Defense Update

Flattening DoD budget, unchanged priorities – Analyzing beneficiaries

Industry Overview

01 June 2021

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$715bn DoD discretionary budget request

Last Friday, the Biden Administration filed its first budget request. The President Budget request for FY2022 includes $715bn for DoD discretionary spending. The implied 1.6% increase over FY2021 enacted level comes below the expected inflation, implying a slight decline in real terms. In order to continue funding the DoD needs to defend and deter evolving threats with a smaller budget, the request proposes a realignment of resources and divestment of legacy systems. The budget also proposes funding for other instruments expected to enhance the effectiveness of national defense spending. These include diplomacy, development, and economic statecraft.

Unchanged priorities: China, nuclear modern, & innovation

The budget proposes shifting resources to match US DoD priorities ahead of threats from China, Russia, North Korea, Iran, and terrorist organizations. The DoD priorities are generally unchanged from the prior administration, with focus on competition with China, shipbuilding, nuclear modernization, and cutting-edge capabilities (hypersonic weapons, artificial intelligence, micro-electronics, 5G, cyber capabilities). Procurement spending request is down for the fourth consecutive year, resulting in lower modernization spending for the second year in a row, despite all time high RDT&E. We note, however, that ultimately the Congress is the one that appropriates the funds and FY2021 Procurement budget was appropriated 5% above the President request.

Well positioned: NOC, RTX, MRCY, GD, LHX, BWXT, HII

In a flattening budget environment the winners and losers become more obvious. We view as relatively well positioned to bode the flattening budget the companies exposed to shipbuilding (especially subs), C4I (especially information security & assurance and tech development), microelectronics (funding up ~50%), space support (up to 52% of space modernization budget from 9% a year ago), and IT & communication systems modernization (S&T up 4% vs. PB2021, FY2021 appropriations came 19% higher than request). We view Northrop Grumman, Raytheon, Mercury, General Dynamics, L3 Harris, BWX Technologies and Huntington Ingalls as relative beneficiaries. We also see the defense IT services providers as relative beneficiaries of the whole defense & non-defense budget request with strong focus on advanced technologies.

Challenged: BA and LMT, appropriations and O&M matter

The relative losers are companies exposed to declining budget for aircraft modernization, missile defense (although MDA says the reprioritized budget with 80% R&D is enough to fund the requirements to deter and defeat evolving threats), conventional ammunitions, space tech development (down to 28% of space modernization budget from 57% a year ago) and satellites (down to 10% of space budget from 26% a year ago). We view Boeing in a relative disadvantage to peer group as the budget asks for significant declines in modernization efforts related to F-18, GMD, V-22, P-8, and KC-46. Lockheed Martin will face challenges related to lower F-35, C-130 and mixed missile-related funding. However, it remains to be seen how many aircraft are ultimately appropriated by Congress (increasing focus on fifth gen) and the role of F-35 sustainment activity.

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Match resources to strategy, strategy to policy

"As the Secretary of Defense, my chief priority is defending America from enemies foreign and domestic and ensuring our troops remain the world's preeminent fighting force. President Biden's FY 2022 Defense Budget meets this commitment with critical investments to help us match resources to strategy, strategy to policy, and policy to the will of the American people. The budget provides us the mix of capabilities we need most and stays true to our focus on the pacing challenge from the People's Republic of China, combating the damaging effects of climate change on our military installations, and modernizing our capabilities to meet the advanced threats of tomorrow. Importantly, this budget invests in our people, the brave women and men in uniform around the world who serve on behalf of this great nation." – statement by Secretary of Defense Lloyd J. Austin III on the President's Fiscal Year 2022 Budget, 28 May 2021.

China and the Pacific Deterrence Initiative (PDI)

The DoD is prioritizing China as the top pacing challenge. FY2022 requests $5.1bn for the Pacific Deterrence Initiative (PDI) in order to deter aggression in the Indo-Pacific region through conventional military advantage. This initiative encompass investment for long-range strike capabilities (Tomahawk, SM-6, land-based 500km+-range conventional fires, and hypersonics); shipbuilding; and other warfighting capabilities (F-35, PNT, and Marine Corps).

Including PDI and other broader Joint Force investments, the DoD is requesting $66bn+ of investment in the Indo-Pacific region for FY2022.

Focus on power projection: Russia, Iran, NK & terrorist org

Beyond China, the DoD aims to be fully ready to respond and deter advanced and persistent threats from Russia, Iran, and North Korea, and violent extremist organizations. The FY2022 Budget prioritizes the DoD power projection capabilities. This strategy includes development and procurement of long range strike weapons, combatant ships, and strike aircraft as well as modernization of existing weapons, ships, aircraft, and electronic warfare capabilities.

Air power: The budget focuses on F-35, B-21, modernization of Air Force and Navy fighters and bombers (F-15X, MQ-25, IRST sensors to F-16, AEA to EA-18, among others), air-to-air missiles, and tech maturation and risk reduction for next generation systems.

Sea power: The budget focuses on submarines, nuclear aircraft carriers (CVNs), amphibious warships, surface combatants, Constellation frigate, Uncrewed Surface Vessels (USVs), and defensive capabilities (SEWIP Block III and SM-6).

Land power: The budget focuses on improving the lethality and survivability of the combatant teams by retiring the vulnerable systems and modernizing the relevant capabilities (Abrams tanks, Striker vehicles, Command Weapons Stations, Future Vehicle Lift family, integrated visual augmentation system (IVAS), among others).

Special Operations: The budget supports investments in precision-strike systems, future vertical lift (FVL), Armed Overwatch/Targeting, and next-generation surface and sub-surface maritime craft.

Nuclear Modernization/Nuclear Deterrence: The budget focuses on GBSD, LRSO, Columbia-class subs, Trident II missile life extension, B-21 bomber, F-35 dual capable aircraft, B61 tail kit, and Nuclear Command, Control and Communications (NC3).

Missile Defeat & Defense: The budget request includes $8.9bn for the Missile Defense Agency (MDA), $7.7bn in regional and strategic missile defense capabilities outside of MDA (USAF/Space $2.8bn + Army u$2.4bn + Navy $2.0bn), and $3.8bn for missile defeat or left-of-launch activities (involving cyber operations and hypersonic strike).

Major weapon modernization programs down 9% Y/Y

The budget request implies a 9% Y/Y decline in funding of the top 78 US military programs (vs. 2% Y/Y decline the prior year). Of the 78 outlined programs almost 50% imply Y/Y declines higher than 5%, while less than third imply Y/Y increases. These are mostly related to Space, Shipbuilding, and Air Force Missiles.

These 78 reported programs qualify as Major Defense Acquisition Programs (MDAPs). There is a total of 85 MDAP programs, but some are not reported as then fall below the reporting criteria. About 30% of the modernization budget is related to the MDAP programs (82 of the 85 are under the Acquisition Category –ACAT- I). ACAT II and ACAT III smaller programs represent the remaining 70% of the modernization funds. This compares to a 36%/64% MDAP/non-MDAP a year ago.

The table below summarizes the major weapons programs

Exhibit 1: FY2022 Major Weapons Systems

There are funding declines on modernization of about half of the major military programs

$ in mn	Name	FY2020	FY2021	FY2022	Y/Y
Aircraft and Related Systems - Joint Service					
F-35	Joint Strike Fighter	$12,187.1	$12,885.6	$12,024.3	-6.7%
V-22	Osprey	1,742.3	2,145.0	1,396.6	-34.9%
C-130J	Hercules	2,039.4	2,252.7	1,434.5	-36.3%
MQ-1B / MQ-1C	Predator/Gray Eagle	194.7	189.7	11.6	-93.9%
MQ-9	Reaper	789.1	697.0	300.6	-56.9%
MQ-4C / RQ-4	Triton/Global Hawk/NATO AGS	964.3	599.9	445.0	-25.8%
	Armed Overwatch / Targeting	-	46.0	193.0	319.6%
Aircraft and Related Systems - US Army					
AH-64E	Apache: Remanufacture/New Build	1,073.4	1,183.0	825.0	-30.3%
CH-47	Chinook	378.7	483.6	226.1	-53.2%
UH-60	Black Hawk	1,708.0	1,123.0	947.3	-15.6%
Aircraft and Related Systems - US Navy/USMC					
MQ-25	Stingray	628.2	257.0	316.4	23.1%
F/A-18	Super Hornet	1,873.0	1,907.0	275.5	-85.6%
E-2D	Advanced Hawkeye	1,481.5	1,185.1	1,271.7	7.3%
P-8A	Poseidon	1,646.0	1,784.4	245.7	-86.2%
VH-92A	Presidential Helicopter	811.4	674.3	91.2	-86.5%
CH-53K	Heavy Lift Replacement Helicopter	1,552.3	1,715.2	1,726.1	0.6%
H-1	AH-1Z Viper/ UH-1Y Venom	217.6	195.4	175.3	-10.3%
Aircraft and Related Systems - USAF					
B-21	Raider	2,878.8	2,843.2	2,980.6	4.8%
B-1, B-2, B-52	Bombers	715.1	799.4	1,070.5	33.9%
KC-46A	Tanker	2,197.5	2,745.4	2,455.8	-10.5%
PAR	Presidential Aircraft Recapitalization	730.2	799.4	680.7	-14.8%
F-22	Raptor	746.5	1,027.3	1,072.0	4.4%
F-15	Eagle	1,872.6	2,189.3	2,188.7	0.0%
CRH	Combat Rescue Helicopter	1,089.0	1,147.0	919.8	-19.8%
T-7A	Advanced Pilot Training	328.4	248.2	199.3	-19.7%
C4I Systems					
TNT	Tactical Network Technology	530.1	411.2	436.5	6.2%
C4I Systems					
HMS	Handheld, Manpack, & Small Form Fit	495.3	567.7	803.9	41.6%
Cyberspace	Cyberspace Activities	3,094.6	3,124.5	3,004.3	-3.8%
Ground Systems - Joint Service					
JLTV	Joint Light Tactical Vehicle	1,716.5	1,401.9	1,055.3	-24.7%
Ground Systems - USA					
M-1	Abrams Tank Modification/Upgrades	2,186.0	1,404.2	1,031.7	-26.5%
AMPV	Armored Multi-Purpose Vehicle	525.2	139.1	140.3	0.9%
NGSW	Next Generation Squad Weapon	86.2	124.4	165.0	32.6%
PIM	Paladin Integrated Management	744.5	681.4	659.7	-3.2%
FMTV	Family of Medium Tactical Vehicles	141.4	207.8	54.1	-74.0%
FHTV	Family of Heavy Tactical Vehicles	50.8	28.8	95.9	233.0%
Stryker	Stryker	953.2	1,186.3	1,036.0	-12.7%
Ground Systems - USMC					
ACV	Amphibious Combat Vehicle	349.3	478.6	613.1	28.1%

$ in mn	Name	FY2020	FY2021	FY2022	Y/Y
Missile Defense Programs - Joint Service					
GMD	Ground-based Midcourse Defense	$2,171.7	$2,296.7	$1,732.7	-24.6%
THAAD	Terminal High Altitude Area Defense	727.3	891.6	562.2	-36.9%
Aegis	Aegis Ballistic Missile Defense	1,722.4	1,826.9	1,622.0	-11.2%
Missile Defense Programs - USA					
Patriot / PAC–3	Patriot Advanced Capability	726.7	765.9	659.1	-13.9%
PAC-3 / MSE	PAC-3/Missile Segment Enhancement Missile	702.4	678.1	776.7	14.5%
Missiles and Munitions - Joint Service					
JDAM	Joint Direct Attack Munition	1,109.5	546.7	198.2	-63.7%
Hellfire	Hellfire Missiles	726.7	516.6	230.0	-55.5%
SDB I	Small Diameter Bomb I	273.3	95.8	82.8	-13.6%
SDB II	Small Diameter Bomb II	384.5	339.6	409.4	20.6%
JASSM	Joint Air-to-Surface Standoff Missile	556.0	570.7	827.9	45.1%
AIM-9X	Air Intercept Missile - 9X	333.7	303.7	250.8	-17.4%
AMRAAM	Advanced Medium Range Air-to-Air Missile	610.5	609.4	297.9	-51.1%
Chem-Demil	Chemical Demilitarization	992.1	1,049.8	1,094.3	4.2%
JAGM	Joint Air-to-Ground Missile	304.8	260.5	204.4	-21.5%
LRASM	Long Range Anti-Ship Missile	185.1	200.6	289.0	44.1%
AMMO	Ammunition	6,302.9	5,099.9	3,941.3	-22.7%
Missiles and Munitions - USA					
GMLRS	Guided Multiple Launch Rocket System	1,294.0	1,137.0	1,098.2	-3.4%
Javelin	Javelin Advanced Anti-Tank Weapon System	177.4	207.2	128.9	-37.8%
PrSM	Precision Strike Missile	149.5	150.1	354.6	136.2%
Missiles and Munitions - USN					
Trident II	Trident II Ballistic Missile Modifications	1,543.0	1,535.5	1,599.4	4.2%
Standard	Standard Missile-6	698.1	795.1	910.7	14.5%
RAM	Rolling Airframe Missile	127.9	96.7	101.3	4.8%
Tomahawk	Tactical Tomahawk Cruise Missile	702.3	645.3	551.7	-14.5%
Missiles and Munitions - USAF					
GBSD	Ground Based Strategic Deterrent	538.6	1,447.1	2,564.4	77.2%
B61	B61 Tail Kit Assembly	66.0	45.3	2.7	-94.0%
LRSO	Long Range Stand-Off Missile	701.9	384.7	609.0	58.3%
Shipbuilding and Maritime Systems - USN					
CVN 78	Gerald R. Ford Class Nuclear Aircraft Carrier	2,537.8	2,904.4	2,869.8	-1.2%
SSBN 826	Columbia Class Ballistic Missile Submarine	2,346.4	4,518.7	5,027.3	11.3%
SSN 774	Virginia Class Submarine	8,791.4	7,164.8	6,946.9	-3.0%
DDG 51	Arleigh Burke Class Destroyer	6,127.2	3,802.7	2,437.4	-35.9%
FFG(X)	Constellation Class Guided Missile Frigate	1,338.1	1,135.1	1,266.5	11.6%
CVN	Refueling Complex Overhaul	651.5	1,548.5	2,522.3	62.9%
T-AO 205	John Lewis Class Fleet Replenishment Oiler	1,074.4	111.8	853.3	663.2%
T-ATS	Towing, Salvage, and Rescue Ship	150.3	157.8	183.8	16.5%
USV	Unmanned Surface Vehicle	388.0	139.3	202.9	45.7%
LPD	San Antonio Class Amphibious Transport Dock	554.8	1,190.0	175.9	-85.2%
Space Based Systems - USSF					
Launch Vehicles	Launch Vehicles	1,701.3	1,628.1	1,661.2	2.0%
GPS III & Prjects	Global Positioning System Enterprise	1,677.9	1,795.5	1,810.1	0.8%
OPIR	Space Based Overhead Persistent Infrared Systems	1,703.2	2,464.8	2,605.8	5.7%
SATCOM	Satellite Communications Projects	1,017.1	800.6	848.0	5.9%

Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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Modernize: nuclear, missiles, hypersonics, S&T, Navy, space & cyber

Nuclear enterprise: $27.7bn to continue funding Columbia-class submarine, Ground Based Midcourse Defense (GBSD) and B-21 programs. DoD also targets recapitalization of key Nuclear Command, Control, and Communications (NC3) systems. The nuclear recapitalization strategy is expected to require significant investment over the next 20 years. However, the DoD plans for the recapitalization efforts not to exceed 7% of the budget during that period (unchanged).

Missile Defeat and Defense: $20.4bn to develop a) the Next Generation Interceptor (NGI) for Ground-Based Midcourse Defense (GBM) and b) the new Terminal High-Altitude Area Defense interceptor (THAAD), as well as to strengthen missile defense network with Patriot missiles (PAC-3), Lower Tier Air and Missile Defense System (LTAMDS), and Short Range Air Defense (SHORAD) battalions.

Long Range Fires: $6.6bn to develop and field multi-service, multi-domain offensive Long Range Fires. This includes fielding hypersonic weapons and expanding the capacity of survivable weapons for new and existing launch platforms.

Science & Technology: $14.7bn, up 4.1% Y/Y

Advanced capability enablers: microelectronics $2.3bn, artificial intelligence (AI) $874mn, and 5G $398mn. This compares to FY2021 request for $1.5bn funding microelectronics/5G and $0.8bn AI. Last year request also highlighted $1.7bn for autonomous systems.

Lethal air forces: $52.4bn for to procure and modernize 4th and 5th gen fighters as well as develop 6th gen TACAIR capability. This also funds the continued tanker recapitalization plan.

Combat effective naval forces: $34.6bn to develop a balanced, hybrid fleet of manned/unmanned ships and future stand-in expeditionary marine forces. This also recapitalizes the naval combat logistics force.

Ground forces: $12.3bn to field Precision Strike Missile (ATACMS missiles replacement), Next Generation Squad Weapon to 1st units in FY2022, and develop next generation combat vehicles.

Space capabilities, resilient architectures, and enhanced space command and control: $20.bn to ensure the Joint Force prevails in a global, all-domain fight. This includes $2.6bn increase to Next-Gen OPIR missile warning development, $1.8bn for Position, Navigation, and Timing (PNT), $1.7bn to fund five launch vehicles, and $936.7mn to develop resilient architectures (LEO solutions, including data transport and missile warning)

Cyberspace activities: $10.4bn committed to cyberspace activities in FY2022 to accelerate a zero-trust framework, support the combatant commander military cyber operations, protect critical infrastructure and the Defense Industrial Base (DIB), grow the Cyber Mission Force, and continue the development of the Joint Cyber Warfighting Architecture (JCWA).

$2.8bn in divestments, mostly Air Force & Navy

Due to the flattish budget, the request also focuses on the divestment of outdated systems and programs in order to be able to reallocate the investment in cutting-edge technologies and capabilities. The budget calls for $2.8bn in divestments of older and less-capable platforms and programs that no longer meet mission needs. It is interesting to highlight that most of the divestments come from the Air Force and Navy, as after several years of restructuring the leaner Army has relatively less to cut. The Army divested equipment and weapon systems for $2.5bn in FY2020 and $300mn in FY2021. These reductions resulted in total savings of $18.1bn in FY2020–FY2025.

Army: $47.8mn from divestment of night vision imaging system, missile launcher, electronic warfare, & IT

Navy: $1.3bn from ships decommissioning (CG, LSD, LCS) and aircraft divestment (F/A-18 A-D, RQ-21)

Air Force: $1.4bn from aircraft divestment (A-10, F-15 C/D, F-16 C/D, KC-135, KC-10, C-130H, E-8, RQ-4)

The DoD plans to partner with Congress to balance the modernization needs while sustaining critical industrial base capabilities.

Maintain and enhance military readiness

The FY2022 budget aims to build and posture a more lethal, operationally ready, and resilient joint force. The request includes $122.1bn to sustain readiness gains and enhance capabilities.

Army: $27.8bn to fund ground and air readiness objectives, installation support, decisive action training, and support to allies and partners. This is $1.8bn down Y/Y on lower USCENTCOM operations due to Afghanistan drawdown.

Navy: $48.5bn to fund Navy depot maintenance, ship and aircraft operations, and integrated training exercises. Funds Marine Corps advance warfighting, including ground and air readiness, infrastructure, and training exercises. This is $2.4bn above FY2021 enacted levels (mostly explained by Navy). Half of the increase is driven by higher spending in aviation readiness.

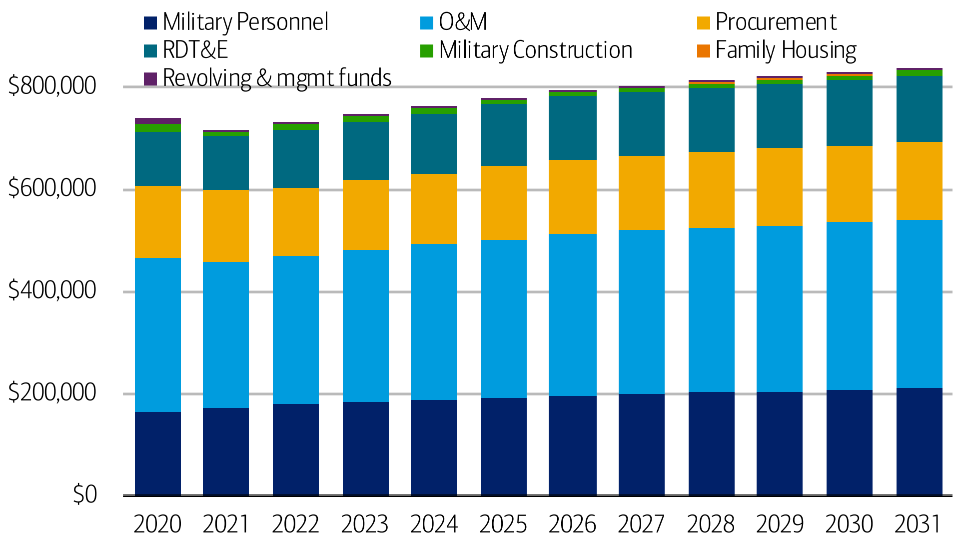
Air Force: $36.5bn to fund Weapons System Sustainment and flying hours to maintain readiness, analytics to reduce sustainment cost, and full-spectrum training exercises. This request also funds *Space Force* launch operations, depot maintenance, and early warning capabilities.

USSOCOM: $9.4bn to fund modernized ranges and simulators, full-spectrum SOF exercises, and invests in artificial intelligence to speed analysis

Chart book: FY2022 Budget request vs. last/next 10yrs

Please note that information from the DoD documents discuss only discretionary spending, while data from the White House filings includes mandatory as well.

Exhibit 2: Defense Budget expected to reach $835bn by 2031, 1.6% CAGR in FY2021-2031
O&M CAGR of 1.5%, Procurement 0.8%, and RDT&E 1.9% (mn)



Source: BofA Global Research, White House FY2022 President Budget

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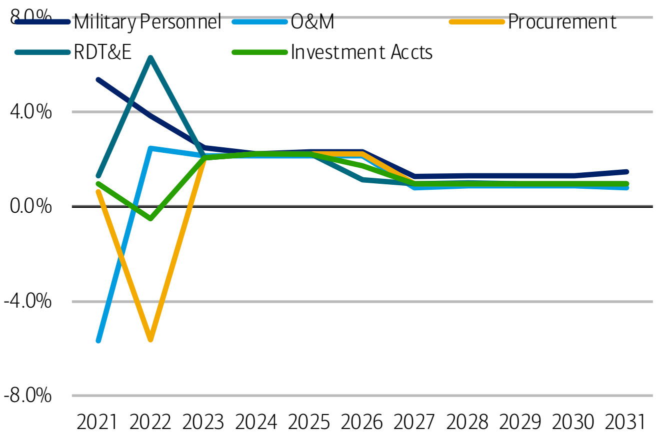
Exhibit 3: FY2022 Budget request for cuts in Procurement
The other accounts are requested to grow



Source: BofA Global Research, White House FY2022 President Budget
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Exhibit 4: Discretionary budget request of $715mn for defense
Air Force is the relative winner, Army discretionary spending down

$mn	FY2021	FY2022	Y/Y
by Agency			
Army	$174	$173	-0.9%
Navy	$207	$212	2.2%
Air Force	$204	$213	4.3%
Defense-wide	$118	$118	-0.5%
by Appropriation Title			
Military Personnel	$162	$167	3.1%
O&M	$283	$290	2.5%
Procurement	$142	$134	-5.7%
RDT&E	$106	$112	5.3%
Other	$10	$12	18.2%
DoD	**$704**	**$715**	**1.6%**
DoE & other	$37	$38	2.4%
National Defense	**$741**	**$753**	**1.6%**

Source: BofA Global Research, Department of Defense
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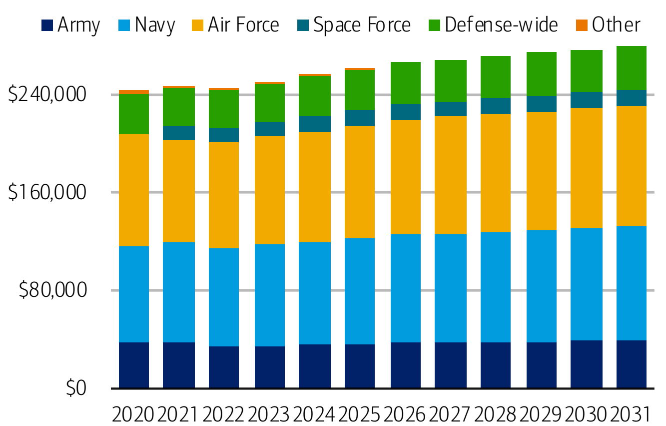
Investment accounts – down 0.5% on Procurement cuts

Exhibit 5: The Army pays the bill, again - 9% Y/Y cut request
Army modernization request declines to $34.1bn in FY22 from $37.7bn in FY21, Air Force requested to increase on higher RDT&E



Source: BofA Global Research, White House FY2022 President Budget
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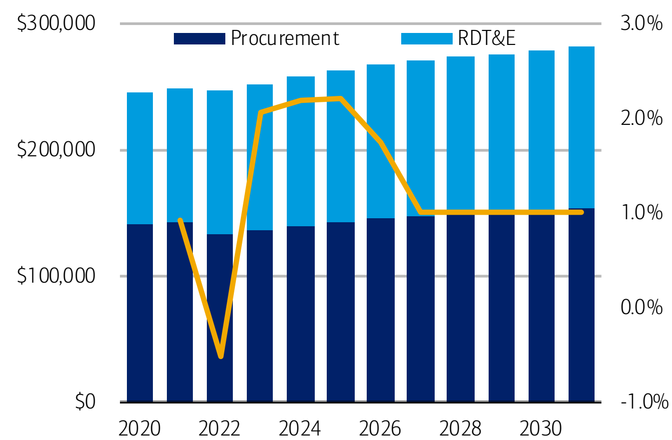
Exhibit 6: Investment accounts to be down 0.5% Y/Y
FY2023 request to be 1.5% above FY2021 – In FY2022 Space Force up 7%, Air Force up 2%, and Navy flat



Source: BofA Global Research, White House FY2022 President Budget
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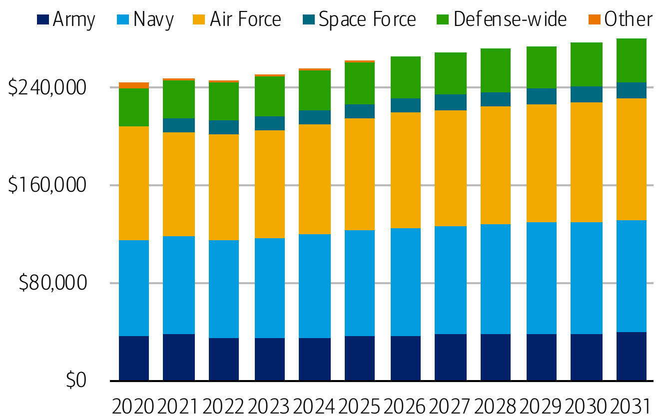
Procurement - $134bn, down 5.6% Y/Y

Exhibit 7: Procurement request of $134bn in FY2022
Declines requested across agencies – Navy will represent 44% of total procurement & Air Force 35%



Source: BofA Global Research, White House FY2022 President Budget

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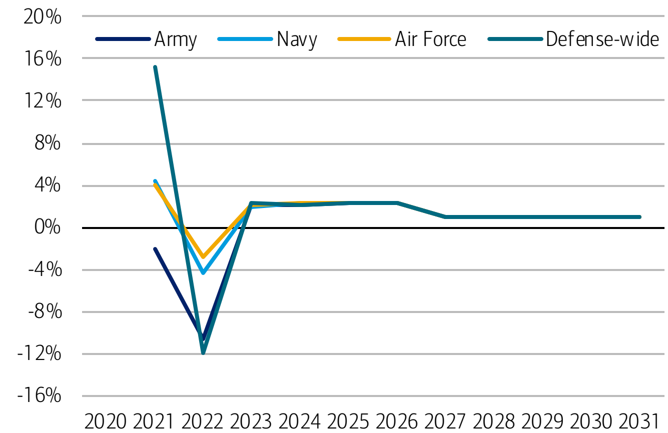
Exhibit 8: Procurement to be down 5.6% Y/Y
Army leads the decline with an 11% Y/Y cut request, vs. Navy 4% cut and Air Force 3% cut – Army & Navy cuts are similar in dollar amount.



Source: BofA Global Research, White House FY2022 President Budget

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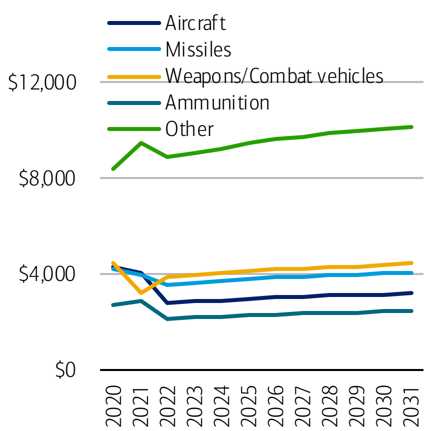
Exhibit 9: Army procurement down 11% Y/Y
Driven by significant declines in aircraft, ammunition and missiles procurement



Source: BofA Global Research, White House FY2022 President Budget

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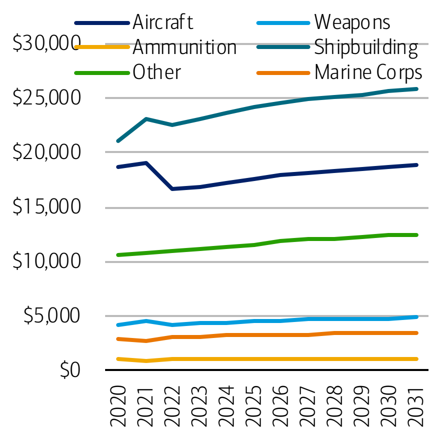
Exhibit 10: Navy procurement down 4%
Mainly driven by aircraft procurements, ammunition and Marine Corps up



Source: BofA Global Research, White House FY2022 President Budget

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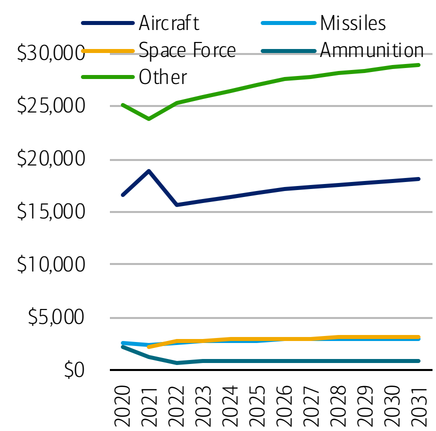
Exhibit 11: Air Force procurement down 3%
Mainly driven by aircraft procurement. Space Force up 20% & Missiles up 14% Y/Y

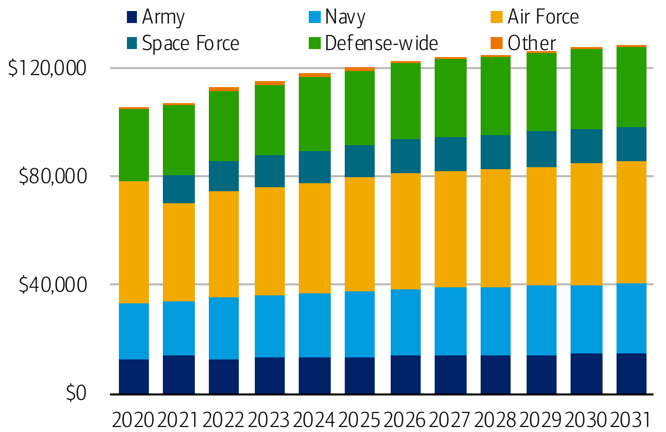


Source: BofA Global Research, White House FY2022 President Budget

BofA GLOBAL RESEARCH

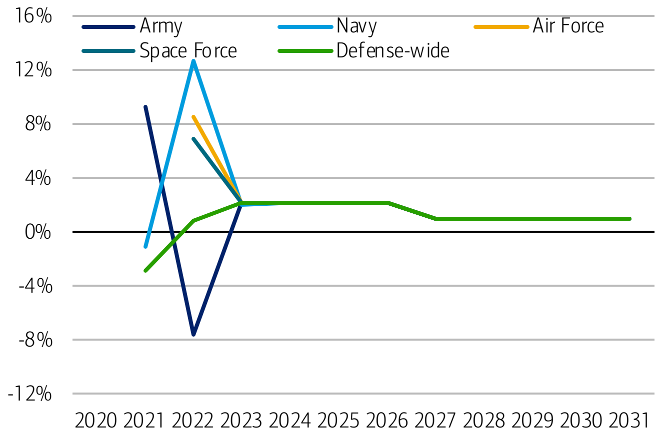
RDT&E at all-time highs - $113bn, up 6.3% Y/Y

Exhibit 12: RDT&E request of $113bn in FY2022
Air Force represents 35% of FY2022 RDT&E request, followed by Defense-wide with 23% and Navy with 20%



Source: BofA Global Research, White House FY2022 President Budget
BofA GLOBAL RESEARCH

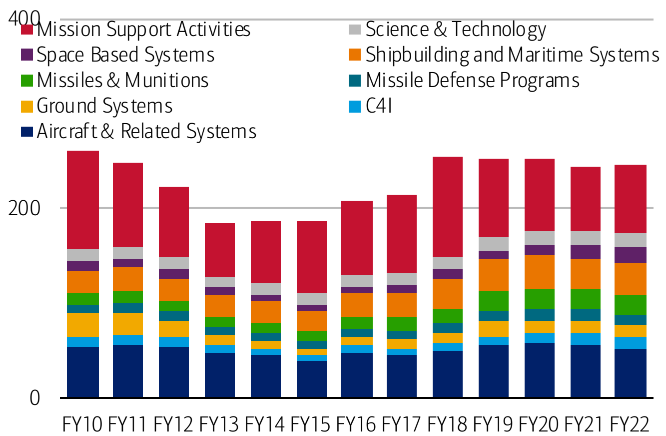
Exhibit 13: RDT&E to be up 6.3% in FY2022
Navy up 13%, Air Force up 8%, Space up 7%, but Army down 8% Y/Y



Source: BofA Global Research, White House FY2022 President Budget
BofA GLOBAL RESEARCH

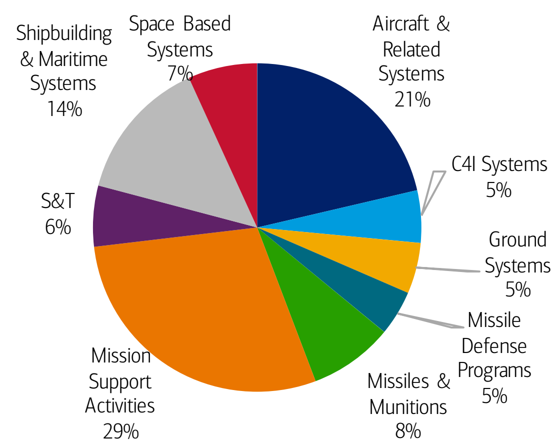
FY2022 modernization breakdown vs. last 10 years

Exhibit 14: Aircraft, Ground Systems, and Missile-related down Y/Y
Y/Y increases for C4I, Shipbuilding and Maritime, Space Based Systems, Science & Technology



Source: BofA Global Research, DoD FY2022 Major Weapons Programs, * Mission & Support Activities implied from the total Modernization Budget reported in FY2021 Green Book
BofA GLOBAL RESEARCH

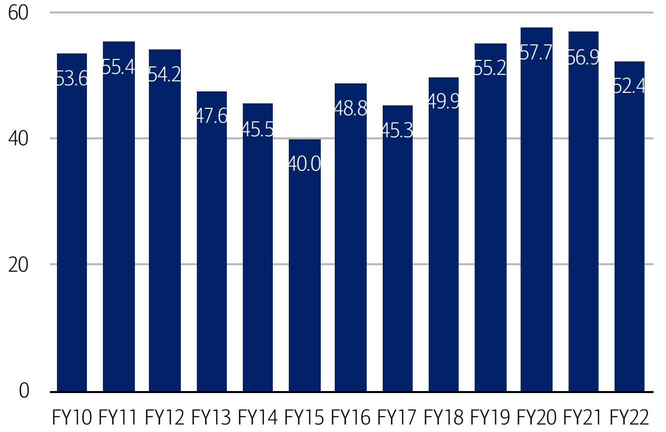
Exhibit 15: Shipbuilding represents 14%, vs. ~10% a decade ago
Mission Support includes cross departmental capabilities and classified programs



Source: BofA Global Research, DoD FY2022 Major Weapons Programs
BofA GLOBAL RESEARCH

Exhibit 16: Aircraft & related systems

FY2022 asks for a 8% Y/Y decline



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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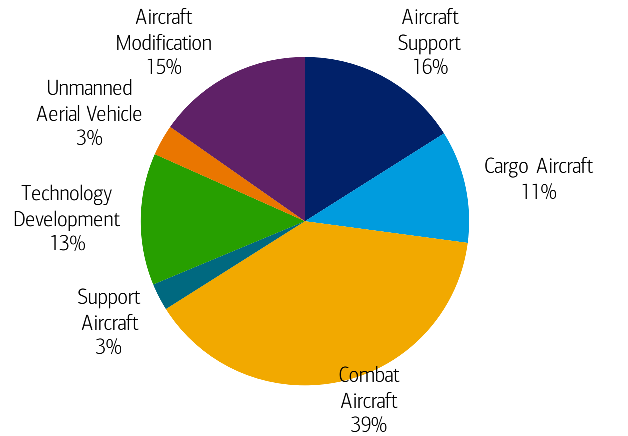
Exhibit 17: Combat aircraft represents 39%

Aircraft support, modification, and tech development follow with 16%, 15%, and 13% share, respectively



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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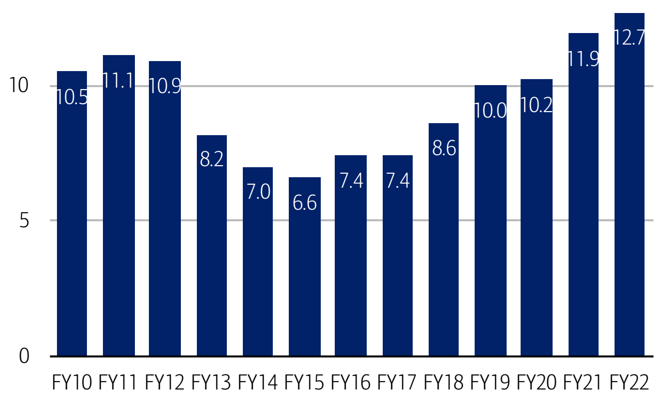
Exhibit 18: Command, Control, Communications, Computers, and Intelligence (C4I)

FY2022 asks for a 7% Y/Y increase



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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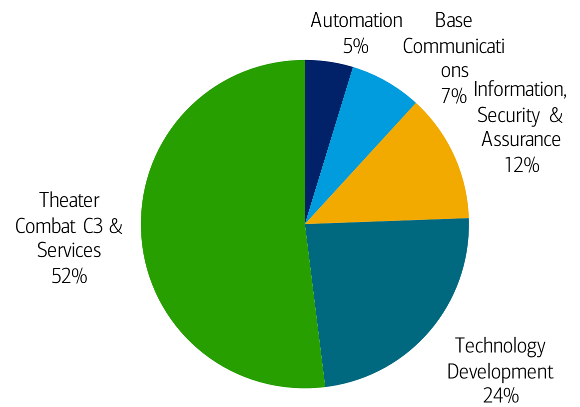
Exhibit 19: Theater Combat C3 & services represent 50%+

Tech development follows with 24% share



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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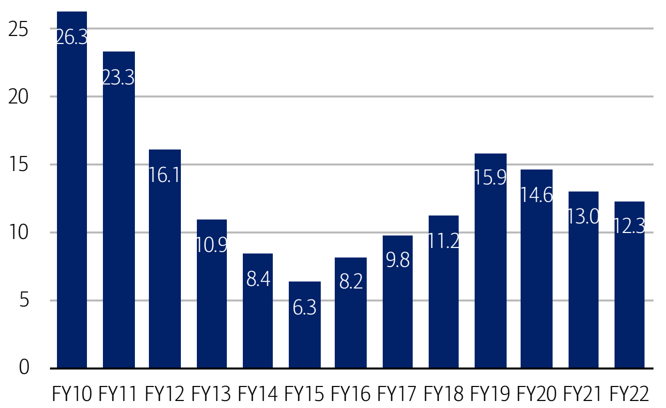
Exhibit 20: Ground systems
FY2022 asks for a 5% Y/Y decline



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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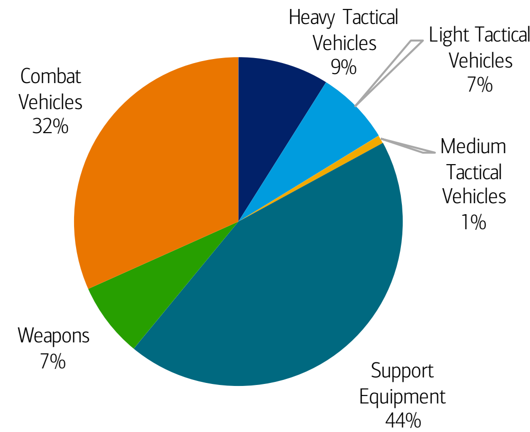
Exhibit 21: Support equipment represents 44%
Followed by combat vehicles with 32% share



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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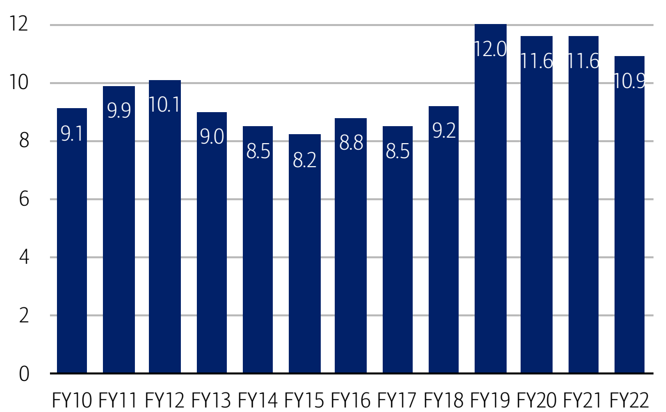
Exhibit 22: Missile defense
FY2022 asks for a 6% Y/Y decline



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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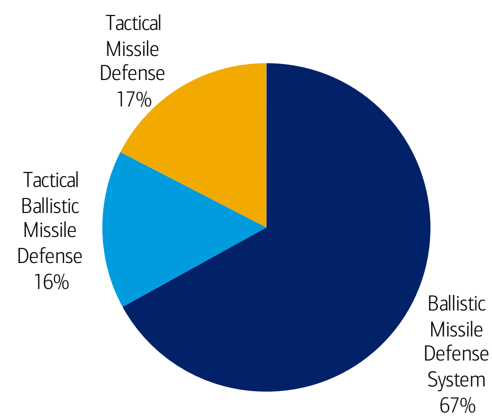
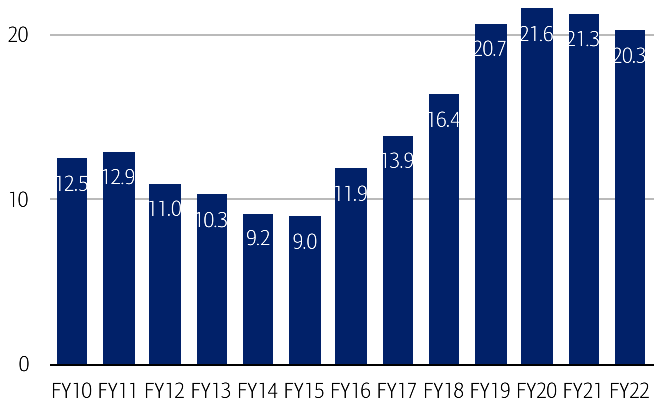
Exhibit 23: Ballistic Missile Defense System represent 2/3
Tactical Missile Defense 17% & Tactical Ballistic Missile Defense 16%



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

BofA GLOBAL RESEARCH

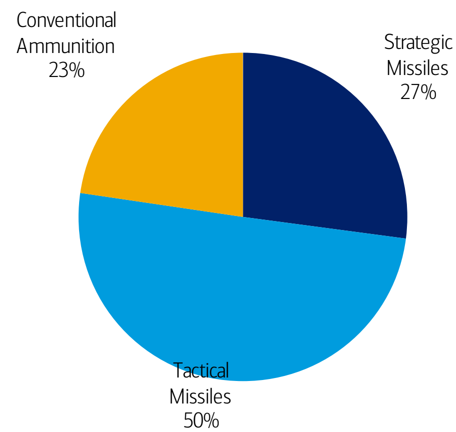
Exhibit 24: Missiles and munitions
FY2022 asks for a 5% Y/Y decline



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

BofA GLOBAL RESEARCH

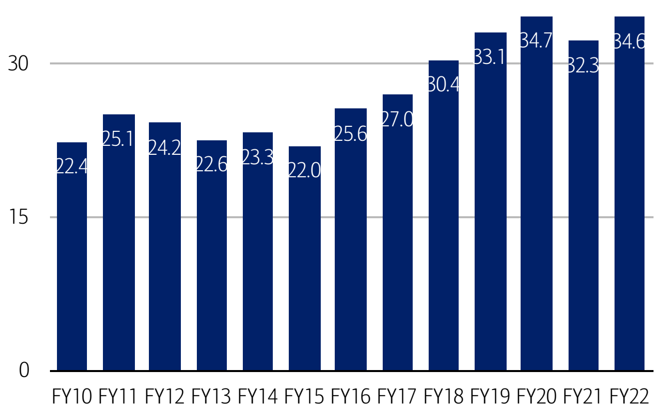
Exhibit 25: Tactical Missiles represent 50%
Strategic Missiles and Conventional ammunition follow with 27% and 23%, respectively



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

BofA GLOBAL RESEARCH

Exhibit 26: Shipbuilding and maritime systems
FY2022 asks for a 7% Y/Y increase



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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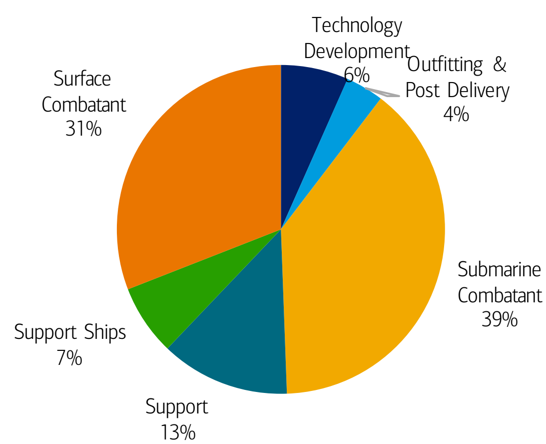
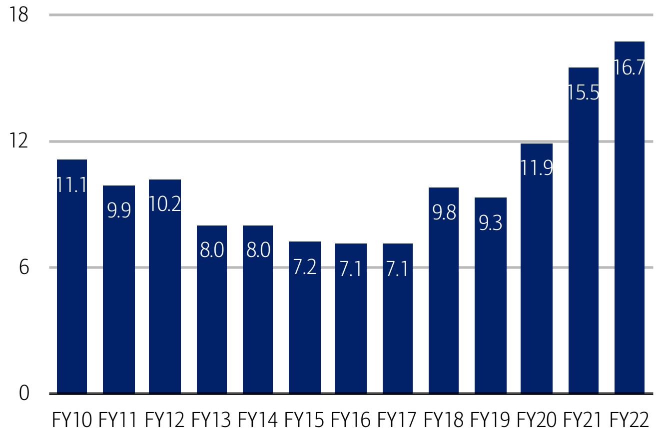
Exhibit 27: Submarine & surface combatants add up to 70% of total
Submarine & surface combatants represent 39% and 31%, respectively



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

BofA GLOBAL RESEARCH

Exhibit 28: Space-based systems
FY2022 asks for a 8% Y/Y increase



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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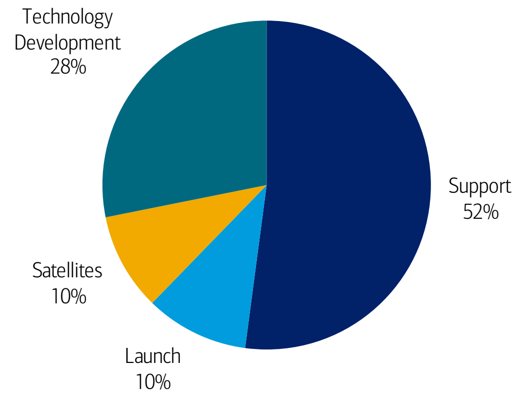
Exhibit 29: Support represents more than 50%
Technology development follows with 28%



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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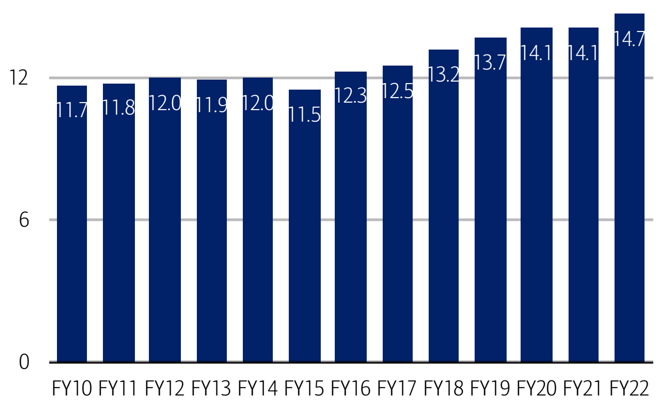
Exhibit 30: Science & Technology
FY2022 asks for a 4% Y/Y increase vs. PB2021, FY2021 appropriations came 19% higher than request).



Source: BofA Global Research, DoD FY2022 Major Weapons Programs

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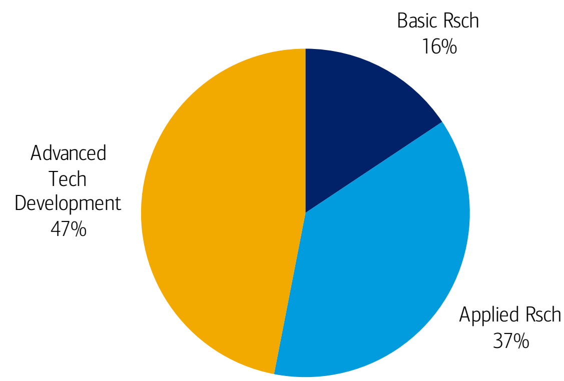
Exhibit 31: Advanced tech development represents almost 50%
Applied & basic research add up the other half

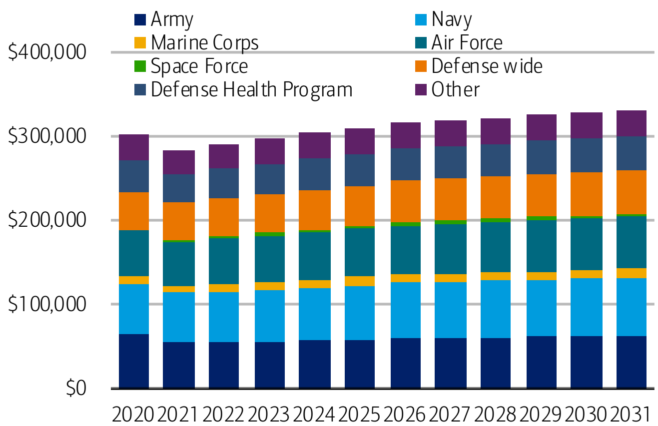


Source: BofA Global Research, DoD FY2022 Major Weapons Programs

BofA GLOBAL RESEARCH

O&M - $291bn, up 2.5% Y/Y

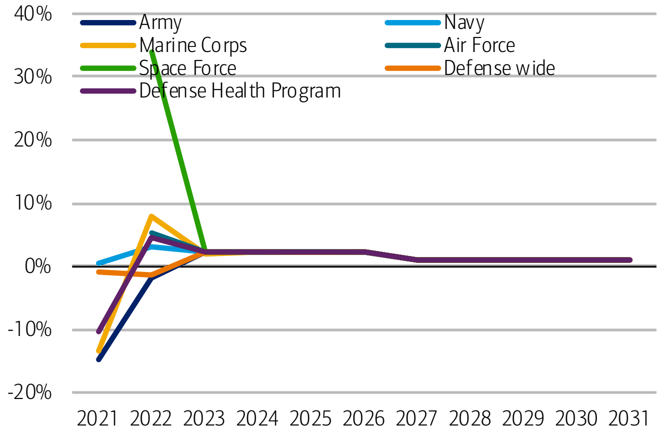
Exhibit 32: O&M request of $291bn in FY2022
Y/Y declines at Army & defense-wide spending is expected to be more than offset by increased in the Air Force, Navy & marines, Healthcare, and Space



Source: BofA Global Research, White House FY2022 President Budget

BofA GLOBAL RESEARCH

Exhibit 33: O&M to be up 2.5% in FY2022
Space will grow the faster, but Air Force explains most of the volumes expansion



Source: BofA Global Research, White House FY2022 President Budget

BofA GLOBAL RESEARCH

Exhibit 34: Stocks mentioned
Prices and ratings for stocks mentioned in this report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
BA	BA US	Boeing	US$ 247.02	C-2-9
BAH	BAH US	Booz Allen Hamilton	US$ 84.93	B-1-7
BWXT	BWXT US	BWX Technologies	US$ 62.54	B-1-7
CACI	CACI US	CACI	US$ 254.96	B-1-9
GD	GD US	General Dynamics	US$ 189.91	B-1-7
HII	HII US	Huntington Ing Ind	US$ 216.21	B-1-7
LHX	LHX US	L3Harris	US$ 218.06	B-1-7
LDOS	LDOS US	LDOS	US$ 102.75	B-1-7
LMT	LMT US	Lockheed Martin	US$ 382.2	B-1-7
MANT	MANT US	ManTech	US$ 87.01	B-1-7
MRCY	MRCY US	Mercury Systems	US$ 65.45	B-1-9
NOC	NOC US	Northrop Grumman	US$ 365.87	B-1-7
RTX	RTX US	Raytheon Tech	US$ 88.71	B-1-8

Source: BofA Global Research

BofA GLOBAL RESEARCH

Price objective basis & risk

Boeing (BA)

Our PO of $265 implies a normalized FCF of $11/share and 10% premium to the market which is in line with current relative valuation levels (vs. historical average of 30% discount). During the 2008 crisis, Boeing relative valuation stayed above the historical range for about two years. We think the market will continue to value Boeing on a normalized post-pandemic and program issues FCF generation.

Upside risks to our PO are: Boeing's ability to break the cost curve on the 787 program and recover $18bn+ in deferred production. The company's ability to sustain 777 delivery rates through the bridge to 777X. Lower than expected 777X, future single aisle and middle of the market aircraft development costs. The 737 MAX disruption is shorter than we expect.

Downside risks to our PO are: Execution risk on new programs (737MAX, 777X, KC-46) could result in cost overruns and margin contractions. Changes in trade policy that end in a trade war could negatively affect Boeing. A sharp and prolonged surge in oil prices to well above $100/bbl would be negative to aircraft demand. A downturn in commercial aviation, due to an exogenous factor, could adversely affect financial results. Given that aircraft are priced in USD, an unexpected rapid revaluation in the dollar could significantly affect order activity. Additionally, a strong dollar could improve Airbus' competitive advantage. The 737 MAX disruption is longer than we expect.

Booz Allen Hamilton (BAH)
Our PO of $110 is based on a 1.2x relative EV/EBITDA multiple to the BofA multiple for the defense primes on CY22 estimates. This equals a 17x EV/EBITDA multiple. We believe a premium to the defense primes factors in strong US National Security demand for innovative technologies and solutions and shareholder friendly capital deployment.

Risks to the downside are cuts to the DoD budget vs. anticipated, which could negatively impact our estimates. Should BAH run into any problems with integrating M&A, containing its costs or a heightened competitive environment there could be downside risk to our estimates. Risks to the upside are a better than anticipated upturn in the federal budget, inexpensive and well integrated M&A activity and unexpected capital return to shareholders in the form of buybacks or special dividends.

BWX Technologies, Inc. (BWXT)
The weighted average implied EV/EBITDA multiple on the defense primes' POs in our coverage universe is 13.8x 2022 estimates. BWXT historically trades on average at a 1.2x premium to the primes' multiple given the company's exposure to the US Navy, its monopoly on nuclear powered ships as well as its diversification efforts underway. As a result, using this average historical premium, we derive a 16.6x EV/EBITDA multiple on BWXT, and thus a PO of $78.

Downside risks to our PO are losing US government contracts, changes in contracting terms that could pressure margins, and program procurement changes that result in market share loss. The US government is BWXT's largest customer that drives about 90% of BWXT's revenues.

Upside risks to our PO are better than expected operating performance and margins, increased demand for nuclear aftermarket for power plants, and higher than expected share in missile tubes for the Virginia-class submarines and Ohio-class submarines. Additionally, acquisitions could provide upside to our estimates.

CACI International (CACI)
Our PO of $310 is based on a 0.9x relative EV/EBITDA multiple to the BofA multiple for the defense primes on CY22 estimates. This equals a 13x EV/EBITDA multiple. We believe a valuation at a slight discount to the defense primes fairly balances CACI's robust acquisitive history, solid free cash flow generation, attractive portfolio of capabilities and strong US National Security demand for innovative technologies and solutions, renewed capital deployment strategy, as well as lack of dividend vs. peer group an ST COVID-19 headwinds.

Downside risks are cuts to the DoD budget vs. anticipated, problems finding acquisition targets, integrating M&A, hiring the right personnel, containing its costs, estimating costs and executing on fixed price contracts, sustaining reputational risk and future awards.

Upside risks are a better than anticipated federal budget allocated to innovative technologies and modernization, inexpensive and well integrated M&A activity, unexpected capital return to shareholders in the form of dividends, market share gains in the mission technology arena, better than expected margin expansion.

General Dynamics (GD)
We derive our $205 PO using a DCF analysis which assumes a 3.3% implied growth and a 10.4% discount rate. In our view, GD's defense program exposure, especially in its Marine unit, coupled with Gulfstream could provide near-term and medium-term organic growth. Additionally, the company's strong balance sheet and solid cash generation could sustain dividend growth and share repurchases.

Downside risks to our PO are: 1) A downturn in business jets, due to an exogenous factor. 2) Given that business jets are priced in dollars, an unexpected devaluation in the dollar could significantly impact order activity, 3) Poor execution on defense programs could adversely impact margins, 4) Defense budget cuts could limit growth in the medium- and long-term.

Huntington Ingalls Industries (HII)
We derive our PO of $255 using a P/FCF multiple of 0.8x (in line with historical average) relative to the S&P 500 on 2022 estimates. This equals a 6.2% FCF yield. We see HII as a direct beneficiary of the US Indo-Pacific strategy.

Upside risks to our PO are: if the US government's "pivot to the Pacific" strategy involves procuring more ships than we forecast and margins continue to expand beyond expected. Higher share repurchases could provide upside to reported EPS. Accretive acquisitions could increase future expected earnings.

Downside risks to our PO are: Cost overruns derail the company's plan to maintain operating margins above 9%. The Navy takes a budget cut and reduces current fleet procurement.

L3Harris (LHX)
Our PO of $270 is based on a 17x 2022E P/FCF multiple. The 17x P/FCF multiple reflects a 0.8x relative multiple to the S&P 500 on '22 estimates, in line with Defense pure play average (Lockheed Martin and Northrop Grumman) of also 0.8x relative to the S&P. Upside risk to our PO could result from LHX winning more content on new and existing programs vs. our expectations. Downside risk to our PO could result from LHX not integrating LLL and HRS as we expect. Integration challenges could put a strain on cash and impact our FCF estimates.

Leidos Holdings (LDOS)
Our PO of $125 is based on a 1.0x relative EV/EBITDA multiple to the Defense primes on 2022 estimates. This equals a 14x EV/EBITDA multiple. We believe LDOS should trade in line with the defense primes as strong US National Security demand for innovative technologies and solutions and solid free cash flow generation, is offset by lack of significant share repurchases in the near term and pricing pressure from changing competitive environment (M&A trends & non-traditional competitors).

Downside risks to our PO are: cuts to the US Government budget vs. anticipated, increased competition from non-traditional players, problems integrating M&A, hiring the right personnel, containing its costs, estimating costs and executing on fixed price contracts, sustaining reputational risk and future awards.

Upside risks to our PO are: a better than anticipated federal budget allocated to innovative technologies and modernization, inexpensive and well integrated M&A activity, unexpected capital return to shareholders in the form of dividends or share buybacks, market share gains, better than expected margin expansion.

Lockheed Martin (LMT)
We derive our PO of $480 using DCF analysis that factors in a discount rate of 7.7% and a terminal growth rate of 2.4% (imply underlying 2025-2030e CAGR of 2%, impact of

R&D amortization fading away, and terminal growth rate after 2030 of 1.8%).

Downside risks: as LMT derives nearly 30% of revenue from the Aeronautics division, should the company run into any execution issues on the F-35 program, we believe this could materially affect the company's financials in addition to posing headline risks. Execution risk on defense programs could result in cost overruns and margin contractions. Unexpected cancellations to programs in both commercial and military could materially impact Lockheed Martin as a result. Orders from international programs are difficult to time due to the complexity of the process. Thus, we could see some lumpiness with regard to international orders.

Upside risks are: F-35 program performs better than anticipated, defense spending is higher than expected, and LMT continues to buy back more shares than we forecast, driving higher EPS growth.

ManTech International (MANT)
Our PO of $100 is based on a 1.1x relative EV/EBITDA multiple to the BofA multiple for the defense primes on 2022 estimates. This equals a 16x EV/EBITDA multiple. We believe a premium to the peer group factors in MANT's strong positioning to the US National Security mission-related demand for cyber and other innovative technologies.

Downside risks to our PO are cuts to the DoD budget vs. anticipated, finding and hiring the right personnel, retaining the know-how and being able to remain on the lead for cutting edge technologies, sustaining reputational risk and future awards, containing its costs, estimating costs and executing on fixed price contracts.

Upside risks to our PO are a better than anticipated federal budget allocated to innovative technologies and modernization, market share gains, inexpensive and strategic M&A activity, better than expected margin expansion.

Mercury Systems (MRCY)
Our $85 PO is based on a 1.65x rel EV/EBITDA multiple on '22 estimates. This multiple is consistent with where the stock traded on average since '13 and we believe it is currently justified given the slowing DoD budget.

Risks to the upside: Better than expected recovery to the DoD budget than currently anticipated could positively impact our estimates. Accretive acquisitions could provide upside to our estimates.

Risks to the downside: If there were a reversal in the defense primes' secular shift towards subsystems outsourcing, Mercury Systems' revenue would be negatively affected. Despite the complex and costly defense business process and high-capital requirements, the large commercial enterprises (such as blade server providers) or Silicon Valley technology companies could enter the military secure processing and storage subsystems business. Should MRCY run into any problems with integrating M&A, containing its costs, or a heightened competitive environment there could be downside risk to our estimates.

Northrop Grumman (NOC)
We derive our PO of $455 based on a DCF analysis that reflects a 4% Y/Y growth rate for 2025-2030e, a 1.9% long term growth rate and an 8.1% discount rate (previously 7.5%) . The US Defense Budget Authorization has grown at a 1.8% (previously 1.9%) CAGR in constant dollars since post World War II. Considering the most profitable production phase of the B-21 Raider program starts in about ten years and the GBSD will enter production at the end of this decade, we expect NOC's next terminal growth rate could exceed the historical growth rate of US defense spending.

Downside risks to our PO are: Execution risk on defense programs could result in cost overruns and margin contractions. Unexpected cancellations to programs in both commercial and military could materially impact NOC.

Raytheon Tech (RTX)
Our PO of $105 is based on a DCF analysis that factors in a discount rate of 9.5%, a 5% next five year growth rate, and a terminal growth rate of 3%. Both the next five year and terminal growth rates are a blend of US defense and global commercial aerospace. We note that our FCF assumptions do include the potential impact of the R&D amortization tax change to reflect conservatism.

Downside risks to our PO are: A downturn in commercial aviation due to the natural business cycle or an exogenous event such as a terrorist attack or a pandemic. A severe global economic slowdown would affect top-line growth as 45% of sales are generated outside the US. Execution risk on defense programs could result in cost overruns and margin contractions. Orders from international programs are difficult to time due to the complexity of the process. Thus, we could see some lumpiness with regard to international orders. Unexpected cancellations to programs in both commercial and military could materially impact RTX.

Upside risks to our PO are: If the commercial aerospace and business aviation jet recoveries are better than expected, earnings could fare better than our projections. If margins fare better than we are forecasting, there could also be upside potential to our valuation. If the company executes on existing programs better than expected, gains share in the international market or makes a materially accretive acquisition, there could be greater-than-anticipated upside in the shares.

Analyst Certification

We, Ronald J. Epstein and Mariana Perez Mora, hereby certify that the views each of us has expressed in this research report accurately reflect each of our respective personal views about the subject securities and issuers. We also certify that no part of our respective compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

US - Aerospace and Defense Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
BUY				
	AerCap Holdings N.V.	AER	AER US	Ronald J. Epstein
	Air Lease Corporation	AL	AL US	Ronald J. Epstein
	Booz Allen Hamilton	BAH	BAH US	Ronald J. Epstein
	BWX Technologies, Inc.	BWXT	BWXT US	Ronald J. Epstein
	CACI International	CACI	CACI US	Mariana Perez Mora
	CAE Inc.	YCAE	CAE CN	Ronald J. Epstein
	Garmin	GRMN	GRMN US	Ronald J. Epstein
	General Dynamics	GD	GD US	Ronald J. Epstein
	Huntington Ingalls Industries	HII	HII US	Ronald J. Epstein
	L3Harris	LHX	LHX US	Ronald J. Epstein
	Leidos Holdings	LDOS	LDOS US	Mariana Perez Mora
	Lockheed Martin	LMT	LMT US	Ronald J. Epstein
	ManTech International	MANT	MANT US	Mariana Perez Mora
	Mercury Systems	MRCY	MRCY US	Ronald J. Epstein
	Northrop Grumman	NOC	NOC US	Ronald J. Epstein
	Raytheon Tech	RTX	RTX US	Ronald J. Epstein
	Teledyne Technologies Inc	TDY	TDY US	Ronald J. Epstein
	Triumph Group	TGI	TGI US	Ronald J. Epstein
	Virgin Galactic Holdings	SPCE	SPCE US	Ronald J. Epstein
NEUTRAL				
	Albany International	AIN	AIN US	Ronald J. Epstein
	Boeing	BA	BA US	Ronald J. Epstein
	Embraer	ERJ	ERJ US	Ronald J. Epstein
	Parsons Corporation	PSN	PSN US	Ronald J. Epstein
	Textron	TXT	TXT US	Ronald J. Epstein
	TransDigm Group Inc.	TDG	TDG US	Ronald J. Epstein
UNDERPERFORM				
	Bombardier Inc.	YBBD B	BBD/B CN	Ronald J. Epstein
	HEICO Corporation	HEI	HEI US	Ronald J. Epstein
	Hexcel Corporation	HXL	HXL US	Ronald J. Epstein
	Spirit AeroSys-A	SPR	SPR US	Ronald J. Epstein

Disclosures

Important Disclosures

Equity Investment Rating Distribution: Aerospace/Defense Electronics Group (as of 31 Mar 2021)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	25	58.14%	Buy	20	80.00%
Hold	8	18.60%	Hold	5	62.50%
Sell	10	23.26%	Sell	6	60.00%

Equity Investment Rating Distribution: Engineering & Construction Group (as of 31 Mar 2021)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	12	66.67%	Buy	8	66.67%
Hold	2	11.11%	Hold	1	50.00%
Sell	4	22.22%	Sell	3	75.00%

Equity Investment Rating Distribution: Global Group (as of 31 Mar 2021)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	1909	58.54%	Buy	1218	63.80%
Hold	653	20.02%	Hold	395	60.49%
Sell	699	21.44%	Sell	356	50.93%

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster*
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Underperform	N/A	≥ 20%

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