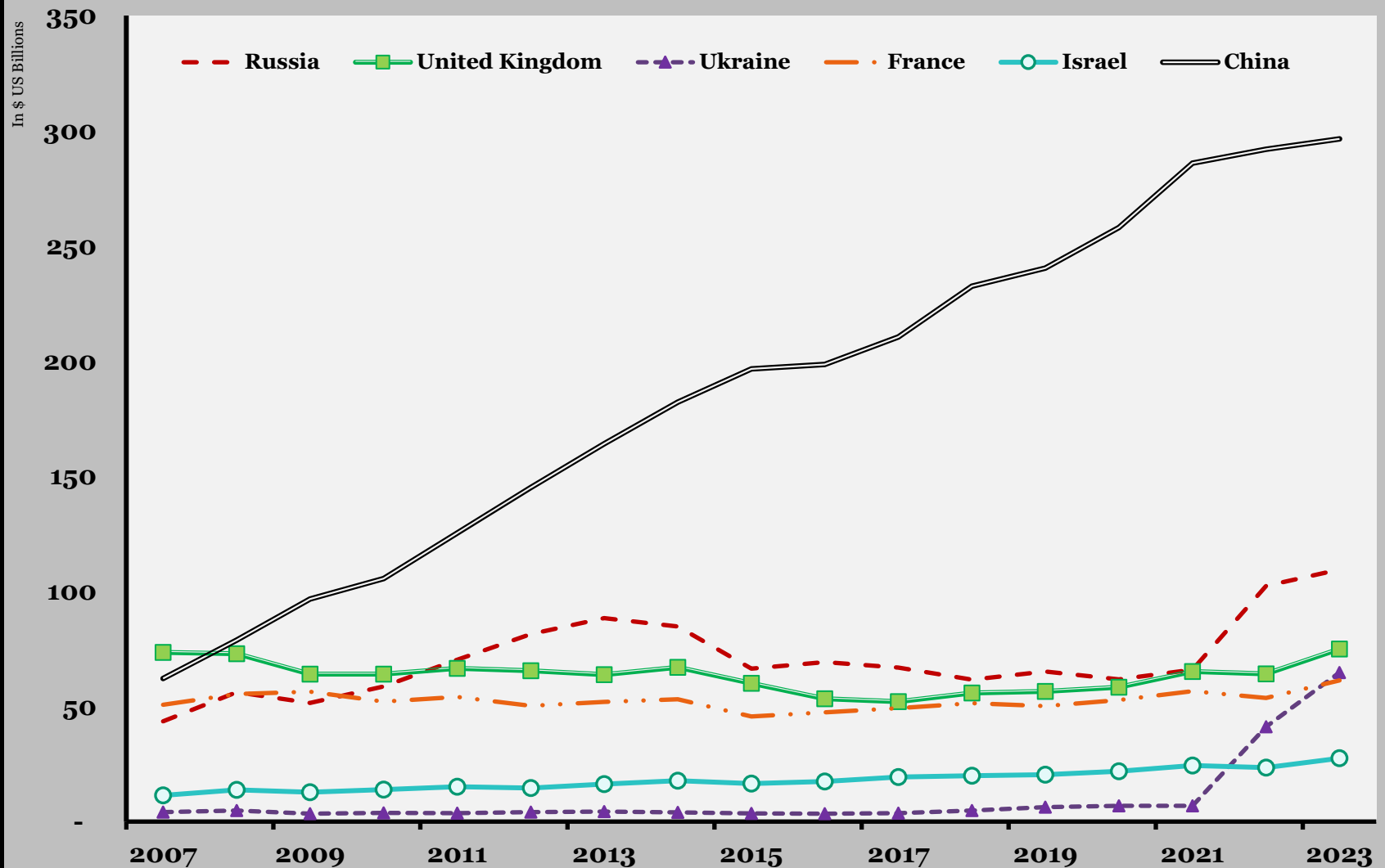
Source: US Dept of Defense

Military & Defense: Foreign Defense Spending



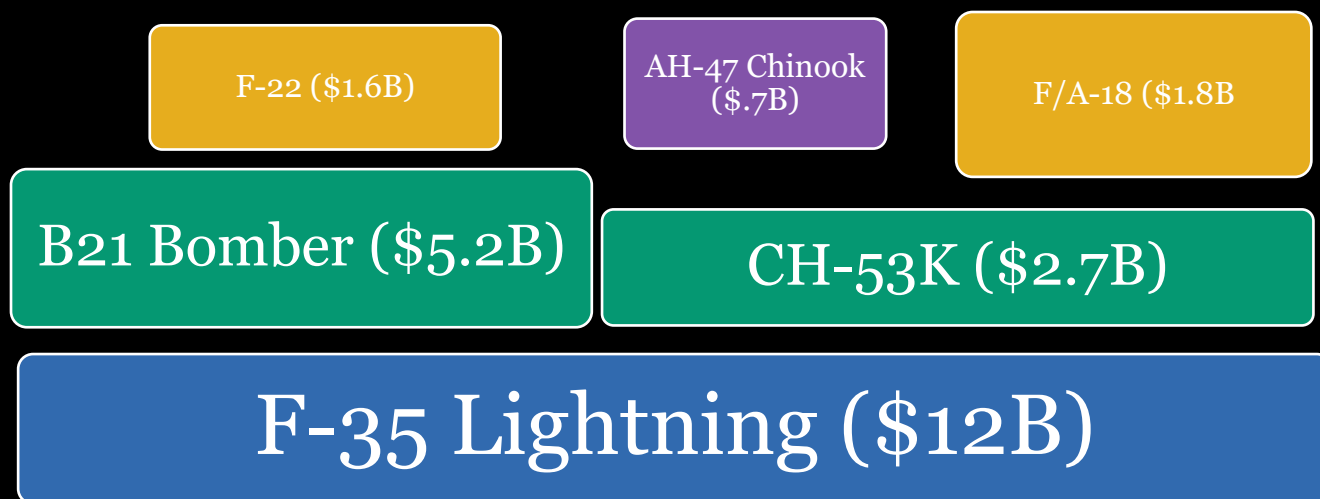
Military & Defense: Foreign Defense Spending

Defense Spending Budgets By Major Countries



Military & Defense: US DoD Spending Outlook

- ✈ United States Defense Spending Is Projected Near \$833B for FY25, which implies a 2.5% reduction versus the FY24 level. The number is somewhat misleading as the prior year spending plan included monies allocated to Ukraine and Isreal.
- ✈ The proposed base DoD budget for FY25 is \$850B versus \$817B, reflecting 4% year-over-year growth. It remains to be seen how much support will be given to allied nations.. The US gave Ukraine \$44B and Isreal \$10B last year. This did not include titanium-intensive weapon systems.





Roughly 530 fighter jets expected to be produced in 2024:

United States: 190

France: 40

United Kingdom: 10

Russia: 35

India: 15

China: 240

We expect output to jump to 575-585 total jets next year, complimented by:

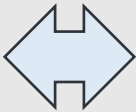
Unmanned Drone Production:

Steady Tanker Build Rates

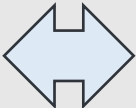
Greater Rotorcraft Output:

Infantry Investments:

Naval Growth:

<u>Military Jet/Roto Programs</u>	<u>Momentum</u>	<u>Comments</u>
F-35 Lightning II		Program expected to begin delivering jets held in storage (75-100 units), upon solving software issues (with DoD approval), Lockheed holding near the peak rate of production (156 jets/year) in 2024 and 2025.
F-15X		Current build rate is 1.5 jets/month, but rate expected to move up to 2/month, following DoD commitment to new orders, seeking greater F-35 air support. Program may wind down in 2028 with only 104 jets left in backlog but some discussions with Turkey could extended timeline.
F/A-18 Super Hornet		Program was slated to be shutdown in 2025, but a Navy order (17 Fighters) extends life by two years. There is a modernization effort in place, with funding established through 2029, involving the revitalizing of one-third of USMC fleet.
F-16		36 total fighters expected to be built this year, with 48 new jets planned for production in 2025. Strong orders expected to come from foreign buyers (demand mostly export-driven).

<u>Military Jet/Roto Programs</u>	<u>Momentum</u>	<u>Comments</u>
C-53K		Sikorski currently producing 2 helicopters/month, planning to increase the rate to 3 by 2025-26 (as export demand materializes). The company is procuring materials well in advance of requirements to secure LT outlook targets.
B-21 Raider		Norfolk Grumman does not expect to produce more than 10 bombers per year in the early ramp period, still in the testing phase. Approximately 100 bombers are planned for production during program lifetime, but peak output will not be realized before 2023.
Typhoon Eurofighter		Around 10 Eurofighters expected to be produced in 2024, which is down from the normal build rate of 20 jets/year. The joint venture between UK, Italy and German is still waiting on 150-200 new orders before ramping production
Rafale		Dassault is expected to produce 20 fighters in CY24 which is below plan due to lingering supply chain bottlenecks. Strong demand is supporting a rate increase to 3/month, but the transition will likely occur in 2025 (not late 2024).

<u>Military Jet/Roto Programs</u>	<u>Momentum</u>	<u>Comments</u>
CH-47 Chinook		CH-47 output is expected to increase in the coming years, following a large order placed by Germany. Boeing produces 18 Chinooks each yet, but it will raise the annual rate to 20 in 2025. The optimal rate is 30-35 helicopter per year.
KC-46A Tanker		The program has been plagued with several problems, that resulted in a lower-than-expected production level of 15 tankers per year (50% below initial plan). The Boeing contract covers the replacement of 175-180 refueling aircraft with 87 deliveries to the Air Force already completed.
Airbus A400M		Airbus has been producing 8 aircraft per year for an extruded period, unlikely to change with 52 orders left in backlog. After completing 152 total deliveries since the program start, the company recently announced plans to lower cost and entice greater export demand.
V-22 Osprey		The production line will be shutdown in 2026 after the final aircraft are delivered to foreign countries. Demand for the Osprey soured on rising costs and reliability concerns.

Military & Defense: Unusual # Of Variables



The Boeing Company labor dispute. While the focus is clearly on the work stoppage in the Pacific Northwest and the halting of commercial aircraft production, the company has also halted production of several military programs. The over/under for the strike timelines is six weeks.

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The Presidential Election. Donald Trump is down slightly to Kamala Harris in the betting markets, but we are not sure another surprise victory for the former president should be chalked up as a big win for the titanium industry. Immediate actions that could alter the global supply landscape, such as the removal of certain sanctions, could potentially counteract the normal demand tailwinds associated with Republican Party leadership.

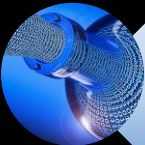
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Supply chain bottlenecks. It is hard to predict where the next capacity constraint will come from, but we see military companies in Europe most exposed to supply chain bottlenecks. Our channel checks suggest a high risk of fighter jet or unmanned drone delivery shortfalls due to a shortage of steel or engine components. The inability to source sufficient levels of high-grade alloy steels is slowly becoming a matter of national security.

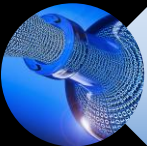
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Airbus will likely sever all titanium ties with Russian-based supplier VSMPO-Avisma. Without Chinese sponge and ingot qualification for aerospace applications, there could be an upstream supply deficit in Western world markets. Given the level of demand associated with peak aircraft production goals, major titanium buyers have already expressed concern about the long-term availability of sponge.

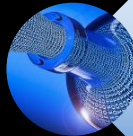
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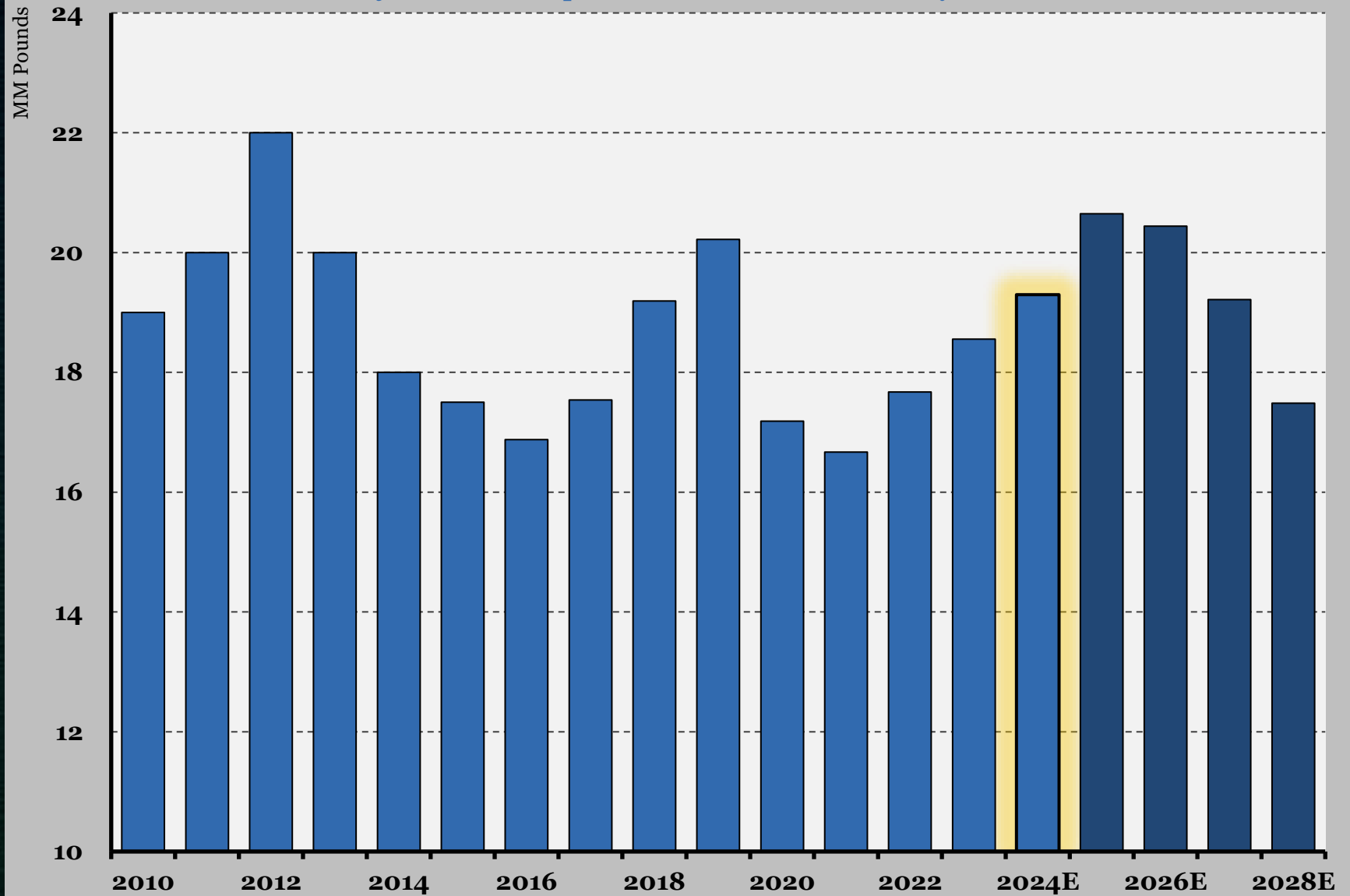
The Ukrainian/Russian War timeline is uncertain, but we assume hostilities between the two countries are closer to the finish lines than the starting point. Military support coming from the US and other foreign allies is largely in the form of armored vehicles, drones, and missile systems.

Military & Defense: Department Of Defense Project List

- One could view the absence of a US-based titanium sponge supply as a national security issue. The Rowley Plant looks destined to remain silent.
- In the titanium melting process, focus on increasing scrap concentration. Award contracts for new technologies, such as the American Titanium Metals plant mill.
- Concerted effort to lower buy-to-fly ratios. New companies such as IperionX, which have received funding from the DoD, offer hope for the future of additive manufacturing.
- Remove the 15% duty on titanium sponge because it serves no purpose.

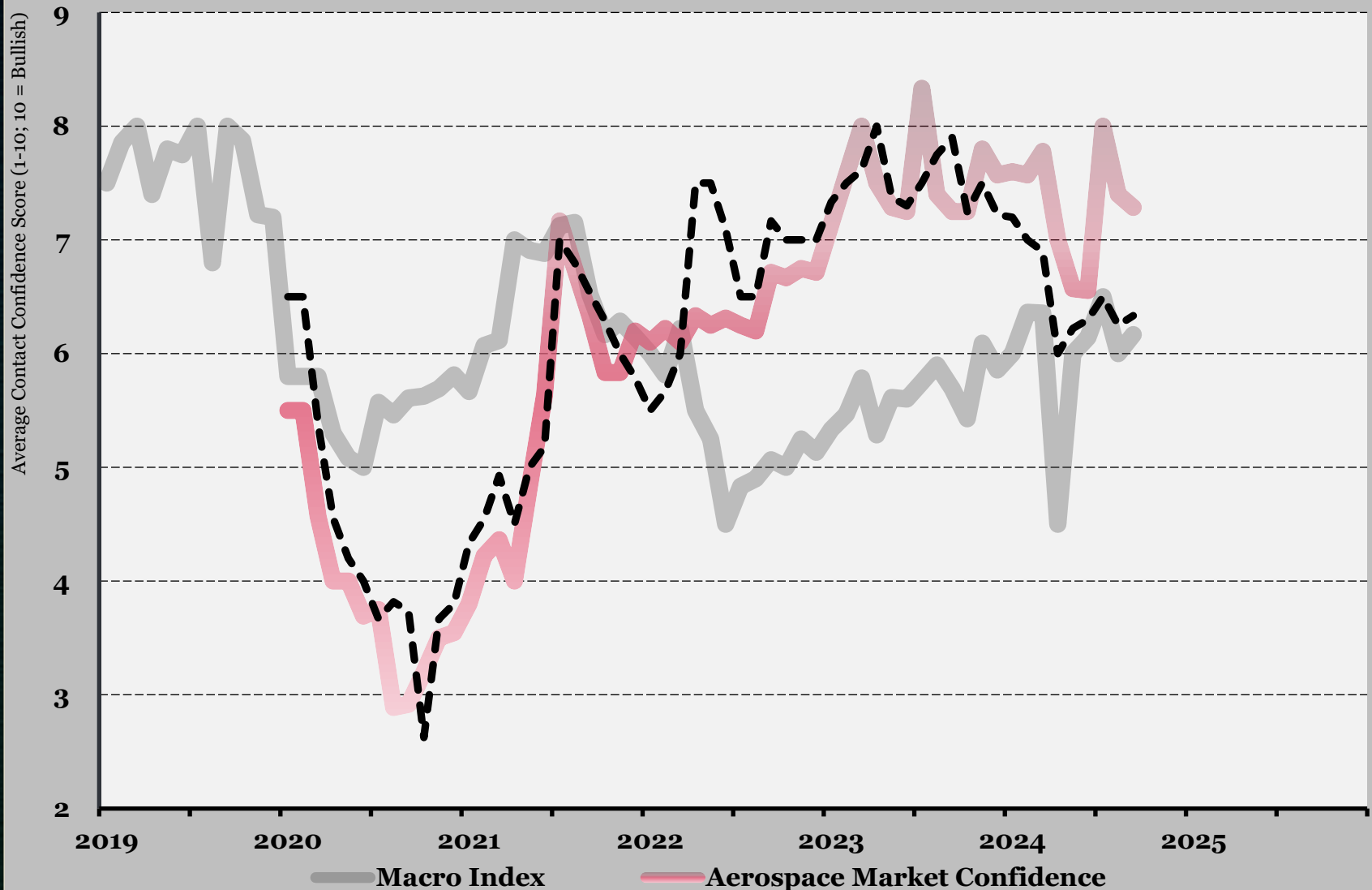
Titanium industry Analysis: Military & Defense Demand

Projected Mill Shipments 2010-2027E (US-Only)

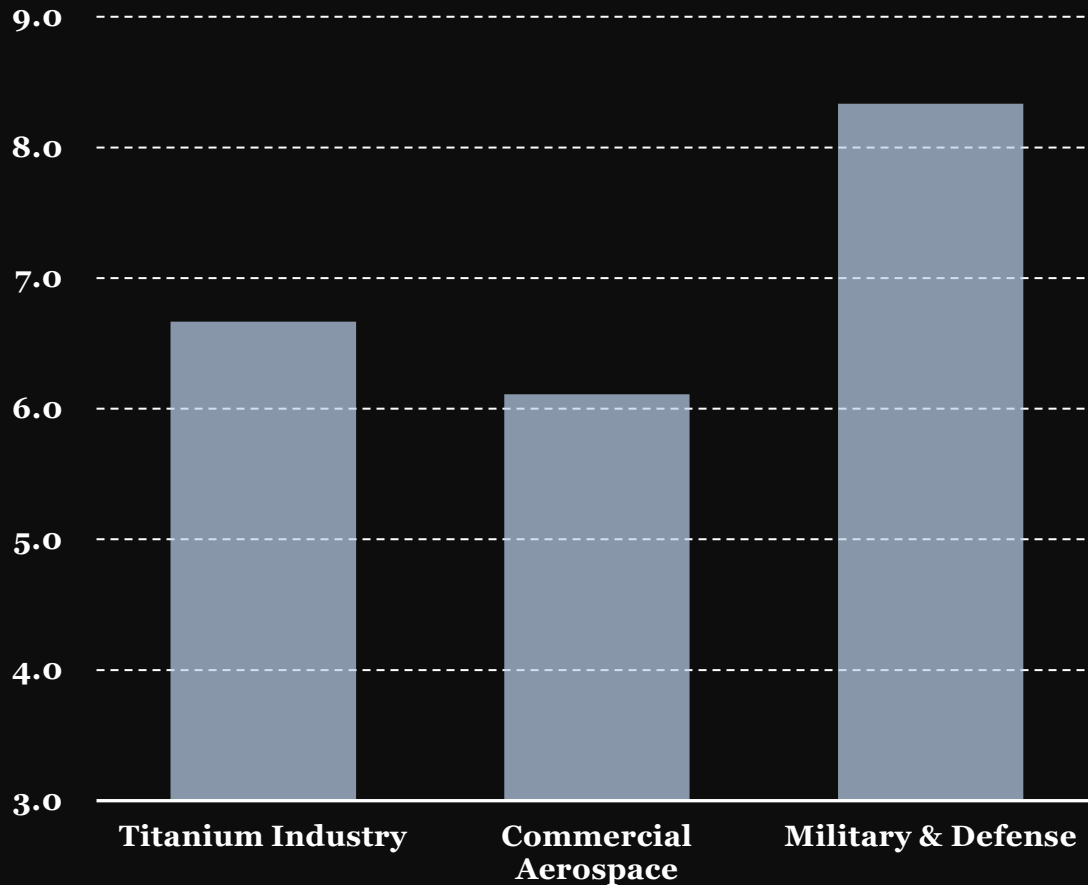


Northcoast Surveys: Titanium Macro Indicators

Monthly Index Scoring: Channel Confidence In Aero Cycle and Titanium Market



Rate Your Level Of Confidence For These Three Markets (1-10, 10 Highest)



Source: Northcoast

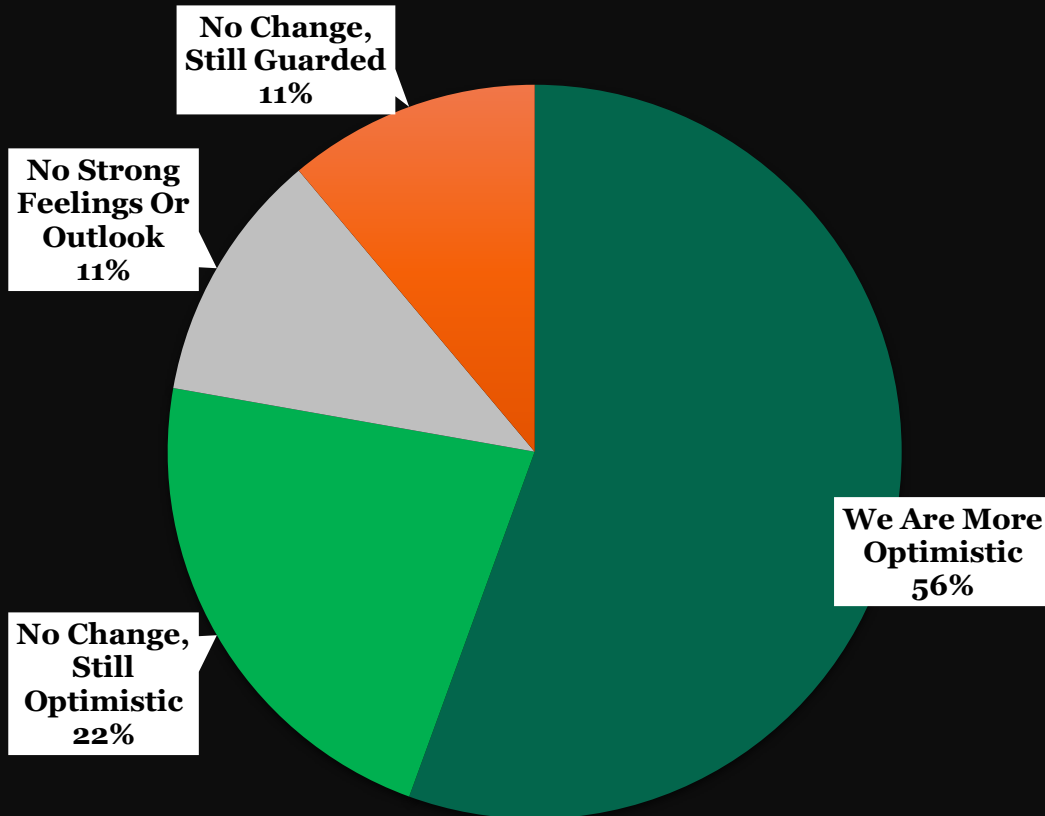
Instant Feedback From The Channel:

We asked our industry contacts in the specialty materials how they felt about their internal military/defense business and certain issues.



On average, the defense-related sales represent roughly 20-25% of total sales for the survey respondents.

Has Your Company's Military/Defense Demand Outlook Changed In Last Six Months?



Source: Northcoast Research Surveys

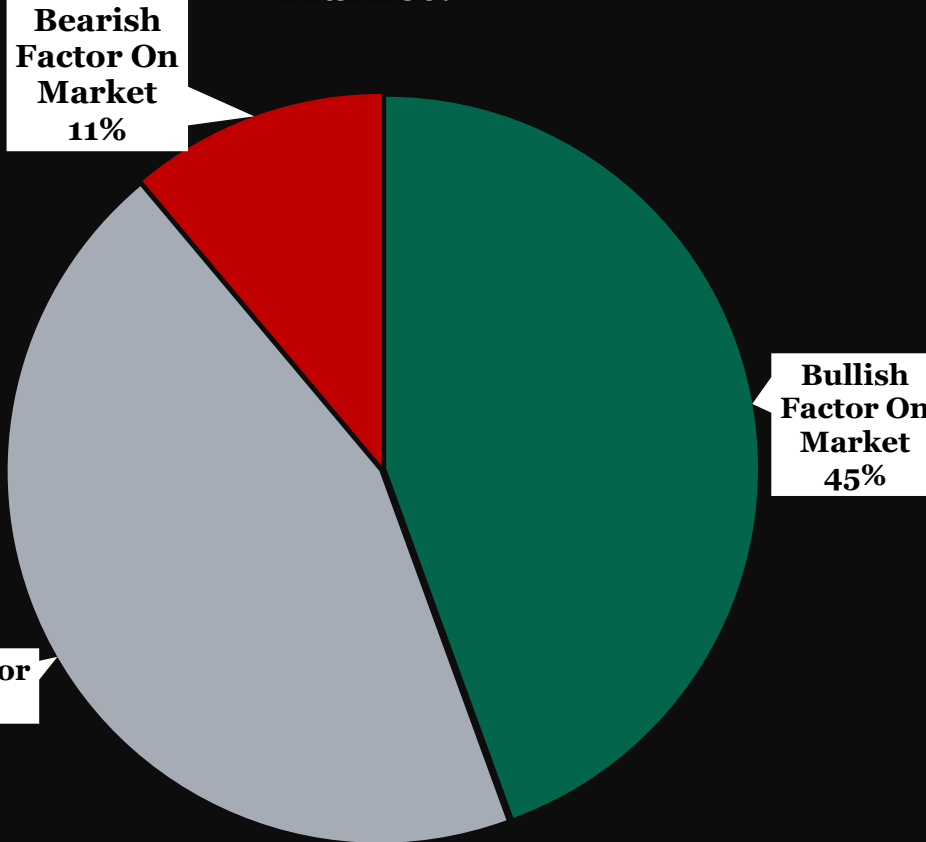
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How Do You View Trump Presidential Election Victory Impact On Titanium Market?



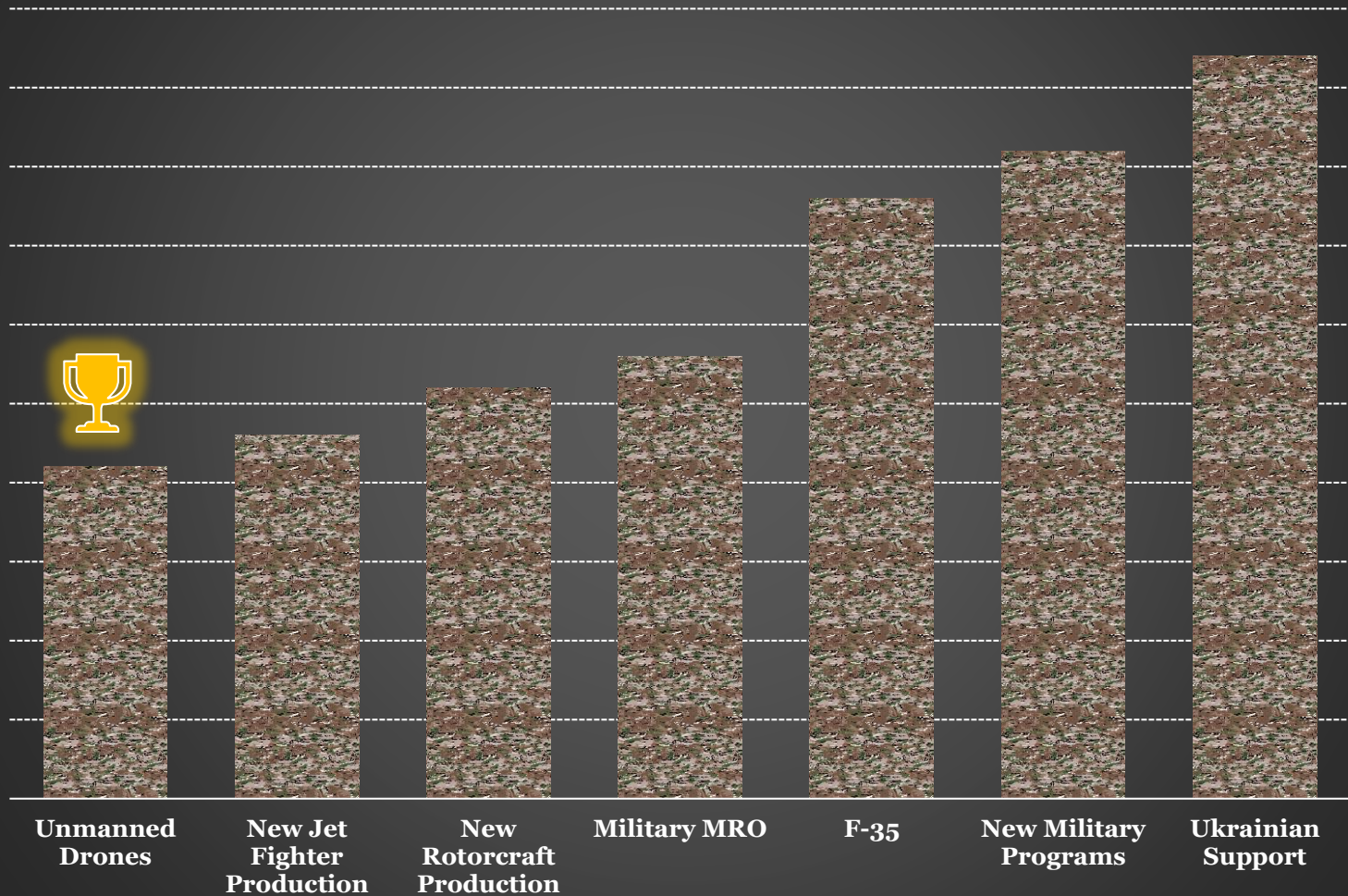
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Ranking Of The Expected Military Demand Drivers Going Forward By Spending Budgets



Source: Northcoast Research Surveys



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