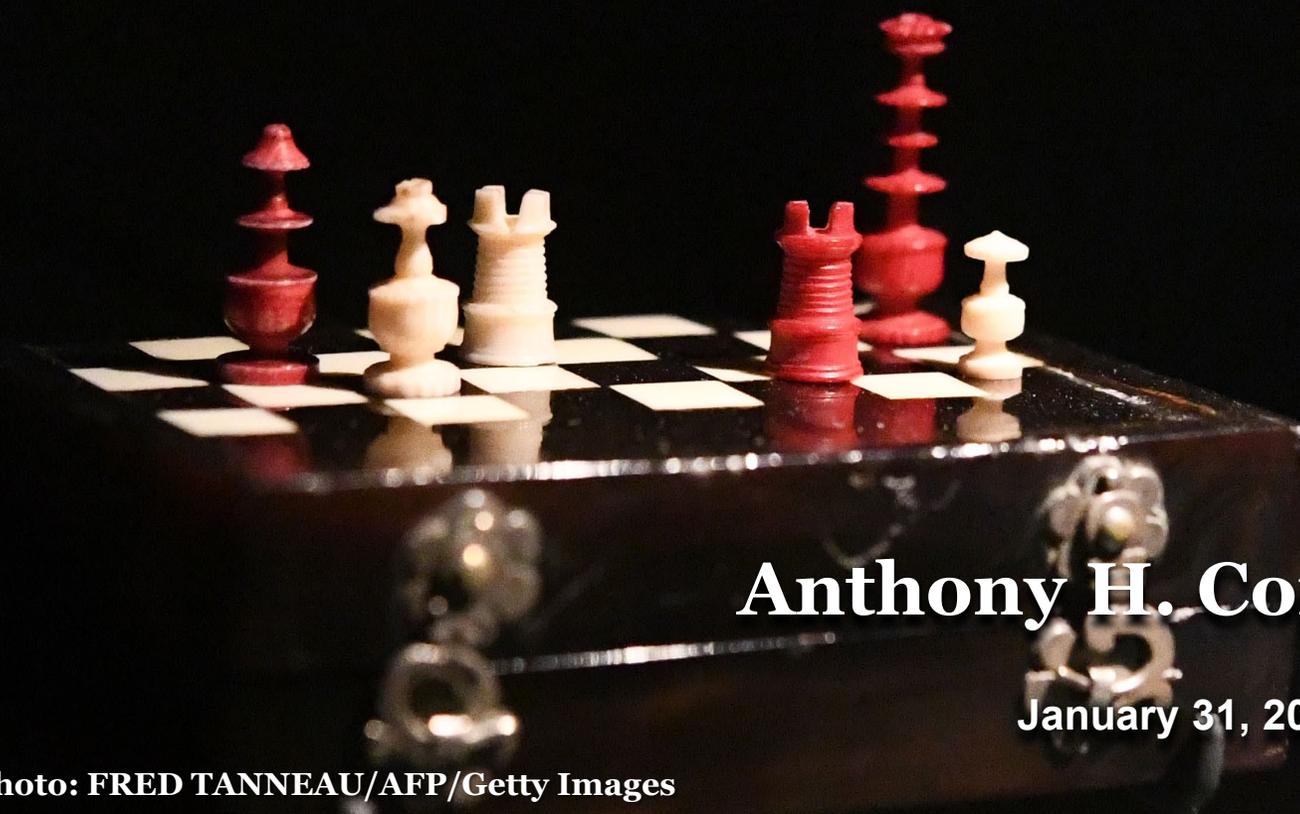


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Strategic Triage vs. Strategic Overstretch



Anthony H. Cordesman

January 31, 2022

Photo: FRED TANNEAU/AFP/Getty Images

Emeritus Chair
In Strategy

Choosing Strategic “Triage” over “Overstretch”

- **Define mix of strategies in terms of credible plans, programs, budgets (PPB) and risks based on “triage” that balances goals with resources and capabilities.**
- **Rebuild PPB and Future Years Defense Program (FYDP), focusing on strategies with clearly defined force plans and budgets.**
- **Focus on key missions and major commands, not budgets of military services.**
- **Treat in terms of Joint All Domain Operations (JADO).**
- **Look beyond warfighting to all aspects of strategic competition from “white area” to nuclear war.**

Introduction

The Emeritus Chair in Strategy at CSIS is issuing a briefing on the challenges the U.S. faces in developing a global strategy that it can sustain with the resources it can actually make available in the years to come – and one that can adapt to the possible emergence of China as a true peer competitor, the sustained challenges from Russia, the threats from powers like Iran and North Korea, and the need to meet global commitments and sustain its strategic partnerships.

This requires changes to both U.S. strategy and to strategic “triage” to avoid “overstretching” its capabilities and resources as it attempts to address a myriad of global concerns, including uncertain domestic spending priorities, competition with China, a hostile Russia, lesser threats like Iran and North Korea, terrorism and extremism, new threats, the global instability of “fragile states,” and emerging and disruptive technologies (EDTs).

This briefing highlights the weaknesses in the current U.S. efforts and the need to define a mix of strategies, including credible plans, programs, and budgets (PPB) and the Future Years Defense Program (FYDP) that can realistically balance its goals with its resources and capabilities. Recent U.S. efforts to define a strategy have failed to go beyond broad goals and statements of good intentions by failing to create real plans and programs, by budgeting based on military services, and by budgeting on an annual budget basis without a real-world Future Years Defense Program and budget. During the time of this writing, the Biden administration has yet to release the FY 2023 defense budget request. This briefing will be updated to reflect any changes to U.S. strategy as reflected in the FY 2023 defense budget.

A realistic strategy must instead focus on key missions as well as on real-world plans, programs, and budgets. It must focus on the major combatant commands and functional commands rather than the shopping lists of the individual military service; fully reflect the need to conduct joint all domain operations (JADO); deal with emerging and disruptive technologies (EDTs); and address the whole range of strategic competition with China, Russia, and other major threats from civil “white area” operations to gray area warfare, theater level conflicts, and nuclear war.

The U.S. also has a defense budget and a defense-oriented planning, programming, and budgeting process rather than a true national security strategy and integrated national security budget. It decouples far too many aspects of the civil aspects of U.S. foreign policy and national security strategy from the military efforts of the Department of Defense. It ignores both the warnings of Clausewitz regarding “ideal war,” and the fact that its primary challenge is now a China that focuses on the integration of civil and military operations advocated by Sun Tzu.

More broadly, the U.S. also needs to exercise “strategic triage” to address the need to balance national security spending and domestic spending and to create real-world strategic partnerships with allied and partner states, rather than burdensharing bullying and arms sales. The present U.S. approach to strategic partnerships undervalues its allies and the need to develop common and interoperable forces – mistakes as serious as the lack of an effective focus on strategy priorities and on a meaningful, mission-oriented planning, programming, budgeting system.

Key Areas of Potential Overstretch

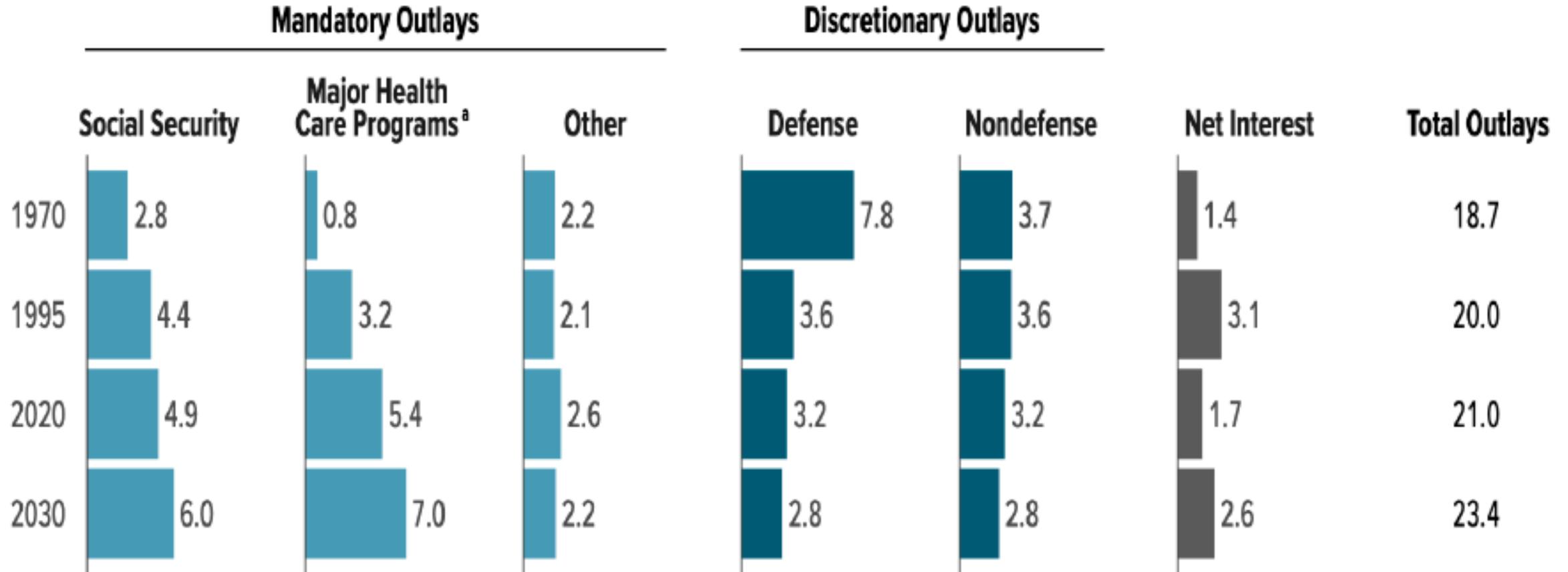
- Deal with conflicting and uncertain federal spending priorities.
- Shift from nuclear balance defined by arms control to full range of emerging “existential” threats to U.S., allies, and partners.
- React to emergence of China as potential peer superpower by 2030.
- Treat Russia as largely hostile under Putin.
- Deal with lesser threats like Iran and North Korea on a global basis.
- Shift from focus on “terrorism” to the challenge of “fragile states.”
- Rethink strategic partnerships. Focus on effectiveness, not burdensharing.
- Adjust to an ongoing revolution in military affairs driven by emerging and destabilizing technologies

Conflicting and Uncertain Federal Spending Priorities

*Defense and National Security Do
Not Drive the Fiscal Side of
“Overstretch”*

Pre-Covid (“Normal”?) Rises in the Impact of Federal Spending Were Driven by Civil Mandatory Spending Programs

Percentage of GDP

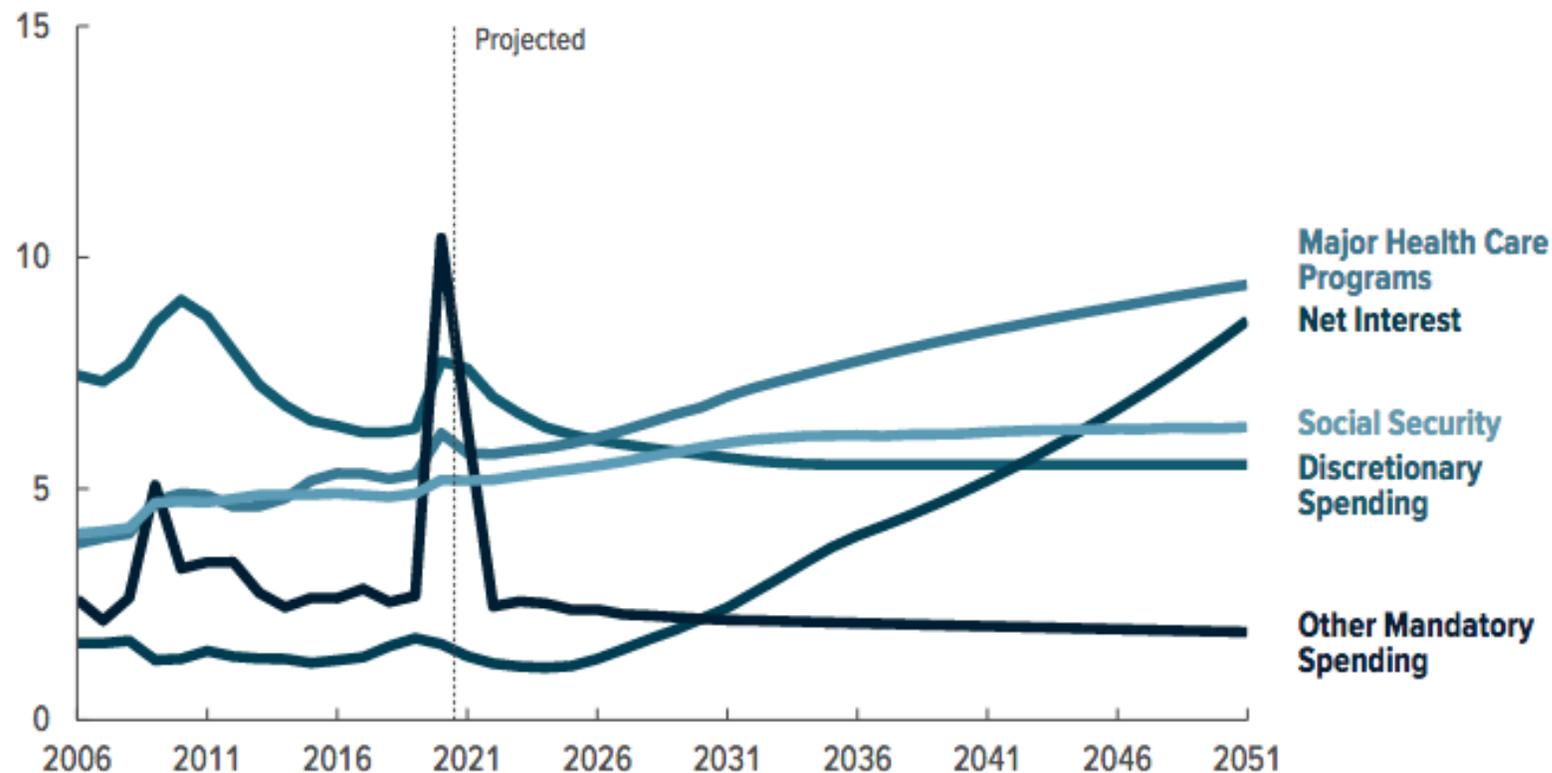


Source: CBO, *The 2021 Long-Term Budget Impact*, March 2021, <https://www.cbo.gov/system/files/2021-03/56977-LTBO-2021.pdf>.

Projected Long-Term Rises in the Impact of Federal Spending Were Driven by Civil Mandatory Programs

Federal spending grows from an average of 21.3 percent of GDP over the 2010–2019 period to an average of 29.7 percent over the 2042–2051 period in CBO’s projections.

Percentage of Gross Domestic Product

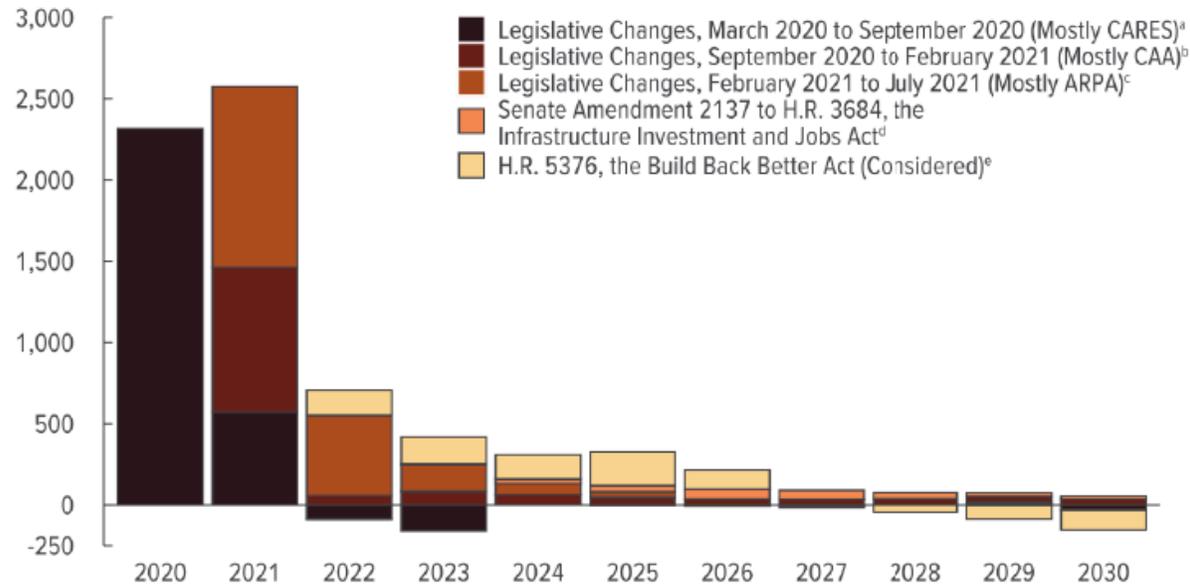


Net spending for interest, measured as a share of GDP, begins to increase in 2025 and more than triples over the last two decades of the projection period. Spending for the major health care programs and Social Security increases in almost every year of the period.

The Uncertain Impact of Domestic Covid Spending on the Budget

Net Increase in the Deficit From Major Pandemic-Related Legislation (Enacted and Considered)

Billions of Dollars



The effects on the deficit were much larger in 2020 and 2021 than they will be from 2022 to 2030, CBO estimates.

CARES = Coronavirus Aid, Relief, and Economic Security Act; CAA = Consolidated Appropriations Act; ARPA = American Rescue Plan Act.

a. Changes in federal deficits, excluding debt service, from legislative changes. See www.cbo.gov/publication/56517, Table A-1.

b. Changes in federal deficits, excluding debt service, from legislative changes. See www.cbo.gov/publication/56970, Table 1-6.

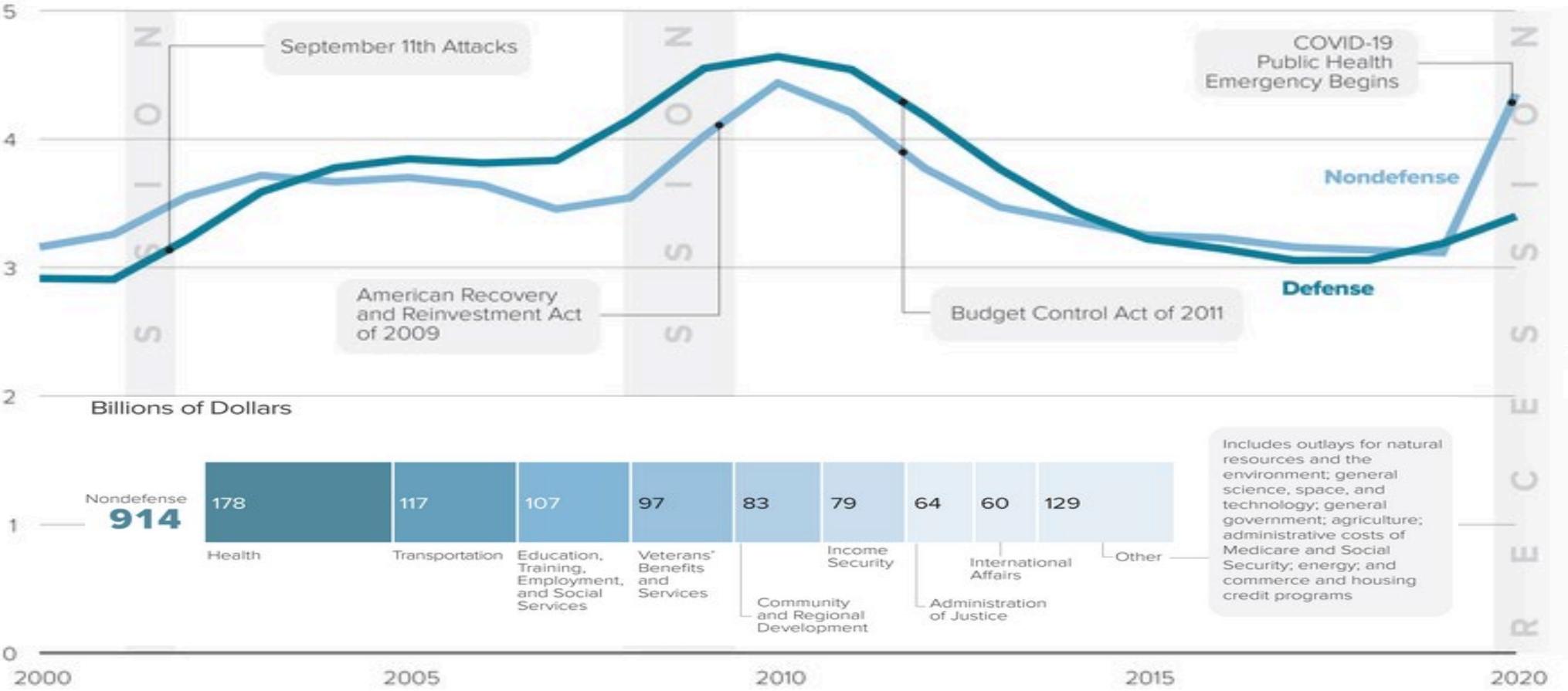
c. Changes in federal deficits, excluding debt service, from legislative changes. See www.cbo.gov/publication/57263, Table A-1.

d. See www.cbo.gov/publication/57406.

e. See www.cbo.gov/publication/57627.

Civilian Discretionary Spending Is Now Overtaking Defense Spending

Outlays, as a Percentage of Gross Domestic Product



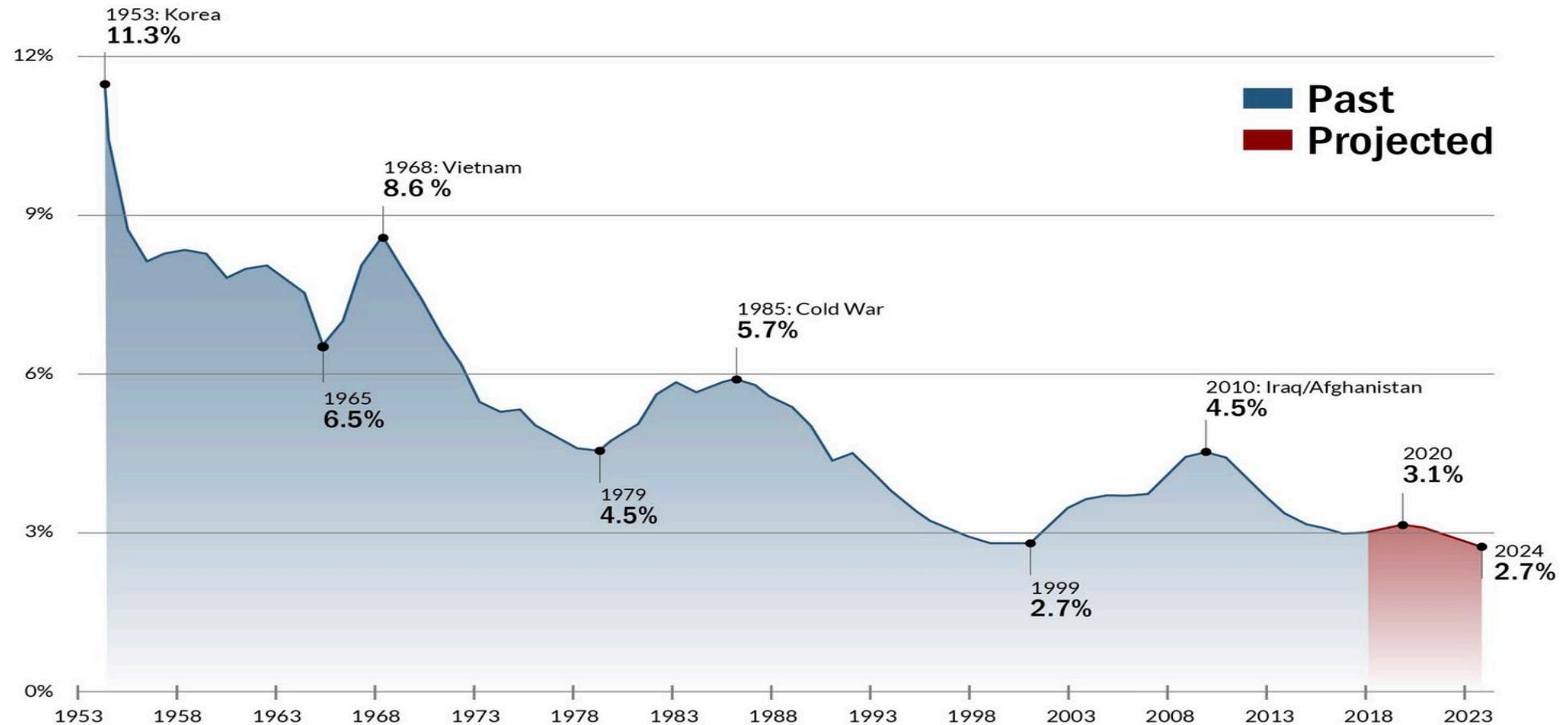
Source: CBO, "Discretionary Spending in Fiscal Year 2020: An Infographic," April 30, 2021, <https://www.cbo.gov/publication/57172>.

Don't Hype the Challenge:

**Historically, the Current “Burden” of Defense
Is Now Close to a Post-War Low and There Is
Ample Precedent for Far Higher Spending
Efforts**



Declining Strain on U.S. Economy – DoD Estimate of Defense Spending as a Percent of GDP: Korean War to 2024

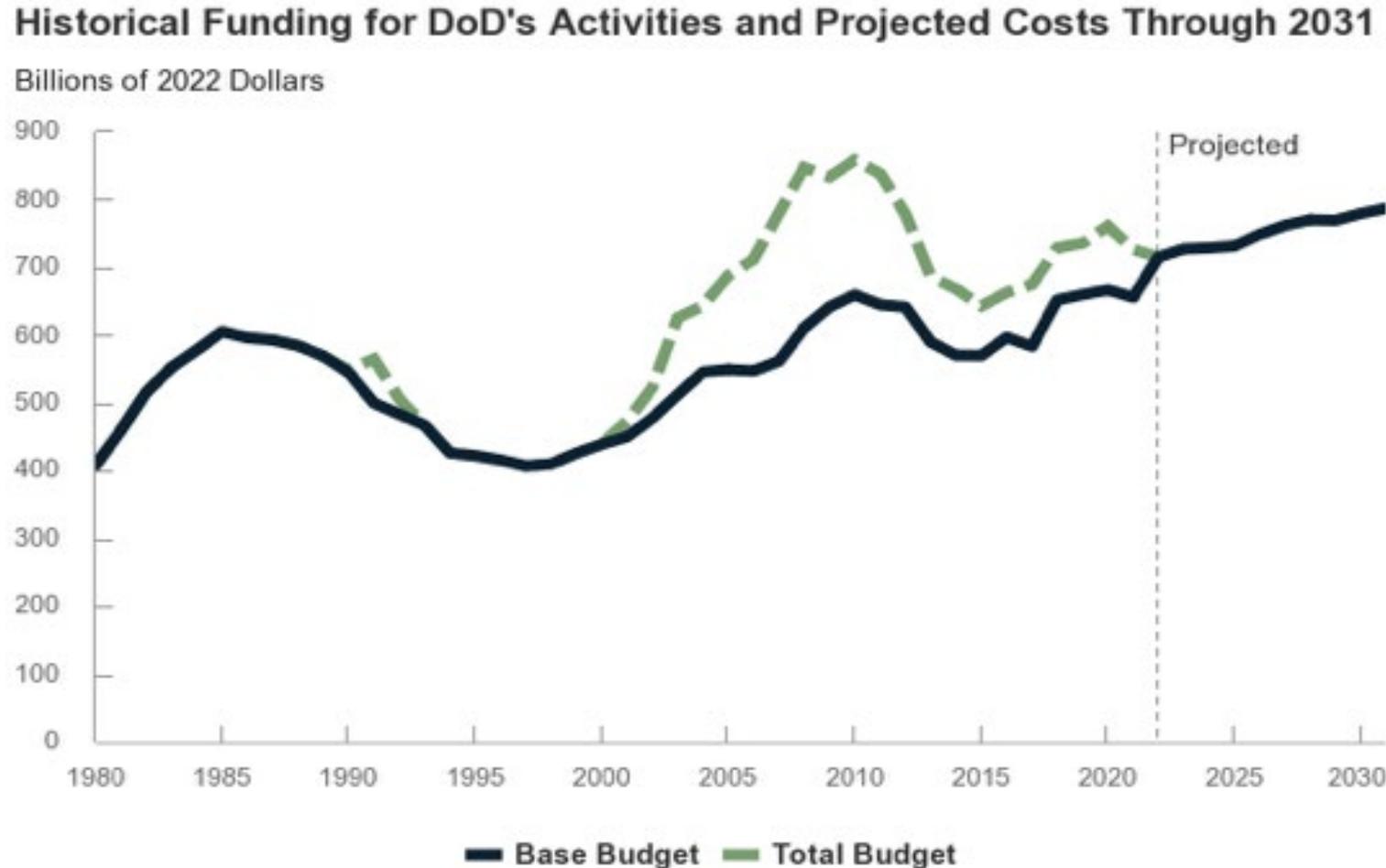


Source: National Defense Budget Estimates for FY 2019 (Table 6-13); historical and projected GDP from both the FY 2019 and FY 2020 Budget of the United States Government.

CBO Estimate of Long-Term Cost of FY2022 U.S. DoD Defense Budget

... as is common when a new administration submits its first budget request, DoD did not release a 2022 FYDP. Therefore, the report draws from the fiscal year 2022 budget request submitted by the Biden Administration, other documents and statements published by the Administration, and the 2021 FYDP (the most recent five-year plan released by DoD).

The Administration's 2022 budget request calls for \$715 billion in funding for DoD. In real terms—that is, with adjustments to remove the effects of inflation—the funding request is 1.5 percent less than the total amount provided for 2021 and 1.0 percent less than the amount that would have been requested for 2022 under the Trump Administration's final (2021) FYDP.



As for Current Operational Costs, They Were Minimal Even Before the Collapse of Afghanistan

Operation/Activity	FY 2021 Enacted	FY 2022 Request ²	Delta FY 2021 to FY 2022
Operation FREEDOM'S SENTINEL (OFS) Direct War Costs	12.9	8.9	-4.0
Operation INHERENT RESOLVE (OIR) Direct War Costs	7.0	5.4	-1.6
Enduring Theater Requirements and Related Missions	29.5	24.1	-5.4
European Deterrence Initiative (EDI) and the Ukraine Security Assistance Initiative (USAI)	4.5	3.7	-0.8
OCO for Base Requirements ¹	16.5	-	-16.5
Subtotal	70.4	42.1	-28.3
Prior-Year Rescissions	-1.9	-	+1.9
Grand Total	68.5	42.1	-26.4

Numbers may not add due to rounding

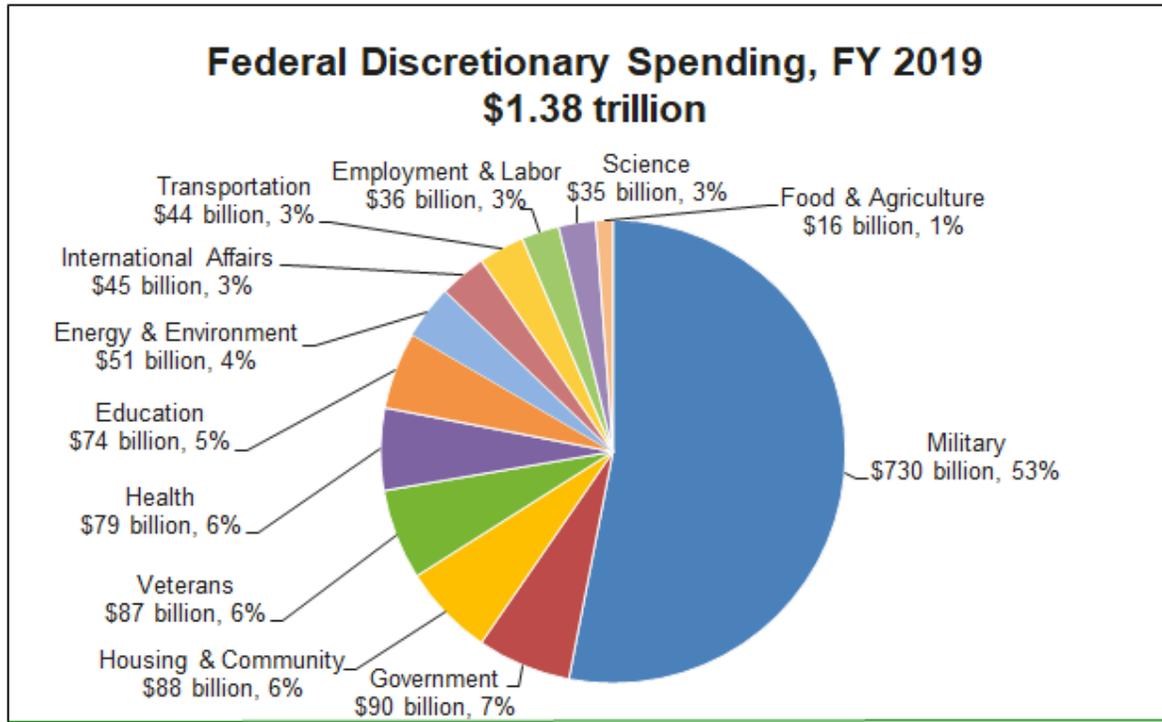
^{1/} The FY 2021 "OCO for Base Requirements" reflects the Department of Defense's base budget requirements requested in the FY 2021 OCO budget in order to comply with the base defense caps in current law.

^{2/} The FY 2022 Request amounts are accounted for in the base budget.

But Do Create a Real National Security Budget and PPB System

Competition with China and Russia is as much civil as military. U.S. civil effort must be as adequate as the military one.

Defense, However, Is Only Part of the U.S. National Security Budget: An Estimate of the Pre-Covid Total Is Shown Below



Militarized Budget, 2019	
Department of Defense-Military	\$687.8 billion
Department of Veterans Affairs	\$86.5 billion
Department of Homeland Security (minus FEMA)	\$44.8 billion
U.S. Customs and Border Protection	\$16.2 billion
Immigration and Customs Enforcement	\$7.8 billion
Department of Justice	\$25.6 billion
Federal Prison System	\$7.5 billion
Federal Prisoner Detention	\$1.7 billion
Drug Enforcement Administration	\$2.2 billion
Federal Bureau of Investigation	\$4 billion
Atomic energy defense activities	\$22.4 billion
International security assistance	\$11.3 billion
Defense-related activities	\$8.5 billion
Federal Drug Control Programs	\$376 million
Other Defense Civil Programs	\$285 million
Total	\$887.8 billion

Begin by Creating Real-World Strategies

*The U.S. (Like Most Countries) Does Not Explain
or Justify its Strategy in Its Defense Budgets and
Force Plans*

**Need to Rebuild the PPB system and the FYDP,
focusing on strategic priorities with clearly
defined force plans and budgets.**

Open-Source U.S. Strategy Documents Have Virtually No Substantive Content, No Plans, No Budgets, and No Programs

- **National Security Strategy and National Defense Strategy documents are little more than broad statements of problems and objectives.**
- **Actual budget submissions are shopping lists for military services.**
- **No real posture statements or FYDPs.**
- **No ways to cost Major Commands or see strategic objectives by regional or functional commands.**
- **No net assessments to justify strategy or spending.**
- **No official effort to provide an integrated National Defense Strategy including the State Department and full intelligence community.**
- **No effort to address strategic partnerships in any detail.**
- **No serious official comparative analyses of Russian, Chinese, Iranian, or North Korean military spending and efforts.**

**U.S. Strategy Is Shaped by U.S. Major
Command; Spending by Military
Service: The “Shopping List” Wins**



Planning, Programming, and Budgeting for Efficient JADO Strategy Should Be Shaped by Major Combatant Commands



In Practice, It Is Dominated by which Military Service “Wins” in the Spending Contest.

(Discretionary and Mandatory Dollars in Millions)

Military Department	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Current Dollars									
Army	166,190	155,393	150,093	148,240	154,865	166,352	178,797	190,324	183,295
Navy	160,153	159,546	161,694	160,047	167,062	182,090	193,984	202,207	208,066
Air Force	147,718	147,169	150,341	156,315	168,162	187,110	198,044	200,729	207,573
Defense-Wide	103,824	100,394	103,241	104,291	110,518	118,423	119,589	119,194	130,511
Total Current Dollars	577,885	562,501	565,369	568,894	600,607	653,975	690,414	712,454	729,444
FY 2022 Constant Dollars									
Army	191,397	177,129	169,578	164,540	168,017	176,541	186,189	194,441	183,295
Navy	183,066	180,407	182,199	177,074	180,640	192,378	201,464	206,679	208,066
Air Force	167,284	166,023	169,137	172,676	181,341	197,124	205,305	205,158	207,573
Defense-Wide	121,455	116,044	117,207	115,892	120,190	126,197	124,564	121,966	130,511
Total Constant Dollars	663,202	639,603	638,120	630,182	650,188	692,240	717,521	728,243	729,444
Percent Real Growth (%)									
Army	-14.0	-7.5	-4.3	-3.0	2.1	5.1	5.5	4.4	-5.7
Navy	-1.3	-1.5	1.0	-2.8	2.0	6.5	4.7	2.6	0.7
Air Force	-4.5	-0.8	1.9	2.1	5.0	8.7	4.2	-0.1	1.2
Total Real Growth	-6.1	-3.6	-0.2	-1.2	3.2	6.5	3.7	1.5	0.2

NOTE: War and supplemental funding is included.

“Wins” in Acquisition Are Defined by Military Service

Costs for acquisition in the 2022 budget request are \$1.4 billion higher than the amount planned for 2022 in the 2021 FYDP, an increase of less than 1 percent.

Changes were larger within each of the components of acquisition, however:

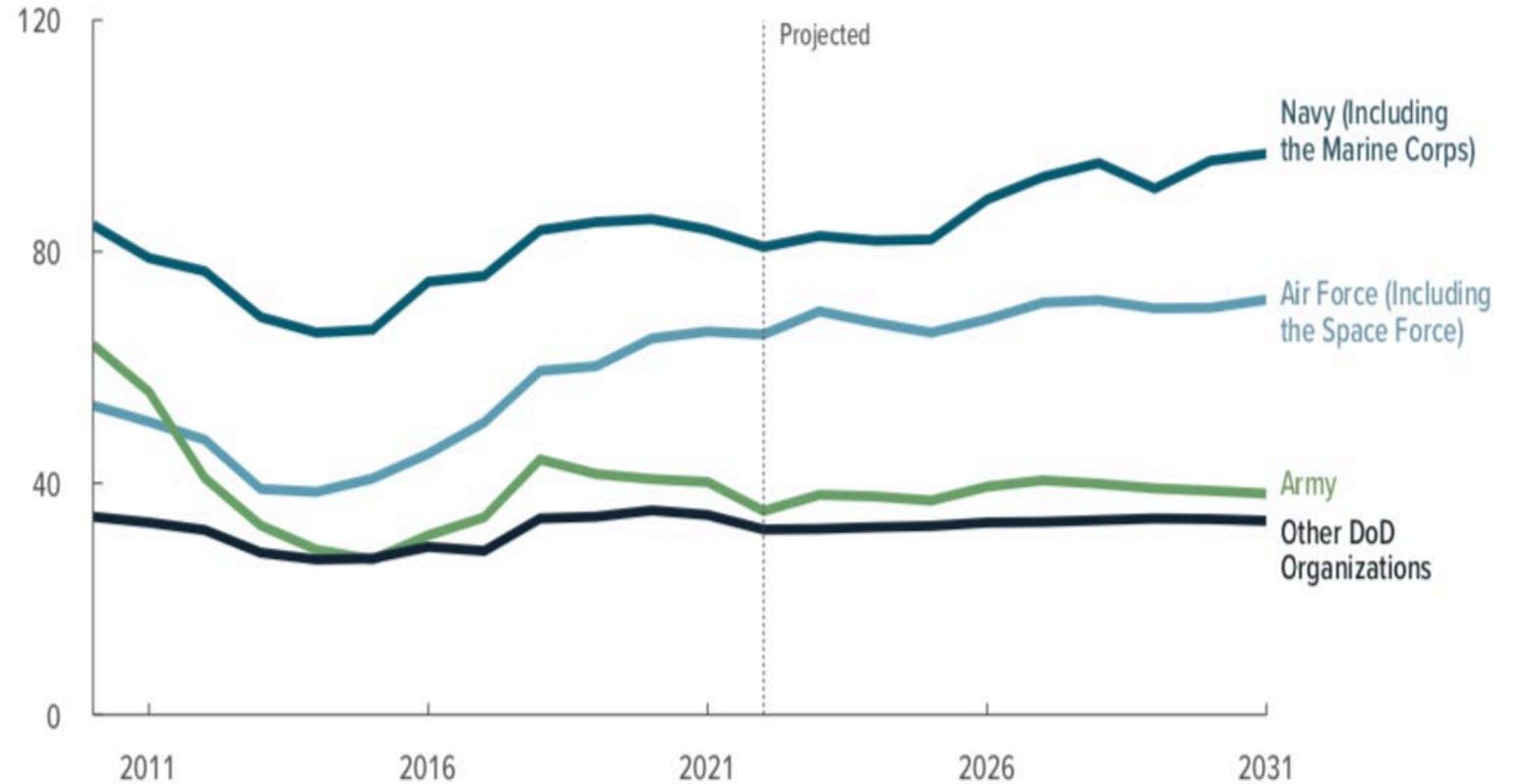
Costs for procurement decreased by \$5.6 billion (or 4 percent), and costs for RDT&E increased by \$7.0 billion (or 7 percent).

Some of the decrease in procurement costs resulted from developmental delays... For other programs, DoD may have slowed purchases while it awaits the outcome of its national security review.

Source: CBO, *Long-Term Costs of the Administration's 2022 Defense Budget*, January 7, 2022, <https://www.cbo.gov/system/files/2022-01/57541-DRP.pdf>.

DoD's Acquisition Costs, by Military Department, 2010 to 2031

Billions of 2022 Dollars



Data source: Congressional Budget Office. See www.cbo.gov/publication/57541#data.

**The Sheer Scale of Needed Change is
Indicated by the Shift from a Nuclear
Balance Defined by Arms Control to
an Unstable Range of Emerging
Existential Strategic Threats**

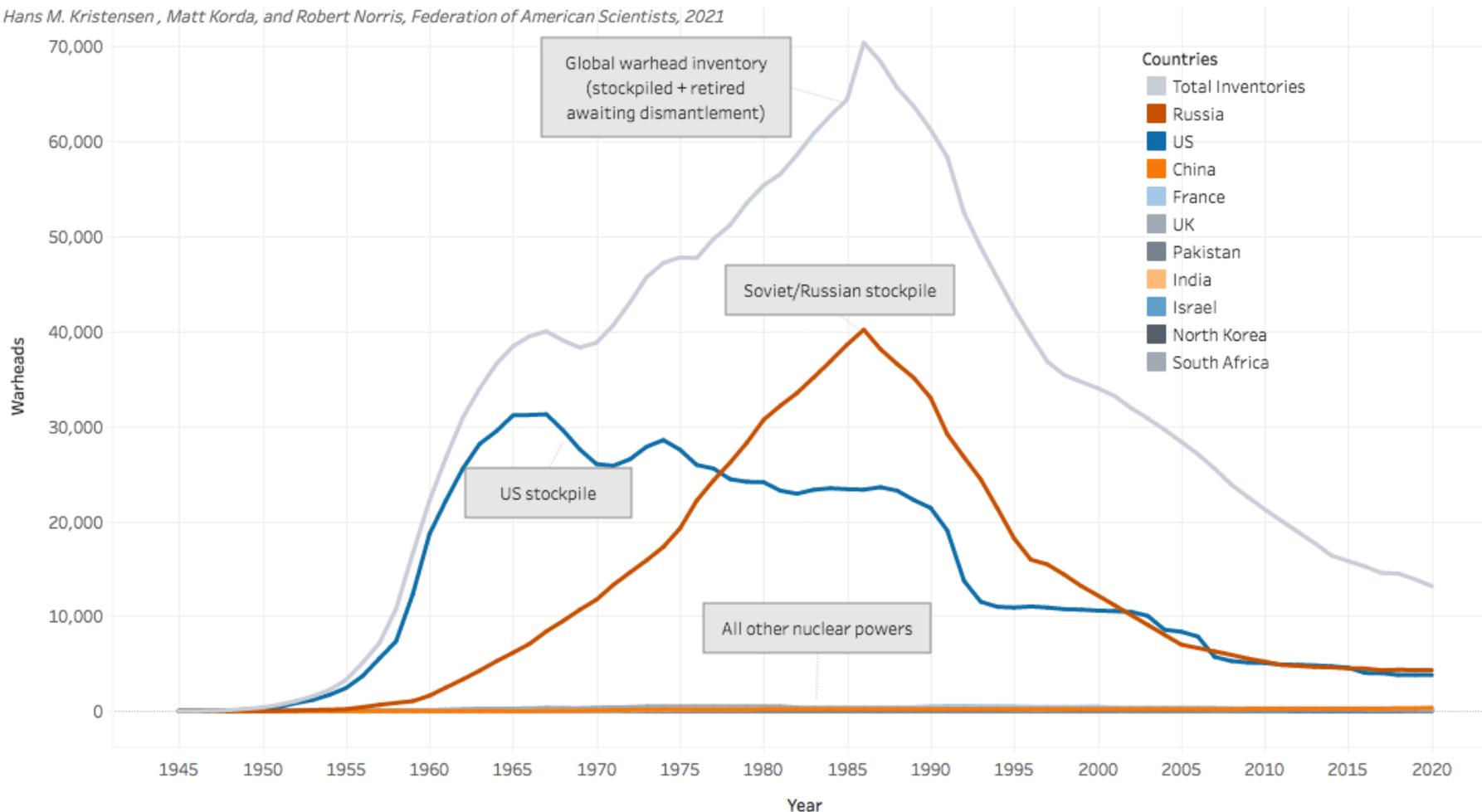


Remembering the Past History of U.S.-Soviet/Russian Competition

Estimated Global Nuclear Warhead Inventories 1945 - 2021

Last updated: 2 August 2021

Hans M. Kristensen, Matt Korda, and Robert Norris, Federation of American Scientists, 2021



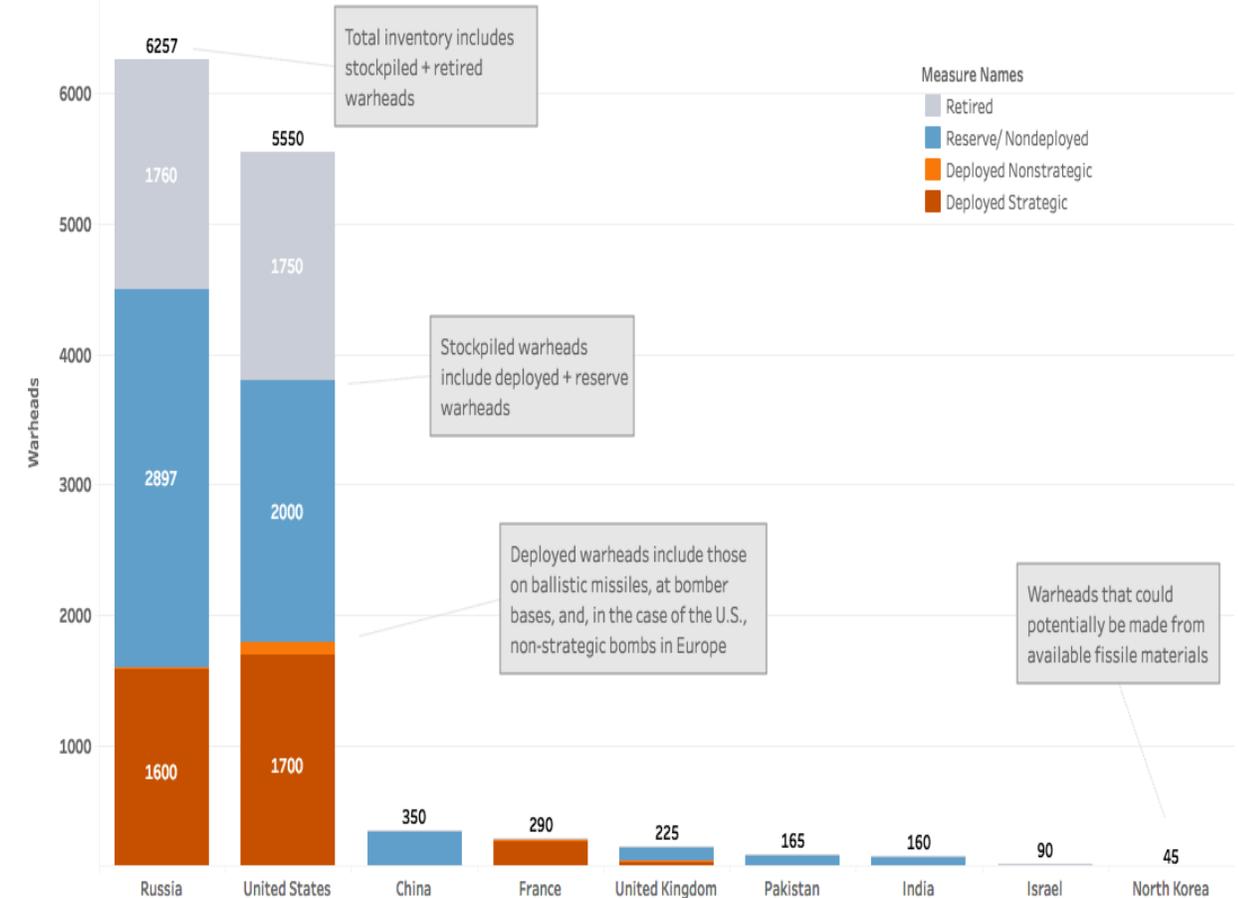
Current “Classic” Nuclear Forces – FAS Estimate: 2021

Last updated: 2 August 2021

Country	Deployed Strategic	Deployed Nonstrategic	Reserve/ Nondeployed	Military Stockpile ^a	Total Inventory ^b
Russia	1,600 ^c	0 ^d	2,897 ^e	4,497	6,257 ^f
United States	1,700 ^g	100 ^h	2,000 ⁱ	3,800 ^j	5,550 ^k
France	280 ^l	n.a.	10 ^l	290	290
China	0 ^m	?	350	350	350 ^m
United Kingdom	120 ⁿ	n.a.	105	225	225 ⁿ
Israel	0	n.a.	90	90	90 ^o
Pakistan	0	n.a.	165	165	165 ^p
India	0	n.a.	160	160	160 ^q
North Korea	0	n.a.	(45)	(45)	(45) ^r
Total:^s	~3,700	~100	~5,820	~9,600	~13,100

Estimated Global Nuclear Warhead Inventories, 2021

Hans M. Kristensen, Matt Korda, and Robert Norris, Federation of American Scientists, 2021



May not include weapons in new missile silos found in fall of 2021. “Deployed strategic warheads” are those deployed on intercontinental missiles and at heavy bomber bases. “Deployed nonstrategic warheads” are those deployed on bases with operational short-range delivery systems. “Reserve/Nondeployed” warheads are those not deployed on launchers and in storage (weapons at bomber bases are considered deployed). The “military stockpile” includes active and inactive warheads that are in the custody of the military and earmarked for use by commissioned deliver vehicles. The “total inventory” includes warheads in the military stockpile as well as retired, but still intact, warheads in the queue for dismantlement.

The Range of Demonstrative to “Existential” Threats: 2022-2030

- From “MAD” to Mutually Assured Nothing:
 - End of MTCRs, Open Skies, full nuclear inspection, uncertain limits on strategic nuclear offensive forces...
 - *And, emergence of major Chinese strategic and dual threat.*
- Nuclear (CBW?) proliferation: Iran and North Korea.
- New delivery systems include dual capable, hypersonic, “smart evasion.”
- Precision conventional strike and targeting capabilities at all ranges: air, land, and sea.
- Cyber, interconnect, space, other technologies.
- Intimidation, threat to strategic partners.
- Concentration of critical civil and military infrastructure nodes – often with long-lead replacement, no option.

**The Other Aspects of the Superpower
Challenge go far beyond the Ukraine and
Taiwan, and they are as much “White Area”
civil and “Gray Area” military as classic
Deterrence and Warfighting**

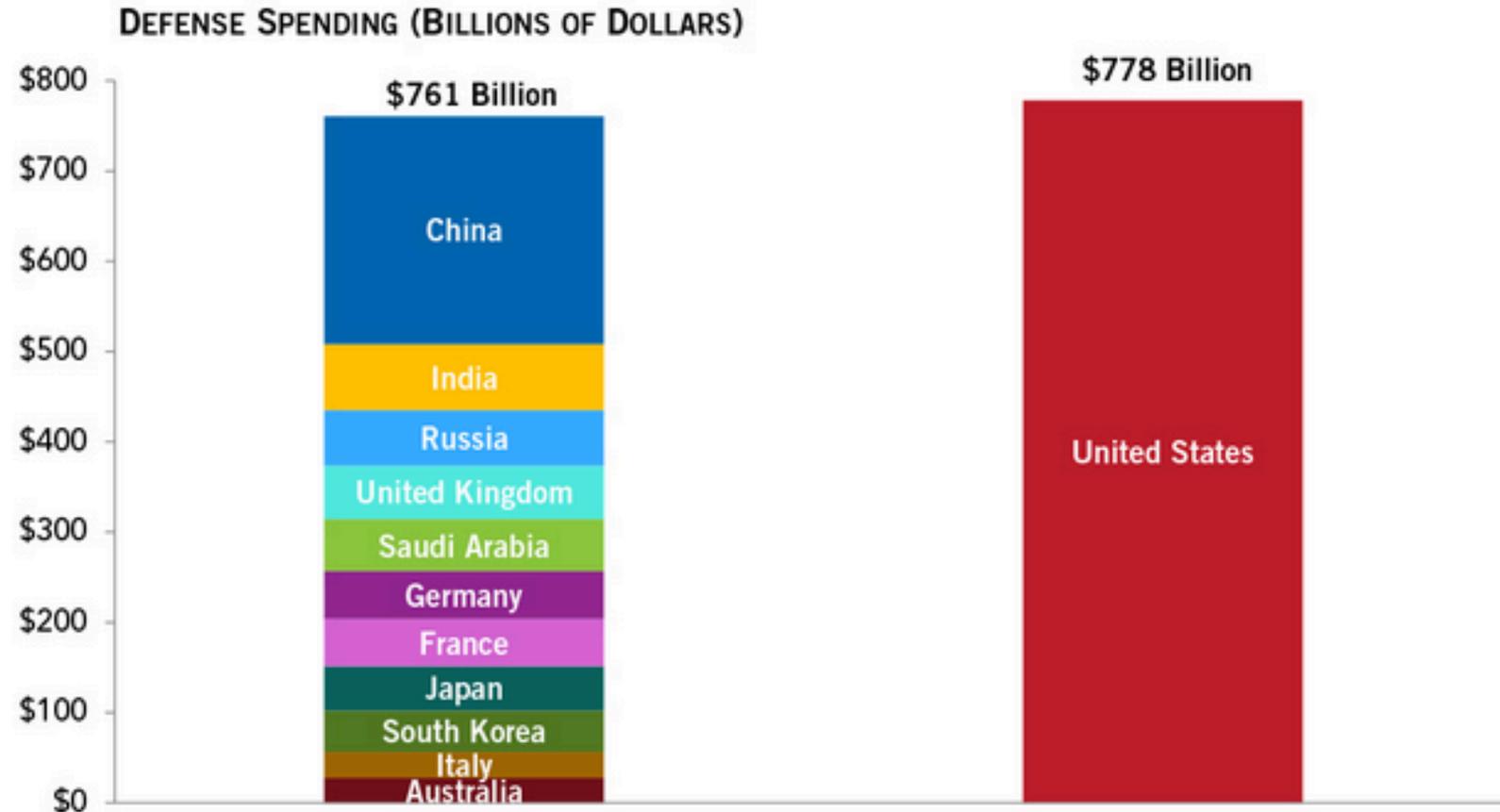


The U.S. Does Spend an Immense Amount on Defense – More than the Next 11 Countries Combined

Many other nations grossly understate their real spending.

As for the U.S., this SIPRI estimate includes discretionary and mandatory outlays by the Department of Defense, Department of Energy, Department of State, and the National Intelligence Program.

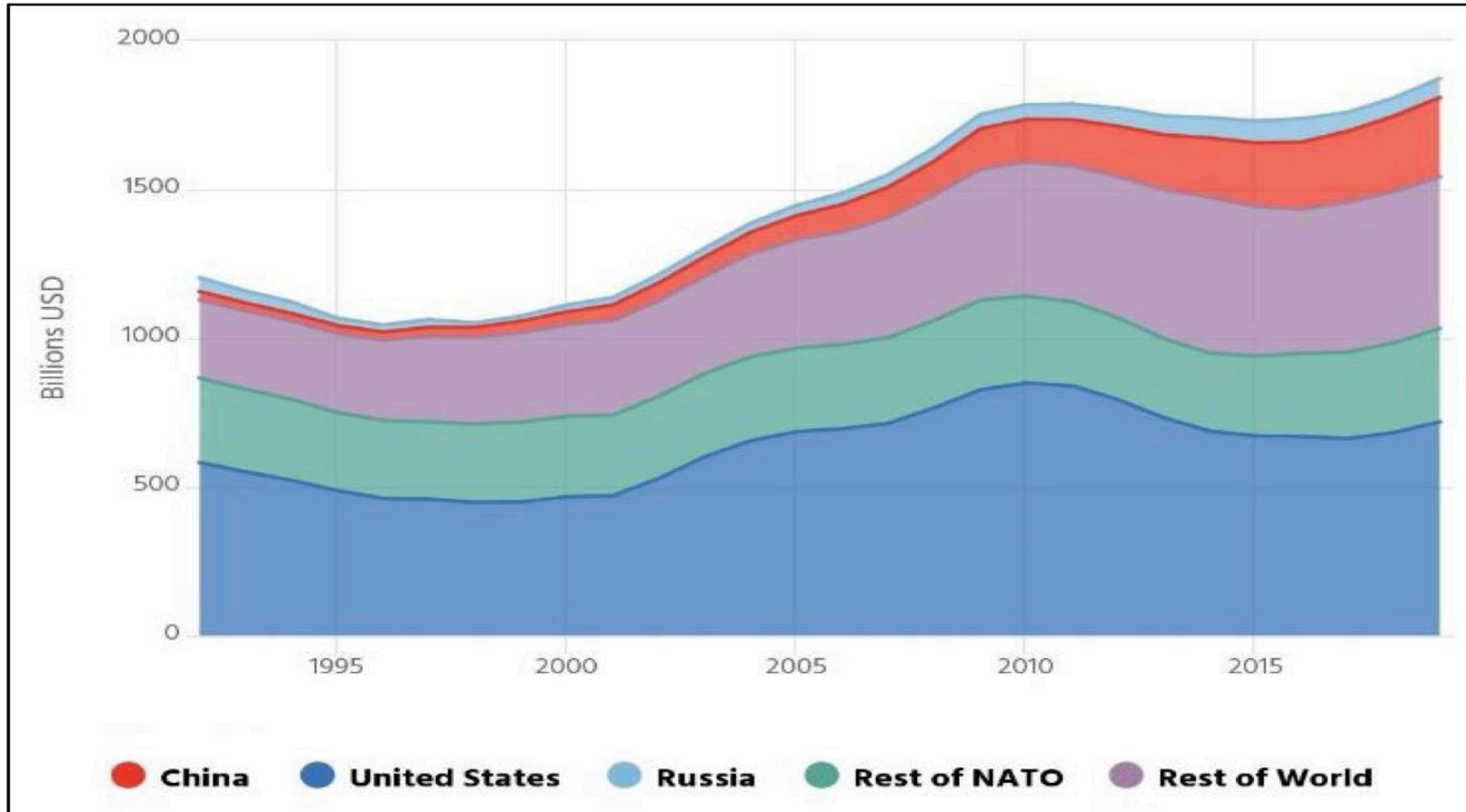
In contrast, the typical US official budget estimate of defense discretionary spending (\$714 billion in 2020) excludes outlays by the Department of State and all mandatory spending.



SOURCE: Stockholm International Peace Research Institute, *SIPRI Military Expenditure Database*, April 2021.

NOTES: Figures are in U.S. dollars converted from local currencies using market exchange rates. Data for the United States are for fiscal year 2020, which ran from October 1, 2019 through September 30, 2020. Data for the other countries are for calendar year 2020. The source for this chart uses a definition of defense spending that is more broad than budget function 050 and defense discretionary spending.

CRS Estimate of Comparative Global Military Spending



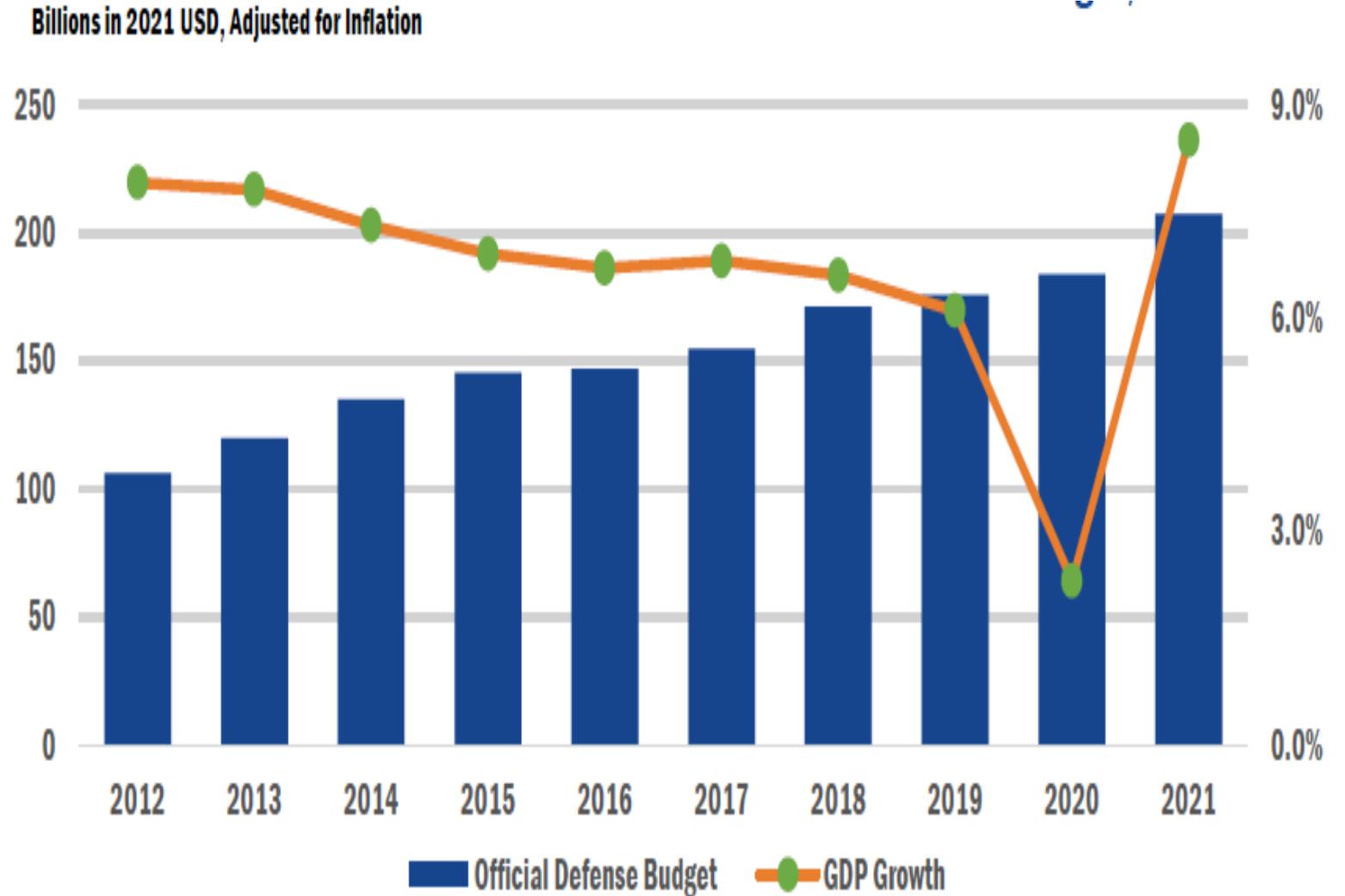
Source: Caitlin Campbell, *China Primer: The People's Liberation Army (PLA)*, Congressional Research Service, January 5, 2021, <https://crsreports.congress.gov/product/pdf/IF/IF11719/4>.

**Russia Remains a Key Threat but
China Is Emerging as the Peer and
Perhaps Larger Superpower –
Where “White Area” Competition is
Critical**



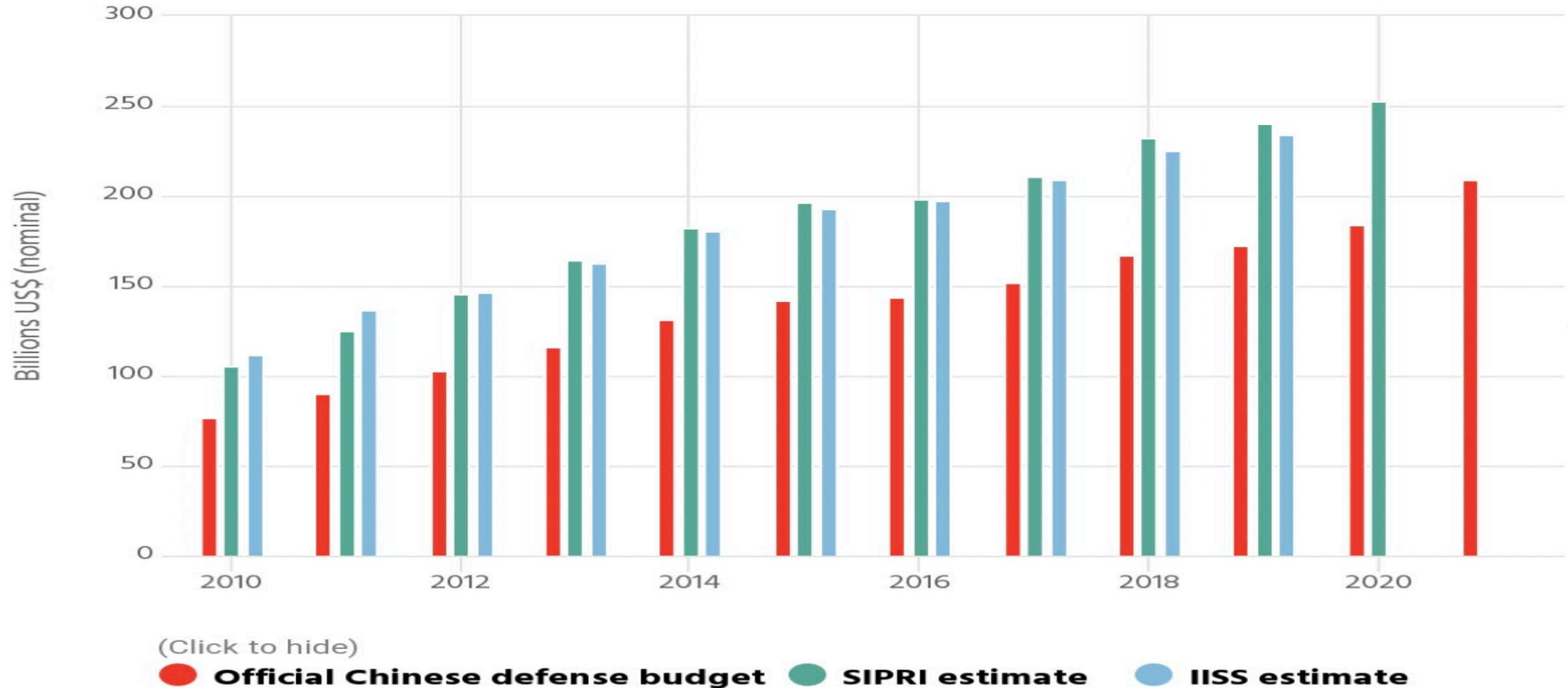
DoD: China's Official Military Spending 2012-2021 – I

Regional Comparison of Official 2021 Defense Budgets	
	Defense Budget (In Billions, USD)
PRC (Official Defense Budget)	\$209
India	\$64.8
Japan	\$55
Russia (National Defense Budget)	\$66.8
South Korea	\$48
Taiwan	\$15.4



Source: Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2021*, November 3, 2021, p. x and 142.

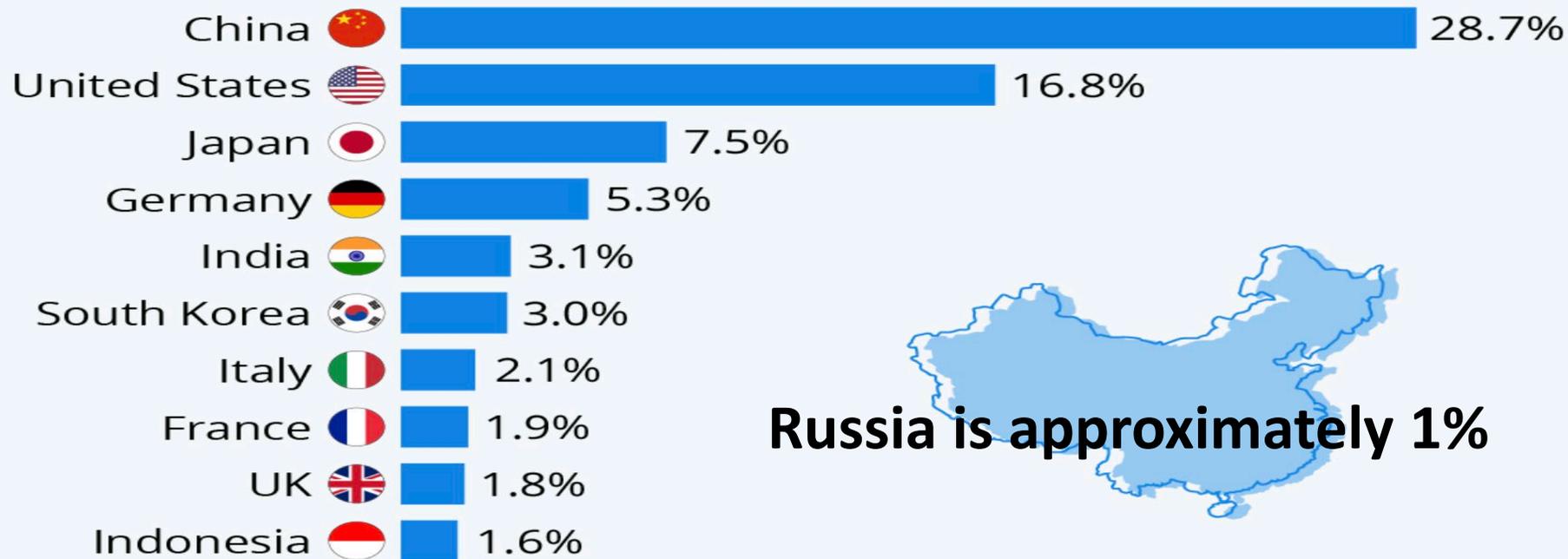
China vs. IISS vs. SIPRI Estimates of Military Spending



Source: Center for Strategic and International Studies China Power Project, “What Does China Really Spend on Its Military?” 2021; Members of Center for Strategic and International Studies China Power Project, interview with Commission staff, October 15, 2019. Note: All values in nominal U.S. dollars. SIPRI stands for Stockholm International Peace Research Institute. IISS stands for International Institute for Strategic Studies. Estimated figures from IISS for 2018 and 2019 and from SIPRI for 2019 are not available. Adapted from *China’s National Defense in a New Era*, July 2019, <http://www.xinhuanet.com/english/download/whitepaperonnationaldefenseinnewera.doc>.

China Is the World's Manufacturing Superpower

Top 10 countries by share of global manufacturing output in 2019*



* output measured on a value-added basis in current U.S. dollars

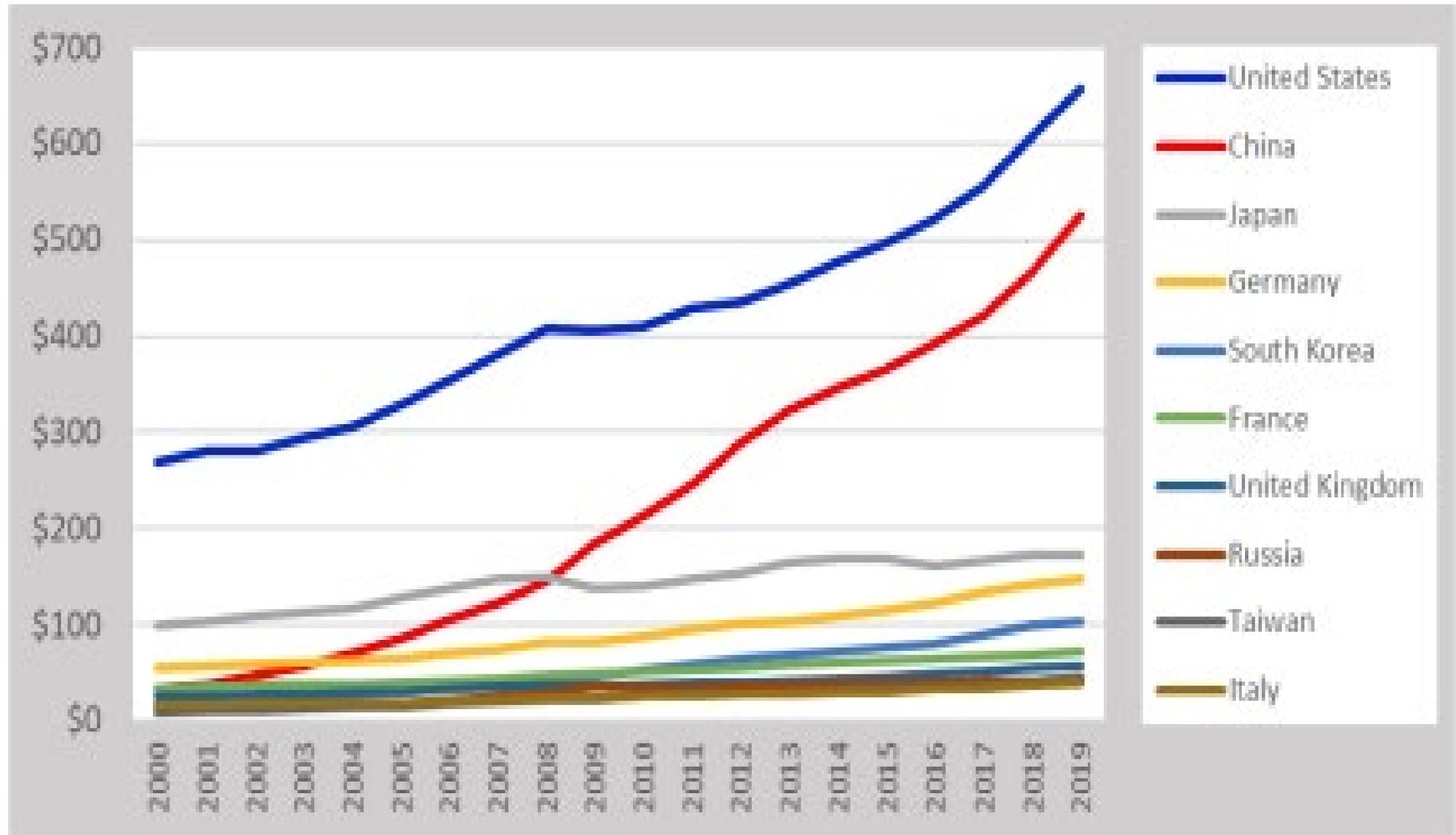
Source: United Nations Statistics Division



statista

CRS: Comparative National Expenditure on Global Research and Development: 2000-2019

In \$US Billions of PPP
Dollars

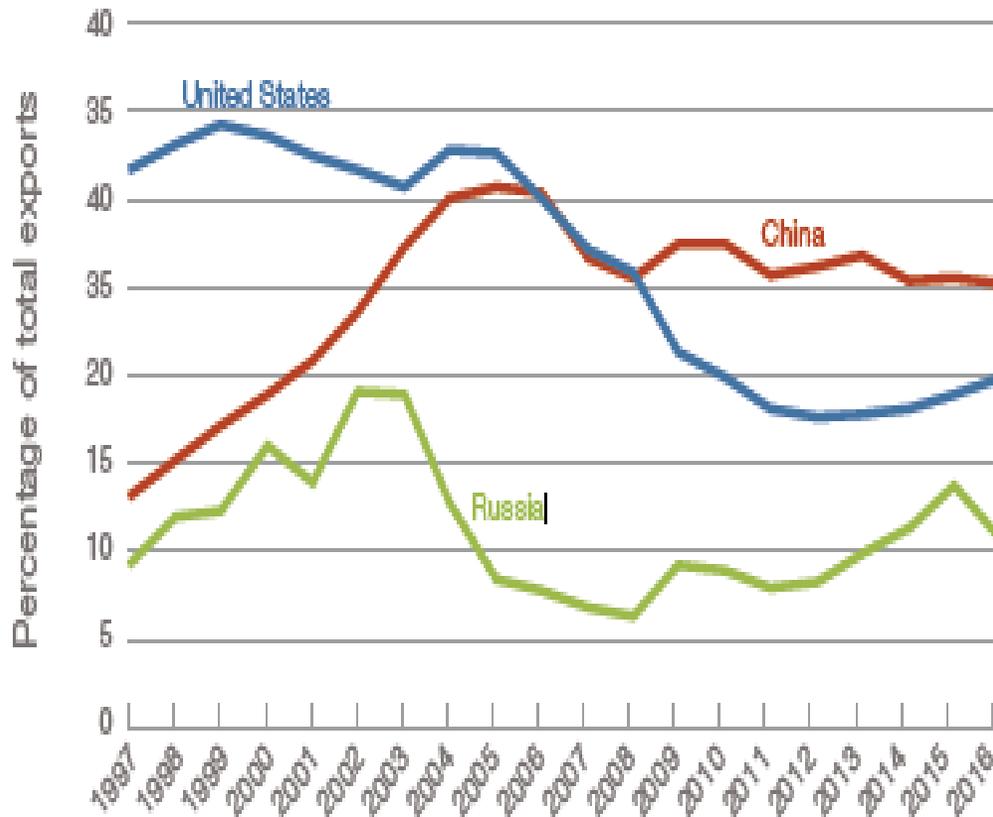


Source: CRS analysis of Organisation for Economic Cooperation and Development, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.

Notes: PPP = Purchasing Power Parity. PPP is used to determine the relative value of different currencies and to adjust data from different countries to a common currency allowing direct comparisons among them.

RAND High-Tech Exports (as Percentage of Manufactured Exports)

High-Tech Exports (as Percentage of Manufactured Exports)



SOURCE: World Bank, 2018.

High-tech exports are important because they show the distribution of global supply chains for the production of high-tech goods (). In 1997, the United States was the leader in both absolute and relative terms, with over 30 percent of its exports being high-technology products.

China was mainly exporting lower value-added goods, with only 13 percent of high-tech goods in its export mix. The figure for Russia was even lower, at 9.3 percent. By 2005, the indicators for the United States and China reached comparative values: 32.7 percent for the United States and 30.8 percent for China.

This parity reflected China’s accession to the WTO and accelerating offshoring of high-tech production to China. Over the same period, although Russia doubled the dollar value of its high-tech exports from 1.89 billion current dollars in 1997 to 3.82 billion current dollars in 2005, the relative share of high-tech products in its exports decreased from 9.3 percent in 1997 to 8.4 percent in 2005, mainly because of the increase in other commodities, such as chemicals.

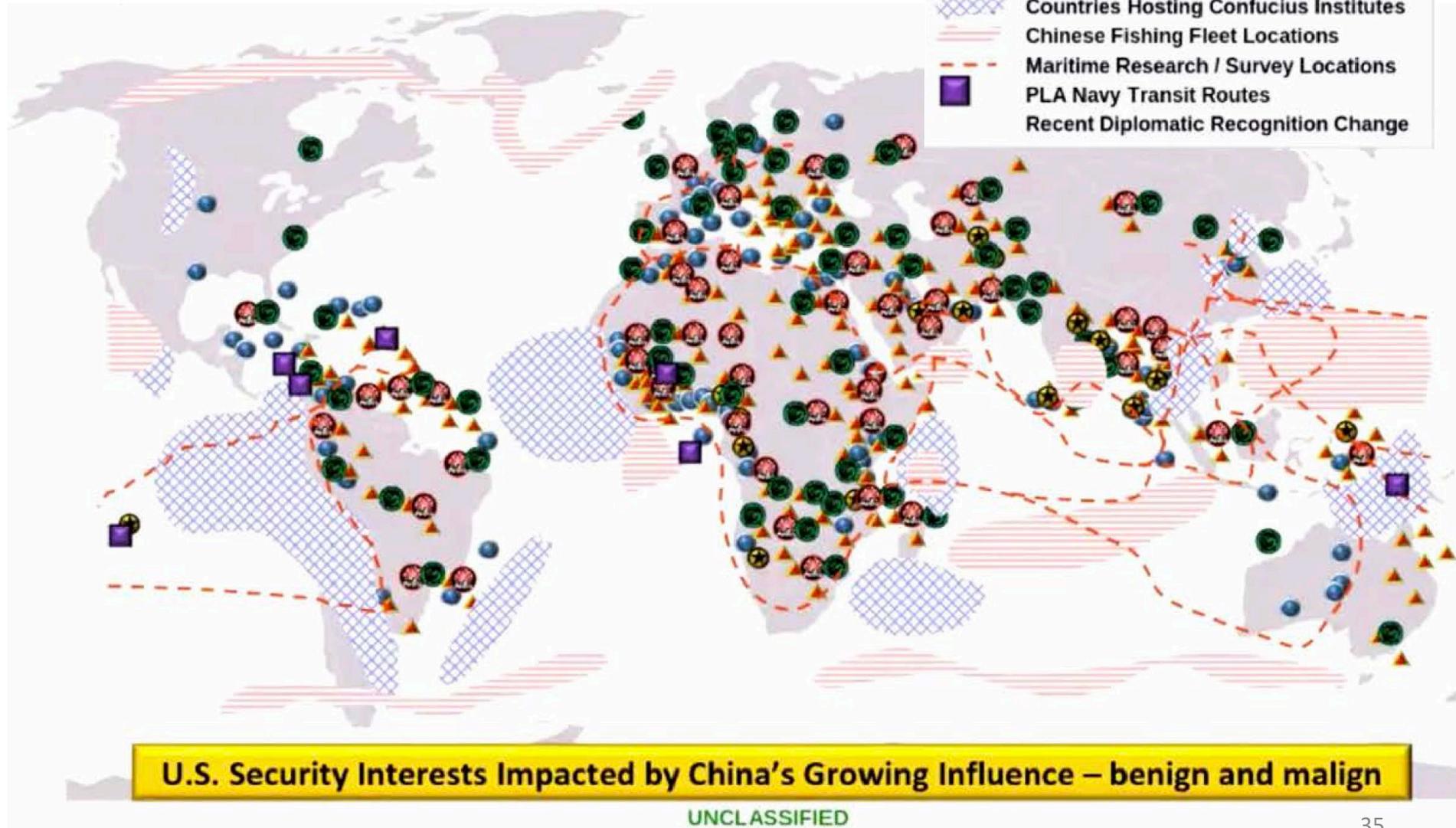
By 2012, the high-tech goods share of U.S. exports declined to 17.7 percent because of continuing offshoring, while the share of high-tech exports of total Chinese exports decreased to 26.2 percent. In absolute terms, however, U.S. high-tech exports decreased from 190 billion

current dollars in 2005 to 148 billion in 2012, while Chinese exports increased from 215 billion current dollars in 2005 to 506 billion in 2012.

The relative decline in the case of China is explained by the fact that other manufactured exports grew at a higher rate. Russia’s high-tech exports also increased in absolute terms, from 3.8 billion current dollars in 2005 to 7 billion in 2012, while the relative share of high-tech goods in overall manufactured exports remained at 8 percent.

In 2016, China’s high-tech exports slightly decreased in absolute and relative terms, to 496 billion current dollars (25.2 percent of its total manufactured exports), while U.S. high-tech exports slightly increased, from 148 billion current dollars and 17.7 percent of total manufactured exports in 2012 to 153 billion current dollars and 20 percent of total manufactured exports in 2016.

China's Growing Global "White Area" Influence



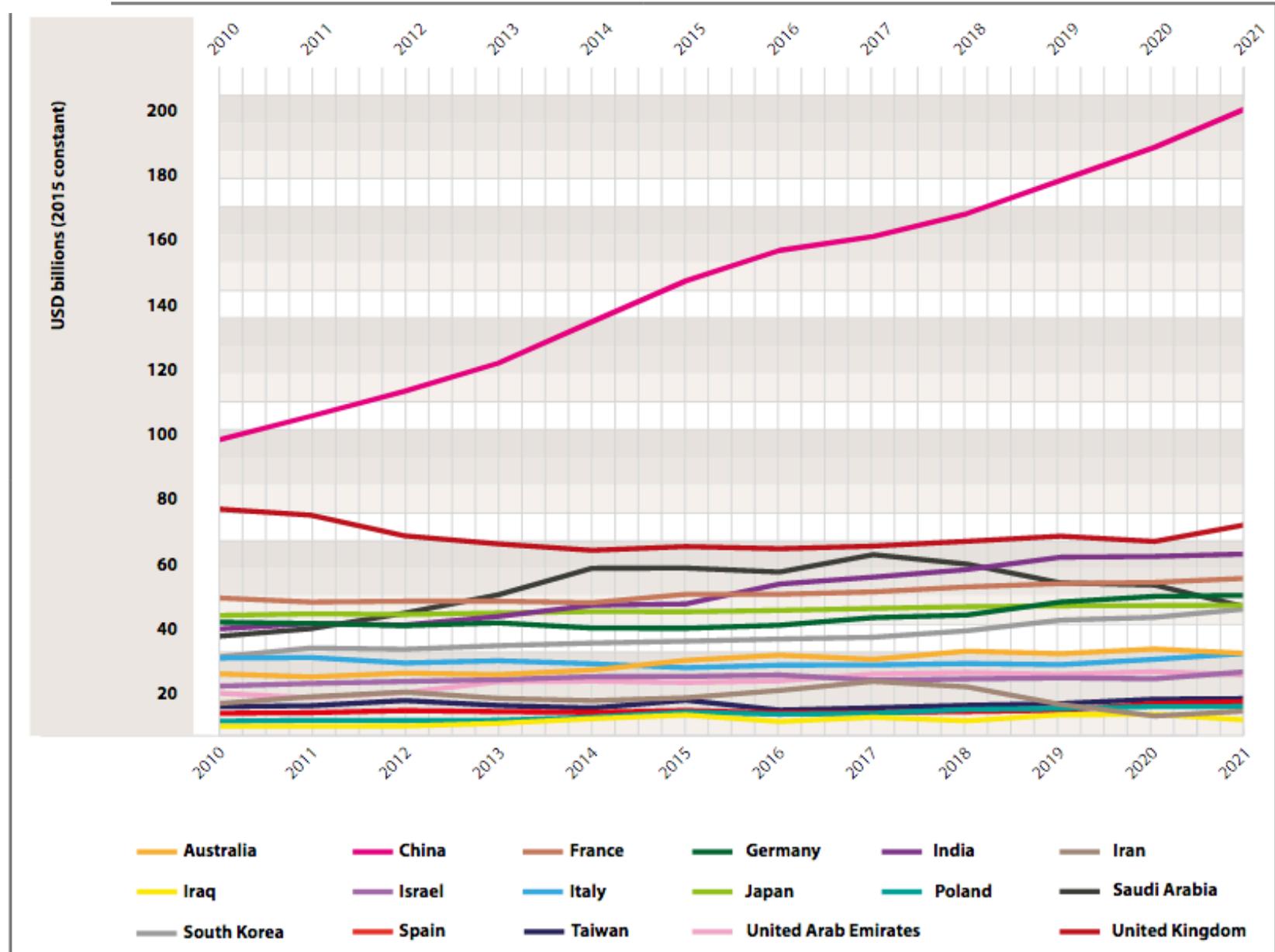
Source: Reformatted from Lt. General Mike Minihan, "United States Indo Pacific Command," NDU WMD, July 7, 2020, <https://us-iti.bbcollab.com/collab/ui/session/playback/load/7cf6bb5c7aaa4aa9930d7bd7b8df0b00>; and FAS https://fas.org/wp-content/uploads/2020/09/PACOM2020_NDU-WMD-Brief2020_Minihan070720.pdf.

These challenges are global and involve more limited threats, all our strategic partners, and other key states – which have their own changing internal challenges and forces



Comparative Spending of China and Regional Powers

Defence spending 2010–21 of selected countries (constant 2015 USD)



Source: Bastian Giegerich, Emile Hokayem, and Sharinee Jagtiani, *Regional security and alliances in the Middle East and the Indo-Pacific: implications for European security*, IISS, Hans Seidel Foundation, January 2022, p.3.

**Competition with China and Russia –
and to some extent Other States – Will
Be Driven by Military Dynamics and
the Operational and Technological
Drivers of an Ongoing
“Revolution in Warfare”**



New Military Dynamics – I

- **Declining focus on existing conventional major weapons system platforms.**
- **Shifts in JADO warfare, C4I, IS&R, and battle management.**
- **New capabilities for life cycle development, sustainment, and combat intensity.**
- **Drones, ballistic missies, cruse missiles, and long-range attack systems.**
- **New forms of countervalue and counterforce targeting and strikes.**
- **Missile defense, layered air/missile defense/passive and civil defense.**
- **Proliferating other “smart” weapons to other countries, non-state actors, and extremists.**

New Military Dynamics – II

- **New focus on space, cyber, information warfare for both military and internal security operations.**
- **New forms of paramilitary and internal security forces and operations.**
- **New types of “spoiler,” gray area, hybrid, and irregular forces.**
- **New types of security assistance, outside military support, volunteers, mercenaries.**
- **Shifts in popular warfare to increase effectiveness of human shields, use of population for defense and offense.**
- **Random character of the impact of emerging and disruptive technologies (EDTs).**

U.S. Under Secretary of Defense for Research and Engineering: Critical Technology Priorities – I

1. Seed Areas of Emerging Opportunity

Biotechnology

Biotechnology is an emerging engineering discipline that uses living systems to produce a wide range of technologies and capabilities. From fighting global pandemics and avoiding surprises to reducing logistics and sustainment costs and increasing energy efficiency, biotechnology can help change the way the Department conducts missions, performs in contested logistics environments, and adapts to major global changes.

Quantum Science

Quantum Science is the study of physical properties at small, even atomic, scales. Defense applications include atomic clocks, quantum sensors, quantum computing, and quantum networks. Quantum science promises to enable leap-ahead capabilities. Quantum computing can provide unprecedented computational speeds and help solve the Department's hardest analytical problems. Quantum sensors promise the ability to provide unprecedented accuracy in position, navigation, and timing. From more accurate information to faster decision making, to significantly stronger encryption capabilities, quantum science has the promise to deliver cutting-edge technology.

Future Generation Wireless Technology (FutureG)

FutureG is a suite of emerging wireless network technologies enabled by DoD and commercial industry cooperation to enable military operations and ensure a free and open internet. As Fifth Generation (5G) wireless technology is adopted and provides building blocks for capability, the DoD will also look to FutureG for leap-ahead technologies to lead in creating future standards. The Department will invest in FutureG technology development to lay the groundwork for continued United States leadership in information technology, which is vital for maintaining our economic and national security.

Advanced Materials

Advanced materials explore innovative new materials and novel manufacturing techniques that can dramatically improve many of the Department's capabilities. Materials that have higher strength, lighter weight, higher efficiency, and can handle more extreme temperatures will have the potential to better protect our service members and enhance their ability to accomplish their missions.

2. Effective Adoption Areas – where there is existing vibrant commercial sector activity

Trusted AI and Autonomy

Artificial Intelligence (AI) is the software engineering discipline of expanding capabilities of software applications to perform tasks that currently require human intelligence. Machine learning is an engineering subfield of AI that trains software models using example data, simulations, or real-world experiences rather than by direct programming or coding. Autonomy is the engineering discipline that expands robots' abilities to perform tasks while limiting the need for human interaction. AI holds tremendous promise to improve the ability and function of nearly all systems and operations. Trusted AI with trusted autonomous systems are imperative to dominate future conflicts. As AI, machine learning, and autonomous operations continue to mature, the DoD will focus on evidence-based AI-assurance and enabling operational effectiveness.

Integrated Network Systems-of-Systems

Integrated Network Systems-of-Systems technology encompasses the capability to communicate, provide real-time dissemination of information across the Department, and effective command and control in a contested electromagnetic environment. Integrated Network Systems-of-Systems capability must enable engagements by any sensor and shooter, with the ability to integrate disparate systems. An interoperable network that leverages emerging capabilities across the electromagnetic spectrum such as 5G, software defined networking and radios, and modern information exchange techniques will allow the Department to better integrate many diverse mission systems and provide fully networked command, control, and communication that is capable, resilient, and secure.

U.S. Under Secretary of Defense for Research and Engineering: Critical Technology Priorities – II

Microelectronics

Microelectronics are circuits and components that serve as the “brain” to human-made electronic functional systems. Virtually every military and commercial system relies on microelectronics. Diminishing microelectronics manufacturing in the United States and supply chain concerns have highlighted national economic and security risks. Working closely with industry, academia, and across the Government, the Department is addressing the need for secure microelectronics sources and will leverage state-of-the-art commercial development and production for defense microelectronic solutions.

Space Technology

Space technologies include space flight, space communication and other technologies needed to maintain space operations. With rising threats and increasing dependence on space-based systems, the Department’s space strategy must shift away from exquisite satellites to a more robust and proliferated architecture. Novel space technologies are necessary to enable resilient cross-domain operations. The space strategy must incorporate technologies that enhance the Department’s adaptive and reconfigurable capabilities in space situational awareness, space control, communication path diversity, on-orbit processing, and autonomy.

Renewable Energy Generation and Storage

Renewable energy generation and storage includes solar wind, bio-based and geothermal technologies, advanced energy storage, electronic engines, and power grid integration. Renewable energy generation and storage promises to decrease warfighter vulnerability and deliver new operational capabilities for the Department. From more efficient batteries to diversifying energy sources and reduced fuel transportation risks, renewable energy generation and storage will add resilience and flexibility in a contested logistics environment.

Advanced Computing and Software

Advanced computing and software technologies include supercomputing, cloud computing, data storage, computing architectures, and data processing. Software is ubiquitous throughout the Department, but the speed at which software develops outpaces the Department’s ability to stay up to date. The Department must rapidly modernize its legacy software systems with resilient, affordable, and assured new software that has been designed, developed, and tested using processes that establish confidence in its performance. The Department must migrate to a Development-Security-Operations (DevSecOps) approach in its software development and evolve to a model of continuous development, continuous test, and continuous delivery. The Department must leverage modular open system architecture approaches to isolate hardware from software and enable rapid upgrades to secure processors.

Human-Machine Interfaces

Human-Machine Interface refers to technologies related to human-machine teaming and augmented and virtual reality. Rapid advancements in this technology will have a multitude of benefits for our service members. Highly immersive realistic training environments provide real-time feedback to enhance warfighter performance. Intuitive interactive human-machine interfaces enable rapid mission planning and mission command by providing a common operational picture to geographically distributed operations.

3. Defense-Specific Areas

Directed Energy

Directed Energy Weapons utilize lasers, high power microwaves, and high energy particle beams to produce precision disruption, damage, or destruction of military targets at range. Directed energy systems will allow the Department to counter a wide variety of current and emerging threats with rapid responses and engagement at the speed of light. High-power lasers and high-power microwave technologies both offer new ways to counter diverse sets of threats.

Hypersonics

Hypersonic systems fly within the atmosphere for significant portions of their flight at or above 5 times the speed of sound, or approximately 3700 miles per hour. Hypersonics dramatically shorten the timeline to strike a target and increase unpredictability. While strategic competitors are pursuing and rapidly fielding advanced hypersonic missiles, the DoD will develop leap-ahead and cost-effective technologies for our air, land, and sea operational forces.

Integrated Sensing and Cyber

To provide advantage for the joint force in highly contested environments, the Department must develop wideband sensors to operate at the intersection of cyber space, electronic warfare, radar, and communications. Sensors must be able to counter advanced threats and can no longer be stove-piped and single function.

Source: *USD(R&E) Technology Vision for an Era of Competition*, February 1, 2022, https://www.cto.mil/wp-content/uploads/2022/02/usdre_strategic_vision_critical_tech_areas.pdf?utm_source=EGov%20Welcome%20Email&utm_medium=email&utm_campaign=ExecutiveGov%20Daily%2002.03.2022%20%28X4gXzs%29&kla_id=01EP4ECWBPZCHENPJ31W4B1R2A&_kx=zE9LstVbwmHyyF-Rji_78OQd7SKPzHQ-OhuSk62ySL8%3D.TBKKxP.

The Complex Mix of Emerging and Disruptive Military (EDT) Technologies – I

EDT	Technology Focus Area (TFA)	NATO S&T Targets of Emphasis
Data	Advanced Analytics Communications	Big data & Long Data Processing and Analysis Ad hoc and Heterogeneous Networks Advanced Signal Processing Trusted Multi-Domain Information Sharing Secure and Resilient Communications
	Advanced Decision Making	Human Decision Making Multi-Domain Situational Awareness Planning and Managing Uncertainties
	Sensors	Sensor Integration & Networks
Artificial Intelligence	Advanced Algorithms	Artificial Intelligence Big Data & Long Data Processing and Analysis Advanced Signal Processing
	Human-Machine Symbiosis	Human & machine interfaces Integrated Human – Machine Hybrid Forces Human-Autonomous Machine Teaming
	Applied AI	Multi-Domain Situational Awareness Planning and Managing Uncertainties Human Decision Making
Autonomy	Autonomous Systems	Mission Autonomous Systems Unmanned Platforms
	Countermeasures Human-Machine Teaming	Active & Passive EM, Acoustic and Optical Countermeasures Human & machine Interfaces Human-Autonomous Machine Teaming Integrated Human – Machine Hybrid Forces
	Autonomous Behavior	Clusters and Swarms Sensor Integration & Networks Secure & Resilient Communications Rules of Engagement, Legal and Ethical Implications

The Complex Mix of Emerging and Disruptive Military (EDT) Technologies – II

Space	Operation	Clusters and Swarms Precision Control
	Platforms	High Assurance Engineering and Validation Modular, Scalable Systems Propulsion Fast & Agile Platforms Enhanced Energy Efficiency & Management Active & Passive EM, Acoustic and Optical Countermeasures Weapons - Techniques and Systems
	Sensors	EM Sensors Non-EM Sensors Sensor Integration & Networks
Hypersonics	Countermeasures	Active & Passive EM, Acoustic and Optical Countermeasures Weapons – Techniques and Systems Weapons effects
	Platforms and Propulsion	Fast and Agile Platforms Hypersonic Platforms Enhanced Energy Efficiency & Management Propulsion
Quantum	Communication	Secure and Resilient Communications Trusted Multi-Domain Information Sharing
	Information Science	Big Data & Long Data Processing and Analysis
	Precision Navigation Sensors	Precision Control EM Sensors Non-EM Sensors

The Complex Mix of Emerging and Disruptive Military (EDT) Technologies – III

Biotechnologies	Bioinformatics	Big data & Long Data Processing and Analysis Human Resiliency Cultural Communications Group and Organisational Behaviour Medical Solutions for Health Optimisation Political Influence Social Influence EM Sensors Non-EM Sensors
	Synthetic Biology	Human Resiliency Medical Solutions for Health Optimisation Advanced and Adaptive Materials
	Human Augmentation	Enhanced Cognitive Performance Human & Machine Interfaces Integrated Human – Machine Hybrid Forces Alternative and Renewable Energy Sources
	Medical Countermeasures	Human Resiliency Medical Solutions for Health Optimisation
Materials	Additive Manufacturing	In-theatre Fabrication & Production of Equipment
	Energy	Power and Energy Storage Alternative and Renewable Energy Sources
	Novel Materials	Advanced and Adaptive Materials Hypersonic Platforms

White House List of Key Areas of Competition in Critical and Emerging Technologies – I

Advanced Computing

- Supercomputing
- Edge computing
- Cloud computing
- Data storage
- Computing architectures
- Data processing and analysis techniques

Advanced Engineering Materials

- Materials by design and material genomics
- Materials with new properties
- Materials with substantial improvements to existing properties
- Material property characterization and lifecycle assessment

Advanced Gas Turbine Engine Technologies

- Aerospace, maritime, and industrial development and production technologies
- Full-authority digital engine control, hot-section manufacturing, and associated technologies

Advanced Manufacturing

- Additive manufacturing
- Clean, sustainable manufacturing
- Smart manufacturing
- Nanomanufacturing

Advanced and Networked Sensing and Signature Management

- Payloads, sensors, and instruments
- Sensor processing and data fusion
- Adaptive optics
- Remote sensing of the Earth
- Signature management
- Nuclear materials detection and characterization
- Chemical weapons detection and characterization
- Biological weapons detection and characterization
- Emerging pathogens detection and characterization
- Transportation-sector sensing
- Security-sector sensing
- Health-sector sensing

Advanced Nuclear Energy Technologies

- Nuclear energy systems
- Fusion energy
- Space nuclear power and propulsion systems

Artificial Intelligence (AI)

- Machine learning
- Deep learning
- Reinforcement learning
- Sensory perception and recognition
- Next-generation AI
- Planning, reasoning, and decision making
- Safe and/or secure AI

White House List of Key Areas of Competition in Critical and Emerging Technologies – II

Autonomous Systems and Robotics

- Surfaces
- Air
- Maritime
- Space

Biotechnologies

- Nucleic acid and protein synthesis
- Genome and protein engineering including design tools
- Multi-omics and other biometrology, bioinformatics, predictive modeling, and analytical tools for functional phenotypes
- Engineering of multicellular systems
- Engineering of viral and viral delivery systems
- Biomanufacturing and bioprocessing technologies

Communication and Networking Technologies

- Radio-frequency (RF) and mixed-signal circuits, antennas, filters, and components
- Spectrum management technologies
- Next-generation wireless networks, including 5G and 6G
- Optical links and fiber technologies
- Terrestrial/undersea cables
- Satellite-based communications
- Hardware, firmware, and software
- Communications and network security
- Mesh networks/infrastructure independent communication technologies

Directed Energy

- Lasers
- High-power microwaves
- Particle beams

Financial Technologies

- Distributed ledger technologies
- Digital assets
- Digital payment technologies
- Digital identity infrastructure

Human-Machine Interfaces

- Augmented reality
- Virtual reality
- Brain-computer interfaces
- Human-machine teaming

Hypersonics

- Propulsion
- Aerodynamics and control
- Materials
- Detection, tracking, and characterization
- Defense

Quantum Information Technologies

- Quantum computing
- Materials, isotopes, and fabrication techniques for quantum devices
- Post-quantum cryptography
- Quantum sensing
- Quantum networking

White House List of Key Areas of Competition in Critical and Emerging Technologies – III

Renewable Energy Generation and Storage

- Renewable generation
- Renewable and sustainable fuels
- Energy storage
- Electric and hybrid engines
- Batteries
- Grid integration technologies
- Energy-efficiency technologies

Semiconductors and Microelectronics

- Design and electronic design automation tools
- Manufacturing process technologies and manufacturing equipment
- Beyond complementary metal-oxide-semiconductor (CMOS) technology
- Heterogeneous integration and advanced packaging
- Specialized/tailored hardware components for artificial intelligence, natural and hostile radiation environments, RF and optical components, high-power devices, and other critical applications
- Novel materials for advanced microelectronics
- Wide-bandgap and ultra-wide-bandgap technologies for power management, distribution, and transmission

Space Technologies and Systems

- On-orbit servicing, assembly, and manufacturing
- Commoditized satellite buses
- Low-cost launch vehicles
- Sensors for local and wide-field imaging
- Space propulsion
- Resilient positioning, navigation, and timing (PNT)
- Cryogenic fluid management
- Entry, descent, and landing

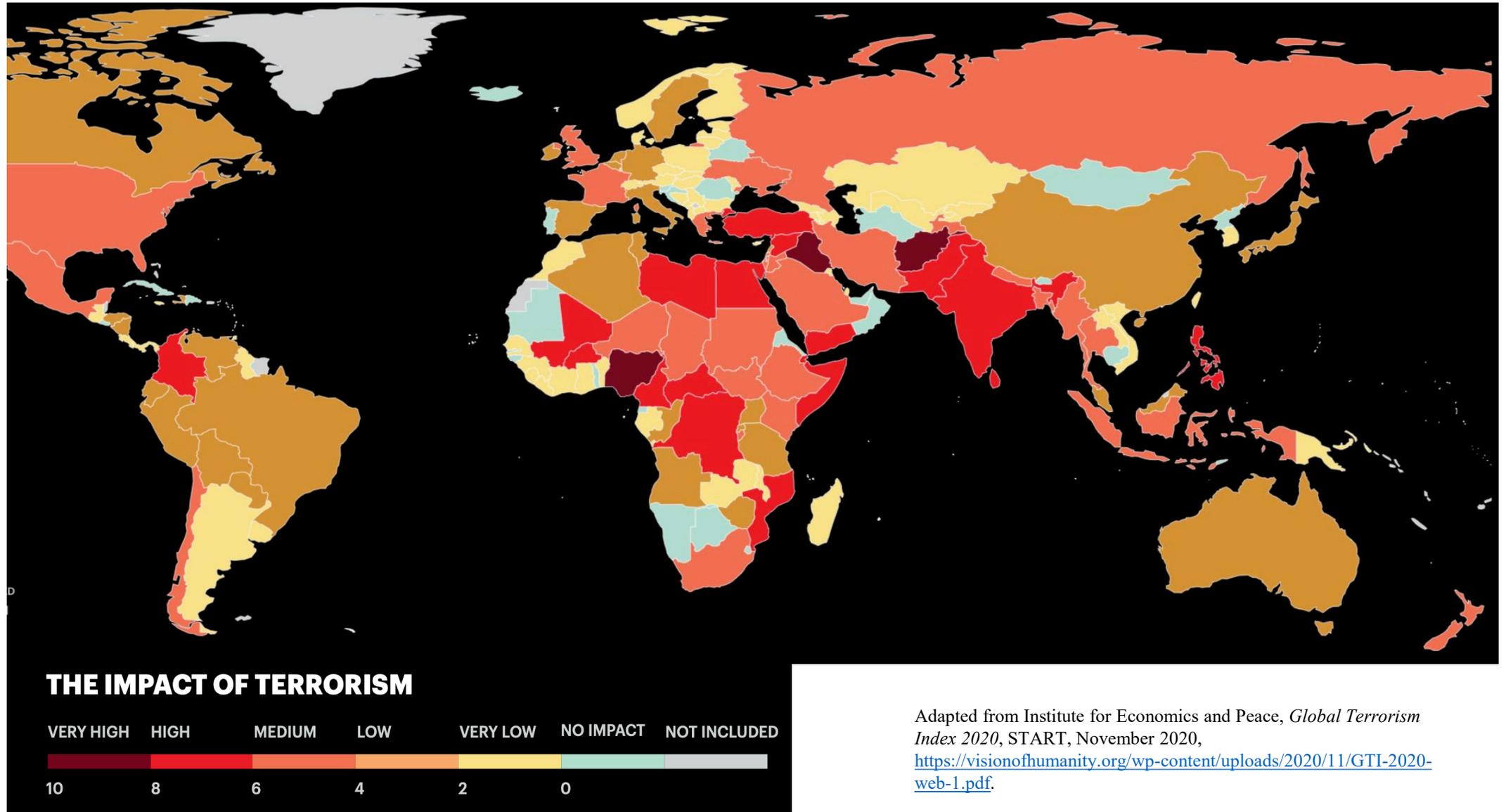
Global Political and Economic Challenges will also Force Continuing Change in U.S. Strategy

**Need to end the current overemphasis on
Terrorism and Extremism and focus on Global
Instability and “Fragile” ~~(Failed)~~ States**

Putting Terrorism in Perspective

- **Terrorism is a real, but comparatively limited threat, although worst case attacks can still occur.**
- **The overall patterns of global violence are driven largely by failed governments in failed states, often provoking violent and extremist reactions.**
- **Levels of corruption are surprisingly good indicators of major protests, violent political action, and propensity for terrorism and extremist violence – although also for legitimate popular action.**
- **The failures to develop, govern effectively and fairly, and deal with civil challenges are far more intense and present broad problems compared to terrorism and extremism.**

Intensity of Terrorism in 2020

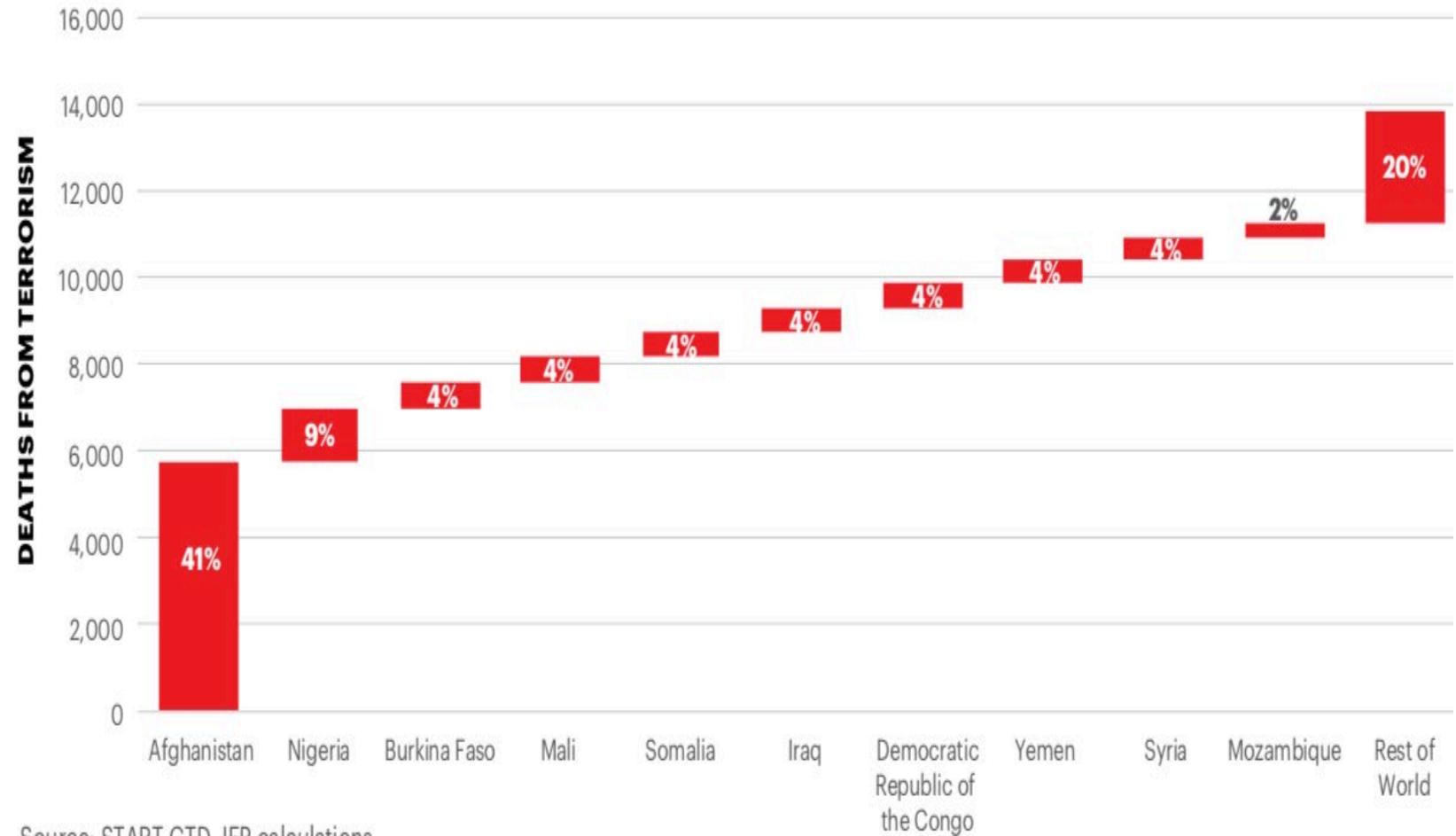


Adapted from Institute for Economics and Peace, *Global Terrorism Index 2020*, START, November 2020,
<https://visionofhumanity.org/wp-content/uploads/2020/11/GTI-2020-web-1.pdf>.

Deaths from Terrorism in 2019

Deaths from terrorism by country, 2019

Ten countries accounted for 80 per cent of deaths from terrorism.



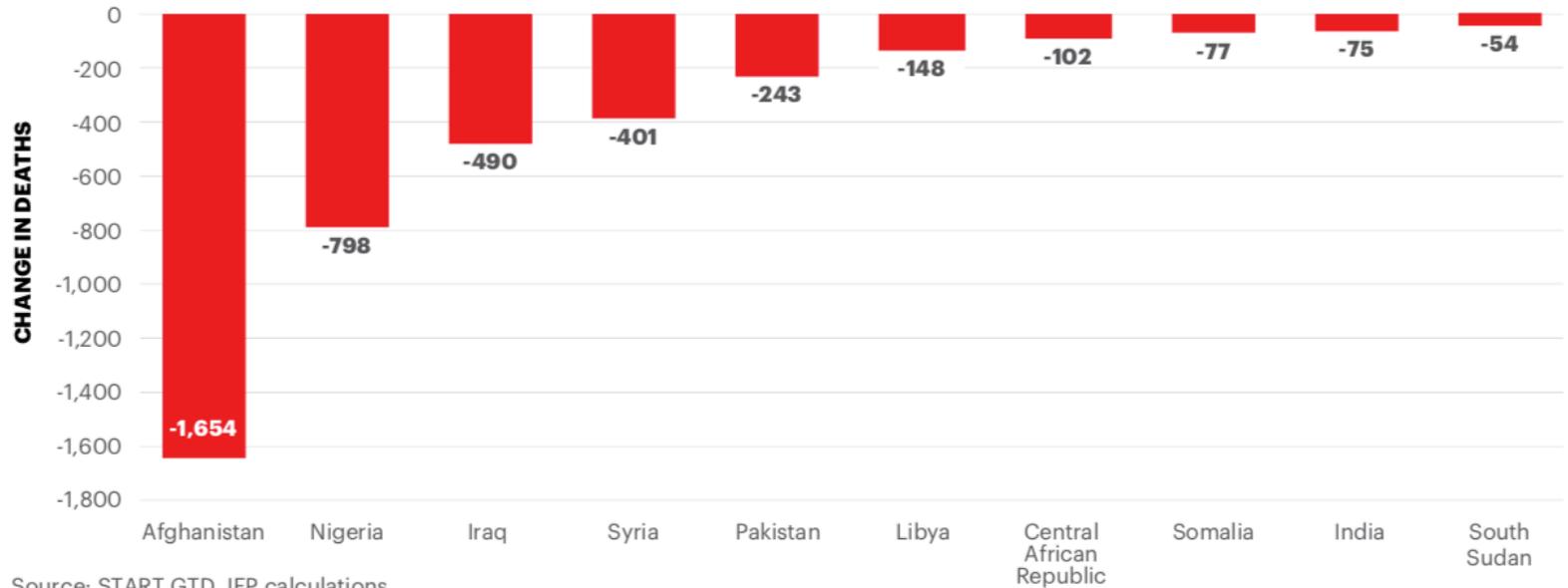
Source: START GTD, IEP calculations

Excerpted from Institute for Economics and Peace, *Global Terrorism Index 2020*, START, November 2020, <https://visionofhumanity.org/wp-content/uploads/2020/11/GTI-2020-web-1.pdf>.

Trend in Deaths from Terrorism in 2018-2019

Largest decreases in deaths from terrorism, 2018–2019

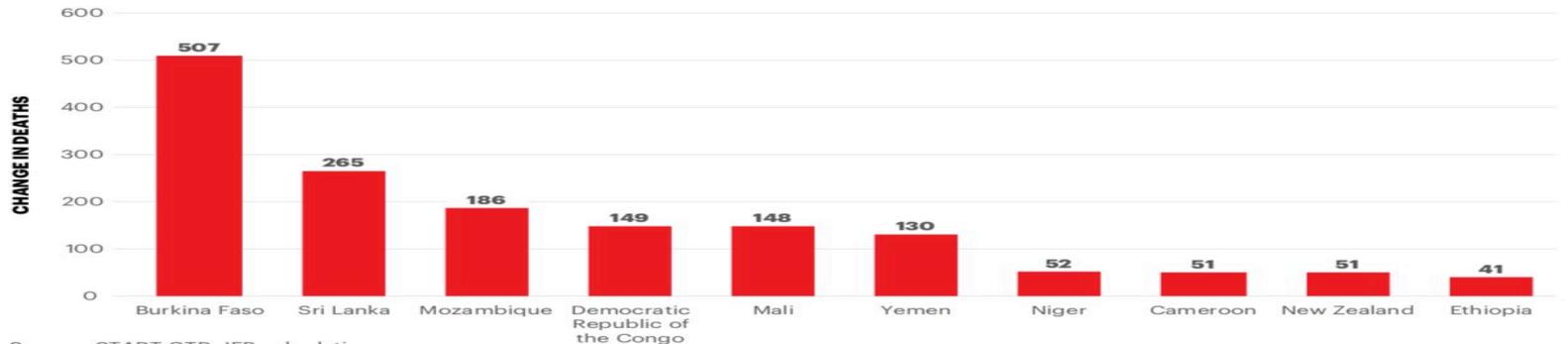
Afghanistan had the largest decrease in the number of deaths from terrorism, reversing a steady increase in terrorism deaths since 2001.



Source: START GTD, IEP calculations

Largest increases in deaths from terrorism, 2018–2019

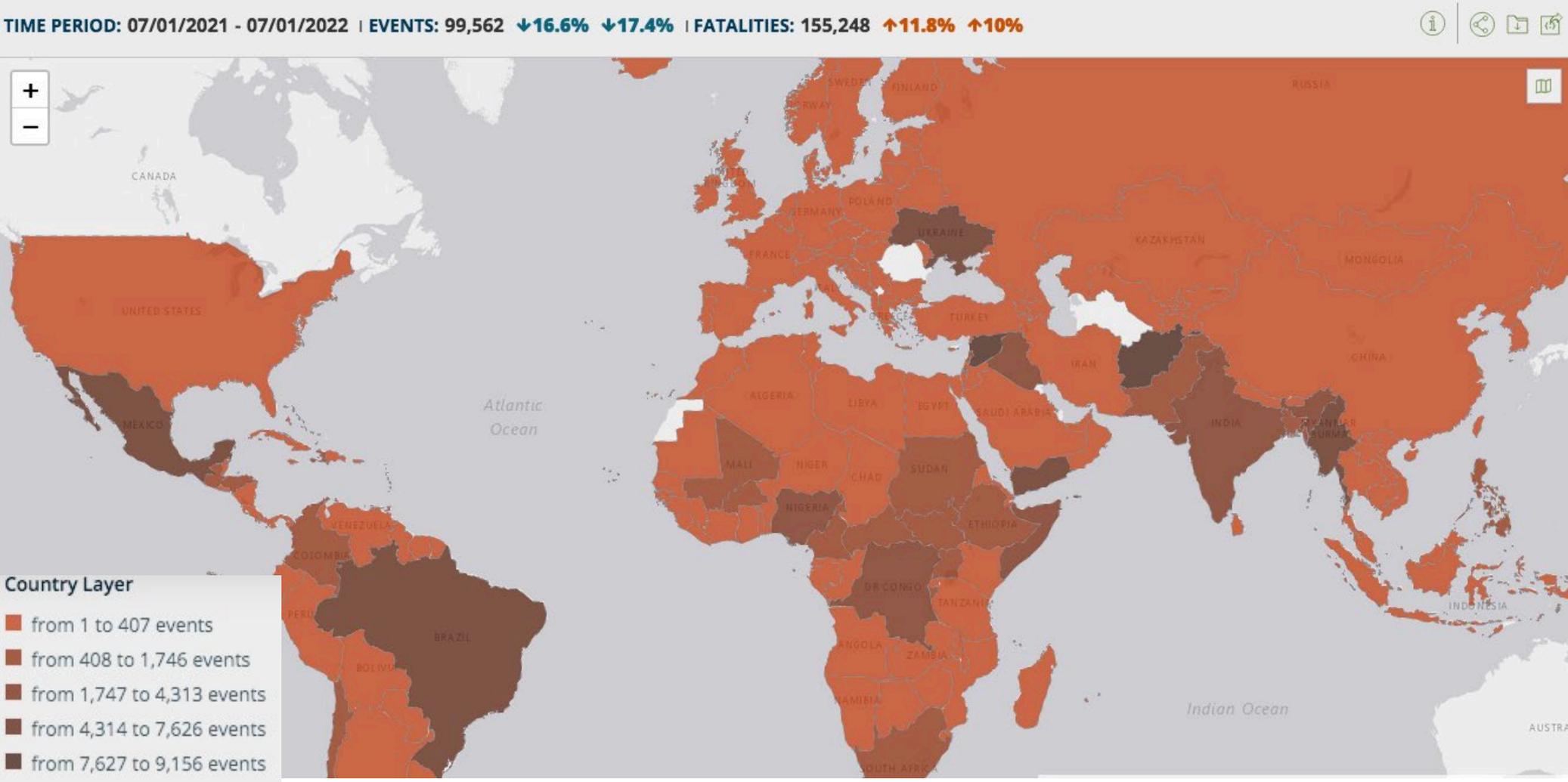
Deaths from terrorism in Burkina Faso increased sixfold in 2019.



Excerpted from Institute for Economics and Peace, *Global Terrorism Index 2020*, START, November 2020, <https://visionofhumanity.org/wp-content/uploads/2020/11/GTI-2020-web-1.pdf>.

Broad Patterns of Global Violence in 2021

(Battles, Violence against Civilians, Explosions/Remote Violence, Riots)

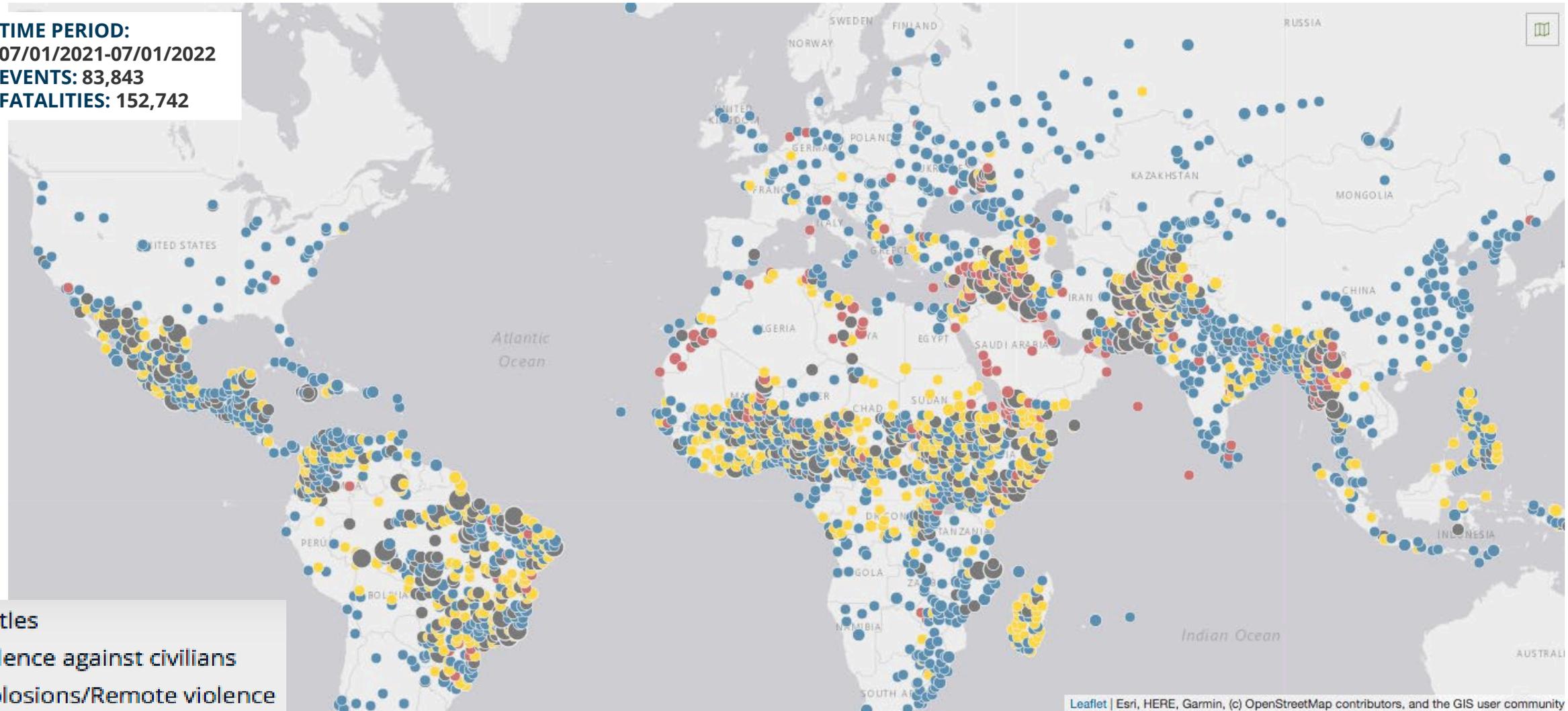


Adapted from ACLED, <https://acleddata.com/dashboard/#/dashboard>.

Major Acts of Violence in 2021 Go Far Beyond Terrorism

(Battles, Violence against Civilians, Explosions/Remote Violence)

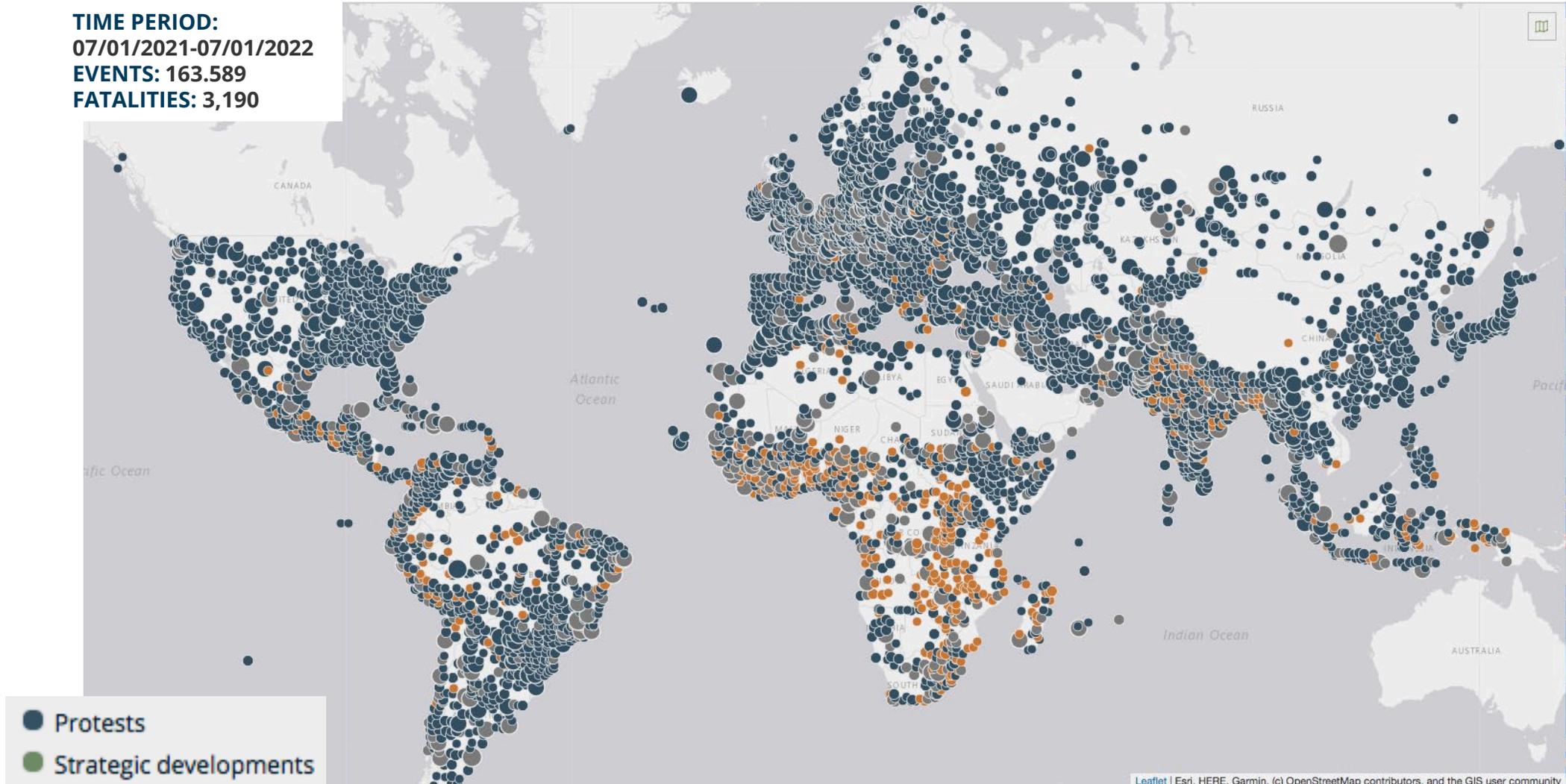
TIME PERIOD:
07/01/2021-07/01/2022
EVENTS: 83,843
FATALITIES: 152,742



Riots and Protests Show Massive Global Unrest

(Riots and Protests)

TIME PERIOD:
07/01/2021-07/01/2022
EVENTS: 163,589
FATALITIES: 3,190



The Structural Forces Driving Global Political Violence and Instability



Military Threats and Violence Are Often the Symptom and Not the Cause

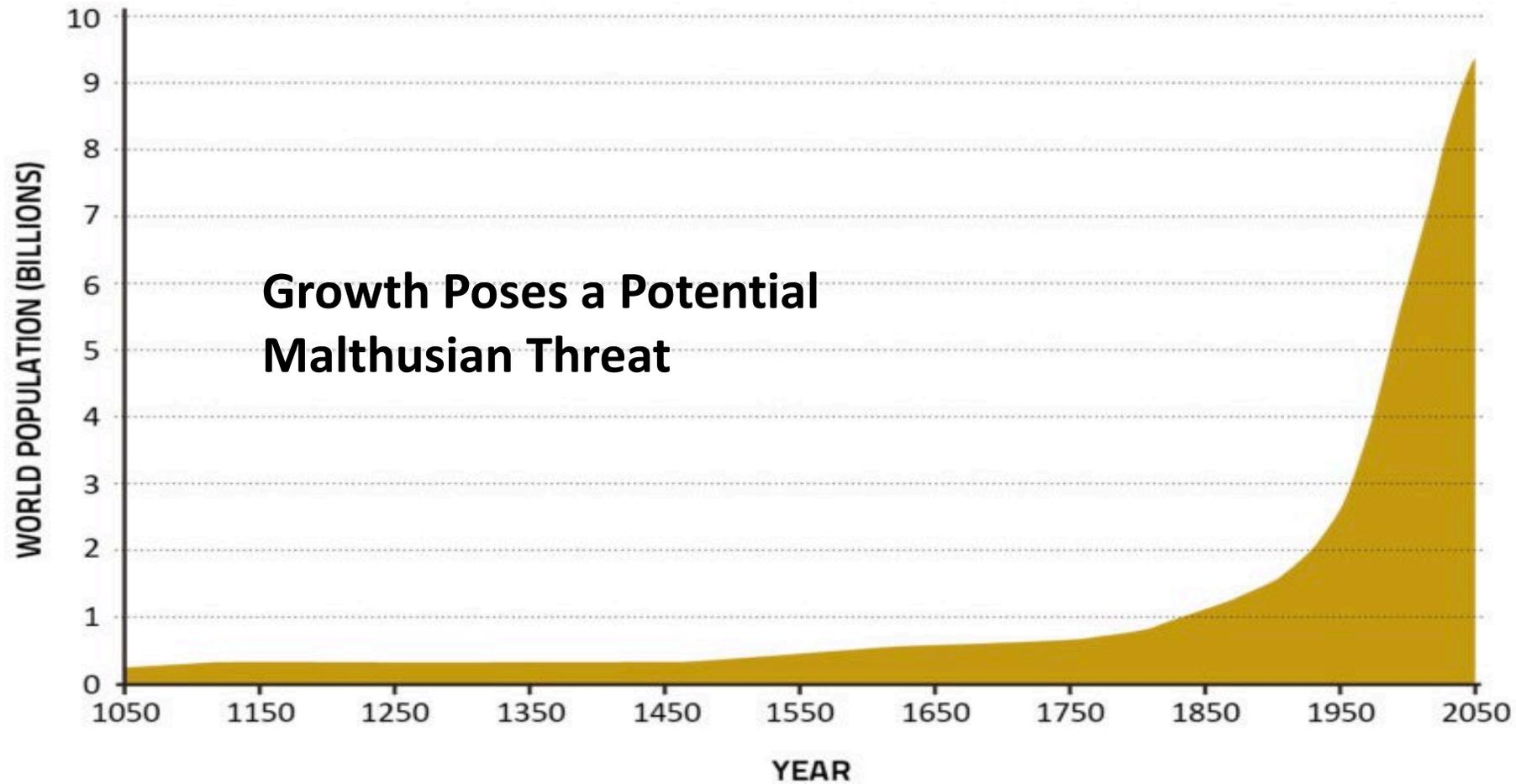
- **Population pressure is a key factor, reshaping every aspect of global behavior.**
- **So is urbanization which is changing the politics, stability, economy and social structure of at least one third of the world's states.**
- **Governance is a critical issue. Most of the world's countries have high levels of corruption and limited effectiveness.**
- **At least one third of the world has no reason to trust the competence of its current government, and even basic legal security in peacetime is often a critical issue.**
- **The U.S. may be able to help a government “win” battles against insurgents, but these victories are pyrrhic if the government's security forces cannot hold and provide local security and the government cannot build an economy and political structure that wins popular acceptance.**
- **Outside military forces are not nation builders, and the U.S. cannot help a government with a failed civil structure and cannot use aid to effectively help itself.**

**Population Dynamics Alone Mean
Another Half Century of Instability in
Much of the World**



Global Population Growth Is a Key Dynamic: 1050-2050

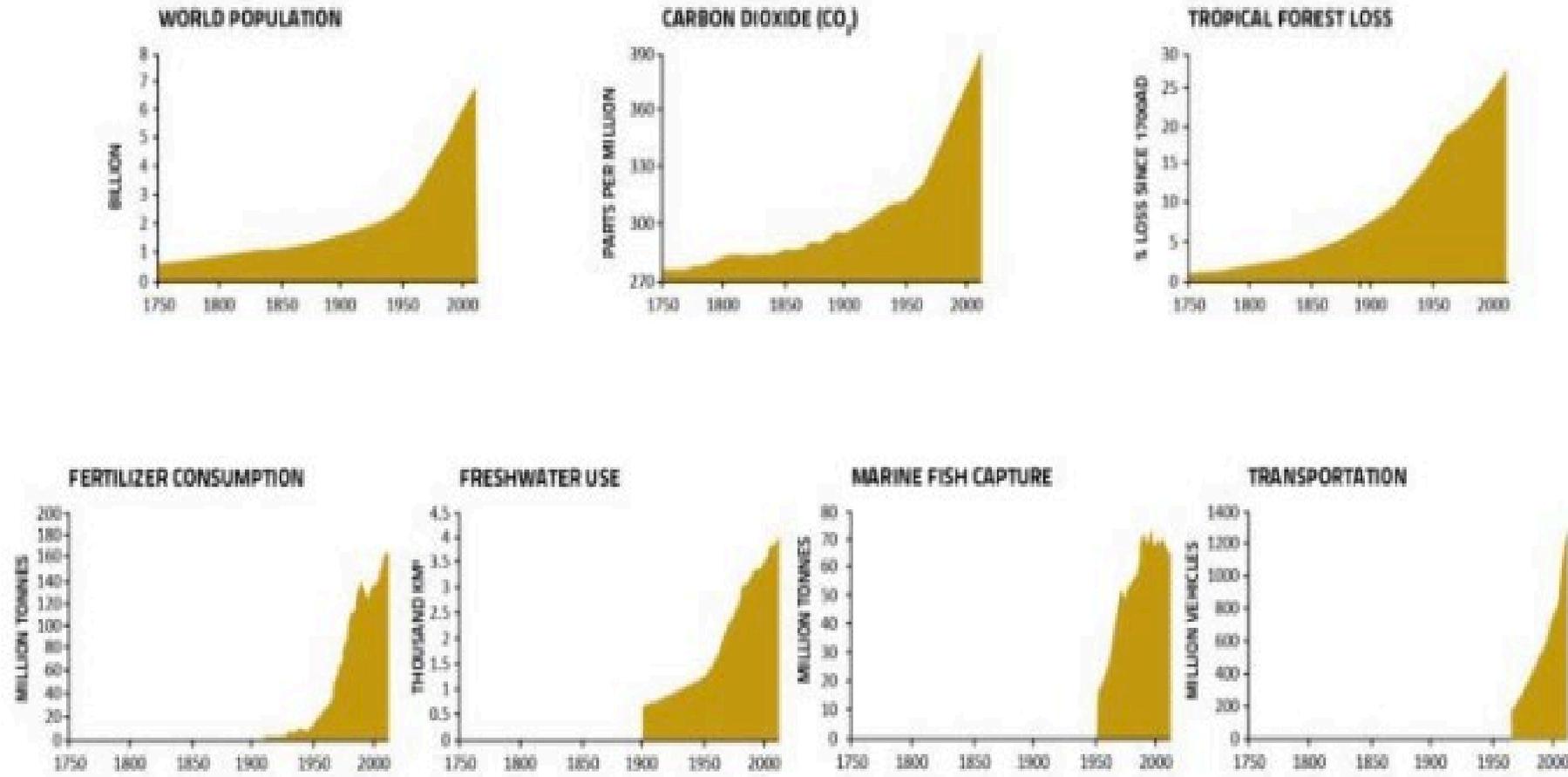
In Billions



Sources: Estimated/United Nations

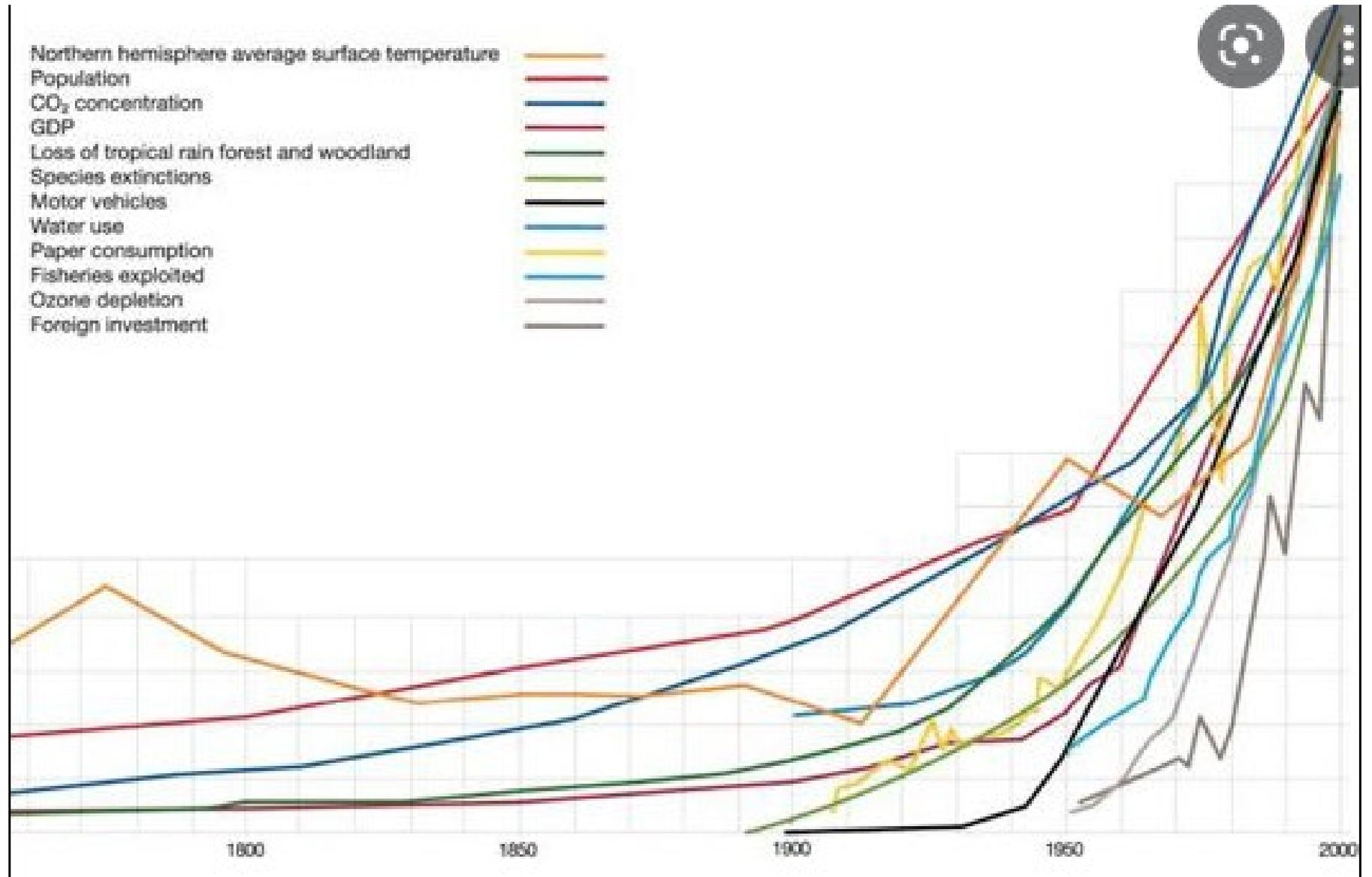
Adapted from The Overpopulation Project, <https://overpopulation-project.com>. Data source is UN.

Population Dynamics Have Key Global Impacts: One of Many Estimates



Adapted from The Overpopulation Project, <https://overpopulation-project.com>. Data source is UN 2017.

A Novelist's (Dan Brown's *Dante's Inferno*) Worst Case



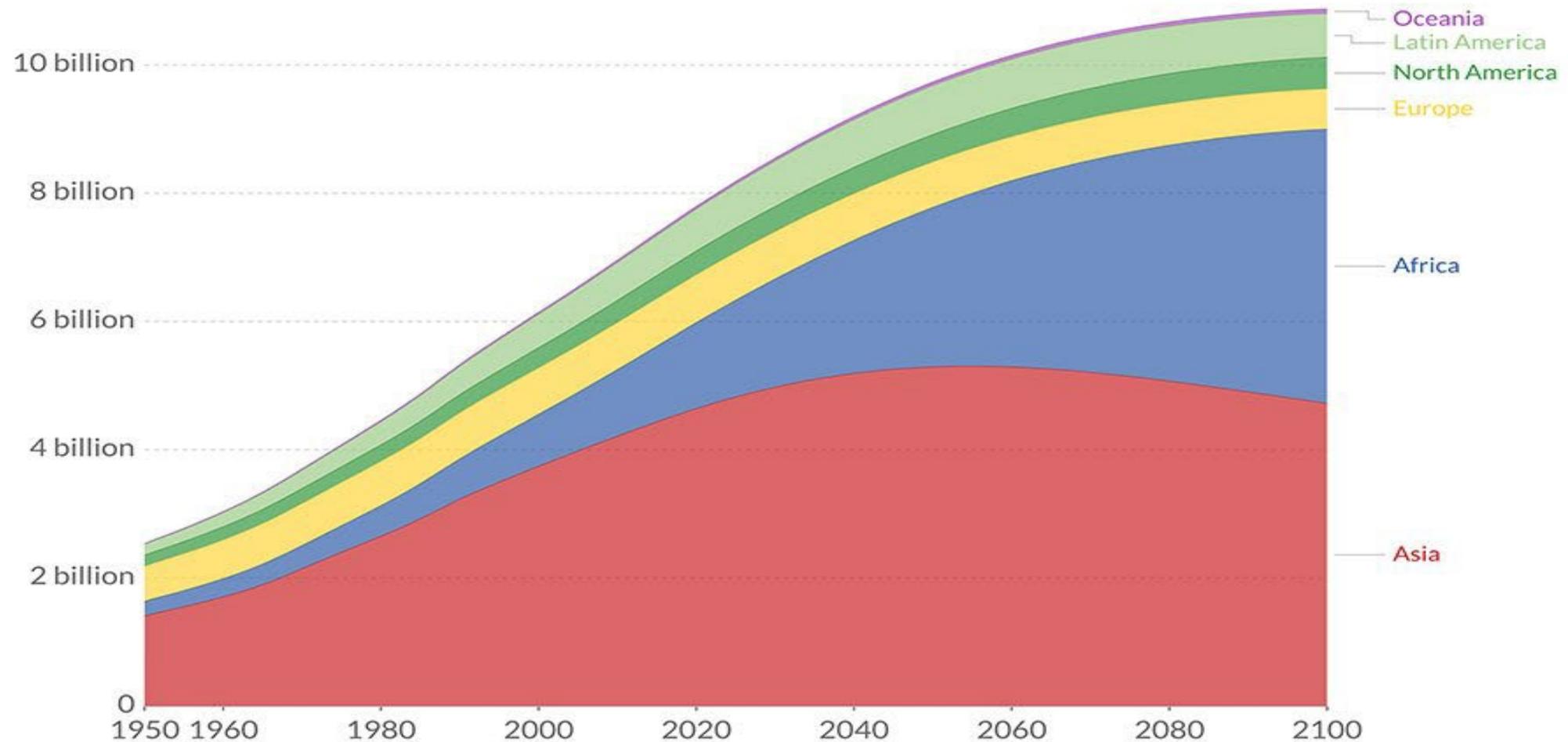
Adapted from Dan Brown, Dante's Inferno as adjusted and colored in https://www.google.com/search?q=population+apocalypse+equation&client=safari&hl=en-us&sxsrf=AOaemvIaJppHYEy_kvkrpiUcsiyuTFuvJw:1642973523739&tbm=isch&source=iu&ictx=1&vet=1&fir=nSrj2pPGh1prbM%252CQodXOngQJ1pL9M%252C_&usg=AI4_-kQXHc5hPbYMzUa6H5ZkPc6-ydsw_A&sa=X&ved=2ahUKEwidxoeq6cj1AhUoQjABHe3fCLEQ9QF6BAgaEAE&biw=1121&bih=1356&dpr=2#imgrc=EpbrEy_RbBi7TM&imgdii=0vv-SdCtjN_LM.

But, Such Pressures Are Radically Different by Region,

World population by region projected to 2100, 1950 to 2100

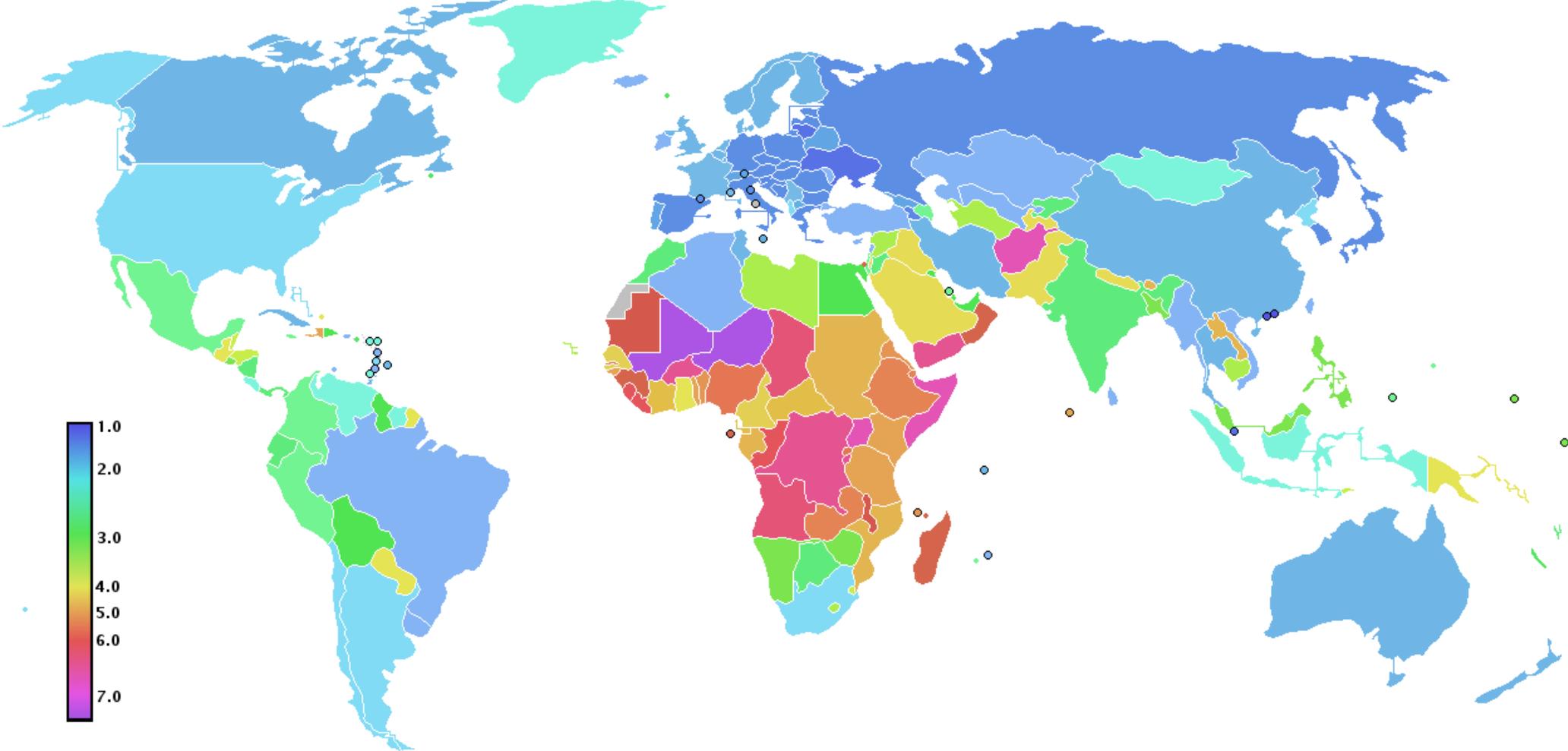
Projected population to 2100 is based on the UN's medium population scenario.

Our World
in Data



Adapted from Anthropocene magazine, <https://www.anthropocenemagazine.org/2020/07/the-human-population-curve-is-on-the-move/>.

And Major Increases in Population are Driven by a Limited Number of Poorer and Fragile States in Africa and Asia



Adapted from The Overpopulation Project, <https://overpopulation-project.com>. Data source is UN 2017.

Urbanization and Economic Change Have Similar Impacts on Stability



Urbanization Affects a Wide Range of Nations with Very Mixed Effects

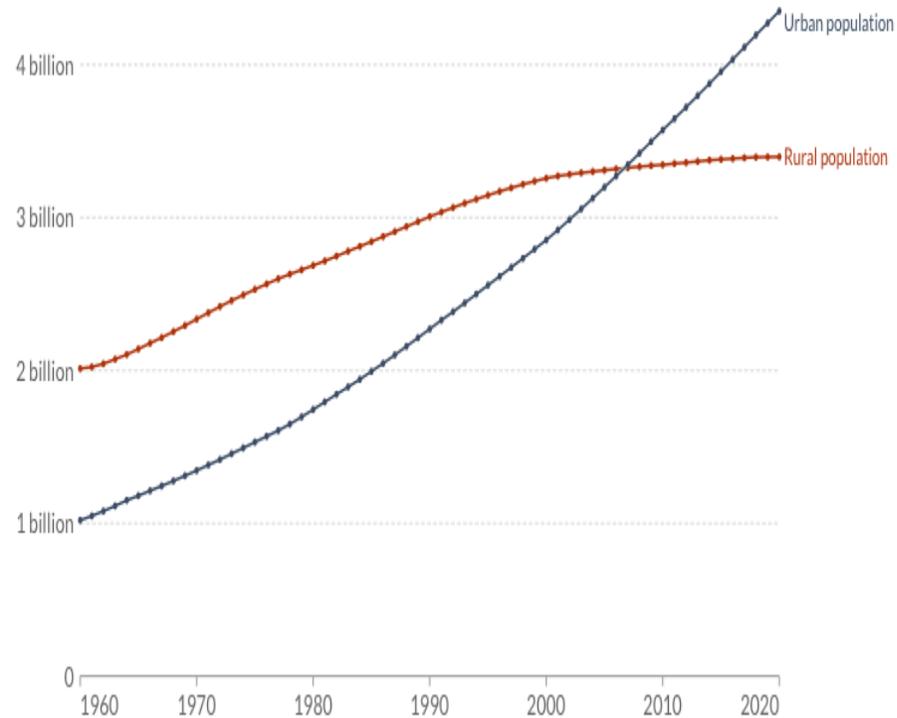
- **Forces majority of population to live in a modern market economy.**
- **Creates major new dependence on trade, communication, infrastructure, service industries.**
- **Makes youth and other employment a critical internal security issue.**
- **Forces major changes in the location and isolation of tribal, regional, ethnic, and sectarian groups.**
- **Requires far more effective governance and internal security/rule of law.**
- **Changes entire media structure and role of internet in reporting on government and politics.**
- **Radically alters dependence of government services like health and education.**
- **Extends impact of corruption on population, resentment and anger over weak and corrupt governance.**
- **Greatly increases ideological outreach capability of protestors, insurgents, radicals, and terrorists.**
- **Changes military threat from neighbors and outside powers; forces competition and modernization.**
- **In many cases, governance fails to adapt, becomes dominated by small elites that now have the power to rule in authoritarian ways.**
- **In all cases, puts governments under major new strains that constantly evolve.**

How Urbanization Is Changing the World

Number of people living in urban and rural areas, World, 1960 to 2020



Change country



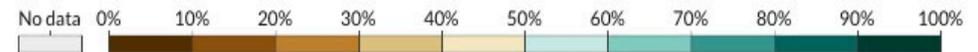
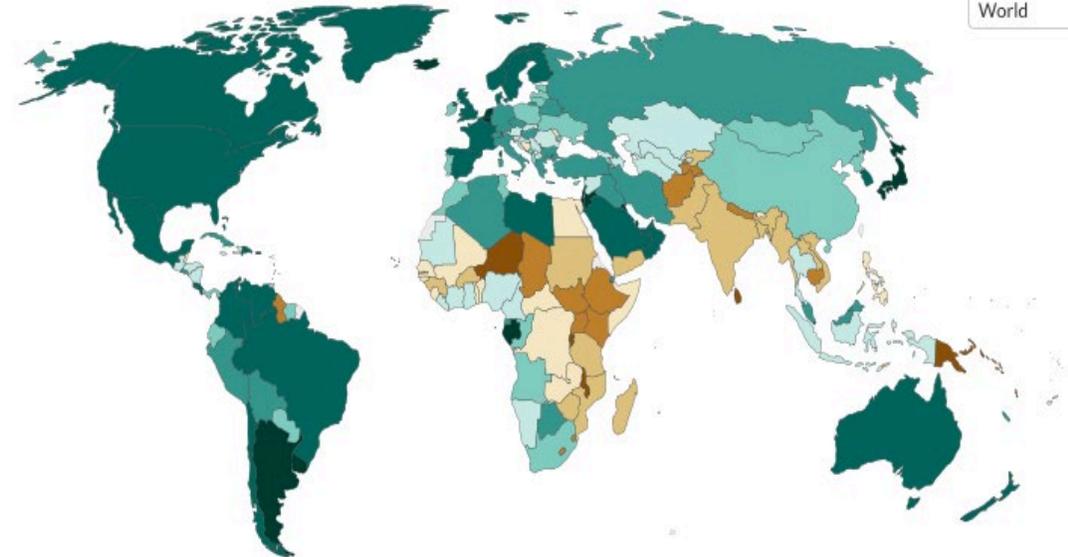
Source: World Bank based on data from the UN Population Division
Note: Urban populations are defined based on the definition of urban areas by national statistical offices.

OurWorldInData.org/urbanization • CC BY

Share of people living in urban areas, 2020



World



Source: UN Population Division (via World Bank)
Note: Urban populations are defined based on the definition of urban areas by national statistical offices.

OurWorldInData.org/urbanization • CC BY

2020

For a detailed analysis of these trends, see Hannah Ritchie and Max Roser, *Urbanization*, Our World in Data, November 2019, <https://ourworldindata.org/urbanization>.

UN Estimate of Key Trends in Urbanization – I

- **Today, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050. Projections show that urbanization, the gradual shift in residence of the human population from rural to urban areas, combined with the overall growth of the world's population could add another 2.5 billion people to urban areas by 2050, with close to 90% of this increase taking place in Asia and Africa, according to a new United Nations data set.**
- **The 2018 Revision of World Urbanization Prospects produced by the Population Division of the UN Department of Economic and Social Affairs (UN DESA) notes that future increases in the size of the world's urban population are expected to be highly concentrated in just a few countries. Together, India, China and Nigeria will account for 35% of the projected growth of the world's urban population between 2018 and 2050. By 2050, it is projected that India will have added 416 million urban dwellers, China 255 million and Nigeria 189 million.**
- **The urban population of the world has grown rapidly from 751 million in 1950 to 4.2 billion in 2018. Asia, despite its relatively lower level of urbanization, is home to 54% of the world's urban population, followed by Europe and Africa with 13% each.**
- **Today, the most urbanized regions include Northern America (with 82% of its population living in urban areas in 2018), Latin America and the Caribbean (81%), Europe (74%) and Oceania (68%). The level of urbanization in Asia is now approximating 50%. In contrast, Africa remains mostly rural, with 43% of its population living in urban areas.**
- **By 2030, the world is projected to have 43 megacities with more than 10 million inhabitants, most of them in developing regions. However, some of the fastest-growing urban agglomerations are cities with fewer than 1 million inhabitants, many of them located in Asia and Africa. While one in eight people live in 33 megacities worldwide, close to half of the world's urban dwellers reside in much smaller settlements with fewer than 500,000 inhabitants.**

UN Estimate of Key Trends in Urbanization – II

- **As the world continues to urbanize, sustainable development depends increasingly on the successful management of urban growth, especially in low-income and lower-middle-income countries where the pace of urbanization is projected to be the fastest. Many countries will face challenges in meeting the needs of their growing urban populations, including for housing, transportation, energy systems and other infrastructure, as well as for employment and basic services such as education and health care. Integrated policies to improve the lives of both urban and rural dwellers are needed, while strengthening the linkages between urban and rural areas, building on their existing economic, social and environmental ties.**
- **To ensure that the benefits of urbanization are fully shared and inclusive, policies to manage urban growth need to ensure access to infrastructure and social services for all, focusing on the needs of the urban poor and other vulnerable groups for housing, education, health care, decent work and a safe environment.**

**The Greatest Threat in Failed States
is Failed Governance**

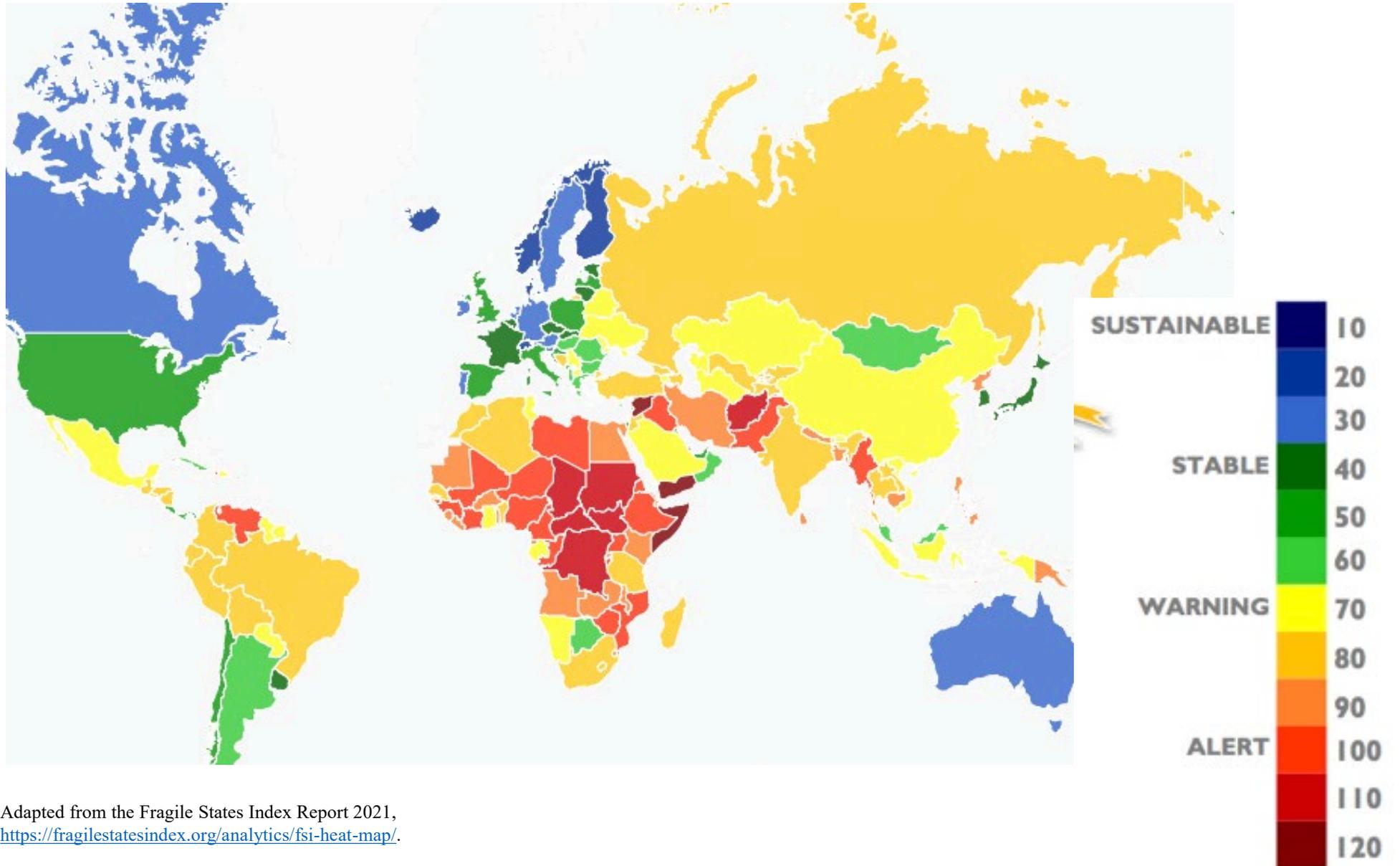


Key Afghan and Iraqi Lessons for U.S. and “Strategic” Partners: The Four Real-World Threats in Irregular and Insurgent Warfare

- 1. The Enemy(ies),** which are usually well established and have made major gains before U.S. military intervention begins.
- 2. The Government or Strategic Partner** (whose gross failures allowed a major threat to evolve).
- 3. The United States** (whose ignorance of the country, division of its civil-military effort, effort to impose its own approach to warfighting, and lack of strategic triage can be critical).
- 4. Foreign and neighboring states which almost inevitably create additional threats and problems.** (Pakistan, Iran?)

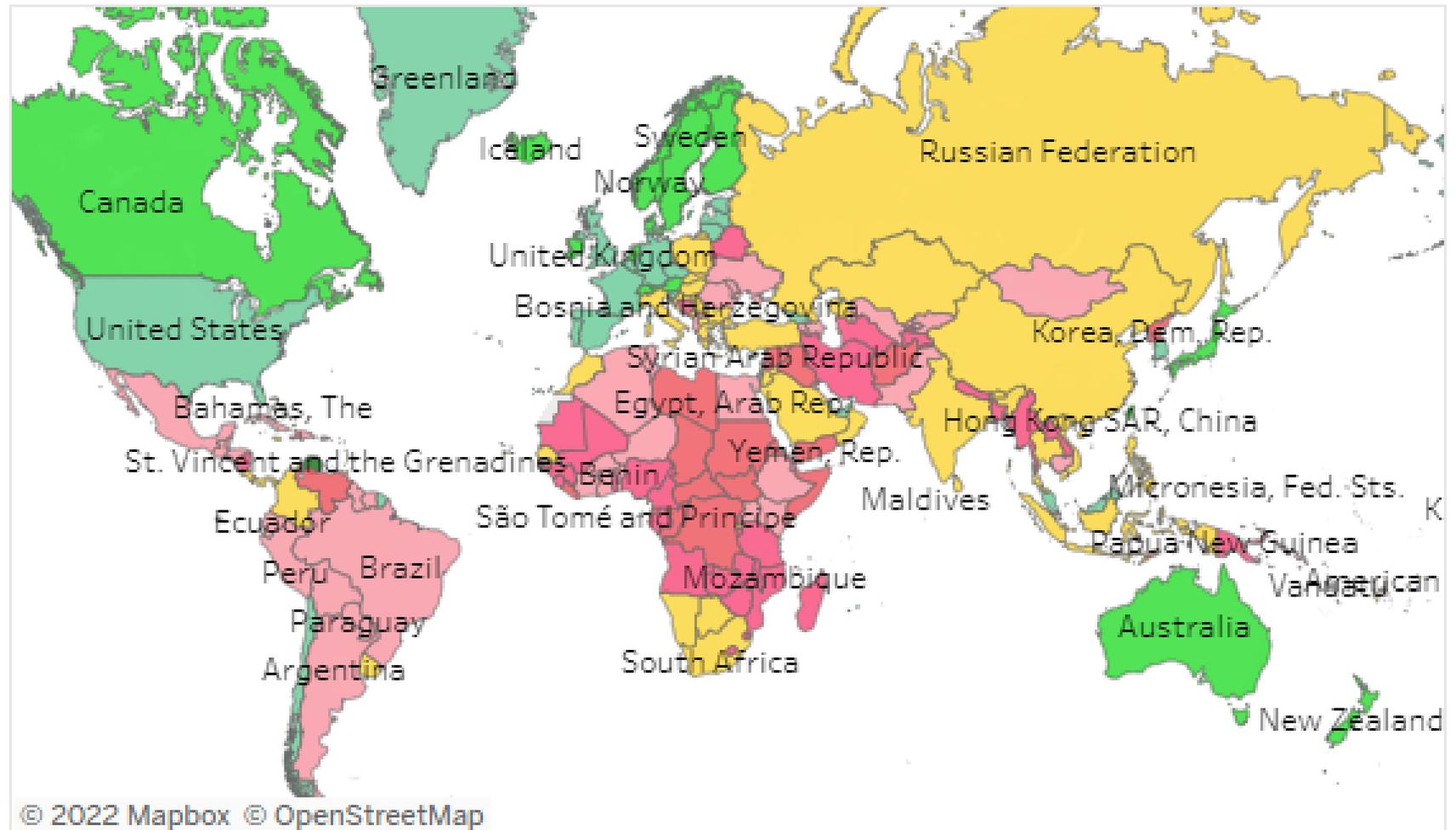
**The
Quality
of the
State is
the
Driving
Factor**

**Fragile
States
Index
for 2021**



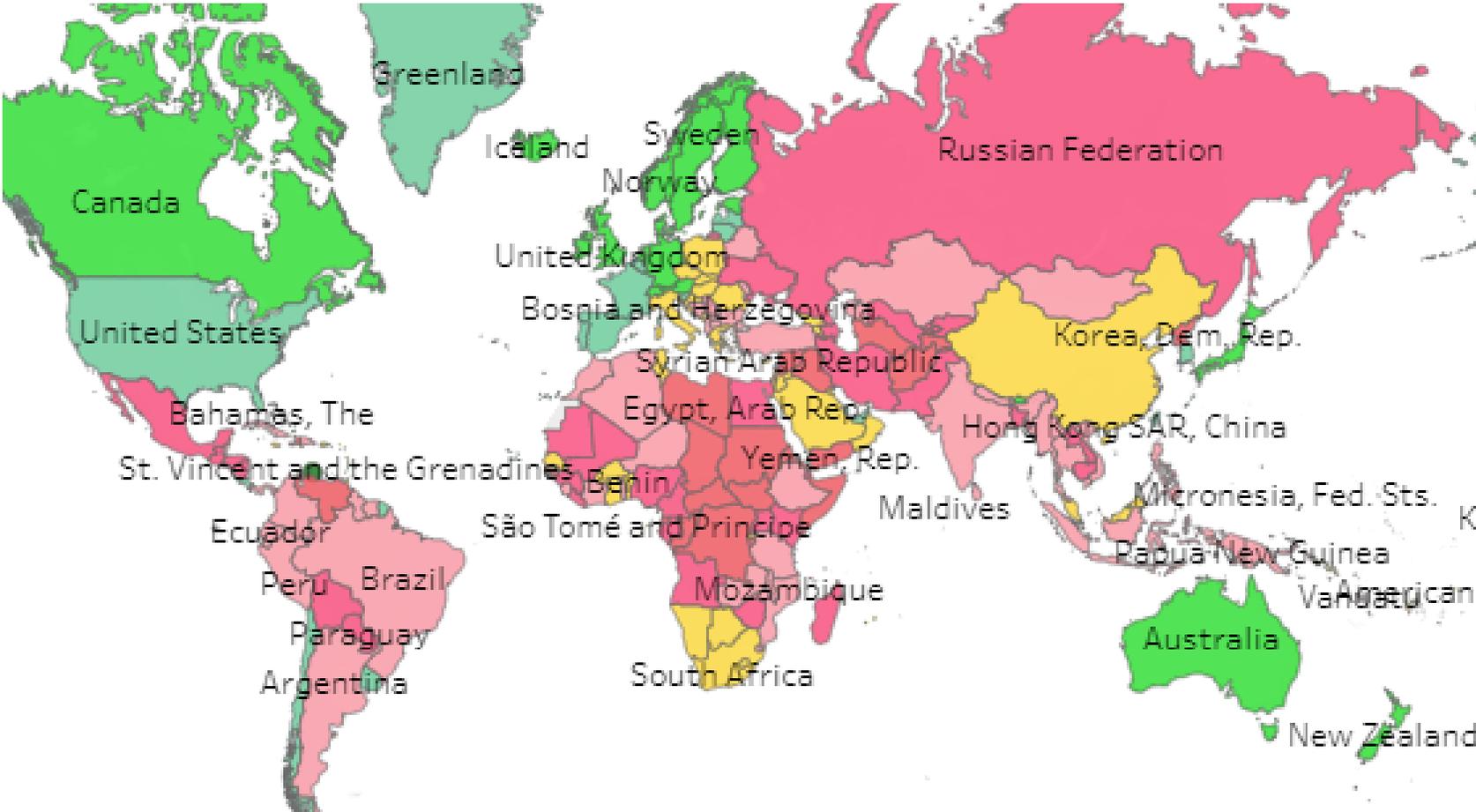
Adapted from the Fragile States Index Report 2021,
<https://fragilestatesindex.org/analytics/fsi-heat-map/>.

World Bank Estimate of Government Effectiveness in 2020



Adapted from the World Bank,
<https://info.worldbank.org/governance/wgi/Home/Reports>.

World Bank Estimate of Control of Corruption in 2020



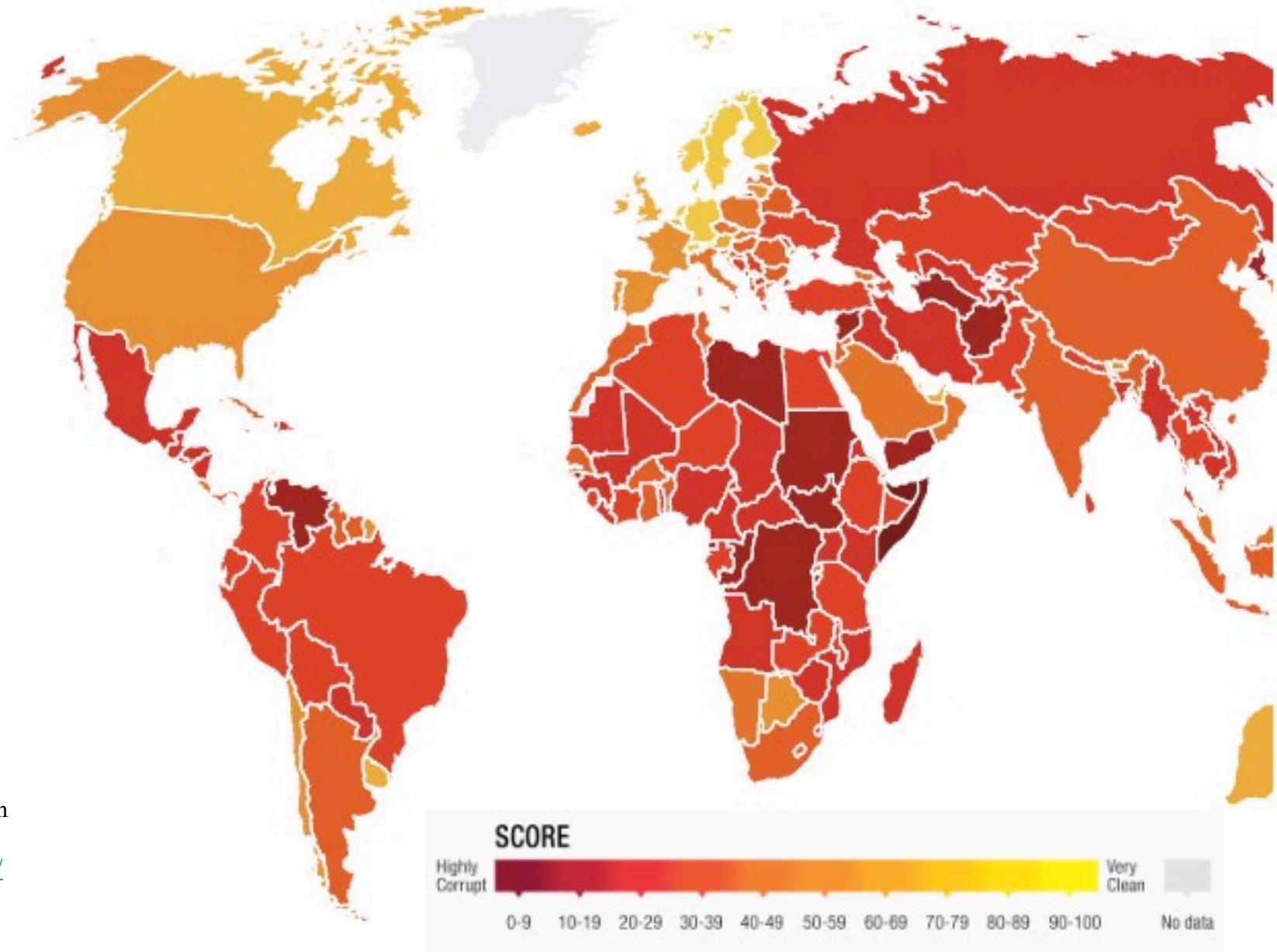
© 2022 Mapbox © OpenStreetMap

Adapted from the World Bank, <https://info.worldbank.org/governance/wgi/Home/Reports>.

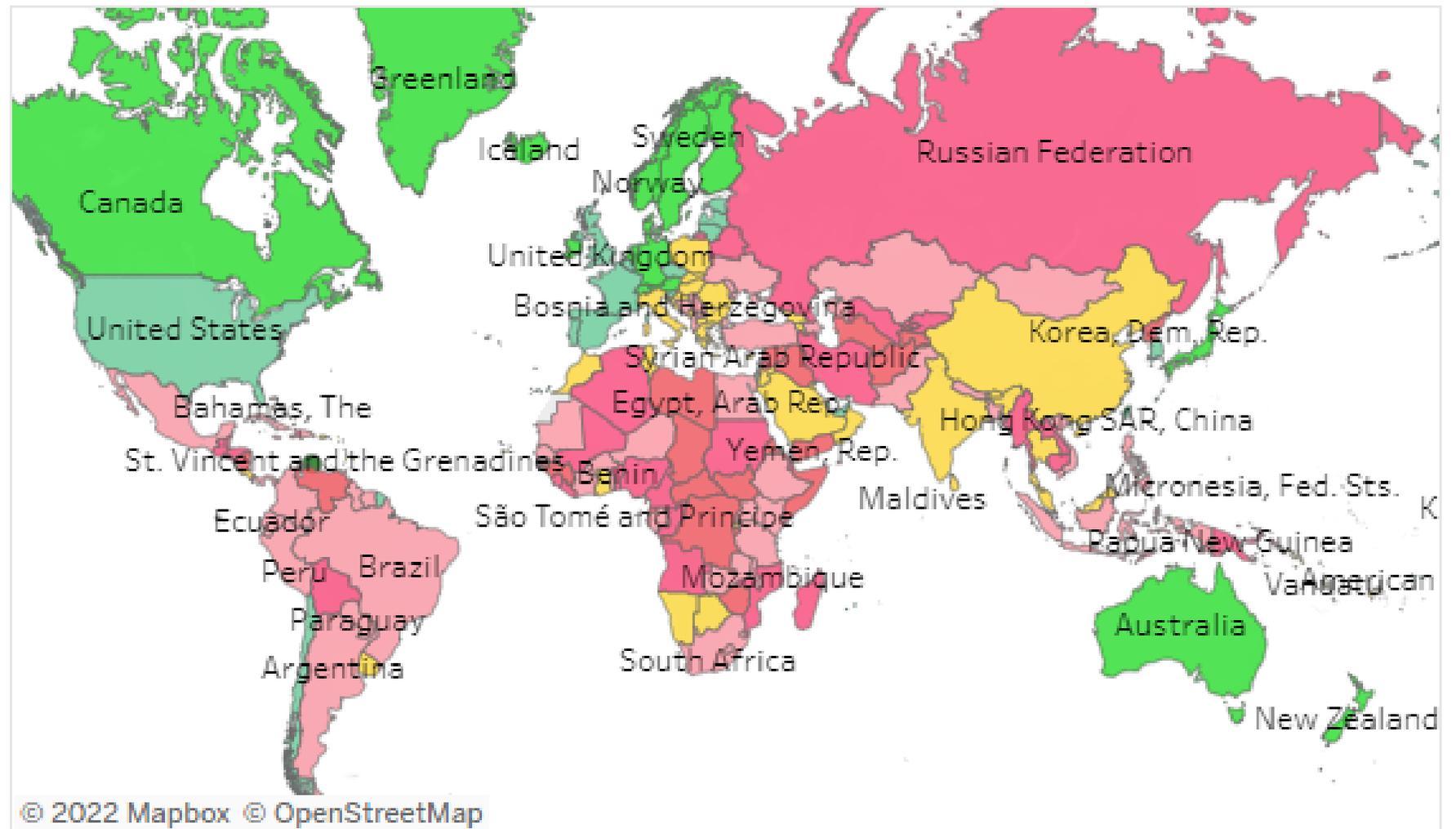


Transparency International's Global Corruption Rating for 2020

Adapted from Transparency International, Corruptions Perception Index, 2020,
<https://www.transparency.org/en/cpi/2020/index/nzl>.



World Bank Estimate of Rule of Law in 2020



Adapted from the World Bank, <https://info.worldbank.org/governance/wgi/Home/Reports>.

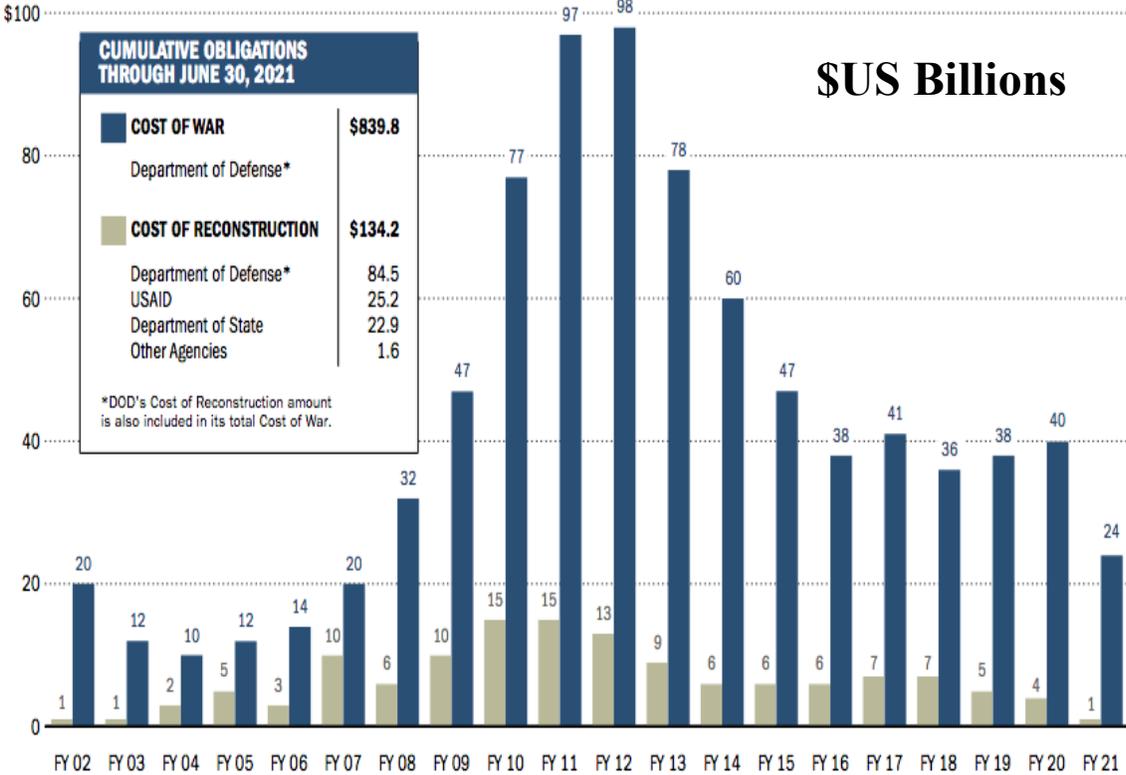
**One Key Response is for the U.S. to
Redefine its Strategic Partnerships
and Make Better Use of the
Combined Resources**



At Least Three Areas of Continuing Global Engagement

- Iran and North Korea may be the focus of today;
- But, cannot deter and contain in Europe, Asia, or MENA unless engage forward indefinitely into the future.
- Power projection is no substitute for substantial forward presence.
- Must correct burdensharing bullying, failed trade policies.
- Work far more closely with allies to create effective forces and foreign aid efforts – treat as real partners.
- JADO, and coping with EDT, must occur at partner level.
- White area partnerships needed as well as Gray Area to Theater/Strategic.
- Redefine “extended deterrence” – layered defense, conventional precision strike, (restore nuclear?).

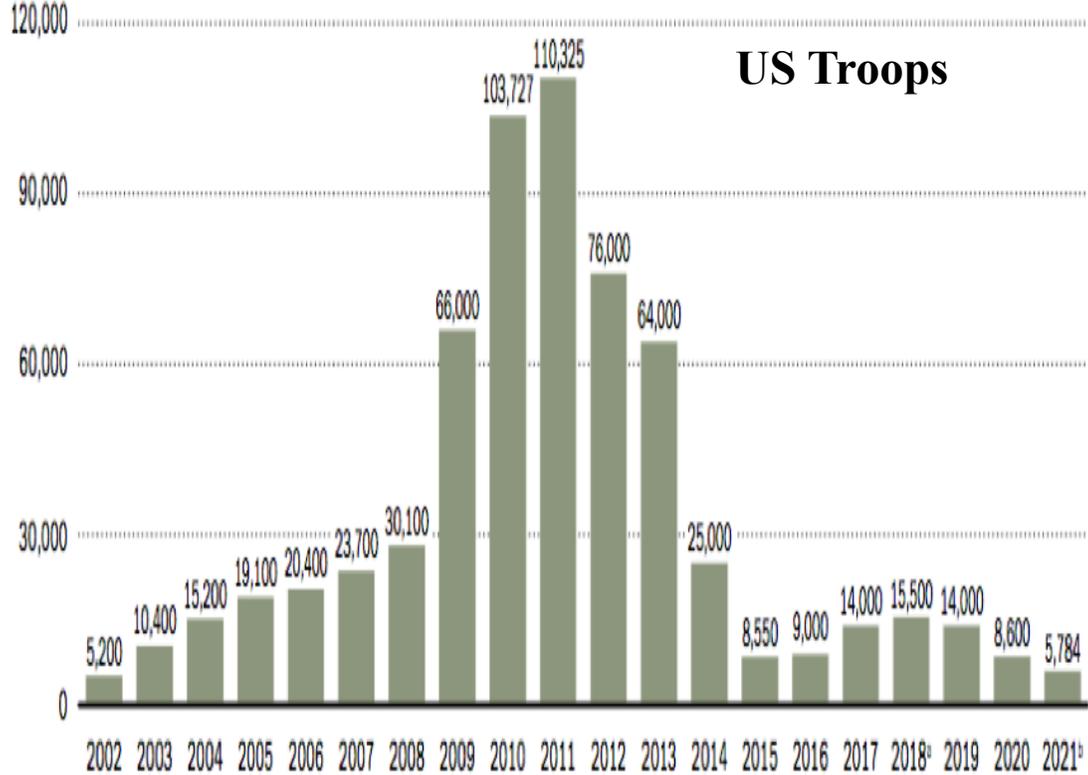
Strategic Overstretch Can Be Cut Radically By the Right Kind of Reliance on Partner Forces or Lead to Defeat



Note: Numbers have been rounded. Cumulative obligations reported by DOD for the Cost of War through June 30, 2021, differ markedly from cumulative appropriations through September 30, 2021, as presented elsewhere in the Status of Funds section, because the former figures do not include unobligated appropriations and DOD Cost of War reporting lags by one quarter.

Source: DOD, Cost of War Monthly Report, Total War-related Obligations by Year Incurred, data as of June 30, 2021. Obligation data shown against year funds obligated. SIGAR analysis of annual obligation of reconstruction accounts as presented in SIGAR, Quarterly Report to the United States Congress, 7/30/2021. Obligation data shown against year funds appropriated.

Source: Adapted from SIGAR, *Quarterly Report to Congress*, p. 44, <https://www.sigar.mil/pdf/quarterlyreports/2021-10-30qr.pdf>.



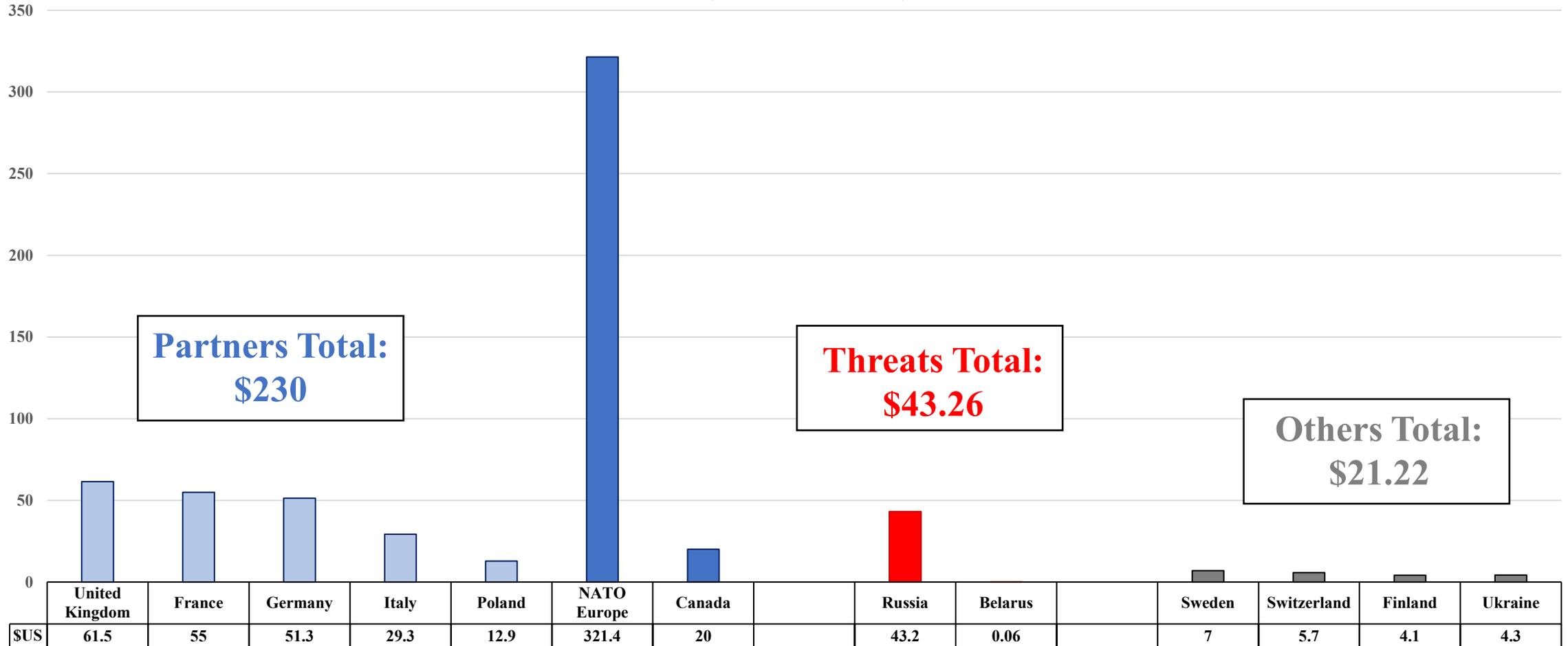
^a Projected for 2018 based on public statements of NATO Secretary General Jens Stoltenberg. According to USFOR-A, the publicly releasable U.S. troop level, as of March 1, 2018, remains 14,000.

^b On January 15, 2021, the number of U.S. troops in Afghanistan was 2,500; the number dropped to 650 by late June/early July as U.S. forces withdrew; peaked at 5,784 in late August as the U.S. deployed forces to assist with the Noncombatant Evacuation Operation; and went to zero on August 30, 2021.

But the Right Kind of Partnership Is Critical

- **Strategic partners provide critical military assets and economic strength in all of the major areas where U.S. commands need support.**
- **The defense spending levels by partners are already at the point where getting more money as burdensharing is not the key objective; it is creating more effective partnerships.**
- **This means treating partners as real partners in terms of interoperability, common planning, and dealing with their deterrent and defense needs.**
- **Aiding other states in dealing with terrorism, extremism, and security threats must be done on triage basis.**
- **What is their real strategic importance to the U.S., can they provide effective civil governance and support?**
- **Must not waste resources trying to help states that cannot credibly help themselves.**

Strategic Partners, Threats, and Other States: Comparative 2020 Defense Budgets Affecting NATO (In \$US Billions)



Note: * indicates no data available.

NATO Europe includes the defense expenditures of all participating countries of NATO.

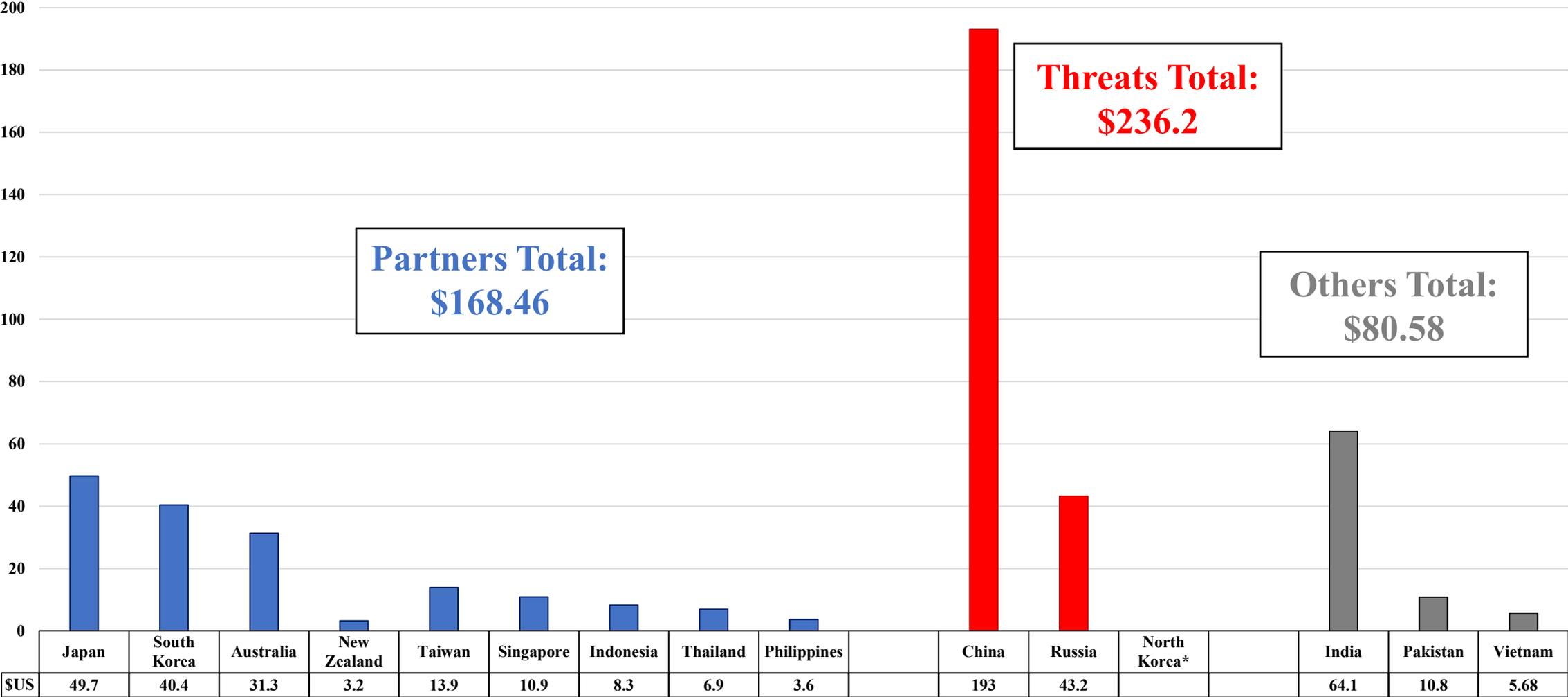
Partners Total include NATO Europe and Canada.

The SIPRI Military Expenditure Database for 2020 estimates the defense budget as \$61.7 for Russia (in \$US billions).

Source: IISS, *Military Balance*, 2021; and NATO, *Defence Expenditure of NATO Countries*.

Strategic Partners, Threats, and Other States: Comparative 2020 Defense Budgets Affecting INDOPACOM

(In \$US Billions)

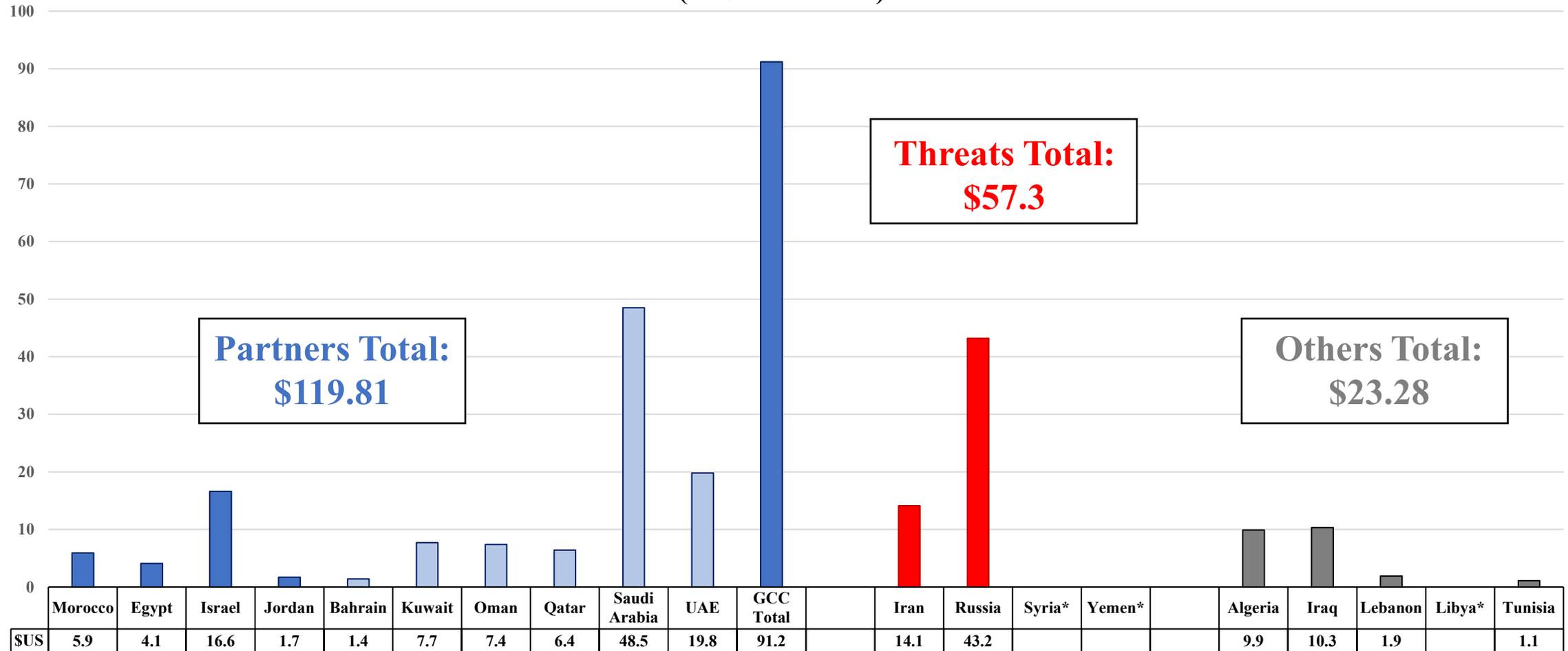


Note: * indicates no data available.
 The SIPRI Military Expenditure Database for 2020 estimates the defense budgets as \$252.3 for China and \$61.7 for Russia (in \$US billions).

Source: IISS, *Military Balance*, 2021.

Strategic Partners, Threats, and Other States: Comparative 2020 Defense Budgets Affecting CENTCOM

(In \$US Billions)



Note: * indicates no data available.

GCC Total includes the budgets of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE.

Partners Total include Morocco, Egypt, Israel, Joran, and the GCC Total.

The SIPRI Military Expenditure Database for 2020 estimates the defense budget as \$61.7 for Russia (in \$US billions).

To Conclude: Repeating Possible Solutions to Key Areas of Potential Overstretch

- Deal with conflicting and uncertain federal spending priorities.
- Shift from nuclear balance defined by arms control to full range of emerging “existential” threats to U.S., allies, and partners.
- React to emergence of China as potential peer superpower by 2030.
- Treat Russia as largely hostile under Putin.
- Deal with lesser threats like Iran and North Korea on a global basis.
- Shift from focus on “terrorism” to the challenge of “fragile states.”
- Rethink strategic partnerships. Focus on effectiveness, not burden sharing.
- Adjust to an ongoing revolution in military affairs driven by emerging and destabilizing technologies

*But, Strategic Triage Challenges Political
Reality*

Engaging effectively now will be far cheaper in terms of any longer-term outcome, but may be politically and institutionally impossible for the United States.