

A black and white photograph of a hand holding a transparent globe. The globe shows a map of the Americas, with labels for various cities and regions. The hand is positioned at the bottom, with fingers spread, supporting the globe. The globe is slightly tilted, showing the Western Hemisphere. The background is a plain, light color.

# A World in Crisis: The “Winter Wars” of 2022-2023

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The world now faces a wide range of potential wars and crises. What is far less obvious is the full level of confrontation that has developed between the U.S. and its strategic partners and Russia, the similar level of confrontation with China, and rising other types of violence and potential conflict that are emerging on a global level.

The Emeritus Chair in Strategy at CSIS has prepared a detailed net assessment that explores these rising levels of risk and confrontation, and the kind of futures that may emerge out of these different crises, confrontations and conflicts, and trends. It focuses on the current level of political, economic, and military risks that shape the world in the winter of 2022-2023, but also examines key strategic trends and military developments.

The assessment shows that *war* does not have to mean actual military conflict between the nations involved. Avoiding or minimizing actual combat has never meant peace. As Sun Tzu pointed out in the *Art of War* well over 2,000 years ago, “war” does not have to involve the use of military force or any form of actual combat. His statement that, “The supreme art of war is to subdue the enemy without fighting” reflected many of the conflicts in China in his own time. It has applied to other states and cultures throughout history, and it applies to many of the confrontations and grey area conflicts that exist today.

The first part of this net assessment focuses on the level of confrontation between the major powers – the U.S. and its strategic partners, Russia, and China in the near to mid-term. It shows that this confrontation has grown far more serious in the last few years and now affects many areas of the globe. It also shows that many aspects of this confrontation are now the equivalent of Sun Tzu’s goal of subduing the enemy without fighting. The confrontations and rivalries between the major powers have become the equivalent of political and economic warfare and competing efforts to use military power to achieve strategic objectives without direct combat.

The second part of the net assessment makes it equally clear that the wide range of lower-level crises and conflicts between regional and local powers, and civil wars and lesser internal conflicts are intensifying.

In far too many cases, the assessment shows all too clearly that the world is not moving towards peace. The world faces a series of possible and ongoing “winter wars” in 2022-2023 that may or may not escalate to open military conflict, but that are already wars at a political and economic level. Many of these “winter wars” also involve efforts to build up more lethal military forces, use security assistance and arms transfers, or proxies to exert political and economic leverage while deterring them from using force in actual fighting.

The list of such wars – violent or non-violent – ongoing in the winter of 2020-2023, and that seem likely to continue to affect global security in the future – includes:

- The “Winter War” in the Ukraine
- The “Winter War” between the West and Russia in Economics, Politics, and Energy
- The “Winter War” in Conventional Force Modernization and Build-Ups by the U.S., NATO and Russia.
- The “Winter War” in Nuclear Forces and Deterrence Between the Major Powers,
- The “Winter War” in Precision Strike Capabilities, Air/Missile Defense and Emerging/Disruptive Technologies
- The “Winter War” in Going from Cooperation and Competition with China to Confrontation and Active War Planning

- The “Winter War” in the Middle East and the Gulf
- The “Winter War” in the Koreas
- The “Winter War in Grey Area, Spoiler, and Proxy Warfare
- The “Winter War” in Fragile, Divided, Authoritarian, and Undeveloped States

The following table of contents for this net assessment examines how the major powers are conducting such “wars” and the threats they pose. Using an extensive mix of graphs, chart, and maps, the data show that new forms of political and economic warfare – and military build-ups – increasingly divide the world’s major powers.

At the same time, the analysis shows that other states are increasingly involved in similar forms of regional and local conflicts or are becoming involved in the confrontation between major powers. It also shows that many such states lack effective governance and adequate economic development and are moving towards new internal, local, and regional conflicts. Desirable as some form of stable globalism may have seemed in the past, this net assessment shows that the world is moving in a very different direction.

## Table of Contents

<b>THE “WINTER WAR” IN UKRAINE .....</b>	<b>5</b>
TYING COMBAT TO ATTACKS ON UKRAINIAN CIVIL TARGETS.....	5
REALITIES VERSUS THE LAWS OF WAR.....	7
<b>THE “WINTER WAR” BETWEEN THE WEST AND RUSSIA IN ECONOMICS, POLITICS, AND ENERGY .....</b>	<b>8</b>
WAR WITHOUT COMBAT .....	8
THE BROADER FORMS OF ECONOMIC AND POLITICAL WARFARE .....	8
<i>Figure One: Major Shifts in Russian Trade Patterns Caused by the Economic War over the Ukraine.....</i>	<i>10</i>
THE ENERGY WAR AS AN INDICATOR OF THE SERIOUSNESS OF ECONOMIC WARFARE .....	11
<i>Figure Two: The Impact of Russian Actions on Gas Supplies and World Energy Prices - Part One .....</i>	<i>13</i>
<i>Figure Two: The Impact of Russian Actions on Energy Exports and World Energy Prices – Part Two.....</i>	<i>14</i>
<i>Figure Three: Potential Decline in Russian Oil and Gas Exports to Europe 2015-2030 .....</i>	<i>15</i>
OTHER FORMS OF POLITICAL AND ECONOMIC COMBAT.....	16
<b>THE “WINTER WAR” IN CONVENTIONAL FORCE MODERNIZATION AND BUILD-UPS BY THE U.S., NATO AND RUSSIA.....</b>	<b>17</b>
PUTTING THE CONVENTIONAL MILITARY BALANCE IN PERSPECTIVE.....	18
<i>Figure Four: The Military Balance in 2021- Part One .....</i>	<i>20</i>
<i>Figure Four: The Military Balance in 2021- Part Two.....</i>	<i>21</i>
ECONOMIC POWER, MILITARY SPENDING, AND THE CONVENTIONAL ARMS RACE: RUSSIA VERSUS THE WEST.....	22
ECONOMIC POWER, MILITARY SPENDING, AND THE CONVENTIONAL ARMS RACE: CHINA AS THE EMERGING SUPERPOWER .....	23
<b>THE “WINTER WAR” IN PRECISION STRIKE CAPABILITIES, AIR/MISSILE DEFENSE, AND EMERGING/DISRUPTIVE TECHNOLOGIES.....</b>	<b>25</b>
EMERGING AND DISRUPTIVE TECHNOLOGIES .....	25
<i>Figure Five: U.S. National Science and Technology Council List of Critical and Emerging Technologies: 2/2022 .....</i>	<i>27</i>
<i>Figure Six: U.S. Under Secretary of Defense for Research and Engineering: Critical Technology Priorities: 2022- Part One .....</i>	<i>28</i>

<i>Figure Six: U.S. Under Secretary of Defense for Research and Engineering: Critical Technology Priorities: 2022 - Part Two</i> .....	29
<i>Figure Seven: NATO, Science &amp; Technology Trends 2020-2040: Exploring the S&amp;T Edge – Priorities -Part One</i> .....	30
<i>Figure Seven: NATO, Science &amp; Technology Trends 2020-2040: Exploring the S&amp;T Edge – Priorities - Part Two</i> .....	31
LONG-RANGE AND PRECISION STRIKE CAPABILITY AS A CASE EXAMPLE.....	32
<i>Figure Eight: How Much is Too Many: Current Russian Longer Range Precision-Guided Strike Systems</i> .....	34
<b>THE “WINTER WAR” IN RUSSIA, IN US, AND CHINESE NUCLEAR FORCES</b> .....	<b>35</b>
NUCLEAR WEAPONS ARE RUSSIA’S LAST AREA WHERE IT REMAINS A TRUE SUPER POWER .....	35
CHINA AS AN EMERGING NUCLEAR SUPER POWER .....	36
CONTINUING U.S. NUCLEAR MODERNIZATION .....	38
ASSESSING THE NUCLEAR “WINTER WAR” .....	39
<i>Figure Nine: Estimate of Total Global Holdings of Nuclear Weapons by Country</i> .....	40
<i>Figure Ten: Russian Nuclear Modernization</i> .....	41
<i>Figure Eleven: Chinese Nuclear Modernization – Part One</i> .....	42
<i>Figure Eleven: Chinese Nuclear Modernization – Part Two</i> .....	43
<i>Figure Twelve: U.S. Nuclear Modernization – Part One</i> .....	44
<i>Figure Twelve: U.S. Nuclear Modernization – Part Two</i> .....	45
<b>THE “WINTER WAR” IN CHINA: FROM COOPERATION AND COMPETITION TO CONFRONTATION AND ACTIVE WAR PLANNING</b> .....	<b>46</b>
THE ROLE OF CHINA IN THE NEW U.S. NATIONAL SECURITY STRATEGY .....	46
CHINA AS THE “PACING THREAT” .....	47
CHINESE STRATEGY AND FORCE DEVELOPMENTS.....	47
CHINA’S CONVENTIONAL MILITARY BUILD-UP .....	48
KEY TRENDS IN CHINESE FORCES.....	49
<i>Figure Thirteen: Chinese Deployment of Advanced Modern Submarines, Surface Ships, and 4th and 5th Generation Aircraft</i> .....	52
<i>Figure Fourteen: U.S. Navy Estimate of Chinese Combat</i> .....	53
<i>Shipbuilding Relative to U.S. Navy</i> .....	53
<i>Figure Fifteen: China’s Evolving Conventional Precision Strike Capability in 2020</i> .....	54
<i>Figure Sixteen: Chinese Longer Range Missile Forces – Part One</i> .....	55
<i>Figure Sixteen: Chinese Longer Range Missile Forces – Part Two</i> .....	56
<i>Figure Fourteen: Chinese Longer Range Missile Forces – Part Three</i> .....	57
CHINA’S GROWING REGIONAL MILITARY POWER .....	58
<i>Figure Seventeen: Japanese MOD Estimate of the Military Forces</i> .....	59
<i>in the Western Pacific and Taiwan in 2022</i> .....	59
<i>Figure Eighteen: Increases in Chinese Military</i> .....	60
<i>Spending Compared to Other Powers</i> .....	60
CHINESE VERSUS U.S. FORCE MODERNIZATION AND FORCE DEVELOPMENT EFFORTS.....	61
GROWING CHINESE TIES TO RUSSIA? .....	62
<b>THE “WINTER WARS” IN FRAGILE, DIVIDED, AUTHORITARIAN, AND UNDEVELOPED STATES</b> .....	<b>65</b>
<i>Figure Nineteen: World Bank List of Fragile States and Conflict Situations in 2022</i> .....	66
<i>Figure Twenty-One: The “Winter War” in Military Spending by Region and Major Spender in 2021-Part One</i> .....	67
<i>Figure Twenty-One: The “Winter War” in Military Spending by Region and Major Spender in 2021-Part Two</i> .....	68
ECONOMICS, DEVELOPMENT, AND GOVERNANCE AS CAUSES OF GLOBAL CONFLICT.....	69
<i>Figure Twenty-Two: The Comparative Quality of Governance in High and Low Income States</i> .....	71
POPULATION GROWTH, HYPERURBANIZATION, CLIMATE CHANGE AND WATER: STRUCTURAL CAUSES OF INTERNATIONAL VIOLENCE.....	72
<i>Figure Twenty-Three: The Growing Global Threat from Population Pressure: 1950-2020 – Part One</i> .....	73
<i>Figure Twenty-Three: The Growing Global Threat from Population Pressure: 1950-2020 – Part Two</i> .....	74

THE INTERACTION BETWEEN OTHER STATES AND THE MAJOR POWERS IN “WINTER WARS” IN GREY AREA, SPOILER, AND PROXY CAMPAIGNS.....	75
<i>Figure Twenty-Four: The Role of Key Middle Eastern and North Africa States in the Global Arms Race.....</i>	<i>76</i>
<b>THE “WINTER WARS” IN THE MIDDLE EAST AND THE GULF .....</b>	<b>77</b>
<i>Figure Twenty-Five: Sources of Arms Transfers to .....</i>	<i>79</i>
<i>the Middle East and North Africa: 2000-2019 .....</i>	<i>79</i>
<i>Figure Twenty-Six: Missile Strike Systems in North Africa and the Middle East – Part One.....</i>	<i>80</i>
<i>Figure Twenty-Six: Missile Strike Systems in North Africa and the Middle East – Part Two .....</i>	<i>81</i>
<i>Figure Twenty-Seven: Major Terrorist Groups in Africa and the Middle East.....</i>	<i>82</i>
<b>THE “WINTER WAR” IN ASIA AND THE KOREAS .....</b>	<b>83</b>
<i>Figure Twenty- Eight: Developments in the Korean Military Balance – Part One.....</i>	<i>84</i>
<b>PUTTING TERRORISM AND EXTREMISM IN PERSPECTIVE .....</b>	<b>85</b>
<i>Figure Twenty-Nine: START Estimate of Trends in Global Terrorism: 1970-2020 .....</i>	<i>86</i>
<b>FROM PEACE, “GLOBALISM,” AND A “GLOBAL VILLAGE” TO A WORLD FILLED WITH GLOBAL TENSIONS AND “WINTER WARS” .....</b>	<b>87</b>

## The “Winter War” in Ukraine

One war has already escalated into a major conflict that pits the United States and the West against Russia, and the fighting between Ukraine and Russia. It is a war that has continued to escalate through the early winter of 2022-2023, and may that may continue in some form for years to come. The Russian invasion of Ukraine that began in February 2022, with what appeared to be a Russian effort to rapidly seize the entirety of Ukraine, has become a war of attrition on the ground, and now escalated to a strategic level against Ukrainian civilian targets.

While Russia may have expected a rapid victory that gave in full control of the Ukraine, it sharply overestimated its own military capabilities, and underestimated the improvements in the Ukraine’s forces since Russia’s seizure of the Crimea and parts of the Eastern Ukraine in 2014. Its advance was halted relatively quickly, and Ukraine then obtained sufficient support from the West and other states to be able to defend against Russia.

The end result of the Russian invasion was to mobilize the U.S., much of Europe, and many other states to support Ukraine in the equivalent of a proxy war. Outside powers provided arms, training, and intelligence support to the Ukrainian forces and began to conduct the equivalent of economic and political warfare to help defend Ukraine and push Russia towards some form of settlement. The U.S. alone had pledged some \$60 billion in arms, economic aid, and other support by early October 2022, Britain, many NATO and EU states, and other strategic partners have provided major aid to Ukraine as well, and the level of sanctions and other economic pressures on Russia has steadily increased over time.

The end result is that Russia has escalated by mobilizing some 300,000 troops in October, using its energy exports in its own form of economic warfare, and shifted to a mix of efforts to create more effective defenses on the territory it has gain from Ukraine and conducting major conventional air, drone, and missile attacks on Ukraine’s economic infrastructure and civilian personnel. It is a war that involves intense levels of actual fighting between Ukraine and Russia, but where the U.S, and the West have shown all too clearly that they can take major steps to subdue the enemy without fighting.

### *Tying Combat to Attacks on Ukrainian Civil Targets*

The U.S. and other supporters of Ukraine have waged an economic war of sanctions, and trade controls on Russia, as well as have provided economic and military aid to Ukraine, but Russia has responded more effectively in other ways with a combination of military escalation and an economic war over energy exports.

Russia has adapted its past reliance on “General Winter” and “General Mud” to include a major effort try to destroy Ukraine’s economy and its ability to resist. Since September 2022, the Ukraine War has escalated from fighting a land/air/missile battle for the control of Eastern Ukraine to a Russian strategy designed to destroy enough of the Ukrainian economy and infrastructure to force the Ukrainian government to end the fighting in ways that leave Russia with significant territorial gains, and Ukraine with a crippled economy that will take years to repair and with an uncertain future political and economic stability.

The cost of the Russia attacks on the Ukraine’s civil and critical infrastructure targets has already reached critical levels by the end of October 2022, and has briefly shut off the flow of Water and electric power to the Ukrainian capital of Kyiv in early November. The Ukrainian government

reported then that strikes on key electricity generating targets in Ukraine had destroyed almost a third of its electric and other power generating facilities, and left at least 1.5 million Ukrainians without power. They deprived Kyiv of safe drinking water for at least several days. These attacks continued to be intense, and have growing impact through early December 2022. Ukraine may be able to repair part of its infrastructure, and deploy more effective and air defenses in the months to come but this is uncertain.

These Russia military attacks interacted with broader forms of economic warfare on Ukraine. Russia attempt with some success to conduct its own energy war and against the West by block some gas exports, sifting its oil and gas exports to other markets, and raising their price. It also took political and economic steps, and made limited military attacks, to reduce Ukrainian grain and food exports.

By December 2022, this mix of military and civil actions had damaged civilian services, created levels of inflation, and destroyed sufficient civil facilities and property to reduce many Ukrainians to the poverty level. They also sharply increased Ukraine's need for economic aid and created a cumulative legacy of destruction and damage to the Ukraine's economy that require a massive and steadily increasing post-war recovery program.

Unless the Russian attacks halt or Ukraine is given a much larger set of missile and air defenses, and continuing and increasing levels of civilian aid, they will create steadily growing problems in maintaining a decent life as winter progresses – often increasing poverty to the point where hard choices have to be made between “heat” and “eat.”

While accurate cost and supply data are lacking, Russia's production of added missiles and drones, adaptations of air defense systems like the S300 to use in conducting land attacks, and purchase of low cost precision-guided conventionally armed missiles and drones and components from Iran and other states, may allow Russia to continue destroying Ukrainian economic and other civil targets. It may also allow Russia to saturate the more advanced Ukraine air/missile defense systems the U.S. and European states are beginning to provide to the Ukraine – systems which will only provide limited area coverage for much of the winter.

In a worst case for the Ukraine, such attacks may cumulatively limit internal Ukrainian popular support for the war, extend the length and cost of the war to the point where outside states reduce or end their aid, and sharply reduce Russian casualties and embarrassing military defeats. At a minimum, the new Russian tactics and missile strikes will extend the length and intensity of the fighting, sharply raise its cost of military and civil aid and the cost of any postwar recovery.

The full impact of these changes in tactics and strategy is far from clear, but they may force Ukraine to compromise on a settlement or to fight a debilitating war indefinitely into the future, and show NATO European states – especially those near the Russian border – that Russia still presents a major threat to them regardless of the problems the fighting has revealed in its land forces.

From another perspective, the combination of Russia's problems in fielding fully effective conventional forces, and any success in escalating to mass attack on civil targets, seems likely to make Russia steadily more reliant on such tactics in the future. As is discussed shortly, it may also make Russia continue to link the use of such missile and air attacks to the threat of escalating to theater nuclear warfare.

### ***Realities Versus the Laws of War***

More broadly such attack provide a further warning that both Russia and other states are likely to make threat or actual use of intense and deliberate attacks on civilian targets a steadily more common aspect of modern warfare in spite of the “laws” of war.

Targeting and attacking civilians and civil targets in the war in Ukraine is scarcely unique. Virtually all recent lower-level conflicts have involved attacks on civil targets – often by terrorists or in internal civil conflicts, but also by states against states, regimes against parts of their own, or the factions in civil conflicts. With few exceptions, it is also increasingly clear that the laws of war are often unenforceable. Even in most of the cases where attackers on civilians or civilian targets lost the war did not result in any special punishment, and little real-world effort has been made to find more effective deterrents to such strikes on civilians.

Here again, Russia has set a precedent. It is striking that Russia’s Defense Minister Sergei Shoigu openly stated on November 1<sup>st</sup>, 2022 that Russia was deliberately targeting the Ukraine’s critical civilian infrastructure in what he called a legitimate effort to reduce the country’s military capacity. He stated that, “With precision-guided strikes, we continue to effectively hit military infrastructure facilities, as well as facilities that affect the reduction of Ukraine’s military potential.” The most Shoigu did to imply any restraint was to state that, “Comprehensive measures are being taken to prevent the death of Ukrainian citizens.”

In short, one key legacy of the “winter war” in the Ukraine may well be that it has conclusively demonstrated that relying on unenforceable laws of war to provide real-world security for civilians may sometimes have worse consequences for the civilians involved than having no laws at all. Moreover, other recent civil wars and other conflicts have shown that almost any war fought in populated areas or cities involving key lines of communication, or involving the use of artillery near population centers and critical infrastructure, also produces serious civilian casualties and amounts of damage to civilian facilities.

The same has been true of many major conflicts against terrorists, extremists, and other factions that shelter in populated areas and use civilians as some form of shield. The U.S. could not avoid significant civilian casualties in Afghanistan and Iraq, although it made a major effort to do so. Most other governments have shown far less restraint. As is noted later in this analysis, it is Assad’s regime in Syria has probably killed far more civilians during the course of the Syrian civil war than all of the world’s extremists and terrorists killed during the same period.



## **The “Winter War” between the West and Russia in Economics, Politics, and Energy**

Another possible legacy of the war in the Ukraine is that it may well lead to an enduring level of confrontation between Russia and the West and a continuing level of political and economic warfare. If so, this will scarcely be an exceptional case. If anything, the growing economic confrontation between the West and China may have far more impact on the global economy, as may regional struggles over control of energy exports and prices and critical technologies.

There already is an intensifying race to modernize and reshape the military forces on each side. This can alter the nature of future wars, but it also will alter such forces in ways that give them more political and economic leverage and more ability to influence proxy wars, grey area clashes, and spoiler operations that do not involve direct fighting.

### ***War Without Combat***

Once again, it is important to note that avoiding or minimizing actual combat does not mean peace. Russia and the West are already competing in seeking to “subdue the enemy without fighting.” And, as is shown in the following sections of this analysis, the same is true of the relations between the U.S. and China, and often between the nations involved in smaller regional and local conflicts and civil wars.

The War in Ukraine extends far beyond Ukrainian and Russian military forces. It has created broad political and economic conflicts between Russia and much of the West. Both sides have steadily escalated their levels political and economic conflict since the start of the Ukraine conflict in February 2022. Putin has responded carrying out a major political campaign against the West, denouncing the U.S. and other states for supporting Ukraine, and accusing the United States and other Western powers of seeking to dominate Europe and isolate and dismember Russia.

The West has launched its own political campaign against Russia. It is building up its military presence in the forward areas of NATO, has openly denounced Putin, and has sought global support in criticizing the initial Russian invasion and its shift to tactics and weapons that inflict steadily increasing civilian casualties and damage. The West not only is fighting a proxy military war against Russia, it has launched the equivalent of an economic war which has done major damage to the Russian economy.

The U.S., Canada, European states, and other states are doing more than providing arms transfers, security assistance, financial aid, and economic aid to Ukraine. They are simultaneously waging economic and political war Russia. And, as noted previously, Russia is replying in kind. This form of economic and political warfare, and competing major military build-ups, seems certain to escalate steadily throughout the winter and may then continue for years to come.

### ***The Broader Forms of Economic and Political Warfare***

So far, there is no clear winner, nor does either side seem likely to emerge as the winner in the near future. On the one hand, it is clear that Putin sharply underestimated the economic and political reaction of Western and many other states prior to his invasion of Ukraine. And, there is no doubt that the Russian people have suffered deeply from Western reactions and sanctions. As yet, however, there has been only limited Russian popular resistance to the war, and Putin has been able to escalate his war fighting efforts in spite of Western political and economic reactions.

The West also miscalculated its initial approach to the war. It began to implement major economic and political sanctions against Russia immediately after its invasion of Ukraine. However, Western planners seem to have sharply underestimated Russia's ability to survive them. They did not foresee the escalating economic impact Russia's response would have on European and other energy supplies, global food exports, on global political divisions, and Russia's actual military behavior.

As of December 2022, the economic and political side of this economic and political war had escalated to the point where the West kept adding sanctions and trade and investment barriers, including controls over the critical technologies, components. Russia had replied in kind by shifting its gas and oil exports, taking other measures to sustain its economy, and attempting to limit Ukrainian grain and other food exports by sea – measures that sharply increased the cost of food to many other countries.

The West had some success, but not the success many expected. **Figure One** shows that Russia actually increased its exports to a number of countries that supported Ukraine early in the war, and did not suffer nearly as much as some planners initially estimated in developing sanctions.

**Figure One: Major Shifts in Russian Trade Patterns Caused by the Economic War over the Ukraine**

<b>Country</b>	<b>Total Trade Before Invasion (\$billions)</b>	<b>Russian Imports Before Invasion (\$billions)*</b>	<b>Shift in Russian Imports After Invasion (Percent)**</b>	<b>Russian Exports Before Invasion (\$ billions)*</b>	<b>Shift in Russian Exports After Invasion (Percent)**</b>
<b>Belgium</b>	<b>\$0.763</b>	<b>\$0.238</b>	<b>-27%</b>	<b>\$0.524</b>	<b>+130%</b>
<b>Brazil</b>	<b>\$0.456</b>	<b>\$0.152</b>	<b>-13%</b>	<b>\$0.303</b>	<b>+166%</b>
<b>China</b>	<b>\$9.2</b>	<b>\$4.3</b>	<b>+24%</b>	<b>\$4.9</b>	<b>+98%</b>
<b>Germany</b>	<b>\$5.0</b>	<b>\$2.3</b>	<b>-51%</b>	<b>\$2.7</b>	<b>+38%</b>
<b>India</b>	<b>\$0.817</b>	<b>\$0.219</b>	<b>-19%</b>	<b>\$0.598</b>	<b>+430%</b>
<b>Japan</b>	<b>\$1.5</b>	<b>\$0.488</b>	<b>-42%</b>	<b>\$0.978</b>	<b>+40%</b>
<b>Netherlands</b>	<b>\$1.5</b>	<b>\$0.506</b>	<b>-52%</b>	<b>\$1.0</b>	<b>+74%</b>
<b>Spain</b>	<b>\$0.472</b>	<b>\$0.167</b>	<b>-44%</b>	<b>\$0.305</b>	<b>+122%</b>
<b>South Korea</b>	<b>\$1.8</b>	<b>\$0.648</b>	<b>-43%</b>	<b>\$1.2</b>	<b>-4%</b>
<b>Sweden</b>	<b>\$0.402</b>	<b>\$0.148</b>	<b>-61%</b>	<b>\$0.249</b>	<b>-86%</b>
<b>Turkey</b>	<b>\$2.1</b>	<b>\$0.312</b>	<b>+113%</b>	<b>\$1.8</b>	<b>+213%</b>
<b>United Kingdom</b>	<b>\$1.6</b>	<b>\$0.291</b>	<b>-71%</b>	<b>\$1.3</b>	<b>-81%</b>
<b>United States</b>	<b>\$2.3</b>	<b>\$0.512</b>	<b>-84%</b>	<b>\$1.8</b>	<b>-20%</b>

\*Monthly average Value: 2017-2021

\*\* Post invasion average monthly value compared with average monthly value in 2017-2021

Source: Adapted from Lazaro Gamio and AnaSwanson, "How Russia Pays for War," New York Times, October 30, 2022, [https://www.nytimes.com/interactive/2022/10/30/business/economy/russia-trade-ukraine-war.html?name=style&region=TOP\\_BANNER&block=storyline\\_menu\\_recirc&action=click&pgtype=LegacyCollection&variant=show&is\\_new=false&smid=nytcore-ios-share&referringSource=articleShare](https://www.nytimes.com/interactive/2022/10/30/business/economy/russia-trade-ukraine-war.html?name=style&region=TOP_BANNER&block=storyline_menu_recirc&action=click&pgtype=LegacyCollection&variant=show&is_new=false&smid=nytcore-ios-share&referringSource=articleShare).

### ***The Energy War as an Indicator of the Seriousness of Economic Warfare***

At the same time, **Figure Two** shows that Russia successfully retaliated against NATO and the other outside powers supporting Ukraine in 2022 by conducting an energy war that did critical damage to many Western economies. This energy war interacted with impact of COVID on these economies, and the West have suffered as well as Russia.

Moreover, Russia had some success in working with OPEC – and states as divided as Iran and Saudi Arabia – to place limits on global exports that help support its position. This has helped raise energy prices in virtually every Western and energy importing state, and has succeeded in creating a level of inflation and other economic damage to the West which is roughly equivalent to the damage the West has done to Russia.

The energy war also had many negative impacts on the rest of the world during 2022. It interacted with the impact of COVID to help create an increasingly uncertain global financial situation. It helped increase a global crisis in food supplies, the levels of international poverty reported by the UN and World Bank, the impact of political instability and wars in other areas, and the impact of climate change.

There is no clear way to predict the future impact of this energy warfare during the rest of the winter of 2022- 2023, or how it may develop in the months and years that will follow. For example, the EU put a cap on gas prices in early December whose impact is still unclear. However, the war's impact on the flow of Russian energy exports has already been significant, and may lead to major strategic changes in the flow of energy exports.

The International Energy Agency (IEA) warned in the annual *World Energy Outlook for October 2022* that,<sup>1</sup>

The world is in the middle of a global energy crisis of unprecedented depth and complexity. Europe is at the center of this crisis, but it is having major implications for markets, policies and economies worldwide. As so often is the case, the poorest and most vulnerable are likely to suffer most. The strains did not begin with Russia's invasion of Ukraine, but they have been sharply exacerbated by it. Extraordinarily high prices are sparking a reappraisal of energy policies and priorities. The Europe-Russia energy relationship lies in tatters, calling into question the viability of decades of fossil fuel infrastructure and investment decisions built on this foundation. A profound reorientation of international energy trade is underway, bringing new market risks even as it addresses longstanding vulnerabilities.

Many of the contours of this new world are not yet fully defined, but there is no going back to the way things were. And we know from past energy crises that the process of adjustment is unlikely to be a smooth one. That adjustment will also be taking place in the context of commitments made by governments to clean energy transitions. A central theme of this *World Energy Outlook 2022* is how the levers of technological change and innovation, trade and investment and behavioral shifts might drive a secure transition towards a net zero emissions energy system, while minimizing the potential risks and trade-offs between various policy objectives.

- Today's energy crisis shares some parallels with the 1970s oil price shocks, but there are also important differences. The crises in the 1970s were concentrated in oil markets and the global economy was much more dependent on oil than it is today. However, the intensity of use of other fossil fuels has not declined to the same extent; for natural gas it has risen in many cases. The global nature of the current crisis, its spread across all fossil fuels and the knock-on effects on electricity prices are all warning signs of broader economic impacts.
- The global energy crisis sparked by Russia's invasion of Ukraine is having far-reaching implications for households, businesses and entire economies, prompting short-term responses from governments as well as a deeper debate about the ways to reduce the risk of future disruptions and promote energy security.

This is a global crisis, but Europe is the main theatre in which it is playing out, and natural gas is center stage – especially during the coming northern hemisphere winter.

- High energy prices are causing a huge transfer of wealth from consumers to producers, back to the levels seen in 2014 for oil, but entirely unprecedented for natural gas. High fuel prices account for 90% of the rise in the average costs of electricity generation worldwide, natural gas alone for more than 50%. The costs of renewables and carbon dioxide have played only a marginal role, underscoring that this is a crisis where energy transitions are the solution, rather than the problem.
- Price and economic pressures mean that the number of people without access to modern energy is rising for the first time in a decade. Around 75 million people who recently gained access to electricity are likely to lose the ability to pay for it, and 100 million people may revert to the use of traditional biomass for cooking.
- There remain huge uncertainties over how this energy crisis will evolve and for how long fossil fuel prices will remain elevated, and the risks of further energy disruption and geopolitical fragmentation are high. In all our scenarios, price pressures and a dim near-term outlook for the global economy feed through into lower energy demand than in last year's *Outlook*.
- With the loss of its largest export market in Europe, Russia faces the prospect of a much-diminished role in international energy affairs. 2021 proves to be a high-water mark for Russian export flows. Its share of internationally traded gas, which stood at 30% in 2021, falls to 15% by 2030 in the STEPS and to 10% in the APS. Importers in China have been actively contracting for liquefied natural gas, and there is no room in China's projected gas balance for another large-scale pipeline from Russia.

**Figure Two** shows a rise in energy prices through the late fall of 2022 that illustrates Russia's ability to conduct economic warfare and the risks it may impose for the future. However, it is impossible to predict the future shifts in Russian and competing energy exports in the longer term – not only because of the uncertain outcome of the war, but because of the uncertain global response to dealing with climate change and the actual progress of given countries in dealing with economic development and the need for added energy supplies.

**Figure Three** provides a projection of future global exports by the International Energy Agency made in October 2022 that provides one view of how these shifts may develop. It shows a major drop in Russian exports to the EU, but that Russia will make major increases in its exports to the developing countries of Asia.

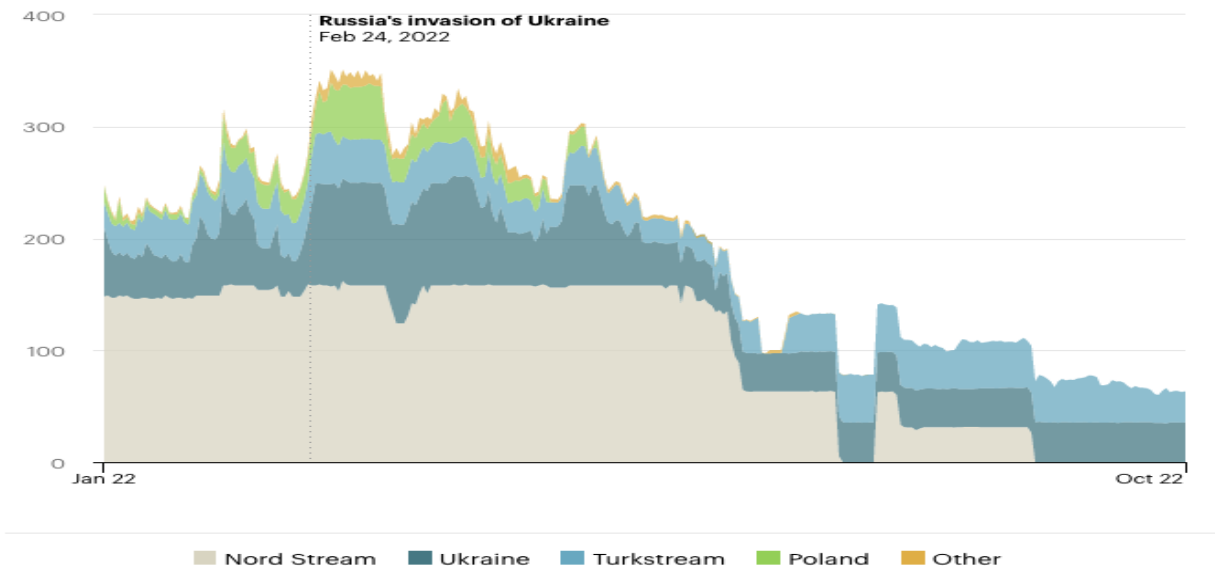
Other analysts feel that the energy crisis may help speed reductions in the global use of fossil fuel as well. However, the IEA stressed in its October 2022 estimates that reaching zero emissions by 2050 would require clean energy investments higher than \$4 trillion by 2030. It also estimated that currently planned investments would only reach half of that figure.

There also is no way to predict the future extent to which Russia and OPEC states will cooperate, nor whether Russia may make a major effort to shift its energy exports from pipelines to northern Europe to pipelines to China and Turkey. Such shifts in Russian exports to China would take time to make and major new pipelines to China would be highly expensive, require gas exports to be liquified, and tie Russia to a single customer, and present potential issues in dealing with climate change with China.

At the same time, estimates of future Chinese oil and gas demand by the International Energy Agency (IEA) indicate that if Russia did shift its export capabilities to provide far larger exports to China, China would become a major Russian customer well beyond 2030. If so, China's ability to obtain energy imports that did not pass through the Indian Ocean, Straits, and South China Sea could greatly reduce one of its key vulnerabilities.<sup>2</sup>

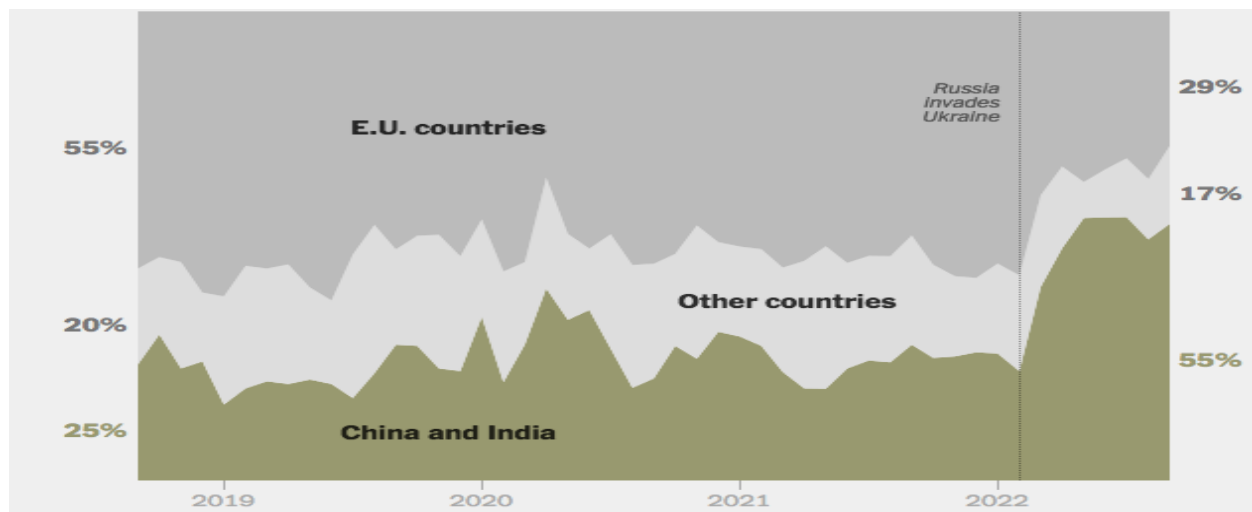
## Figure Two: The Impact of Russian Actions on Gas Supplies and World Energy Princes - Part One

War Induced Reductions in Pipeline Flow of Natural Gas to EU and Turkey Since January 2022 (MCM/Day)



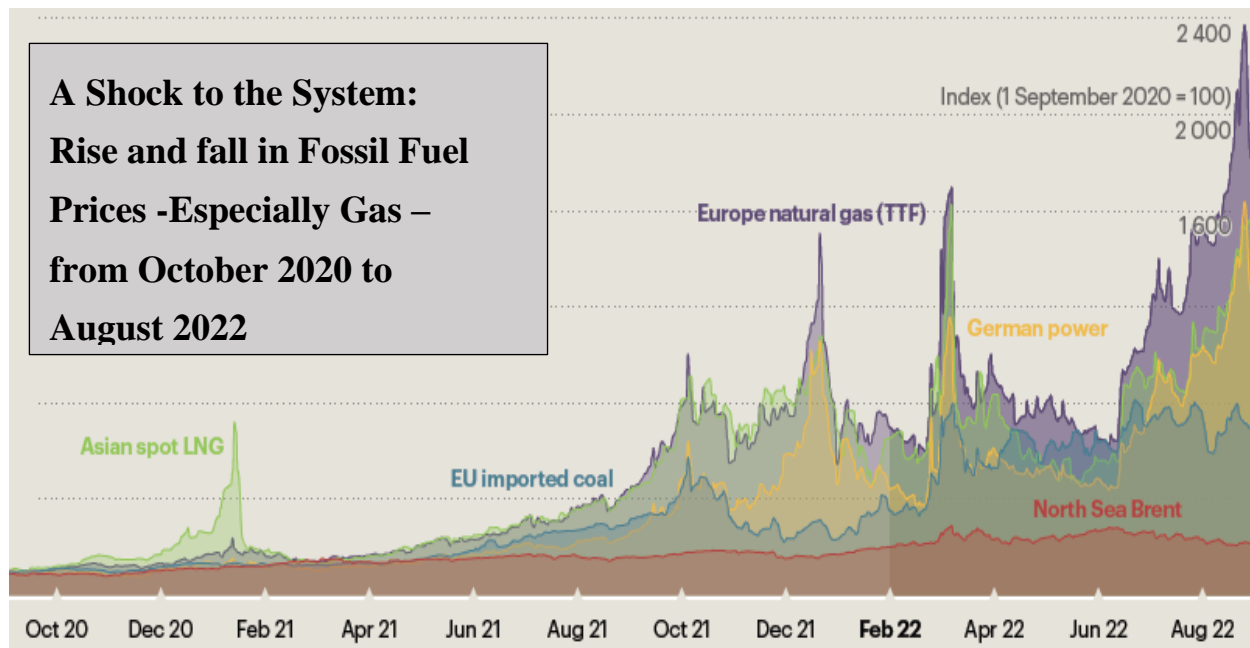
Source: IEA, *World Energy Outlook 2022*, October 2022, p. 92 <https://www.iea.org/reports/world-energy-outlook-2022/the-global-energy-crisis#abstract>

## Shifts in the Flow of Russian Oil Shipments Caused by The Ukraine War



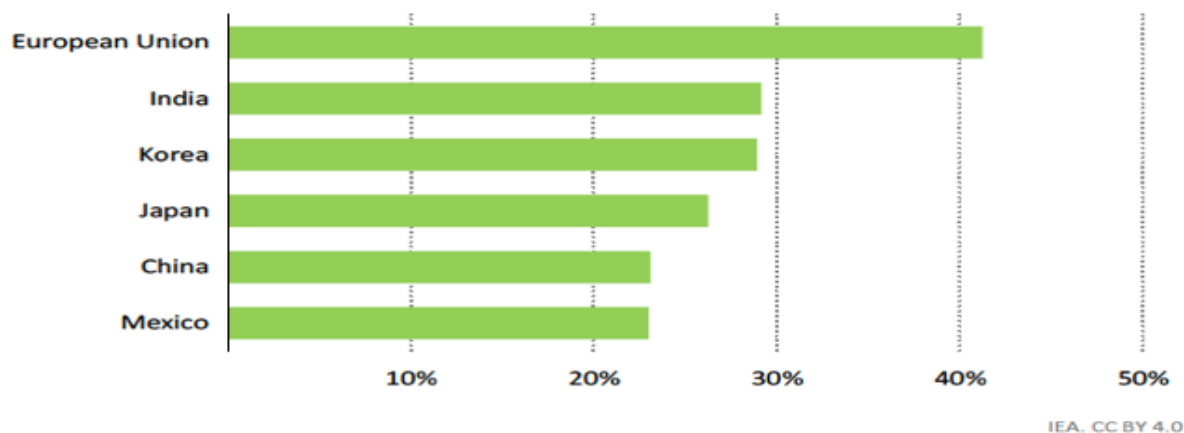
Source: Adapted from Lazaro Gamio and AnaSwanson, "How Russia Pays for War," New York Times, October 30, 2022, [https://www.nytimes.com/interactive/2022/10/30/business/economy/russia-trade-ukraine-war.html?name=styleIn-russia&region=TOP\\_BANNER&block=storyline\\_menu\\_recirc&action=click&pgtype=LegacyCollection&variant=show&is\\_new=false&smid=nytcore-ios-share&referringSource=articleShare](https://www.nytimes.com/interactive/2022/10/30/business/economy/russia-trade-ukraine-war.html?name=styleIn-russia&region=TOP_BANNER&block=storyline_menu_recirc&action=click&pgtype=LegacyCollection&variant=show&is_new=false&smid=nytcore-ios-share&referringSource=articleShare).

**Figure Two: The Impact of Russian Actions on Energy Exports and World Energy Prices – Part Two**



Source: IEA, *World Energy Outlook 2022*, <https://www.iea.org/reports/world-energy-outlook-2022/the-global-energy-crisis#abstract>

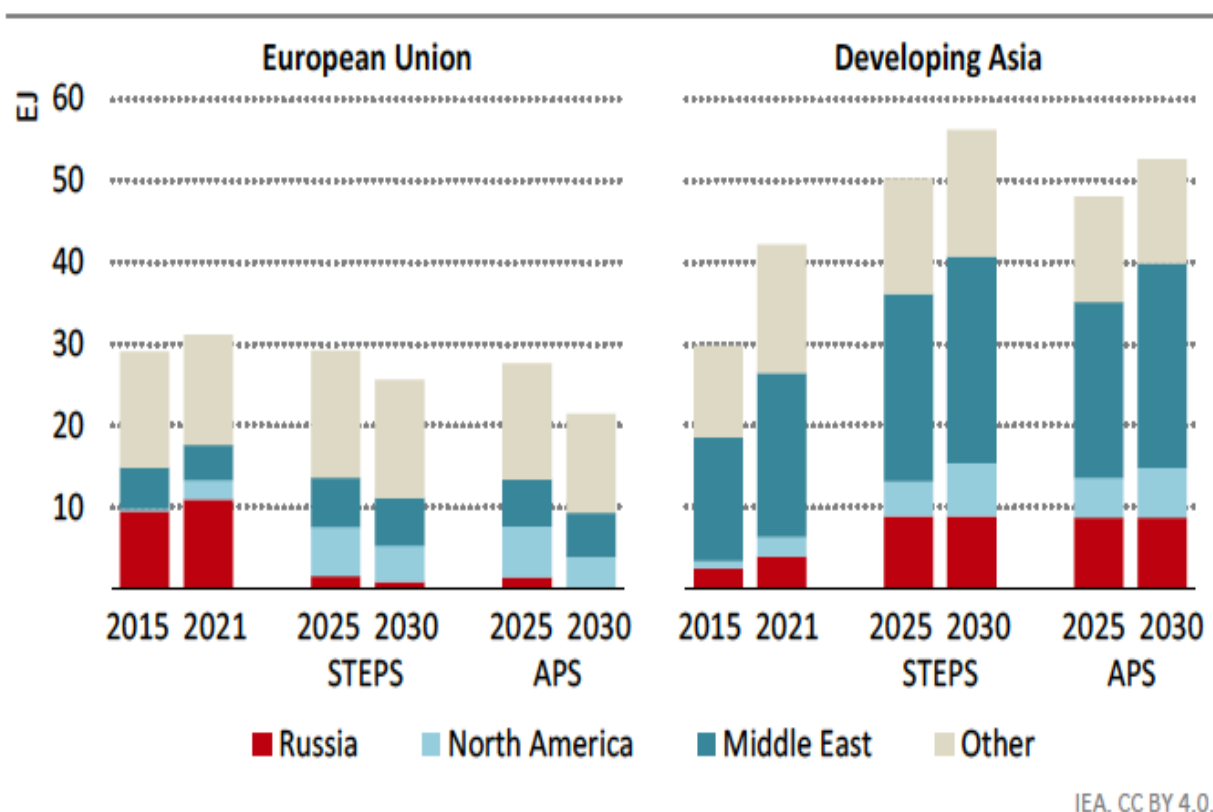
**Increases in Peak Average Electric Power Costs Largely Cause by Economic Warfare in the Ukraine**



*Increases in power generation costs were driven by higher fuel prices and have been particularly sharp in gas-importing countries and regions*

Source: Adapted from Lazaro Gamio and AnaSwanson, "How Russia Pays for War," New York Times, October 30, 2022, [https://www.nytimes.com/interactive/2022/10/30/business/economy/russia-trade-ukraine-war.html?name=stylIn-russia-ukraine&region=TOP\\_BANNER&block=storyline\\_menu\\_recirc&action=click&pgtype=LegacyCollection&variant=show&is\\_new=false&smid=nytcore-ios-share&referringSource=articleShare](https://www.nytimes.com/interactive/2022/10/30/business/economy/russia-trade-ukraine-war.html?name=stylIn-russia-ukraine&region=TOP_BANNER&block=storyline_menu_recirc&action=click&pgtype=LegacyCollection&variant=show&is_new=false&smid=nytcore-ios-share&referringSource=articleShare).

**Figure Three: Potential Decline in Russian Oil and Gas Exports to Europe 2015-2030**



*Russia's oil and gas exports switch focus to developing Asia in the STEPS and APS, but gains in these new markets are less than losses in exports to Europe*

Note: EJ = exajoule.

Over time, more Russian resources are likely to be drawn eastwards to Asian markets. In the case of oil, increased Russian flows to Asia are already visible. For natural gas, the reorientation of flows will require more time to take shape because of the need for major new infrastructure investments if exports are to expand beyond the 38 bcm/year foreseen for the Power of Siberia pipeline. These will require new agreements with partners, some of which have found their confidence in natural gas – and in Russia – shaken by recent events. For the moment, with no links to alternative markets, much of the natural gas that was intended to flow westwards to Europe has no place to go. As a result, Russia's share of internationally traded gas, which stood at 30% in 2021, falls to 15% by 2030 in the STEPS and to 10% in the APS. Its projected net income from gas sales (revenue minus costs) falls from USD 75 billion in 2021 to less than USD 30 billion in 2030 in the APS.

Source: IEA, *World Energy Outlook 2022*, October 2022, pp. 54, 56, <https://www.iea.org/reports/world-energy-outlook-2022/the-global-energy-crisis#abstract>



### ***Other Forms of Political and Economic Combat***

The struggle between Russia and the West also needs to be kept in a global perspective. Other “winter wars” are being fought at the regional and local levels on a political, economic, and ideological level. Many along sectarian and ethnic lines. In addition, many countries carry out an indirect form of warfare by using their economic strength to build-up national military forces in ways that give them enough strategic leverage to force the opposing side to meet its opponents’ strategic goals without direct fighting between them.

Many local and regional arms races are cases in point. Most such regional and local efforts reflect efforts change the political and economic behavior of other states rather than conquer them, or to keep them from intimidating or forcing given patterns of action on other states. The side with the largest, or most effective forces, can pressure the weaker side.

Outside players can also have a major impact. Economic and financial aid is often used to strengthen a given strategic partner or third country. Outside players can also use political and economic support, arms transfers and security assistance, and the potential threat posed by their own military forces – sometimes to alter the balance without actual fighting and sometimes to avoid having to fight themselves.

For example, proxy wars can be fought in ways that involve indirect combat. Examples are proxy wars like the West’s military aid to the Ukraine, and Russia’s use of mercenaries in Libya and “advisors” in Syria. In other cases, an outside power can use spoiler operations that push other parties into fighting, carry out deployments and exercises that act as military threats, or use national military forces passively to exert political leverage and influence.

While deterrence is often associated with preventing fighting or the escalation, it has always been a form of combat as well and a way of exerting political and military leverage. Deterrence can be defensive, but it can equally be structured in ways that put acute pressure on other states to alter or limit their behavior. In practice, military deterrence is simply another a form of warfare: it exploits the competitive use of military forces to achieve a strategic objective without fighting.

## The “Winter War” in Conventional Force Modernization and Build-Ups by the U.S., NATO and Russia

It is a matter of semantics as to whether an arms race should be described as political or as military warfare, and the answer is probably both. The same is true of arms control, which generally is as much a battle for political influence, and the ability to use military forces as political leverage, as it is a move towards peace and stability.

In any case, the War in Ukraine has shown Russia and the world that Russian conventional military forces have serious weaknesses, has helped lead to a new and more proactive NATO strategy, and led key Western nations like Germany and Britain to call for major increases in military spending. It has also led the United States to put more emphasis on NATO at a time it sees China as its primary threat, and adopt a strategy that calls for major new efforts in military reform and modernization.

The U.S. made this clear in the new *National Security Strategy* that it issued in October 2022:<sup>3</sup>

Alongside our allies and partners, America is helping to make Russia’s war on Ukraine a strategic failure. Across Europe, NATO and the European Union are united in standing up to Russia and defending shared values. We are constraining Russia’s strategic economic sectors, including defense and aerospace, and we will continue to counter Russia’s attempts to weaken and destabilize sovereign nations and undermine multilateral institutions. Together with our NATO Allies, we are strengthening our defense and deterrence, particularly on the eastern flank of the Alliance. Welcoming Finland and Sweden to NATO will further improve our security and capabilities. And we are renewing our focus on bolstering our collective resilience against shared threats from Russia, including asymmetric threats. More broadly, Putin’s war has profoundly diminished Russia’s status vis-a-vis China and other Asian powers such as India and Japan. Moscow’s soft power and diplomatic influence have waned, while its efforts to weaponize energy have backfired. The historic global response to Russia’s war against Ukraine sends a resounding message that countries cannot enjoy the benefits of global integration while trampling on the core tenets of the UN Charter.

While some aspects of our approach will depend on the trajectory of the war in the Ukraine, a number of elements are already clear. First, the United States will continue to support Ukraine in its fight for its freedom, we will help Ukraine recover economically, and we will encourage its regional integration with the European Union. Second, the United States will defend every inch of NATO territory and will continue to build and deepen a coalition with allies and partners to prevent Russia from causing further harm to European security, democracy, and institutions. Third, the United States will deter and, as necessary, respond to Russian actions that threaten core U.S. interests, including Russian attacks on our infrastructure and our democracy. Fourth, Russia’s conventional military will have been weakened, which will likely increase Moscow’s reliance on nuclear weapons in its military planning. The United States will not allow Russia, or any power, to achieve its objectives through using, or threatening to use, nuclear weapons. America retains an interest in preserving strategic stability and developing a more expansive, transparent, and verifiable arms control infrastructure to succeed New START and in rebuilding European security arrangements which, due to Russia’s actions, have fallen in to disrepair. Finally, the United States will sustain and develop pragmatic modes of interaction to handle issues on which dealing with Russia can be mutually beneficial.

The new *National Security Strategy* also made it clear that the U.S was returning to a broader emphasis on supporting European security:

Europe has been, and will continue to be, our foundational partner in addressing the full range of global challenges. To effectively pursue a common global agenda, we are broadening and deepening the transatlantic bond—strengthening NATO, raising the level of ambition in the U.S.-EU relationship, and standing with our European allies and partners in defense of the rules-based system that underpins our security, prosperity, and values.

Today, Europe stands at the front lines of the fight to defend the principles of freedom, sovereignty, and non-aggression, and we will continue to work in lockstep to ensure that freedom prevails. America remains

unequivocally committed to collective defense as enshrined in NATO's Article 5 and will work alongside our NATO Allies to deter, defend against, and build resilience to aggression and coercion in all its forms. As we step up our own sizable contributions to NATO capabilities and readiness—including by strengthening defensive forces and capabilities, and upholding our long-standing commitment to extended deterrence—we will count on our Allies to continue assuming greater responsibility by increasing their spending, capabilities, and contributions. European defense investments, through or complementary to NATO, will be critical to ensuring our shared security at this time of intensifying competition. We stand behind NATO's continued adaptation to modern security challenges, including its emphasis on defense in cyberspace, climate security, and the growing security risks presented by the PRC's policies and actions.

And, the new U.S. strategy document described support of the Ukraine in terms close to describing U.S. aid to NATO aid as the equivalent of proxy warfare:

Europe has been, and will continue to be, our foundational partner in addressing the full range of global challenges. To effectively pursue a common global agenda, we are broadening and deepening the transatlantic bond—strengthening NATO, raising the level of ambition in the U.S.-EU relationship, and standing with our European allies and partners in defense of the rules-based system that underpins our security, prosperity, and values. Today, Europe stands at the front lines of the fight to defend the principles of freedom, sovereignty, and non-aggression, and we will continue to work in lockstep to ensure that freedom prevails. America remains unequivocally committed to collective defense as enshrined in NATO's Article 5 and will work alongside our NATO Allies to deter, defend against, and build resilience to aggression and coercion in all its forms.

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### ***Putting the Conventional Military Balance in Perspective***

As yet, there are no clear Russian plans to correct the weaknesses the war in the Ukraine has revealed in its forces. It is clear, however, that Russia must be making such plans, and will take a much more competitive stance to shaping forces that can influence, deter, and – if necessary – fight NATO and Western supported countries. Putin's speeches during 2022 made this clear, and Russia would have had to make major efforts to restructure and modernize force in any case to keep up with the many new advances in weaponry and military technology.

It is also clear that the U.S., Canada, and NATO European states must make similar changes. They not only must compete with Russia, but also most must compensate for years of decline in the size of their forces, rates of modernization, and any real world effort to improve interoperability either within their forces or by providing new forces and capabilities to match the changes in the most advanced national forces.

The Russian invasion of the Ukraine has shown all too clearly that most NATO countries have underestimated the Russian threat and have taken excessive “peace dividends” in terms of cuts in their defense efforts since 1992. Most former Warsaw Pact states that are now in NATO, and on or near the borders of Russia have failed to properly convert and modernize their forces to fight as part of NATO.

Moreover, most NATO countries failed to take effective steps to correct this situation after Russia seized the Crimean Peninsula in 2014. They never met NATO's goal of spending 2% of their GDP on military forces, and those that did found that this goal was too low to properly modernize, and

maintain, readiness and force size. Seen with the hindsight provided by Russia's invasion of the Ukraine, NATO countries generally came closer to "farce" planning than force planning. So far, neither NATO nor any NATO country have made their plans to deal with this situation clearly. They do not publish meaningful force plans, net assessments, or projected budgets.

As a result, there is no current way to know how well either Russia or NATO countries will engage in the "war" to modernize their forces and make them more effective. The broad structure of U.S., European NATO, and Russian conventional military balance is shown in **Figure Four**, along with the forces of China which is the core of another "winter war" discussed later in this analysis. The U.S. clearly has major advantage over Russia in its strategic partners, although Russia is attempting to increase its influence and military role in Belarus and Moldova.<sup>4</sup>

These broad force comparisons also help put the broader military dimension of the "winter wars" in perspective, but they also have serious limits. In many ways, traditional force comparisons are the equivalent of the kind of military analysis that focus only on infantry and cavalry before World War I, or that ignored the new role of armor, air power, and changes in the role of sea power before World War II. Put generously, traditional military strength analysis probably only addresses about 20% of modern military capability, and much of the "war" in the restructuring of Russian and NATO conventional forces triggered by the ongoing war in Ukraine will parallel the changes triggered by shifts in nuclear forces, dual capable forces, and precision conventional strike capabilities discussed later in this analysis. They will play out over the coming decades as a revolution in military forces that no one can currently predict and fully characterize.

Traditional comparisons of personnel and major weapons strength do not, however, approach a meaningful net assessment. It does not cover the full range of competition for economic power, dominance in technology, and relative the capability to fund future military competition between the United State and its strategic partners, Russia and China. This analysis is far too long to include in this analysis, but it is summarized in a different study entitled *Major Powers and Strategic Partners: A Graphic Net Assessment*.<sup>5</sup>

**Figure Four** only compares key elements of force size based on active personnel and major weapons platforms. This means that it does not compare training, other elements of readiness, sustainment and warfighting reserves, military industrial and technology bases, deployments and power projection capabilities, and interoperability. It also does not show comparative modernization and the massive shifts taking place in the role of battle management and secure communications, space, cyber, smart and long-range munitions, artificial intelligence, joint all domain capabilities, and all the other emerging and disruptive technologies that are reshaping military forces on a global basis.

**Figure Four: The Military Balance in 2021- Part One**

<b>Category</b>	<b>United States</b>	<b>NATO Europe</b>	<b>Russia</b>	<b>China</b>
Military Budget (\$U.S. billions)	768	324	45.8	207
Military Expenditures (\$U.S. billions)	811	331	62.2	270
Total Active Personnel	1,395,350	1,584,205	900,000	2,035,000
Reserve Military Personnel	843,450	1,230,850+	2,000,000	510,000
<b>Nuclear Strategic Forces</b>				
ICBM	400	-	339	116
IRBM	NA	-	?	110+
Nuclear Bombers	66	-	76	-
Satellites	142	40	131	161
<b>Army Forces</b>				
Total Active Ground Personnel	489,050	1,030,985	280,000	965,000
Main Battle Tanks	2,645	6,446	3,257	5,400
Other Armored Fighting Vehicles (OAFVs)	3,419	6,285	6,440	7,350
Armored Personnel Carriers	10,814	14,992	6,450	4,350
Total Major Artillery (Towed, SP, MRL)	2,616	6,452	3,174	7,034
Self-Propelled Artillery	689	2,925	1,968	2,910
Towed Artillery	2,151	2,642	150	1,234
Multiple Rocket Launchers	410	885	1,056	1,640+
Surface-to-Surface Missiles	NA	NA	162	NA
Total Attack Helicopters <sup>1</sup>	871	433	411	308
<b>Naval Forces</b>				
Navy Active Personnel	349,600	240,780	150,000	260,000
SSBNs	14	8	11	6
Other SSNs/SSGNs	53	10	18	6
Conventional Attack Submarines	-	46	20	46
Total Principal Surface Combatants	124	147	32	86
Carriers	11	5	1	2
Cruisers	24	36	4	3
Destroyers and Frigates	89	106	27	81
Mine Warfare	8	159	42	57
Principal Amphibious	38	13	9	-
Patrol and Coastal Combatants	86	266	129	196
<b>Naval Aviation</b>				
Combat Capable Aircraft	954	93	219	446
ASW and Mine Warfare Helicopters	557	243	60	50

<sup>1</sup>Includes air force holdings

**Figure Four: The Military Balance in 2021- Part Two**

Category	United States	NATO Europe	Russia	China
<b>Marine Forces</b>				
Active Marine Personnel	179,250	23,750	35,000	35,000
Tanks	0	0	330	0
AFV and APC	1,949	303	1,660	280+
Major Artillery	859	69	405	40+
Combat Capable Aircraft	366	-	-	-
Attack Helicopters	131	-	-	-
<b>Air Forces</b>				
Active Air Force Personnel	329,400	312,440	165,000	395,000
Total Combatant Aircraft	2,354	1,277	722	1,277
Early 4th Generation Fighter Aircraft	122	362	228	74
4th Generation Fighter Aircraft	791	97	367	744
4+ Generation Fighter Aircraft	829	744	126	97
5th Generation Fighter Aircraft	612	74	1	362
Bomber	123	-	176	137
Fighter Ground Attack	1,055	1,157	427+	972+
Fighter	261	690	185	517
Attack	135	156	264	140
Electronic Warfare, IS&R, ELINT	24	46	92	73
AEW and C2	35	17	17	24
Tanker/Tanker Transport	238	44	15	16
Transport Airlift	333	618	448	247+
Long Range SAM/Missile Defense Launchers	522	56+	608+	454+

Note: Data reflect the military balance before the beginning of the Ukraine War. They do not include the forces of

- Canada (defense expenditures of \$26.9 billion, 66,500 active military personnel, 82 main battle tanks, 163 major artillery weapons, 4 submarines and 12 principal surface combatants, and 111 combat capable aircraft,)
- Finland (defense expenditures of \$5.5 billion, 19,250 active personnel, 100 tanks, major artillery, no principal surface combatants, and 107 combat aircraft),
- Sweden (defense expenditures of \$76.5 billion, 14,600 active personnel, 120 tanks, 35 major artillery, 5 submarines and 5 principal surface combatants, and 96 combat aircraft.), and
- Ukraine before the Russian invasion (active personnel 196,000, 858 tanks, 1,476 major artillery, 1 principal surface combatant, and 124 combat aircraft,)

Source: Adapted from IISS, *Military Balance 2022* with some minor adjustments using U.S. military data. Figures for all countries do not include reserve personnel by service, Coast Guard, coastal defense, and paramilitary forces; and 175,000 active personnel in Chinese strategic support forces.

### ***Economic Power, Military Spending, and the Conventional Arms Race: Russia versus the West***

The future balance of overall military capability will be driven by the very real financial limits on what both Russia and the West can spend on improving and modernizing their conventional military forces, and the current economic war between Russia and the West will have a major impact on their near-term spending. The improvements in military capability that both sides must make involved very costly improvements in military forces that may well involve the need to spend higher percentages of total national GDPs on military forces over the period of a decade or more. This will inevitably increase the competition over military spending versus spending on civilian programs and needs.

This spending involves major challenges for the West as well as Russia, and the cost of military and economic support for Ukraine to Western states and their strategic partners has already been far higher than their political leaders anticipated in shaping their initial military aid plans. The rises in prices for energy and other imports mentioned earlier have also raised inflation to critical levels, and there already have been political calls for less aid to Ukraine and broader political indications that NATO countries are cutting back on their plans to modernize and improve their forces.

More broadly, NATO countries will enter the winter of 2022-2023 with major civil economic problems, and new popular demands for government spending that seem likely to limit member country military spending. NATO will also begin the broader Ukrainian War arms race having taken larger peace dividends over the last two decades, and with 30 (32?) member countries that have radically different force structures, poor overall interoperability, and radically different trends in real world force modernization.

At the same time, during the first few months of the war in the Ukraine, the military and economic cost of the War in the Ukraine reached levels which the Russian leadership almost certainly grossly underestimated in launching the conflict, and an examination of Russia's GDP and military spending figures indicate that Russia is anything but a superpower in economic strength and military spending military.

Once again, the full range of trends involved affecting relate economic power is too complex to cover in depth in this analysis, and has been provided in a separate report called *Major Powers and Strategic Partners: A Graphic Net Assessment*.<sup>6</sup> One metric alone, however, shows how serious the economic challenges Russia faces now are. The World Bank estimates that Russia had a GDP of only \$1.776 billion in 2021.

A GDP this small scarcely makes Russia an economic superpower, and Russia's only current equivalent of a strategic partner is Belarus, which had a GDP of only \$0.682 billion.<sup>7</sup> In contrast, the World Bank estimates that the U.S. had a GDP of \$22.966 trillion in current dollars in 2021. The rest of the Western alliance had massive additional resources. The EU estimated it had a GDP of \$17.089 trillion, and NATO estimated that NATO Europe and Canada had a GDP of some \$22.687 billion. Democracies do have to respond to popular civil demands by paying far more of their government income to meet civil needs than authoritarian states like Russia, but NATO's total estimated GDP in 2021 was \$45,653 trillion, some 26 times the Russia GDP of \$1.776 trillion.<sup>8</sup>

These comparisons of total economic strength are critical because it seems likely that the war in the Ukraine has triggered the beginning of a lasting military confrontation between Russia and

NATO, and a race to modernize and improve military forces, that will last at least as long as Putin is in power. They also provide a further illustration of why the U.S. and Western effort to support Ukraine is so important, and so cost-effective.

Unfortunately, there are no equally reliable ways to compare the publicly reported military spending of open Western governments with the reporting on military spending by command economies like Russia or China – which often conceal key aspects of national security spending – with the relatively open and reliable reporting of Western states.

If one looks at some of the best and most directly comparable estimates of military spending, however, NATO reports that the U.S. spent \$793.99 billion on military forces in 2021, and the U.S. Congress reports that it authorized \$858 billion in FY 2023. NATO reports that NATO Europe spent \$361.29 billion for a NATO total of some \$1,096.6 billion. In contrast, the International Institute for Strategic Studies estimates that Russia spent only \$62.2 billion by the NATO definition of defense spending. This is only 5.7% of the reported total for NATO, which is 17 times the Russian figure.<sup>9</sup>

Some experts question whether the current estimates of Russian military spending are too low. Russia has the potential military advantage of unity and a totalitarian leadership that can exert direct control over a command economy and do so with far less need to respond to popular civil needs. Although Russia also has suffered major losses in the fighting in the Ukraine, and has used up many of its reserves of weapons, munitions, and parts.

More broadly, the unclassified data on the Russia military industrial base, and many key elements of its national and military technology base, are very limited. It is also important to remember that Cold War estimates of the military expenditures of the Soviet Union were later shown to be gross underestimates of the actual spending after the West better access following the Soviet Union's collapse. The same was true of some estimates of the Soviet Union's military research and development activities, and the size and efficiency of its military industries – many of which proved to be far larger and at the same time less efficient – than experts estimated during the Cold War.

However, Russia has a far smaller economy in comparative terms than the Former Soviet Union and no longer has a Warsaw Pact and control over most of Eastern Europe. It is hard to believe that it can compete with the U.S. and its partners over time even if its actual military spending is far higher than the official figure.

This is, however, an area where a major net assessment effort is needed, and one that requires the support of intelligence experts. Far more data are available on the U.S. and Western military industrial base, and on many key elements of its national and military technology base, than on Russia. There also are many gaps in coverage, particularly on actual programs, ongoing active activities, and any credible measures of effectiveness. It is also clear from the history of many national efforts that quantity is not a measure of quality.

### ***Economic Power, Military Spending, and the Conventional Arms Race: China as the Emerging Superpower***

Russia, however, is only one of the major powers the U.S. and its strategic partners now confront. The key question is how well the U.S. and these partners can compete with both Russia and China, and here it is critical to note that the U.S. sees China as the more serious threat. While the challenge



from China is described in detail later in this analysis, a comparison with Russia helps illustrate Russia's limitations.

The World Bank estimated that China had a GDP of \$17,734 billion in current dollars in 2021. The IISS indicates that China's official military spending figure was \$207 billion, and was \$270 billion by NATO's definition. The \$270 billion figure indicates that China was spending 4.5 times as much on military forces as Russia.

These data show the World Bank estimated that China's GDP was almost ten times larger than Russia's. However, once again the U.S. ability to work with key partners has a major impact on the total military and financial resources that are available to each side. Japan, a key Asian strategic partner of the U.S. had a GDP of \$4,937 billion. South Korea had a GDP \$1,799 billion.

## The “Winter War” in Precision Strike Capabilities, Air/Missile Defense, and Emerging/Disruptive Technologies

The emergence of China as a potential peer economic competitor to the United States also helps explain why the U.S. national security strategy issued in October 2022 singled out China as the primary threat to the U.S., and several key U.S. security partners in NATO – notably Britain and France – have recently focused on the Chinese threat as well. Funding a “race” to modernize NATO will be limited by the fact that the U.S. and some of strategic partners must focus on China and other threats as well as Russia.

This makes it even more important to put the impact of the current “winter wars,” and the future arms races between the major powers, in a broader context. Advances in military technology will have their own influence and all of the world’s major powers will have to compete in making major expenditures on new military technology, weapons, and new forms of warfare.

### *Emerging and Disruptive Technologies*

There is no clear way to sort out which of the many emerging and disruptive technology that affect civil society and global economics, as well as every aspect of military and strategic competition, will have the most influence over the next decade. It is easy to focus on a given area, or technological “buzz word.” Space, joint all-domain warfare, command and control, artificial intelligence, quantum computing, and cyber warfare are just a few of the cases in point.

It is clear, however, that any current list of near-term developments and priorities may not survive for even half a decade. The White House and Department of Defense published three different lists of such technologies in 2021-2022, and NATO has published much longer lists which both differs from the U.S. list and present a much longer list of ongoing changes.

This is further illustrated by the U.S. government and NATO lists of such technologies in **Figure Five, Figure Six, and Figure Seven**, although the NATO list is drawn from a full report that provide one of the best and easiest to understand reports ever done on military technology. Each in these lists area will have a major impact on both civil and military development, and the course of all the “winter wars” described in this analysis but each category also involves a wide range of ongoing changes and innovations – sometimes hundreds within a given category – whose military impact will interact with other technologies and where the patterns of future investment and success are unclear.

The complexity of these lists is a bit daunting, but they collectively make a critical point. There is no expert consensus on which category will dominate the pace of change or how tactics, training, readiness, sustainability and pace of multi-stage improvement programs will have to change even five years into the future. Collectively they impact the following major areas of modernization, tactics, strategy, and every area of military dynamics:

- The 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 missiles, cruise 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 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).

At the same time, these changes in technology and military dynamics will reduce the value of existing systems or force ongoing changes and modifications in many areas of weaponry, command and control, and tactics. The War in Ukraine has, for example, raised significant questions about the value of current armored weapons. Seemingly minor developments like Iran’s development and sale of drones have also had an impact in that war, and its ongoing development of “smart” naval mines with low detectability may well alter the pattern of combat in the Gulf.

### **Figure Five: U.S. National Science and Technology Council List of Critical and Emerging Technologies: 2/2022**

The following critical and emerging technology areas are of particular importance to the national security of the United States:

- Advanced Computing
- Advanced Engineering Materials
- Advanced Gas Turbine Engine Technologies
- Advanced Manufacturing
- Advanced and Networked Sensing and Signature Management
- Advanced Nuclear Energy Technologies
- Artificial Intelligence
- Autonomous Systems and Robotics
- Biotechnologies
- Communication and Networking Technologies
- Directed Energy
- Financial Technologies
- Human-Machine Interfaces
- Hypersonics
- Networked Sensors and Sensing
- Quantum Information Technologies
- Renewable Energy Generation and Storage
- Semiconductors and Microelectronics
- Space Technologies and Systems

Source: National Science and Technology Council, Critical and Emerging Technologies, Office of the President of the United States, February 2022, <https://www.whitehouse.gov/wp-content/uploads/2022/02/02-2022-Critical-and-Emerging-Technologies-List-Update.pdf>.

## **Figure Six: U.S. Under Secretary of Defense for Research and Engineering: Critical Technology Priorities: 2022- Part One**

The OUSD(R&E) works closely with the Military Services, Combatant Commands ,There are 14 critical technology areas vital to maintaining the United States' national security grouped into three categories. While many technologies may cross between these categories, these groupings represent the broad and different approaches that are required to advance technologies crucial to the Department. By focusing efforts and investments into these 14 critical technology areas, the Department will accelerate transitioning key capabilities to the Military Services and Combatant Commands. As the Department's technology strategy evolves and technologies change, the Department will update its critical technology priorities.

### **1. Seed Areas of Emerging Opportunity**

**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** 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)** 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** 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** 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.

**Microelectronics** are circuits and components that serve as the "brain" to human-made electronic functional systems.

## Figure Six: U.S. Under Secretary of Defense for Research and Engineering: Critical Technology Priorities: 2022 - Part Two

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 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** 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 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 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

**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.

**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.

**Figure Seven: NATO, Science & Technology Trends 2020-2040:  
Exploring the S&T Edge – Priorities -Part One**

Domain	NATO S&T Priority Areas	Targets of Emphasis	
HUMAN	Advanced Human Performance & Health	Medical Solutions for Health Optimisation Human Resiliency Enhanced Cognitive Performance Human & Machine Interfaces	
	Cultural, Social & Organisational Behaviours	Social Influence Political Influence Cultural Communications Group & Organisational Behaviour	
INFORMATION	Data Collection and Processing	EM Sensors Non-EM Sensors Sensor Integration & Networks Advanced Signal Processing	
	Information Analysis & Decision Support	Big Data & Long Data Processing and Analysis Big Data & Human Decision Making Multi-Domain Situational Awareness Planning and Managing Uncertainties	
	Advanced Systems Concepts	Integrated Human - Machine Hybrid Force Clusters & Swarms Modular, Scalable Systems High Assurance Engineering & Validation	
	Autonomy	Artificial Intelligence Mission Autonomous Systems Human-Autonomous Machine Teaming	
	Communications & Networks	Secure and Resilient Communications Trusted Multi-Domain Information Sharing Ad hoc and Heterogeneous Networks	
	PHYSICAL	Precision Engagement	Precision Control Weapons - Techniques and Systems Weapons - Effects
Platforms & Materials		Active & Passive EM, Acoustic & Optical Countermeasures Fast and Agile Platforms Unmanned Platforms Hypersonic Platforms Advanced and Adaptive Materials	
Power & Energy		In-Theatre Fabrication & Production of Equipment Power & Energy Storage Alternative & Renewable Energy Sources Propulsion Enhanced Energy Efficiency & Management	
EDT	Technology Focus Area (TFA)	NATO S&T Targets of Emphasis	TOE
Data	Advanced Analytics Communications	Big data & Long Data Processing and Analysis	IA&DS-2
		Ad hoc and Heterogeneous Networks	C&N-3
	Advanced Decision Making	Advanced Signal Processing	DC&P-4
		Trusted Multi-Domain Information Sharing	C&N-2
		Secure and Resilient Communications	C&N-1
		Human Decision Making	IA&DS-1
	Sensors	Multi-Domain Situational Awareness	IA&DS-3
		Planning and Managing Uncertainties	IA&DS-4
Artificial Intelligence	Advanced Algorithms	Sensor Integration & Networks	DC&P-3
		Artificial Intelligence	A-1
	Human-Machine Symbiosis	Big Data & Long Data Processing and Analysis	IA&DS-2
		Advanced Signal Processing	DC&P-4
		Human & machine interfaces	AHP&H-4
	Applied AI	Integrated Human – Machine Hybrid Forces	ASC-1
		Human-Autonomous Machine Teaming	A-3
		Multi-Domain Situational Awareness	IA&DS-3
		Planning and Managing Uncertainties	IA&DS-4
		Human Decision Making	IA&DS-1

Excerpted from Source: NATO Science & Technology Organization Trends 2020-2040, Exploring the S&T Edge, NATO, March 2020, pp. 166-117, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/2020/4/pdf/190422-ST\\_Tech\\_Trends\\_Report\\_2020-2040.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/2020/4/pdf/190422-ST_Tech_Trends_Report_2020-2040.pdf).

**Figure Seven: NATO, Science & Technology Trends 2020-2040:  
Exploring the S&T Edge – Priorities - Part Two**

EDT	Technology Focus Area (TFA)	NATO S&T Targets of Emphasis	TOE
Autonomy	Autonomous Systems	<b>Mission Autonomous Systems</b>	<b>A-2</b>
		<b>Unmanned Platforms</b>	<b>P&amp;M-2</b>
	Countermeasures	Active & Passive EM, Acoustic and Optical Countermeasures	PE-4
	Human-Machine Teaming	<b>Human &amp; machine Interfaces</b>	<b>AHP&amp;H-4</b>
		<b>Human-Autonomous Machine Teaming</b>	<b>A-3</b>
		<b>Integrated Human – Machine Hybrid Forces</b>	<b>ASC-1</b>
	Autonomous Behavior	<b>Clusters and Swarms</b>	<b>ASC-2</b>
		<b>Sensor Integration &amp; Networks</b>	<b>DC&amp;P-3</b>
		Secure & Resilient Communications	C&N-1
		<b>Rules of Engagement, Legal and Ethical Implications</b>	<b>PE-5</b>
Space	Operation	Clusters and Swarms	ASC-2
		<b>Precision Control</b>	<b>PE-1</b>
	Platforms	High Assurance Engineering and Validation	ASC-6
		Modular, Scalable Systems	ASC-3
		<b>Propulsion</b>	<b>P&amp;E-3</b>
		<b>Fast &amp; Agile Platforms</b>	<b>P&amp;M-1</b>
		Enhanced Energy Efficiency & Management	P&E-4
		Active & Passive EM, Acoustic and Optical Countermeasures	PE-4
		Weapons - Techniques and Systems	PE-2
	Sensors	EM Sensors	DC&P-1
Hypersonics		Non-EM Sensors	DC&P-2
		Sensor Integration & Networks	DC&P-3
	Countermeasures	Active & Passive EM, Acoustic and Optical Countermeasures	PE-4
		Weapons – Techniques and Systems	PE-2
		Weapons effects	PE-3
	Platforms and Propulsion	Fast and Agile Platforms	P&M-1
		<b>Hypersonic Platforms</b>	<b>P&amp;M-3</b>
		Enhanced Energy Efficiency & Management	P&E-4
		Propulsion	P&E-3
Quantum	Communication	<b>Secure and Resilient Communications</b>	<b>C&amp;N-1</b>
		Trusted Multi-Domain Information Sharing	C&N-2
	Information Science	<b>Big Data &amp; Long Data Processing and Analysis</b>	<b>IA&amp;DS-2</b>
	Precision Navigation	<b>Precision Control</b>	<b>PE-1</b>
	Sensors	<b>EM Sensors</b>	<b>DC&amp;P-1</b>
Biotechnologies		<b>Non-EM Sensors</b>	<b>DC&amp;P-2</b>
	Bioinformatics	Big data & Long Data Processing and Analysis	IA&DS-2
		<b>Human Resiliency</b>	<b>AHP&amp;H-1</b>
		Cultural Communications	CS&OB-3
		Group and Organisational Behaviour	CS&OB-4
		Medical Solutions for Health Optimisation	AHP&H-1
		Political Influence	CS&OB-2
		Social Influence	CS&B-1
		EM Sensors	DC&P-1
		<b>Non-EM Sensors</b>	<b>DC&amp;P-2</b>
	Synthetic Biology	<b>Human Resiliency</b>	<b>AHP&amp;H-1</b>
		<b>Medical Solutions for Health Optimisation</b>	<b>AHP&amp;H-2</b>
		Advanced and Adaptive Materials	P&M-4
	Human Augmentation	<b>Enhanced Cognitive Performance</b>	<b>AHP&amp;H-3</b>
		<b>Human &amp; Machine Interfaces</b>	<b>AHP&amp;H-4</b>
		Integrated Human – Machine Hybrid Forces	ASC-1
		Alternative and Renewable Energy Sources	P&E-2
	Medical Countermeasures	<b>Human Resiliency</b>	<b>AHP&amp;H-1</b>
		<b>Medical Solutions for Health Optimisation</b>	<b>AHP&amp;H-2</b>
Materials	Additive Manufacturing	<b>In-theatre Fabrication &amp; Production of Equipment</b>	<b>P&amp;M-3</b>
	Energy	Power and Energy Storage	P&E-2
		<b>Alternative and Renewable Energy Sources</b>	<b>P&amp;E-2</b>
	Novel Materials	<b>Advanced and Adaptive Materials</b>	<b>P&amp;M-4</b>
		<b>Hypersonic Platforms</b>	<b>P&amp;M-3</b>

Excerpted from Source: NATO Science & Technology Organization Trends 2020-2040, Exploring the S&T Edge, NATO, March 2020, pp. 166-117, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/2020/4/pdf/190422-ST\\_Tech\\_Trends\\_Report\\_2020-2040.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/2020/4/pdf/190422-ST_Tech_Trends_Report_2020-2040.pdf).



### ***Long-Range and Precision Strike Capability as a Case Example***

The advances in long-range and precision missile strike capability make a tangible case example. They are only one of the more tangible current examples of how technology and modernization are changing the character of “winter wars,” but a list of such examples does all to clearly how rapidly the nature of military competition is changing.

Recent examples of the impact of this case in actual combat include the missile strikes now being exchanged by Russia and the Ukraine – along with missile and drone strikes by Iran and Yemen on Saudi Arabia and the UAE and the drone war Azerbaijan launched on Armenia, have shown that new conventional weapons with precision strike capability, and advances in targeting and related forms of intelligence, can make a major difference in striking both military and civilian targets.

More broadly, precision strike capabilities range from short-range systems like anti-tank missiles and drones to long range missiles and launch platforms ranging from hand-held weapons to theater-wide strike capabilities. And, they are supported by major advances in targeting, command and control, secure communications.

The U.S., a number of European states, Russia, and China already have long-range precision conventional strike systems that can destroy critical infrastructure and high value targets, and all of the world’s major powers are working on the development of new longer-range ballistic, cruise, and other new approaches to strike technology. They are also making related advances in many forms of targeting, secure communications, command and control, joint all domain warfare capabilities, and artificial intelligence, and the deployment of steadily more to advanced 5<sup>th</sup> generation aircraft and multi-platform weaponry.

Almost inevitably, these advances in strike systems mean that developing and deploying layered missile and air defenses, with new sensors and advanced command and control systems will be a matching source of competition, and another form of “war.” As is discussed shortly, the advances in precision strike also creates the risk that many new systems may acquire dual capability and nuclear warheads.

Even the more advanced current air defense systems with dual capability in defending against missiles – like the Russian S-400 and the U.S. Patriot – have serious limits in defending against the more advanced forms of missile and drone attack, and there are good reasons why Ukraine has steadily increased its calls for more advanced air and missile defenses, why Russia will seek to speed up the development of its new strike and missile defense systems, and why the U.S. and NATO Europe are seriously considering major near term investment in effective theater defenses.

**Figure Eight** – which is drawn from the work of the CSIS Missile Defense Project – shows just how wide the range of missile developments have been in Russia, and just how wide the range of Russian land, air, navy-based missile coverage already is, and the extent of the potential nuclear and conventional threat to targets as far away as the United States.

Precision guidance, improved targeting technology, and better real-time command and control are also affecting tactical and short-range military operations. The War in the Ukraine has highlighted the vulnerability of existing armor, the need for more advanced artillery, the vulnerability of ships to missiles, and a host of other advances in secure communications, battle management, logistic support systems. They also interact with a wide range of new military technologies that affect the use of space, cyber warfare, artificial intelligence, and other emerging and “disruptive”

technologies that can do far more to integrate every aspect of military operations and forms of joint all-domain operations.

None of these advances are cheap, but major deployments of such systems have already begun, and they may amount to a near revolution in military force structures and operations over the coming decade.

Putin, for example, accused the U.S. and NATO of planning to create a “preemptive strike capability before the war in the Ukraine began – leaving it tacitly open as to whether the it would be conventional or nuclear. He has also talked about a U.S. Conventional Prompt Global Strike Capability that could attack targets anywhere in the world within an hour.<sup>10</sup> It is Russia, however, that has taken the lead in deploying hypersonic and other advanced missiles that greatly extend both its conventional and tactical nuclear strike capabilities and – as is addressed later in this analysis – states like China, Iran, and North Korea that have emphasize similar missile developments and deployments.

While such options may be something of a worst case, the fact that all of the major power and most of the larger regional powers are actively competing in deploying a mix of short-to-long range missiles, and host of other weapons and technologies, means the competition in the development and deployment of high technology military capabilities and systems will be a form of “warfare” where selecting the right mix of improvements could give one side a major advantage in terms of both deterrence and strategic leverage in peacetime, and where making the right investments selectively will be critical in shaping both deterrence and the nature of any actual warfighting.

The winter of 2022-2023 is not likely to produce major new developments in these areas except in the Ukraine conflict, but each round of Russian missile attacks deep into Ukraine, the Ukrainian long range attacks on Russian targets that began in December, and every expansion of the target base to cover more kinds of civilian targets does increases the perceived need to move more quickly to acquire such systems throughout the world, invest more in advanced military technology, and develop some coherent plans for deployment in all four areas.

Like many other aspects of the “winter wars,” this aspect of fighting in Ukraine has become a major catalyst in shaping global arms races and one where it seems less and less likely that the world will return to anything like the levels of pre-Ukraine War stability, peace dividends, and arms control.

**Figure Eight: How Much is Too Many: Current Russian Longer Range Precision-Guided Strike Systems**

Missile Name	Class	Range	Status
<a href="#">Kalibr (SS-N-30A)</a>	LACM	1,500 - 2,500 km	Operational
<a href="#">3M-54 Kalibr/Club (SS-N-27 "Sizzler")</a>	ASCM	220 - 300 km	Operational
<a href="#">Iskander (SS-26 "Stone")</a>	SRBM	500 km	Operational
<a href="#">9M729 (SSC-8)</a>	GLCM	2,500 km	Operational
<a href="#">Avangard</a>	HGV	6,000+ km	In development
<a href="#">Kh-101 / Kh-102</a>	ALCM	2,500 - 2,800 km	Operational
<a href="#">Kh-47M2 Kinzhal</a>	ALBM	1,500 - 2,000 km	Operational
<a href="#">Kh-55 (AS-15 "Kent")</a>	ALCM	2,500 km	Operational
<a href="#">OTR-21 Tochka (SS-21 "Scarab")</a>	SRBM	70 - 120 km	Operational
<a href="#">P-800 Oniks/Yakhont/Bastion (SS-N-26 "Strobile")</a>	ASCM	300 km	Operational
<a href="#">Zyb (SS-N-6 "Serb")</a>	SLBM	2,400 - 3,200 km	Obsolete
<a href="#">R-29 Vysota (SS-N-18 "Stingray")</a>	SLBM	6,500 km	Operational
<a href="#">Shtil (SS-N-23 "Skiff")</a>	SLBM	11,000 km	Operational
<a href="#">R-36 (SS-18 "Satan")</a>	ICBM	10,200 - 16,000 km	Operational
<a href="#">Granat (SS-N-21 "Sampson")</a>	Cruise Missile	2,400 - 3,000 km	Operational
<a href="#">RS-24 Yars (SS-27 Mod 2)</a>	ICBM	10,500 km	Operational
<a href="#">RS-26 Rubezh</a>	ICBM/IRBM	2,000-5,800 km	In development
<a href="#">RS-28 Sarmat</a>	ICBM	10,000+ km	In development
<a href="#">Pioneer (SS-20 "Saber")</a>	IRBM	5,000 km	Obsolete
<a href="#">Bulava (SS-N-32)</a>	SLBM	8,300 km	Operational
<a href="#">Topol (SS-25 "Sickle")</a>	ICBM	11,000+ km	Operational
<a href="#">Topol-M (SS-27 Mod 1)</a>	ICBM	11,000 km	Operational
<a href="#">R-11 (SS-1 "Scud")</a>	SRBM	190 - 550 km	Obsolete
<a href="#">UR-100 (SS-19 "Stiletto")</a>	ICBM	10,000 km	Operational

Source: Missile Defense Project, "Missiles of Russia," *Missile Threat*, Center for Strategic and International Studies, June 14, 2018, last modified August 10, 2021, <https://missilethreat.csis.org/country/russia/>.

## The “Winter War” in Russia, in US, and Chinese Nuclear Forces

These challenges to peace and stability are being increased by still another form of “winter war:” Even before the Ukraine War began, the major powers had return to the nuclear arms race, China was emerging as a major nuclear power, and the future of nuclear arms control was becoming steadily more uncertain. Russia, the U.S., Britain, France, and China became involved in a major nuclear modernization efforts long before the Ukraine War began. Here, a substantial amount of official unclassified data are available.

The total nuclear weapons holdings of Russia, the U.S., Britain, France, and other powers are summarized in **Figure Nine**. Russian nuclear modernization plans are summarized in **Figure Ten**, Chinese plans are summarized in **Figure Eleven**, and U.S. plans are summarized in **Figure Twelve**. It should be stressed that the summaries in all these figures use unclassified material developed in 2021 and 2022, and their content may differ significantly from the full range of developments in current intelligence estimates.

### *Nuclear Weapons are Russia’s Last Area Where It Remains a True Superpower*

In the case of Russia, **Figure Nine** shows that nuclear weapons are the one area where Russia remains a true superpower after the break-up of the former Soviet Union. The Ukraine war has made the weaknesses in Russia’s conventional forces all too clear, and current estimates of Russia’s military research and development resources indicate that it cannot compete with the West in military technology, or with the rising technology base of China.

Russia does, however, have major holding of strategic nuclear weapons that it inherited from the former Soviet Union. While some aspects of the unclassified estimates in **Figure Nine** are uncertain –the Federation of American Scientists (FAS) estimates that Russia had some 6,257 nuclear weapons in its total inventory in 2021. This compared with 5,550 for the U.S., 350 for China, 225 for Britain, 290 for France, 160 for India, 165 for Pakistan, 90 for Israel, and 45 for North Korea.

Russia’s holdings of nuclear weapons also give it the potential ability to deploy large numbers of theater/tactical nuclear weapons as well as strategic weapons, although the figures involved are again uncertain. An unclassified estimate by the Federation of American Scientists (FAS) indicates that Russia had 2,565 strategic nuclear warheads in early 2022, and 1,912 non-strategic and defensive force warheads. FAS also reported that some experts felt the latter number might double 2030, and listed possible deployments of tactical and theater weapons in naval, air, land, and missile defense forces, and a wide range of possible delivery systems.<sup>11</sup> As a result, Russia’s nuclear strength is the one area where it can now credibly threaten the West and NATO with unacceptable levels of conflict by using this as leverage in political warfare.

Putin has suspended strategic nuclear arms control talks, and this is only a small part of the near collapse of other forms of nuclear-related arms control like the INF Treaty. He also has made major speeches emphasizing since 2000 emphasizing the levels of Russian nuclear modernization shown in **Figure Ten**, and has focused on efforts like the development and deployment of nuclear strategic nuclear delivery systems including ICBMs and a long-range guided, nuclear-armed torpedo. Like China, Russia is developing tactical and theater weapons delivery platforms like hypersonic missiles that it could rapidly make dual capable in delivering both conventional and nuclear warheads.

As has been discussed earlier, the War in the Ukraine has given these Russian nuclear modernization efforts a new and higher profile. Putin has talked about “dirty” radiological bombs, and made repeated references to the possible use of theater nuclear weapons, in his public speeches on the Ukraine War. Reports have also been made that Russian generals have begun to seriously discuss tactical and theater nuclear options, and members of the U.S. Congress have debated the need for new nuclear armed cruise missiles as a possible counter to such Russian weapons.

### ***China as an Emerging Nuclear Super Power***

The data for China in **Figure Nine** and **Figure Eleven** are more uncertain than the data for the U.S. and Russia, but they do reflect the updates in reporting on Chinese weapons efforts made available in the 2022 edition of *Chinese Military Power*.<sup>12</sup> They show that China is engaged in a steadily heightening nuclear arms race that has reached the point where the competition in global strategic weapons has shifted from a competition dominated by the U.S. and Russia to one that includes China.

A wide variety of reports have also surfaced that China may be adapting different types of theater and existing tactical nuclear weapons – including hypersonic delivery systems – to provide functional nuclear tactical warheads for its newer delivery systems.<sup>13</sup>

These shifts in China’s capabilities, and other key aspects of its current “winter war” in confronting the United States include creating nuclear forces capable of giving it leverage in political warfare, and shaping the levels of escalation in future conflicts, are in changes nuclear doctrine and strategy and were declassified for the first time in *China Military Power* in 2022:<sup>14</sup>

The PRC’s approach to using nuclear force is based on PLA “deterrence” of an enemy first strike and “counterstrike” when deterrence fails, threatening retaliation against an adversary’s military capability, population, and economy. The PRC’s nuclear weapons policy prioritizes the maintenance of a nuclear force able to survive a first strike and respond with sufficient strength to conduct multiple rounds of counterstrike, deterring an adversary with the threat of unacceptable damage to its military capability, population, and economy.

The PRC’s current approach to nuclear force includes a public declaratory “no first use” (NFU) policy. That policy states the PRC will never use nuclear weapons first at any time nor under any circumstances. In addition, the PRC unconditionally undertakes not to use or threaten to use nuclear weapons against any non-nuclear-weapon state or in nuclear-weapon-free zones. Despite this policy, China’s nuclear strategy probably includes consideration of a nuclear strike in response to a nonnuclear attack threatening the viability of China’s nuclear forces or C2, or that approximates the strategic effects of a nuclear strike. Beijing probably would also consider nuclear use to restore deterrence if a conventional military defeat gravely threatened PRC survival.

...Although the PRC almost certainly keeps the majority of its nuclear force on a peacetime status—with separated launchers, missiles, and warheads—nuclear and conventional PLARF brigades conduct “combat readiness duty” and “high alert duty.” These apparently include assigning a missile battalion to be ready to launch, and rotating to standby positions, on about a monthly basis for unspecified periods of time. The PRC will likely increase the number of units on “high alert duty” during times of increased tension. Authoritative PLA text books on strategy state “high alert duty” is valuable for the defender in a nuclear war and recommend the PLARF adopt a high alert posture conceptually comparable to the claimed high alert posture kept by portions of U.S. and Russian nuclear force. Such a posture is compatible with the PRC’s active defense concept, NFU policy, and post-strike response approach.

...The PRC’s evolving posture is presently more consistent with what PLA writings describe as a “limited deterrent”—a posture that the PLA describes as the very wide space between a minimum and maximum deterrent. The PRC claims to adhere to a minimum deterrent which it defines as “...keeping its nuclear capabilities at the minimum level required for maintaining its national security.” The PRC perceived national

security requirements will grow as it transitions from a ‘large country’ to a ‘powerful country’ and its minimum number of military forces—to include nuclear—needed to defend those greater interests is also likely to grow.

...In 2020, the DoD estimated China’s operational nuclear warhead stockpile was in the low-200s and expected to at least double by 2030. However, Beijing probably accelerated its nuclear expansion, and DoD estimates this stockpile has now surpassed 400 operational nuclear warheads. By 2030, DoD estimates that the PRC will have about 1,000 operational nuclear warheads, most of which will be fielded on systems capable of ranging the continental United States (CONUS).

Beijing has not declared an end goal nor acknowledged the scale of its expansion, and has declined to engage in substantive arms control discussions. We continue to assess the PRC is constructing the infrastructure necessary to support this force expansion, including increasing its capacity to produce and separate plutonium by constructing fast breeder reactors and reprocessing facilities. Though this is consistent with the PRC goal of closing the nuclear fuel cycle, the PRC likely intends to use some of this infrastructure to produce plutonium for its expanding nuclear weapons program.

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The PLA is implementing a launch-on warning posture, called “early warning counterstrike” ...where warning of a missile strike leads to a counterstrike before an enemy first strike can detonate. PLA writings suggest multiple manned C2 organs are involved in this process, warned by space and ground based sensors, and that this posture is broadly similar to the U.S. and Russian LOW posture. The PRC probably seeks to keep at least a portion of its force, especially its new silo-based units, on a LOW posture, and since 2017, the PLARF has conducted exercises involving early warning of a nuclear strike and launch on warning responses.

...Despite these developments, the PRC has called upon other states to abandon similar launch-on-warning postures to enhance strategic stability while declining to engage in substantive dialogue on risk reduction. The PRC probably believes a LOW posture is consistent with its no first use policy, given that it involves a retaliatory strike that takes place after warning of an inbound first attack from an adversary. PRC military writings note that command and control systems—which would include early warning systems—can be a source of accidental nuclear war. China has refused to join the Hague Code of Conduct or participate in other confidence building measures designed to reduce the risk of accidental nuclear war. However, the PRC does have a bilateral missile and carrier rocket launch notification agreement with Russia called the Russian-Chinese Inter-governmental Agreement signed in 2009, which was extended for 10 years in 2021—though little additional information regarding the implementation of the notification agreement is known.

The PRC is probably developing advanced nuclear delivery systems such as a strategic hypersonic glide vehicle and a fractional orbital bombardment (FOB) system in part due to long-term concerns about United States missile defense capabilities, as well as to attain qualitative parity with future worldwide missile capabilities. On July 27th, 2021, the PRC conducted a test of an ICBM-range hypersonic glide vehicle that travelled 40,000 kilometers. The test likely demonstrated the PRC’s technical ability to field a FOB system.

...The PRC probably seeks lower yield nuclear warhead capabilities to provide proportional response options that its high-yield warheads cannot deliver. PRC strategists have highlighted the need for lower-yield nuclear weapons in order to increase the deterrence value of the PRC’s nuclear force, though they have not defined specific nuclear yield values. A 2017 defense industry publication indicated a lower-yield weapon had been developed for use against campaign and tactical targets that would reduce collateral damage. By late 2018, PRC concerns began to emerge that the United States would use low-yield weapons against its Taiwan

invasion fleet, with related commentary in official media calling for proportionate response capabilities. The DF-26 is the PRC's first nuclear-capable missile system that can conduct precision strikes, and therefore, is the most likely weapon system to field a lower-yield warhead in the near-term.

PRC military writings in 2021 noted that the introduction of new precise small-yield nuclear weapons could possibly allow for the controlled use of nuclear weapons, in the warzone, for warning and deterrence. Additional PRC military writings as of 2017 noted that while strategic nuclear weapons remain the foundation of deterrence, tactical nuclear weapons with high hit precision and smaller yield would be effective in lowering the cost of war. Such discussions provide the doctrinal basis for limited nuclear employment on the battlefield, suggesting PRC nuclear thinkers could be reconsidering their long-standing view that nuclear war is uncontrollable.

In short, China is actively creating a nuclear force designed to compete directly with the United States, and one whose function goes beyond deterrence to giving China sufficient nuclear leverage to challenge the U.S. in terms of political and military leverage. As is the case with Russia, nuclear “deterrence” – like arms control or the lack of it – is an ongoing form of warfare that can be used to try to “subdue the enemy without fighting”

### ***Continuing U.S. Nuclear Modernization***

So far, the U.S. is modernizing its strategic nuclear triad without announcing major shifts in doctrine or strategy that differ from its search to limit nuclear forces through arms control. As **Figure Twelve** shows, the *U.S. Nuclear Posture Review* that was attached to the new *U.S. National Defense Strategy* issued in October 2022, describe a comprehensive effort to modernize strategic forces, but does not address any new deployments of theater nuclear weapons, or changes in strategy in response to Russian and Chinese efforts, or the uncertain future of arms control.

The focus of the National Defense Strategy Section on “Integrated deterrence” is on non-nuclear conflicts and dealing with threats to America's strategic partners. Its only comment on nuclear deterrence are:<sup>15</sup>

Any adversary use of nuclear weapons, regardless of location or yield, would fundamentally alter the nature of a conflict, create the potential for uncontrolled escalation, and have strategic effects. To maintain credible and effective deterrence of both large-scale and limited nuclear attacks from a range of adversaries, the Department will modernize nuclear forces, nuclear command, control, and communications, and the nuclear weapon production enterprise, and strengthen extended deterrence.

We will bolster regional nuclear deterrence by enhanced consultations with Allies and partners and by better synchronizing conventional and nuclear aspects of planning – including by improving conventional forces' ability to operate in the face of limited nuclear, chemical, and biological attacks so as to deny adversaries benefit from possessing and employing such weapons. The Department will employ an integrated deterrence approach that draws on tailored combinations of conventional, cyber, space, and information capabilities, together with the unique deterrent effects of nuclear weapons

The rest of the text focuses on deterrence through the use of conventional forces, although much of it could apply equally to extended deterrence using theater and tactical nuclear weapons.

U.S. efforts to deploy missile defenses could have a potential strategic impact in the future, but do not currently limit Russian or Chinese capabilities to achieve mutual assured destruction. The U.S. has also never publicly addressed the extent to which the steady concentration of its population and industrial base, and dependence on complex and stable international supply chains has increased its vulnerability to countervalue attacks – a development that affects virtually all of its major strategic partners as well.

The fact that U.S. is developing advanced new conventional strike systems does, however, give it the same potential capability to deploy dual capable (conventional and nuclear) strike systems as Russia and China. There are no reliable estimates of the holdings of active non-strategic weapons, but the FAS does indicate that the U.S. may be the only power with large holdings that could be rapidly adapted for theater and tactical use. It could draw upon 2,000 nuclear in storage and 1,750 more weapons awaiting dismantlement.<sup>16</sup>

The FAS also reports that the U.S. had 100 B-61 nuclear bombs in Europe for F-16, F-18, Tornado, and F-35 combat aircraft with yields from 50 KT to 170 KT, and is adapting some strategic weapons to have a lower yield option that could be used for theater and tactical targeting. It states that, “Belgian, Dutch, German, and Italian air forces are assigned nuclear strike missions with US nuclear weapons.” It reports France had some 300 variable yield nuclear weapons – three sets of 16 for its submarines and 54 cruise missiles for carrier and land-based Rafale delivery systems which could be used for both strategic and theater strikes. It does not report Britain as having tactical or theater nuclear weapons, and indicate all of its weapons are for its SSBNs.

The Arms Control Association reports that the United States has some 100 B-61 nuclear gravity bombs, and that that are forward-deployed at six NATO bases in five European countries: Aviano and Ghedi in Italy; Büchel in Germany; Incirlik in Turkey; Kleine Brogel in Belgium; and Volkel in the Netherlands. Another 130 U.S. B-61s are in inventory. France and Britain also may have low yield or other nuclear weapons in storage that could be used or modified for theater use.<sup>17</sup>

### *Assessing the Nuclear “Winter War”*

In short, a situation already exists where there is a major three nation competition in nuclear weapons modernization, and growing risk of the revival of active competition in the deployment of theater nuclear forces as forms of military leverage and a higher – if still limited – risk of their use actual warfare fighting.

This “competition” (or “confrontation”) has also made the future of arms control highly uncertain. Russia has an obvious incentive to try to use its nuclear weapons to obtain political and military leverage, carried out weapons developments that effectively ended the Intermediate Nuclear Forces Treaty (INF Treaty) and has at least temporarily withdrawn from efforts to negotiate further reductions and constraint on strategic arms.

China has made it clear that it has no current interest in nuclear arms control negotiations with the U.S., and as **Figure Nine** shows, is focusing on expanding its nuclear strength to levels closer to those of the U.S. and Russia. Combined with the faltering progress in arms control and the fact the U.S must now compete with both China and Russia, nuclear forces have clearly become another kind of “winter war,” and one that potentially is far more dangerous.



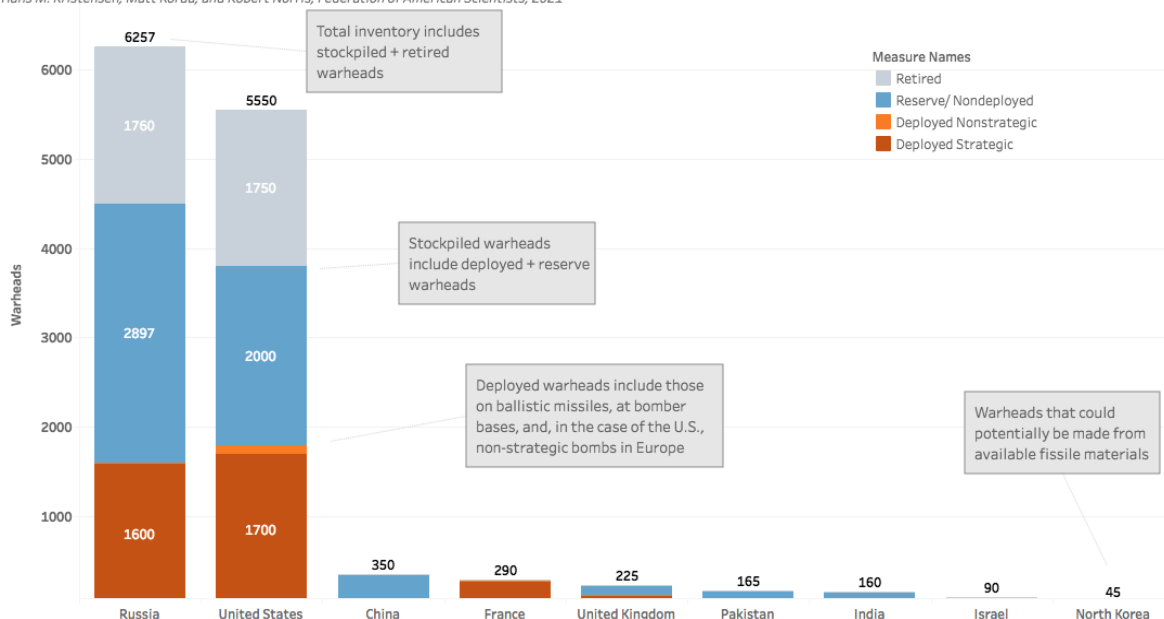
**Figure Nine: Estimate of Total Global Holdings of Nuclear Weapons by Country**

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

**Estimated Global Nuclear Warhead Inventories, 2021**

Last updated: 2 August 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, or reflect all the results of the 2022 US. nuclear posture review. “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.

**Source:** Hans M. Kristensen, Matt Korda, and Robert Norris, “Status of World Nuclear Forces,” 2022, <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces>

## Figure Ten: Russian Nuclear Modernization

### *Russian Nuclear Modernization*

System	Warheads	Notes
Avangard HGV	One per vehicle, nuclear	Can be delivered by SS-19 and potentially the Sarmat ICBMs; intended to overcome missile defense
RS-28 (Sarmat) silo ICBM	10+, nuclear	Deployment expected around 2022; intended to overcome missile defense
Poseidon Autonomous Underwater Vehicle	Conventional or nuclear	Carried by special-purpose submarines; intended as a second-strike, retaliatory weapon
Burevestnik Nuclear Powered Cruise Missile	Nuclear	"Unlimited" range, owing to its nuclear reactor; intended to overcome missile defense
Kinzhal Air-Launched Ballistic Missile	Conventional or nuclear	Intended to target naval vessels
Tsirkon Hypersonic Cruise Missile	Conventional or nuclear	Intended to attack ships and ground targets
Barguzin Rail-Mobile ICBM	up to 4? Nuclear	Program reportedly postponed in 2017
RS-26 Rubezh ICBM	up to 4? Nuclear	Program reportedly postponed in 2018

**Source:** Compiled by CRS.

**Note:** While the text used both Russian designations (RS-X) and U.S./NATO designations (SS-X) to identify deployed Russian weapons systems, this table displays the Russian only the Russian designation (RS-X) because a NATO designation has not yet been assigned.

## Figure Eleven: Chinese Nuclear Modernization – Part One

- **Seems to be more than doubling its stockpile of nuclear weapons. May have risen from around 200 to 350 by 2020. 272 operational for existing missiles and bombs and 78 for new systems. Possibly grew by 118 warheads during 2020-2021.**
- **Have detected 270+ new missile silos. 119 in Northwestern China seem to be for ICBMs.**
- **Has shunned arms control and transparency.**
- **Steadily improving nuclear command and control and battle management systems.**
- **Deploying advanced solid-fuel mobile ICBMs (DF-21 & DF-31/DF-31A/DF-32AG), MIRV'd liquid fuel ICBM (DF-5B), new MIRV'd DF-41 ICBM, Type 094 SSBN with JL-2 SLBMs.**
- **Developing low noise 096 SSBN and 9,000 kilometer range 096 SLBM.**
- **Progressively harder to determine what theater and short-range delivery systems may become dual-capable. DF-21 MRBM (2,150 KM) and DF-26 IRBM (4,000 KM) known to be nuclear. DF-21 is precision strike, dual-capable and could deliver low-yield nuclear weapons.**
- **Modifying H-6 nuclear bombers to H-6N with refueling, missile carrying capability. H-20 stealth bomber in development.**
- **May be evolving far beyond countervalue second strike capability. Examining use as theater warfare threat?**

Source: Hans M. Kristensen, Matt Korda, and Robert Norris, "Status of World Nuclear Forces," 2022, <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces>; SIPRI Yearbook, Section 2: China's Nuclear Forces: Moving Beyond a Minimal Deterrent, 2021, [https://www.uscc.gov/sites/default/files/2021-11/Chapter\\_3\\_Section\\_2--Chinas\\_Nuclear\\_Forces\\_Moving\\_beyond\\_a\\_Minimal\\_Deterrent.pdf](https://www.uscc.gov/sites/default/files/2021-11/Chapter_3_Section_2--Chinas_Nuclear_Forces_Moving_beyond_a_Minimal_Deterrent.pdf); and DIA, China, Military Power, 2021

## Figure Eleven: Chinese Nuclear Modernization – Part Two

- Over the next decade, the PRC aims to modernize, diversify, and expand its nuclear forces. Compared to the PLA's nuclear modernization efforts a decade ago, current efforts exceed previous modernization attempts in both scale and complexity.
- The PRC is investing in and expanding the number of its land-, sea-, and air-based nuclear delivery platforms and constructing the infrastructure necessary to support this major expansion of its nuclear forces. The PRC is also supporting this expansion by increasing its capacity to produce and separate plutonium by constructing fast breeder reactors and reprocessing facilities.
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- In 2021, Beijing probably accelerated its nuclear expansion; DoD estimates China's operational nuclear warheads stockpile has surpassed 400.
- The PLA plans to "basically complete modernization" of its national defense and armed forces by 2035. If China continues the pace of its nuclear expansion, it will likely field a stockpile of about 1500 warheads by its 2035 timeline.
- The PRC is fielding the DF-41, China's first road-mobile and silo-based ICBM with MIRV capability. The system is likely intended to carry no more than three warheads per missile and has improved range and accuracy over DF-31 class ICBMs. The PRC is conducting continuous at-sea deterrence patrols with its six JIN-class (Type 094) submarines (SSBNs), which are equipped to carry up to 12 JL-2 or JL-3 SLBMs.
- The PRC is rapidly establishing its silo-based solid-propellant missile fields likely consisting of over 300 silos in total, which are capable of fielding both DF-31 and DF-41 class ICBMs. This project and the expansion of China's liquid-propellant silo force suggests that the PRC intends to increase the peacetime readiness of its nuclear force by moving to a launch-on-warning (LOW) posture
- In 2021, the PLARF launched approximately 135 ballistic missiles for testing and training. This was more than the rest of the world combined, excluding ballistic missile employment in conflict zones. In 2021, the PRC continued building three solid-fueled intercontinental ballistic missile (ICBM) silo fields, which will cumulatively contain at least 300 new ICBM silos.
- The PRC likely began near-continuous at-sea deterrence patrols with its six operational JIN class SSBNs, which are equipped to carry up to 12 CSS-N-14 (JL-2) or CSS-NX-20 (JL-3) SLBMs. The PRC's next-generation Type 096 SSBN is probably intended to field MIRVed SLBMs judging from past developmental trends. The 096 SSBNs will likely begin construction in the early-2020s.
- In October 2019, the PLAAF publicly revealed the H-6N as its first nuclear-capable air-to-air refuelable bomber, signaling the airborne leg of its nuclear triad.
- In 2021, Beijing probably accelerated its nuclear expansion. The Department of Defense estimates that the PRC's operational nuclear warheads stockpile has surpassed 400.
- The PLA plans to "basically complete modernization" of its national defense and armed forces by 2035. If China continues the pace of its nuclear expansion, it will likely field a stockpile of about 1,500 warheads by its 2035 timeline.

\*\* Source: Excerpted from Department of Defense, *China Military Power: 2022*, p. VII, XI, 96, <https://media.defense.gov/2022/Nov/29/2003122279/-1/-1/1/2022-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>

## Figure Twelve: U.S. Nuclear Modernization – Part One

### *As of January 2022*

**Modernized Strategic Delivery Systems:** Existing delivery systems are undergoing continual modernization, including complete rebuilds of the Minuteman III ICBM and Trident II SLBM. The service lives of the Navy's 14 Trident Ohio-class ballistic missile submarines are being extended. Additionally, a new submarine, the Columbia-class, which will replace the Ohio-class ballistic missile submarines, is undergoing development and is expected to cost [\\$127 billion](#) to acquire the 12-ship class...The B-2 strategic bomber, a relatively new system, is being upgraded, as is the B-52H bomber. The Air Force is also planning a new strategic bomber, the B-21 Raider, and a new nuclear-capable cruise missile, known as the Long-Range Standoff Weapon (LRSO) to replace the existing Air-Launched Cruise Missile (ALCM).

**Refurbished Nuclear Warheads:** The U.S. stockpile of nuclear warheads and bombs is continually refurbished through NNSA's Life Extension Program (LEP). Existing warheads are certified annually to be safe and reliable. The NNSA is currently pursuing a controversial and expensive plan to refurbish or replace nearly every warhead type in the stockpile.

**Modernized Production Complex:** The nuclear weapons production complex is being modernized as well, with new facilities planned and funded. For example, the FY 2021 NNSA budget request includes \$750 million for the Uranium Processing Facility (UPF) at Oak Ridge, Tennessee. The total construction cost for UPF is estimated at \$6.5 – 7.5 billion, according to an [independent study](#) conducted by the Corps of Engineers, although some estimates put the price tag at \$11 billion. NNSA has [pledged](#) to complete construction by 2025 at a price tag of no more than \$6.5 billion.

**Command and Control Systems:** The Defense Department maintains command, control, communications, and early-warning systems that allow operators to communicate with nuclear forces, issue commands that control their use, and detect or rule out incoming attacks. The 2018 NPR calls for placing greater attention and focus on sustaining and upgrading command and control capabilities. The CBO estimates that the Pentagon will need to spend \$77 billion on these activities between FY 2019 and FY 2028 in order to implement the department's plans.

### *As of October 2022*

Adopt a strategy and declaratory policy that maintain a very high bar for nuclear employment while assuring Allies and partners, and complicating adversary decision calculus.

Adopt an integrated deterrence approach that works to leverage nuclear and non-nuclear capabilities to tailor deterrence under specific circumstances.

Field and maintain strategic nuclear delivery systems and deployed weapons in compliance with New START Treaty central limits as long as the Treaty remains in force. We will continue to deploy a nuclear triad and are fully committed to the programs that will begin to field modernized systems later this decade. Programs are also being executed to modernize U.S. DCA, the nuclear weapons stockpile, the NC3 architecture, and the weapons production infrastructure.

Clearly convey to the PRC that the United States will not be deterred from defending our Allies and partners, or coerced into terminating a conflict on unacceptable terms. Forces that provide this flexibility include the W76-2 low yield submarine-launched ballistic missile warhead, globally-deployable bombers, dual-capable fighter aircraft, and air-launched cruise missile

Deter theater attacks and nuclear coercion of Allies and partners, by bolstering the Triad with capabilities that strengthen regional deterrence, such as F-35A dual-capable fighter aircraft (DCA) equipped with the B61-12 bomb; the W76-2 warhead; and the Long-Range Standoff (LRSO) weapon.

Eliminate “hedge against an uncertain future” as a formal role of nuclear weapons.

Take steps to strengthen extended deterrence and Allied assurance.

Pursue enhanced security through arms control, strategic stability, non-proliferation, and reducing the risks of miscalculation.

Affirm full-scope Triad replacement and other nuclear modernization programs, including NC3.

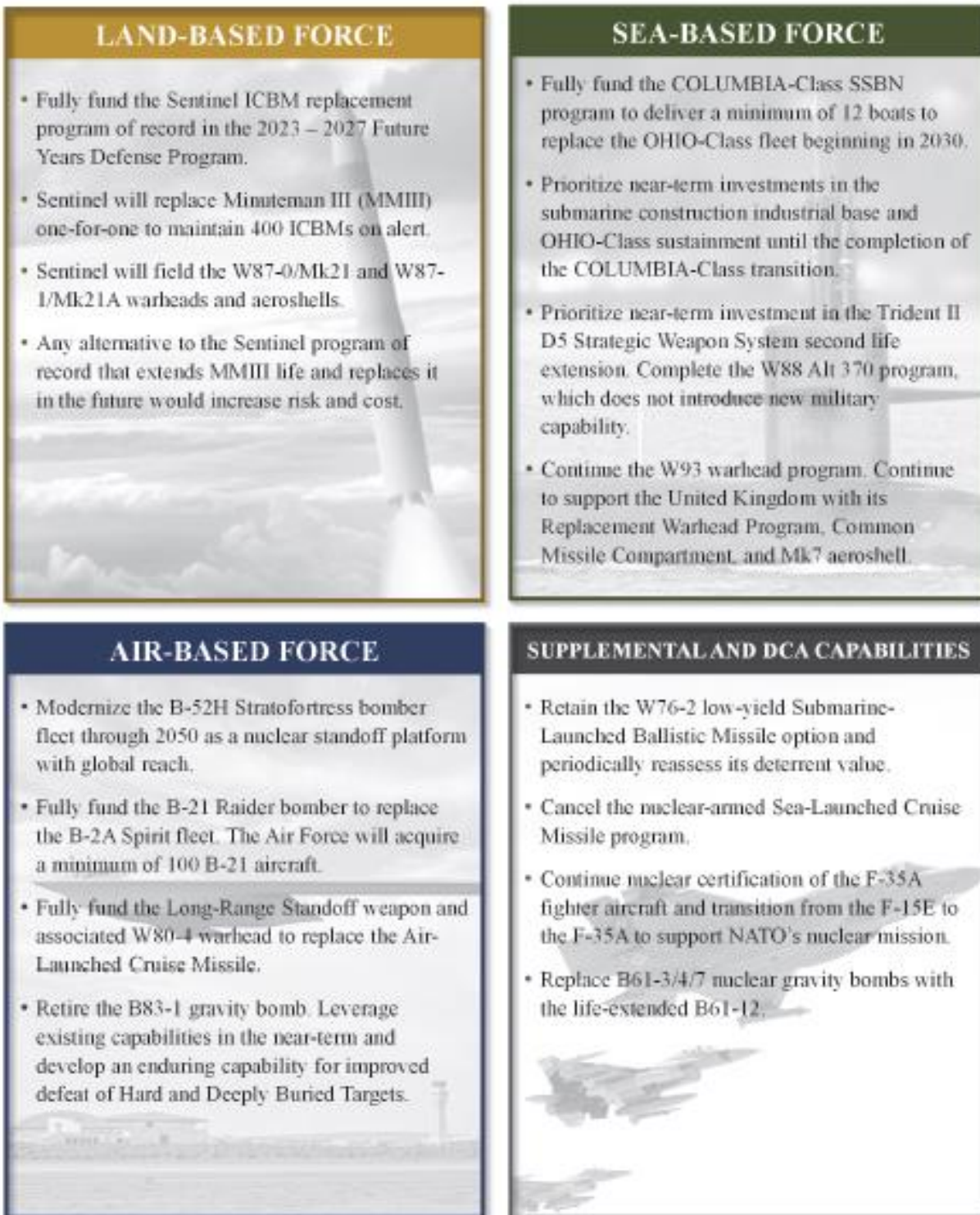
Retire the B83-1 gravity bomb.

Cancel the nuclear-armed Sea-Launched Cruise Missile (SLCM-N) program.

Deliver a modern, adaptive nuclear security enterprise based on an integrated strategy for risk management, production-based resilience, science and technology innovation, and workforce initiatives.

Source: Data for early 2022 are excerpted and adapted from Shannon Bugos, “Nuclear Modernization Program Fact Sheet,” Arms Control Association, January 2022, <https://www.armscontrol.org/factsheets/USNuclearModernization#snapshot>, and data for October 2022 are excerpted from 2022 *Nuclear Posture Review*, DoD web site, October 27, 2022, <https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF>.



**Figure Twelve: U.S. Nuclear Modernization – Part Two**

Source: 2022 Nuclear Posture Review, DoD web site, October 27, 2022, <https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF>, p. 21.

## **The “Winter War” in China: From Cooperation and Competition to Confrontation and Active War Planning**

The levels of tension and confrontation between China and the U.S extend far beyond the shifts in nuclear forces and nuclear strategy and have created another form of “winter war” centered around their competition in conventional forces and overall military power. The U.S. and its strategic partners now face a China whose economy is growing to levels where it may match or exceed the size of the U.S. economy and it is building up conventional forces in ways that are shifting U.S. and China from competition to confrontation, competition in creating forces that provide political and economic leverage, and planning for possible conflicts.

These tensions between China and the West have also increased sharply as the world has entered the winter of 2022-2023. President Xi Jinping clearly emerged at the dominant leader of China at the 20<sup>th</sup> Party Congress in October 2022, and made it clear that he was committed to make China the dominant economic and military power in the world, and to expanding its political role and leverage on a global basis.

### ***The Role of China in the New U.S. National Security Strategy***

The U.S. National Security Strategy issued October 2022 makes it clear that the U.S. now sees China as the primary threat to its security, and more in terms of war than any real intention to emphasize cooperation.<sup>18</sup>

The 2022 National Defense Strategy advances a strategy focused on the PRC, and on collaborating with our growing network of Allies and partners on common objectives. It seeks to prevent the PRC’s dominance of key regions while protecting the U.S. homeland and reinforcing a stable and open international system. Consistent with the 2022 National Defense Strategy, a key objective is to dissuade the PRC from considering aggression as a viable means of advancing goals that threaten vital U.S. national security interests. Conflict with the PRC is neither inevitable or desirable. The Department’s priorities support broader whole-of-government efforts to develop terms of interaction with the PRC that are favorable to our interests and values, while managing strategic competition and enabling the pursuit of cooperation on common challenges.

...The most comprehensive and serious challenge to U.S. national security is the PRC’s coercive and increasingly aggressive endeavor to refashion the Indo-Pacific region and the international system to suit its interests and authoritarian preferences. The PRC seeks to undermine U.S. alliances and security partnerships in the Indo-Pacific region, and leverage its growing strength and military footprint to coerce its neighbors and threaten their interests. The PRC’s increasingly provocative rhetoric and coercive activity towards Taiwan are destabilizing, risk miscalculation, and threaten the peace and stability of the Taiwan Strait. This is part of a broader pattern of destabilizing and coercive Chinese behavior that stretches across the East China Sea, and along the Line of Actual Control. The PRC has expanded and modernized nearly every aspect of the PLA, with a focus on offsetting U.S. military advantages. The PRC is therefore the pacing challenge for the Department.

The PRC is the only competitor with both the intent to reshape the international order and, increasingly, the economic, diplomatic, military, and technological power to do it. Beijing has ambitions to create an enhanced sphere of influence in the Indo-Pacific and to become the world’s leading power. It is using its technological capacity and increasing influence over international institutions to create more permissive conditions for its own authoritarian model, and to mold global technology use and norms to privilege its interests and values. Beijing frequently uses its economic power to coerce countries. It benefits from the openness of the international economy while limiting access to its domestic market, and it seeks to make the world more dependent on the PRC while reducing its own dependence on the world. The PRC is also investing in a military that is rapidly modernizing, increasingly capable in the Indo-Pacific, and growing in strength and reach globally – all while seeking to erode U.S. alliances in the region and around the world.

...Our strategy toward the PRC is threefold: 1) to invest in the foundations of our strength at home – our competitiveness, our innovation, our resilience, our democracy, 2) to align our efforts with our network of allies and partners, acting with common purpose and in common cause, and 3) compete responsibly with the PRC to defend our interests and build our vision for the future. The first two elements— invest and align—are described in the previous section and are essential to out- competing the PRC in the technological, economic, political, military, intelligence, and global governance domains.

Competition with the PRC is most pronounced in the Indo-Pacific, but it is also increasingly global. Around the world, the contest to write the rules of the road and shape the relationships that govern global affairs is playing out in every region and across economics, technology, diplomacy, development, security, and global governance. In the competition with the PRC, as in other arenas, it is clear that the next ten years will be the decisive decade. We stand now at the inflection point, where the choices we make and the priorities we pursue today will set us on a course that determines our competitive position long into the future.

Many of our allies and partners, especially in the Indo-Pacific, stand on the frontlines of the PRC's coercion and are rightly determined to seek to ensure their own autonomy, security, and prosperity. We will support their ability to make sovereign decisions in line with their interests and values, free from external pressure, and work to provide high-standard and scaled investment, development assistance, and markets. Our strategy will require us to partner with, support, and meet the economic and development needs of partner countries, not for the sake of competition, but for their own sake.

We will act in common purpose to address a range of issues – from untrusted digital infrastructure and forced labor in supply chains and illegal, unreported, and unregulated fishing. We will hold Beijing accountable for abuses – genocide and crimes against humanity in Xinjiang, human rights violations in Tibet, and the dismantling of Hong Kong's autonomy and freedoms – even as it seeks to pressure countries and communities into silence. We will continue prioritizing investments in a combat credible military that deters aggression against our allies and partners in the region, and can help those allies and partners defend themselves.

### ***China as the “Pacing Threat”***

The Chairman of the U.S. Joint Chiefs of Threat made this U.S. position equally clear in a joint press conference with the U.S. Secretary of Defense on November 16, 2021, where he described China as America's “pacing threat.”<sup>19</sup>

China is the pacing threat, as we describe it, and DOD is part of the national defense strategy. It was defined in the previous months, defined in the current ones as a pacing threat.

And what do we mean by that. We mean that China is the one country out there that geopolitically has the power potential to be a significant challenge to the United States and they are. There -- based on their population, their technology, their economy and nano and a bunch of other things, China is the greatest geopolitical challenge to the United States.

And China is not shy about their goal. They want to be the number one power in the globe by midcentury, by 2049. And they want to do that militarily, diplomatically, informationally, economically, and so on and so forth. So they want to be number one by mid-century. By the 2030s, mid-2030s, they had previously said they want to be number one regionally.

So they want to have a military that out does the United States military regionally by the mid-'30s. They previously said that. And then they advanced to that goal to 2027. So they advanced that goal in I think it was two party congresses ago or one party congress ago. And what they have said is that they want to be equal to -- or superior militarily to -- the United States. That's only five years away. So they're working on that and they're working on that very, very hard.

### ***Chinese Strategy and Force Developments***

The 2022 edition of *Chinese Military Power* provides a highly detailed unclassified assessment by the U.S. intelligence community of the U.S. view of Chinese strategy and conventional force developments. This assessment again highlights the fact that the U.S. and China are now major



competitors that effectively confront each other in a race for military capability and leverage that goes beyond the tensions, and competition in the U.S. and allied “winter war.” It describes the developing nuclear race between the U.S. and China. It describes the following major shifts in Chinese strategy and goals in confronting and competing with the United States:<sup>20</sup>

The PRC’s national strategy aims to achieve “the great rejuvenation of the Chinese nation” by 2049. The strategy is a determined pursuit of political, social, and military modernity to expand the PRC’s national power, perfect its governance, and revise the international order in support of Beijing’s system of governance and national interests.

The PRC increasingly views the United States as deploying a whole-of-government effort meant to contain the PRC’s rise, which presents obstacles to its national strategy. The PRC has characterized its view of strategic competition in terms of a rivalry among powerful nation states, as well as a clash of opposing ideological systems. PRC leaders believe that structural changes in the international system and an increasingly confrontational United States are the root causes of intensifying strategic competition between the PRC and the United States.

The PRC’s strategy entails deliberate and determined efforts to amass, improve, and harness the internal and external elements of national power that will place the PRC in a “leading position” in an enduring competition between systems.

The PRC’s 20th National Congress of the CCP holds important military and security implications for the PLA’s 2027 centenary objectives. The 20th Party Congress report focused on intensifying and accelerating the PLA’s modernization goals over the next five years, including strengthening its “system of strategic deterrence.” Xi Jinping retained his chairmanship of the seven-person Central Military Commission (CMC) and selected members that offer political continuity, technical expertise on military modernization and space issues, and Taiwan-focused operational experience.

... In 2021, the PRC’s stated defense policy aims remained oriented toward safeguarding its sovereignty, security, and development interests, while emphasizing a greater global role for itself. The PRC’s military strategy remains based on the concept of “active defense.”

PRC leaders stress the imperative of strengthening the PLA into a “world-class” military by the end of 2049 as an essential element of its strategy to rejuvenate the PRC into a “great modern socialist country.”

In 2020, the PLA added a new milestone for modernization in 2027, to accelerate the integrated development of mechanization, *informatization*, and *intelligentization* of the PRC’s armed forces, which if realized could give the PLA capabilities to be a more credible military tool for the CCP to wield as it pursues Taiwan unification.

In 2021, the PLA began discussing a new “core operational concept,” called “Multi-Domain Precision Warfare (MDPW).” MDPW is intended to leverage a C4ISR network, which the PLA calls the “network information system-of-systems that incorporates advances in big data and artificial intelligence to rapidly identify key vulnerabilities in the U.S. operational system and then combine joint forces across domains to launch precision strikes against those vulnerabilities.

... The PLA seeks to modernize its capabilities and improve its proficiencies across all warfare domains so that, as a joint force, it can conduct the full range of land, air, and maritime, as well as nuclear, space, counterspace, electronic warfare (EW), and cyberspace operations. The PLA’s evolving capabilities and concepts continue to strengthen the PRC’s ability to “fight and win wars” against a “strong enemy” (a euphemism likely for the United States), counter an intervention by a third party in a conflict along the PRC’s periphery, and project power globally.

### ***China’s Conventional Military Build-Up***

The new U.S. strategy describes China’s efforts to improve its conventional military forces in terms that closely match the major elements of the U.S. effort to improve its own conventional military forces:<sup>21</sup>

In addition to expanding its conventional forces, the PRC is rapidly advancing and integrating its space, counterspace, electronic, and informational warfare capabilities to support its holistic approach to joint warfare. The PLA seeks to target the ability of the Joint Force to project power to defend vital U.S. interests and our Allies in a crisis or conflict. The PRC is also expanding the PLA's global footprint and working to establish a more robust overseas and basing infrastructure to allow it to project power at greater distances. In parallel, the PRC is accelerating the modernization and expansion of its nuclear capabilities. The United States and its Allies and partners will increasingly face the challenge of deterring two major powers with modern and diverse nuclear capabilities – the PRC and Russia – creating new stress on strategic stability.

### ***Key Trends in Chinese Forces***

Other sources show that China has already made significant progress in achieving parity with the U.S. The conventional balance shown earlier in **Figure Four** reflects major increases in China's conventional military strength since 1990, and these numbers only show a comparatively small part of the massive Chinese shift away from a reliance on massive ground forces in 1990 to creating land, naval forces, and air forces as modern or more modern than U.S. forces.

China has been creating major power projection capabilities in the Pacific and Indian Ocean since at least the mid-1990s, and China has published a variety of unclassified defense white papers and strategies that make it clear that it is seeking to become superior in its ability to use the most advanced emerging and disruptive technologies.

This progress is described in detail in the 2022 edition of *China Military Power*. There are serious limits to the level of detail that can be declassified, but the report does describe key force changes that show that the level of China's efforts to become the dominant power in the region.<sup>22</sup>

**People's Liberation Army (PLAA):** The PLAA has approximately 975,000 active-duty personnel in combat units and is the primary ground fighting force in the PLA. In 2021, the PLAA emphasized realistic training scenarios and standardization of training methods during the exercise STRIDE-2021 and throughout extensive joint amphibious training that utilized both People's Liberation Army Navy (PLAN) and civilian roll-on-roll-off (RORO) vessels. PLAA and Russian Army units participated in ZAPAD/INTERACTION 2021, a large-scale joint exercise to expand cooperation between the two militaries, which was conducted on PRC soil for the first time.

**People's Liberation Army Navy (PLAN):** The PLAN is numerically the largest navy in the world with an overall battle force of approximately 340 ships and submarines, including approximately 125 major surface combatants. As of 2021, the PLAN is largely composed of modern multi-mission ships and submarines. In 2021, the PLAN's overall battle force shrank due to the transfer of 22 early flight JIANGDAO class corvettes to the China Coast Guard (CCG). The PLAN commissioned its fourth RENHAI class cruiser in late 2021 and resumed series construction of the JIANGKAI II class frigate. The PLAN commissioned two YUSHEN class amphibious assault ships, one each in April 2021 and April 2022. The PLAN launched a third hull in the YUSHEN class in January 2021, which is currently undergoing sea trials prior to commissioning.

**People's Liberation Army Air Force (PLAAF) and PLAN Aviation:** The PLAAF and PLAN Aviation together constitute the largest aviation force in the region and the third largest in the world, with over 2,800 total aircraft (not including trainer variants or uncrewed aerial systems (UAS)) of which approximately 2,250 are combat aircraft (including fighters, strategic bombers, tactical bombers, multi-mission tactical, and attack aircraft). The PLAAF is rapidly catching up to Western air forces and continues to modernize with the delivery of domestically built aircraft and a wide range of UAVs.

**People's Liberation Army Rocket Force (PLARF):** The PLARF organizes, mans, trains, and equips the PRC's strategic land-based nuclear and conventional missile forces, associated support forces, and missile bases. counter- intervention or joint campaigns outside the First Island Chain remains in its infancy...

**Capabilities for Power Projection and Counter-intervention:** The PLA is aggressively developing capabilities to provide options for the PRC to dissuade, deter, or, if ordered, defeat third-party intervention in the Indo-Pacific region. The PLA is also developing the capabilities to conduct military operations deeper

into the Indo-Pacific region, and in some cases, globally. Although the PLA has undertaken important structural reforms to promote joint operations, its capability to carry out joint operations in support of counter-intervention or joint campaigns outside the First Island Chain remains in its infancy.

The PRC's counter-intervention strategy aims to restrict the United States from having a presence in China's immediate periphery and limit U.S. access in the broader Indo-Pacific region. The PLA's anti-access/area-denial (A2/AD) capabilities are, to date, the most robust within the First Island Chain, although the PLA is increasingly able to project power into the Philippine Sea and the PRC seeks to strengthen its capabilities to reach farther into the Pacific Ocean.

**Long-Range Precision Strike and Supporting ISR:** PLA doctrinal writings state that precision attack in all warfare domains is critical in modern war. PLA writings state that precision weapons are not only force multipliers, but also a means of "war control" to prevent escalation.

**Integrated Air Defense System (IADS):** The PRC has a robust and redundant IADS architecture over land areas and within 300 nautical miles (mm) (556kilometers (km)) of its coast that relies on an extensive early warning radar network, fighter aircraft, and a variety of Surface-to-Air Missile (SAM) systems. The PRC has also placed radars and air defense weapons on outposts in the South China Sea, further extending the range of its IADS. It also employs point defenses, primarily to defend strategic targets against adversary long-range cruise missiles and airborne strike platforms.

**Hypersonic Weapons:** China's deployment of the DF-17 hypersonic glide vehicle (HGV)-armed Medium-Range Ballistic Missile (MRBM) will continue to transform the PLA's missile force. The system, fielded in 2020, is possibly intended to replace some older Short-Range Ballistic Missile (SRBM) units, according to PRC media, and is designed to strike foreign military bases and fleets in the Western Pacific, according to a PRC-based military expert.

**Advancing Toward an Informatized Military:** The PLA considers information operations (IO) as a means of achieving information dominance early in a conflict and continues to expand the scope and frequency of IO in military exercises. The PRC presents a significant, persistent threat of cyber-enabled espionage and attack on an adversary's military and critical infrastructure systems. The PLA is pursuing next-generation combat capabilities based on its vision of future conflict, which it calls "intelligentized warfare," defined by the expanded use of artificial intelligence (AI) and other advanced technologies at every level of warfare.

**Space and Counterspace Capabilities:** The PLA continues to acquire and develop a range of counterspace capabilities and related technologies, including kinetic-kill missiles, ground-based lasers, and orbiting space robots, as well as expanding space surveillance capabilities, which can monitor objects in space within their field of view and enable counterspace actions. The PLA views space operations as a means to deter and counter third-party intervention during a regional military conflict. Moreover, PRC defense academics suggest that reconnaissance, communication, navigation, and early warning satellites could be among the target of attacks designed to "blind and deafen the enemy."

These changes can be quantified in some areas. They are reflected in the rapid rate of increase in China's modern combat aircraft, surface ships, and submarines shown in **Figure Thirteen**. They are also reflected in the estimates of the growth of Chinese sea power relative to U.S. sea power that is shown in **Figure Fourteen**.

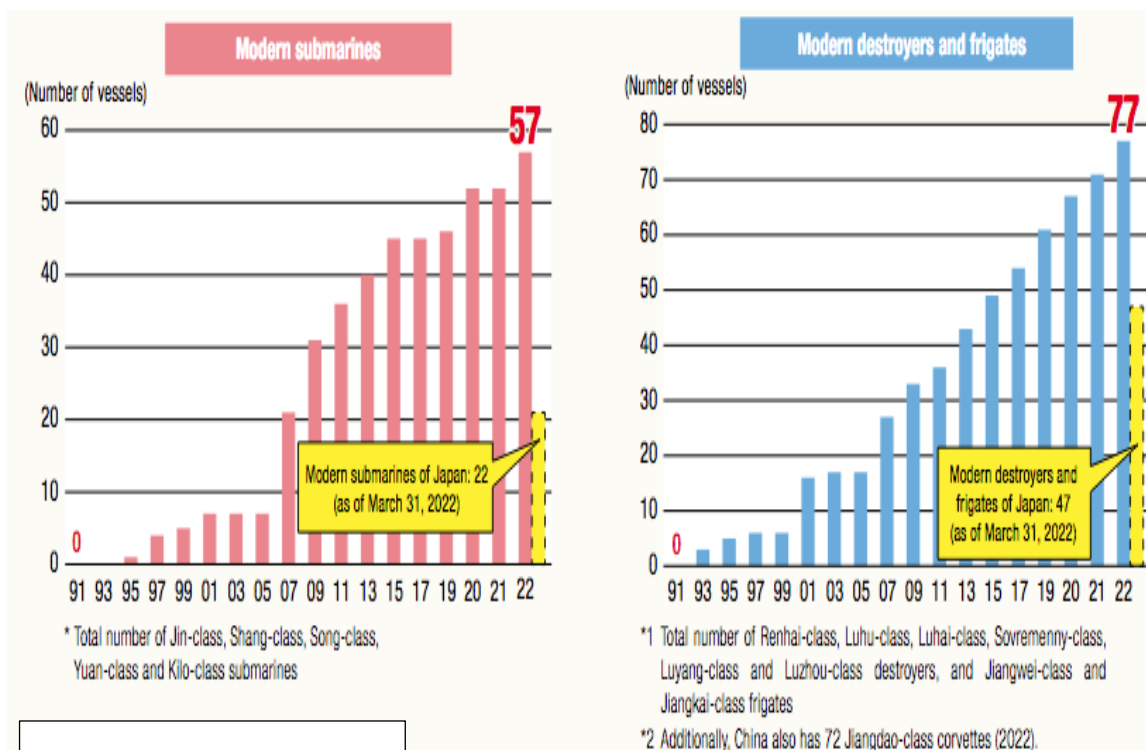
These figures show that China is becoming a far more modern air force, and that China is becoming a major blue water navy. While Chinese ships are smaller and less capable than U.S. ships, they do not need the ability to project power across the entire Pacific for long periods that the U.S. Navy must provide, and work by the Congressional Budget Office (CBO) and General Accountability Office (GAO) warn that the U.S. Navy may have significantly overestimated the ship building efforts that current budgets allow it to perform.<sup>23</sup>

At the same time, **Figure Fifteen** and **Figure Sixteen** show that China is making the same major advances in precision strike capabilities as the U.S., Russia, and other advanced military powers., long-range missile strike capabilities, and precision strike capabilities as Russia and the United

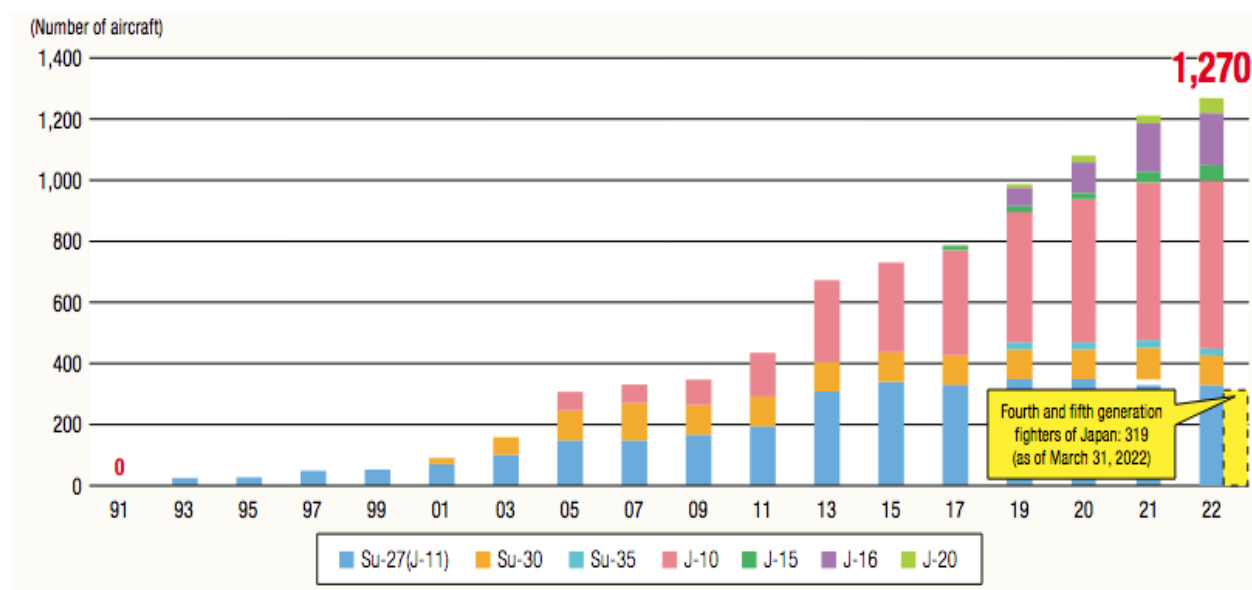
States, and is truly emerging as a potential peer competitor is using such weapons to strengthen its capabilities to use its military forces as weapons of influence and achieve military objectives both by avoiding combat and equaling U.S. and Russian capabilities if conventional or nuclear fighting does take place between them or escalates to critical levels.

### Figure Thirteen: Chinese Deployment of Advanced Modern Submarines, Surface Ships, and 4th and 5th Generation Aircraft

#### Modern Submarines, Destroyers, and Frigates



#### Fourth and Fifth Generation Combat Aircraft



Adapted from Japan, Ministry of Defense, *Defense of Japan 2022*, August 2022, p. 43, [https://s3.documentcloud.org/documents/22187264/doj2022\\_en\\_full.pdf](https://s3.documentcloud.org/documents/22187264/doj2022_en_full.pdf)

## Figure Fourteen: U.S. Navy Estimate of Chinese Combat Shipbuilding Relative to U.S. Navy

### Numbers of Chinese and U.S. Navy Battle Force Ships, 2000-2030

Figures for Chinese ships taken from ONI information paper of February 2020

	2000	2005	2010	2015	2020	2025	2030
Ballistic missile submarines	1	1	3	4	4	6	8
Nuclear-powered attack submarines	5	4	5	6	7	10	13
Diesel attack submarines	56	56	48	53	55	55	55
Aircraft carriers, cruisers, destroyers	19	25	25	26	43	55	65
Frigates, corvettes	38	43	50	74	102	120	135
<b>Total China navy battle force ships, including types not shown above</b>	<b>210</b>	<b>220</b>	<b>220</b>	<b>255</b>	<b>360</b>	<b>400</b>	<b>425</b>
<b>Total U.S. Navy battle force ships</b>	<b>318</b>	<b>282</b>	<b>288</b>	<b>271</b>	<b>297</b>	<b>287</b>	<b>290 or 291</b>
<b>U.S. total above compared to China total above</b>	<b>+108</b>	<b>+62</b>	<b>+68</b>	<b>+16</b>	<b>-63</b>	<b>-113</b>	<b>-135 or -134</b>

Source: Table prepared by CRS. Source for China's navy: Unclassified ONI information paper prepared for Senate Armed Services Committee, subject "UPDATED China: Naval Construction Trends vis-à-vis U.S. Navy Shipbuilding Plans, 2020-2030," February 2020, 4 pp. Provided by Senate Armed Services Committee to CRS and CBO on March 4, 2020, and used in this CRS report with the committee's permission. Figures are for end of calendar year. Source for figures for U.S. Navy: U.S. Navy data; figures are for end of fiscal year.

Note: In the column for the year 2000, the ONI information paper showed a figure for the total number of China navy battle force ships of 110, but the Navy later stated that this was a typo, and that the correct figure is 210.

### Numbers of Chinese Combat Ships: 2020-2040

Figures for Chinese ships are from U.S. Navy, reflecting data as of October 2020

Ship type	2020	2025	2030	2040	2040 change from 2020
Ballistic missile submarines	4	6	8	10	+6
Nuclear-powered attack submarines	6	10	14	16	+10
Diesel attack submarines	47	47	46	46	-1
Aircraft carriers	2	3	5	6	+4
Cruisers and destroyers	41	52	60	80	+39
Frigates and corvettes	102	120	135	140	+38
LHA-type amphibious assault ships	0	4	4	6	+6
LPD-type amphibious ships	7	10	14	14	+7
LST-type amphibious tank landing ships	30	24	24	15	-15
<b>TOTAL for China of types shown above</b>	<b>239</b>	<b>276</b>	<b>310</b>	<b>333</b>	<b>+94</b>
<b>TOTAL number of U.S. Navy battle force ships</b>	<b>297</b>	<b>287</b>	<b>290 or 291</b>	<b>324 or 350</b>	<b>+27 or +53</b>
<b>U.S. total above compared to China total above</b>	<b>+58</b>	<b>+11</b>	<b>-20 or -19</b>	<b>-9 or +17</b>	<b>-67 or -41</b>

Source: For Chinese navy ships: U.S. Navy data provided to CRS by Navy Office of Legislative Affairs, reflecting data as of October 26, 2020.

Note: The figures for the U.S. Navy for 2030 and 2040 show different alternatives presented in the Navy's FY2023 budget submission.

Source: Adapted from Ronald O'Rourke, *Chinese Naval Modernization: Implications for U.S. Capabilities*, Congressional Research Service RL33153, pp. 9&10.

## Figure Fifteen: China's Evolving Conventional Precision Strike Capability in 2020

**Short-Range Ballistic Missiles (300-1,000 km).** The PLARF has approximately 200 SRBM launchers and over 600 SRBMs. These missile systems include advanced variants with improved ranges and accuracy as well as more sophisticated payloads; earlier generations are being phased out and replaced by variants with true precision strike capability.

**Medium-Range Ballistic Missiles (1,000-3,000 km).** The PLA fields approximately 150 conventional MRBMs launchers and more than 150 missiles which increase the range at which it can conduct precision strikes against land targets and naval ships operating out to the First Island Chain.

**Intermediate-Range Ballistic Missiles (3,000-5,500 km).** The PLA's DF-26 is a road-mobile, nuclear and conventional capable IRBM that is able to conduct near-precision strikes as far away from China as Guam in the Second Island Chain. The PLA has fielded approximately 200 IRBM launchers and more than 200 missiles. In conjunction with reconnaissance satellites, the PLAN's expanding network of sky wave and surface wave over-the-horizon (OTH) systems provide warning and targeting capabilities at extended distances from China to support long-range precision strikes, including employment of ASBMs.

**Land-Attack Cruise Missiles.** The PLA fields approximately 100 ground-launched LACMs launchers and more than 300 missiles for standoff precision strikes. The PLA continues to develop additional LACM-variants for deployment with the PLAN and PLAAF.

**Anti-ship Cruise Missiles.** China deploys a wide range of advanced ASCMs, with the YJ-83 family of missiles the most numerous, and equipping the majority of China's ships as well as multiple aircraft. China has also outfitted several ships with YJ-62 ASCMs. The YJ-18 is a long range, torpedo tube launched ASCM with a supersonic terminal sprint. It has likely replaced the older YJ-82 on Song, Yuan, and Shang class submarines. China claims its new Luyang III class DDGs and Renhai CGs have a vertically launched variant of the YJ-18. China has also developed the long range supersonic YJ-12 ASCM for the H-6 bomber. At a 2018 exhibition, China displayed a ship-to-ship variant of the YJ-12 called the YJ-12A and the ground launched anti-ship variant YJ-12B. China has deployed the YJ-12B to several outposts in the South China Sea. China carries the Russian SS-N-22 SUNBURN on two Russian-built Sovremenny class DDGs. Upgrades to two of the Sovremenny DDGs (Hulls 136 and 137) allow them to fire the YJ-12A. China also employs the Russian SS-N-27b SIZZLER on eight Russian built Kilo class submarines. **Ground Attack Munitions.** The PLAAF has a small number of tactical air-to-surface missiles (ASMs) as well as precision munitions; guidance options include satellite positioning, laser, electro-optic, and imaging infrared. China is developing or adapting a range of smaller ASMs and guided bombs for use on its expanding fleet of armed UAVs.

**Anti-Radiation Weapons.** The PLA imported Israeli-made Harpy UAVs and Russian-made anti-radiation missiles during the 1990s. China is integrating the YJ-91, an indigenous version of the Russian Kh-31P (AS-17), into its fighter-bomber force and advertising the ASN-301 anti-radiation drone, an improved domestic variant of the Harpy.

**Artillery-Delivered High Precision Munitions.** The PLA is fielding long-range rocket artillery systems with the range to strike targets within or even across the Taiwan Strait. The most common of these systems is the PHL-03 12x300 mm multiple-rocket launcher – similar to the Russian 9A52-2

**Anti-Radiation Weapons.** The PLA imported Israeli-made HARPY UAVs and Russian-made anti-radiation missiles during the 1990s. China is integrating the YJ-91, an indigenous version of the Russian Kh-31P (AS-17), into its fighter-bomber force and advertising the ASN-301 anti-radiation drone, an improved domestic variant of the HARPY.

**Artillery-Delivered High Precision Munitions.** The PLA is fielding long-range rocket artillery systems with the range to strike targets within or even across the Taiwan Strait. The most common of these systems is the PHL-03 12x300 mm multiple-rocket launcher – similar to the Russian 9A52-2 SMERCH – with a 150 km range. Improved warheads for these rockets may include vertical penetrators and sensor-fuzed munitions.

Source: U.S. Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020*, August 21, 2020, pp. 59-60.

**Figure Sixteen: Chinese Longer Range Missile Forces – Part One**

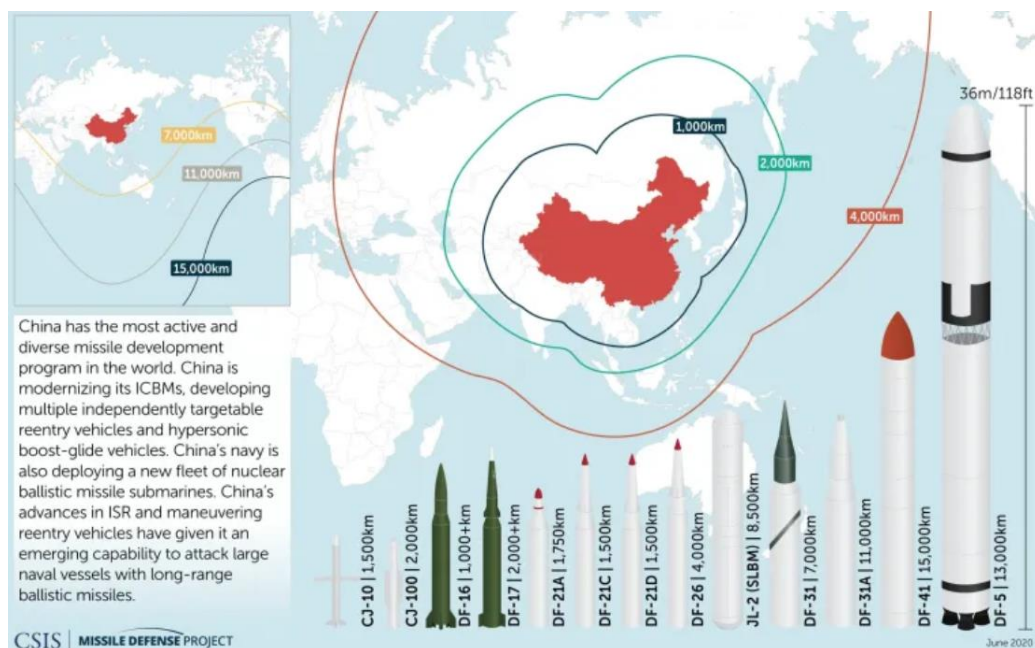
Missile Name	Class	Range	Status
<a href="#"><u>DF-11</u></a>	SRBM	280 - 300 km	Operational
<a href="#"><u>DF-12 / M20</u></a>	SRBM	280 km	Operational
<a href="#"><u>DF-15</u></a>	SRBM	600 km	Operational
<a href="#"><u>DF-16</u></a>	SRBM	800 - 1,000 km	Operational
<a href="#"><u>DF-17</u></a>	HGV	1,800 - 2,500 km	Operational
<a href="#"><u>DF-21</u></a>	MRBM	2,150 km	Operational
<a href="#"><u>DF-26</u></a>	IRBM	4,000 km	Operational
<a href="#"><u>DF-31</u></a>	ICBM	7,000 - 11,700 km	Operational
<a href="#"><u>DF-4</u></a>	IRBM/ICBM	4,500 - 5,500 km	Operational
<a href="#"><u>DF-41</u></a>	ICBM	12,000 - 15,000 km	Operational
<a href="#"><u>DF-5</u></a>	ICBM	13,000 km	Operational
<a href="#"><u>HN 2</u></a>	Cruise Missile	1,400-1,800 km	Operational
<a href="#"><u>HN 3</u></a>	Cruise Missile	3,000 km	Operational
<a href="#"><u>HN 1</u></a>	Cruise Missile	50 - 650 km	Operational
<a href="#"><u>JL-2</u></a>	SLBM	8,000 - 9,000 km	Operational
<a href="#"><u>YJ-18</u></a>	Cruise Missile	220 - 540 km	Operational

Source: Missile Defense Project, "Missiles of China," *Missile Threat*, Center for Strategic and International Studies, June 14, 2018, last modified April 12, 2021, <https://missilethreat.csis.org/country/china/>.



## Figure Sixteen: Chinese Longer Range Missile Forces – Part Two

### Global Range



### Theater Range



Source: Missile Defense Project, "Missiles of China," *Missile Threat*, Center for Strategic and International Studies, June 14, 2018, last modified April 12, 2021, <https://missilethreat.csis.org/country/china/>.

## Figure Fourteen: Chinese Longer Range Missile Forces – Part Three

### Key Chinese Modernization Efforts

- Conventional missile inventory: According to DOD, the PLA's ballistic missile inventory includes 600 or more short-range ballistic missiles (SRBMs, with ranges of 300-1,000 km) paired with 250 launchers, 150 or more medium-range ballistic missiles (MRBMs, with ranges of 1,000-3,000 km) paired with 150 launchers, 200 or more intermediate-range ballistic missiles (IRBMs, with ranges of 3,000-5,500 km) paired with 200 launchers, and 100 intercontinental-range ballistic missiles (ICBMs, with ranges greater than 5,500 km) paired with 100 launchers, as well as submarine-launched ballistic missiles. The PLA fields hundreds of cruise missiles as well.
- DF-26 IRBM: According to DOD, this missile, which entered service in 2015, is a road-mobile IRBM that can conduct nuclear and conventional precision strikes against ground targets and conventional strikes at naval targets in the Western Pacific, South China Sea, and Indian Ocean. Some analysts argue that the apparent ability to swap out conventional and nuclear warheads quickly could create ambiguity and create opportunities for dangerous inadvertent escalation. DOD revised its estimate of DF-26 launchers from 80 in 2019 to 200 in 2020.
- DF-41 ICBM: DOD and others estimate that this intercontinental ballistic missile, which is "currently in various stages of development and deployment" according to the International Institute for Strategic Studies, could have a range of 12,000-15,000 km. DOD notes it is road-mobile and suggests it could be launched from silos and transported via rail. It is capable of carrying multiple independently targetable reentry vehicles. Other ICBMs the PLARF currently fields include the road-mobile DF-31 and the DF-5, the PLA's oldest and longest-range ICBM, variants of which can carry up to five multiple independently targetable reentry vehicles, according to DOD.
- Hypersonic glide vehicles: China has invested heavily in and is testing a hypersonic glide vehicle, the DF-ZF, which, according to DOD and other observers, would be paired with the DF-17 medium-range missile system.<sup>228</sup> The DF-17/DF-ZF likely is aimed at evading ballistic missile defenses, and could be the first intermediate-range hypersonic glide vehicle to be fielded (the United States is developing hypersonic glide vehicles as well, and Russia announced it had deployed its first such weapon in 2019). In 2020, a U.S. military commander appeared to suggest that the DF-41 also could carry a nuclear hypersonic glide vehicle.
- CJ-100/DF-100 cruise missile: Unveiled at the PLA's October 2019 National Day military parade, the CJ-100 is a ground launched cruise missile that some observers expect to have a 6,000 km strike range if paired with the PLA's H-6N bomber.
- SRBMs: China's SRBM force, which is improving its range, accuracy, and payload sophistication, would have particular relevance at the outset of a Taiwan conflict. Among these is the DF-16 (which DOD refers to as an SRBM but others consider a MRBM). Many PLARF missile brigades are located across the Taiwan Strait from Taiwan. The SRBM force is becoming smaller over time as ground-launched cruise missiles and MRBMs have come online.

Source: Caitlin Campbell, *China's Military: The People's Liberation Army*, CRS, R46808, September 8, 2021, pp. 38-39.

### ***China's Growing Regional Military Power***

Once again, however, “winter wars” can be wars of political and economic influence, and China is now a far more serious source of such wars than Russia. Since 1990, Chinese has emerged as the world’s largest manufacturing power, and as a global economic power whose trading capabilities have a major global impact in every continent, and whose “belt and road” activities often include features that give it direct or potential military access and leverage.

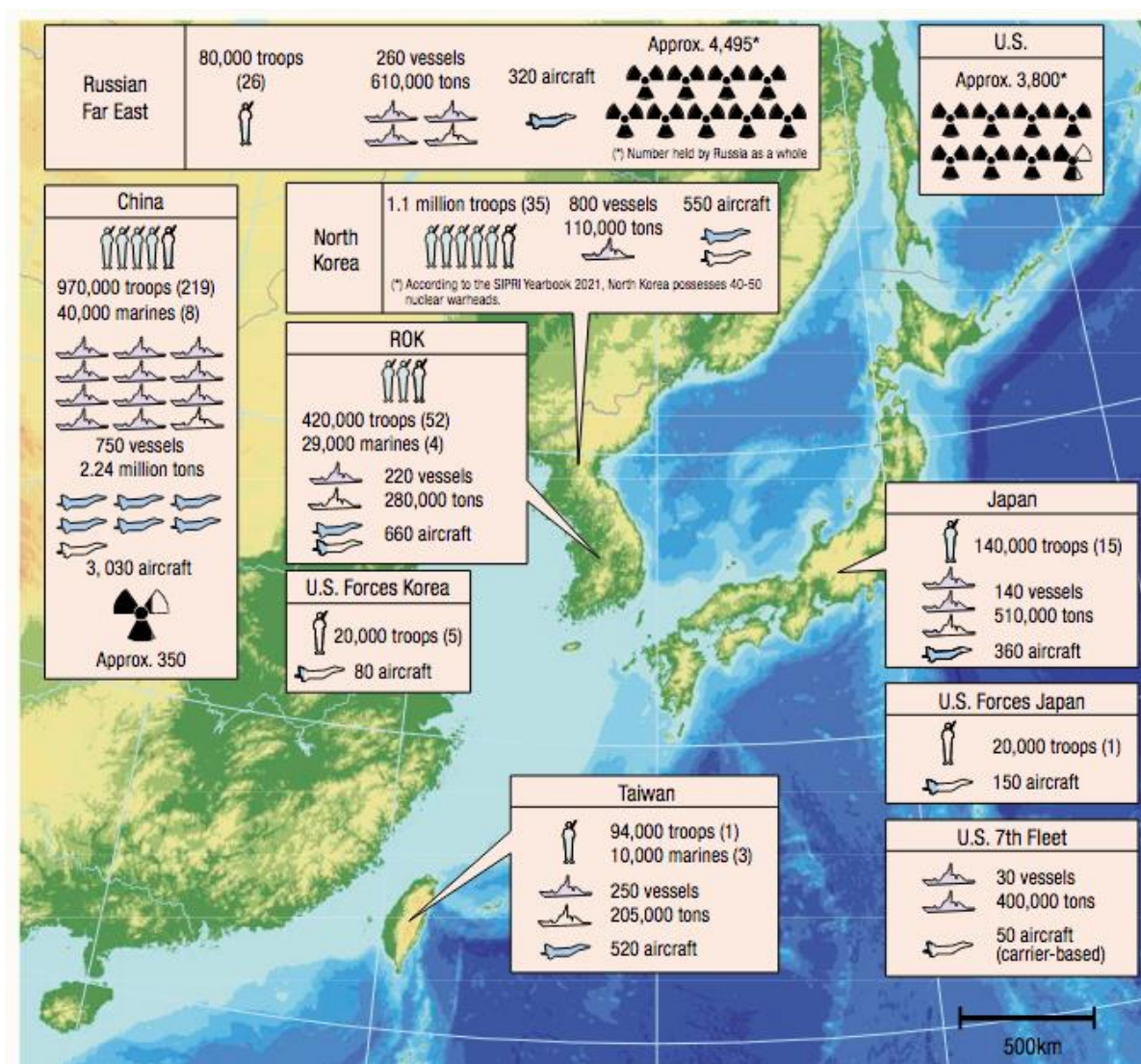
The growth of China’s overall level of military power relative to other states in the Pacific region has been particularly striking, and is shown in **Figure Seventeen**. It has reached the point where it is yet another form of winter war with the U.S, and is clear from the comparisons of Chinese forces with those of the U.S., Russia, the Koreas, Japan, and Taiwan in 2021 that China already was the largest military power in the region – although it did not match the U.S. Japan, and South Korea in many aspects of force quality.

More broadly, **Figure Eighteen** shows that unclassified intelligence assessments show that China has increased its military spending far more quickly than Russia, the U.S. and regional powers. China and Xi can draw upon a far stronger economic base and level of military spending than Putin can in Russia. China is also making a far larger annual investment in technology and a far higher level of manufacturing capability. These trends are shown in detail in a separate CSIS study entitled *Major Powers and Strategic Partners: A Graphic Net Assessment*.<sup>24</sup>

That assessment shows that China’s rapid growth as a global economic trading power, aggressive foreign investment, and state-driven ability to seek economic ties and leverage on global basis – exemplified by its Belt and Road Initiative – have made it a major global economic and technological power at a time Russia has lagged badly in economic development and fallen far behind in its overall manufacturing and STEM efforts.

China’s future growth does, however, face growing challenges. Its rate of economic growth has diminished since 2021, it has badly mismanaged its effort to deal with COVID, its property market is in a crisis, its labor and manufacturing costs are rising, it is over-regulating its technology sector, unemployment is rising, and its population is aging.

**Figure Seventeen: Japanese MOD Estimate of the Military Forces in the Western Pacific and Taiwan in 2022**



- Notes: 1 Source: Documents published by the DoD, "The Military Balance 2022" and "SIPRI Yearbook 2021," etc.  
 2 Figures for Japan indicate the strength of each SDF as of the end of FY2021; the number of combat aircraft is the sum of ASDF aircraft (excluding transport aircraft) and MSDF aircraft (fixed-wing aircraft only).  
 3 Figures for the ground forces of U.S. Forces Japan/Korea indicate the combined total for Army troops and U.S. Marines.  
 4 Figures for combat aircraft include naval and marine aircraft.  
 5 Figures in parentheses indicate the total number of major units such as divisions and brigades. That for North Korea includes only divisions. That for Taiwan includes military police.  
 6 The figures for the U.S. 7th Fleet indicate forces forward-deployed to Japan and Guam.  
 7 The figures for the combat aircraft of U.S. Forces Japan and the U.S. 7th Fleet include only fighter aircraft.

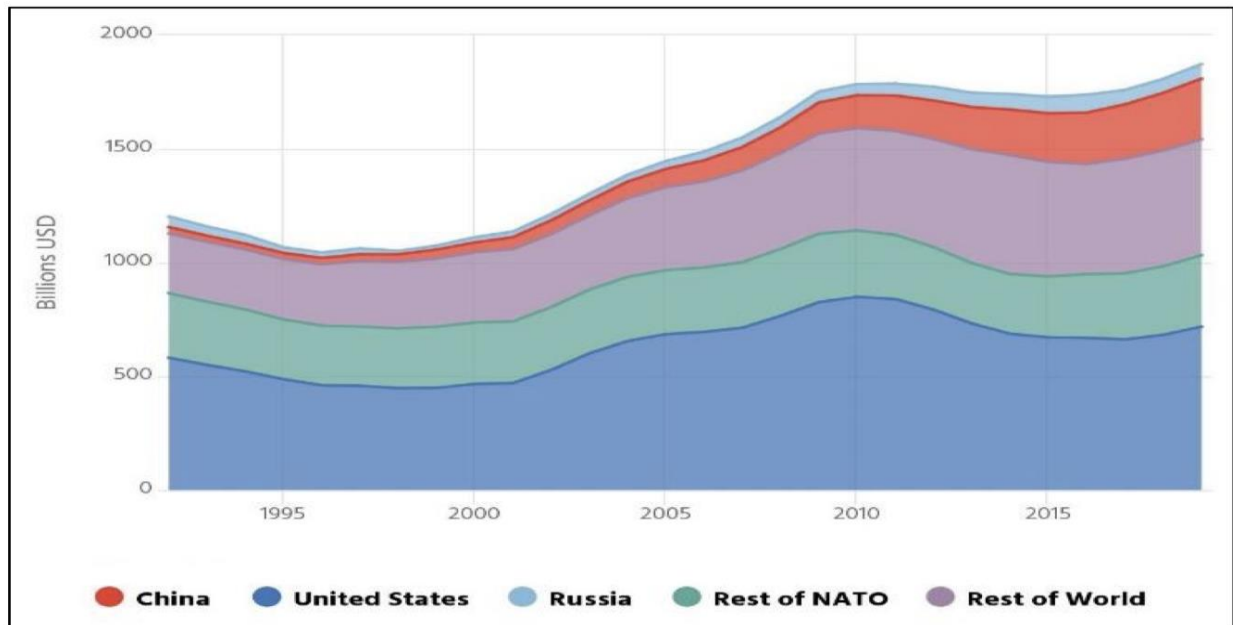
**Legend**

Ground forces (200,000 troops)	Vessels (200,000 tons)	Combat aircraft (500 aircraft)	Number of nuclear warheads (500)
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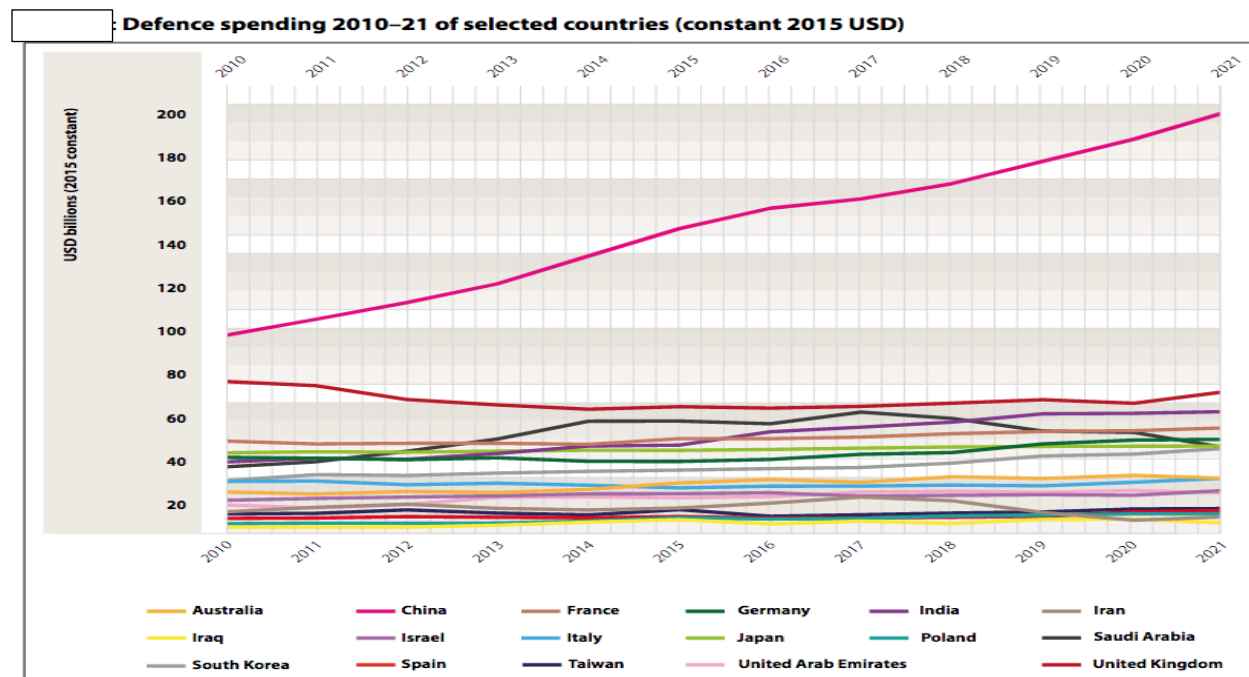
Adapted from Japan, Ministry of Defense, *Defense of Japan* 2022, August 2022, p. 5, [https://s3.documentcloud.org/documents/22187264/doj2022\\_en\\_full.pdf](https://s3.documentcloud.org/documents/22187264/doj2022_en_full.pdf)



**Figure Eighteen: Increases in Chinese Military Spending Compared to Other Powers**



### *Comparison with Individual Powers*



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>; and 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\

### ***Chinese versus U.S. Force Modernization and Force Development Efforts***

There is no way to make a reliable unclassified net assessment of the full range of current Chinese and U.S. capabilities or their future and comparative evolution. Not only are there no reliable unclassified data on Chinese plans and progress in many areas, the new *National Security Strategy* that U.S. issued in October 2022 had virtually no plans, programs, and budget data on how the U.S. intended to achieve its strategic goals relative to China. This means that the impact of the new strategy on U.S. plans to deal with China and Russia will only emerge when the President submits a new defense budget proposal to Congress early in 2023.

What is clear is that the “winter war.” between the U.S. and China is far more serious at a practical military level in many areas than some U.S. and Chinese diplomatic rhetoric indicates, and that Taiwan has become a major focus of such tension. The U.S. *National Security Strategy* issued in October 2022 notes that,<sup>25</sup>

We have an abiding interest in maintaining peace and stability across the Taiwan Strait, which is critical to regional and global security and prosperity and a matter of international concern and attention. We oppose any unilateral changes to the status quo from either side, and do not support Taiwan independence. We remain committed to our one China policy, which is guided by the Taiwan Relations Act, the Three Joint Communiqués, and the Six Assurances. And we will uphold our commitments under the Taiwan Relations Act to support Taiwan’s self-defense and to maintain our capacity to resist any resort to force or coercion against Taiwan.

The U.S. and China have repeatedly conducted competing exercises and movement in the Taiwan Straits, the U.S. has built up its power projection capabilities and base in Guam, and is reshaping its Navy and Marine Corps to deal with the emerging Chinese threat. Media reports also make it clear that it is conducting a wide range of war games and studies to deal with the possibility of war to defend Taiwan from a Chinese invasion as well as to support Japan, Australia, South Korea, and other partners and friendly states.

At the same time, Taiwan presents a special challenge for the U.S. The late Andrew Marshall highlighted this challenge early in China’s competition with the U.S. by highlighting what he called “countervailing power.” The ability of one side to pressure the other by creating a military crisis and build-up that forced the other to spend far more of its money and military efforts to meet a challenge than the other.

Competing at the opposite side of the Pacific over the security of an island in the area where China normally deploys much of its military power, and at the distances the Pacific imposes in terms of U.S. power projection, is far more expensive for the U.S. than for China. China can step up the level of force the U.S. needs to compete with China through relatively simple deployments and at comparatively little cost, and it takes minimal risk of actually having to fight unless it chose to initiate a conflict. A successful U.S. defense of Taiwan would scarcely inspire of China, and could then confront the U.S. with having to sustain an even greater forward military presence tailored to the defense of one strategic partner. Yet, any U.S. failure to defend Taiwan would undermine its entire strategic position in Asia.

A major conflict or clash between the U.S. and China does seem unlikely in the near term and may never occur. China is after all the land of Sun Tzu, and has already shown how well it can focus on forms of warfare that rely on economic power and military influence rather than combat. President Biden has stated that war is unlikely in the next two years, although he expects the PRC to increase pressure on Taiwan as it expands its military capabilities for an amphibious invasion.<sup>26</sup>

Two years, however, is scarcely a long period in strategic terms, and media reports make it clear that the U.S. is conducting war games and exercises to find the best way to deal with a Chinese invasion of Taiwan, and is planning for a sudden war over Taiwan and one that could easily escalate to cover much of the South China Sea and the rest of the western Pacific.

More broadly, the U.S. *National Security Strategy* issued in October 2022 that the U.S. sees the expansion of Chinese influence in Southeast Asia, the Indian Ocean, and the Gulf, the rest of the Middle East, and Africa as hostile and as a far broader threat.<sup>27</sup> No one on either side can dismiss that risk of a conflicts somewhere else in the Pacific or Asia, or be certain of the level of theater-wide escalation or intensity of combat that might occur.

Moreover, the level of tension between China and the U.S., and its allies over trade, economic policy, and technological espionage has reached a level of confrontation bordering on economic warfare. The U.S., along with a number of its strategic partners in the West and Asia, has taken steadily sharper measures to limit China's access to key areas of technology with military applications or that can be used for economic warfare and to apply penalties and sanctions.

A meeting of President Biden and President XI on November 14, 2022 did try to put a different public face on these developments, and give the impression that the U.S. and China were actively seeking to improve their level of cooperation. In reality, however, it seemed to be largely an attempt to find ways to maintain trade and more limited forms of economic cooperation between two powers that were actively involved in political and economic warfare in many areas than an effort to resolve the difference between the two countries

It was clear from the White House statements about the meeting, however, that it did not resolve any key issues. It instead sought to find some areas where both sides could benefit without making any serious changes in their competition, and that it reflected more of a reaction to the common problems the U.S. and China faced because of COVID and the war in the Ukraine than a serious effort to change their strategic positions.<sup>28</sup>

The speeches of President Xi Jinping – who chairs China's Central Military Commission – at the China's 20<sup>th</sup> Party Congress were as confrontational as the new US National Security Strategy issued in October 2022. Both made it clear that China and the U.S. are engaged a “winter war” that seems likely to continue for years to come, and one with all of the same major risks as the “winter war” with Russia.

At the same time, both sides have every incentive to try to win their confrontation over Taiwan without actual combat, and an actual major conflict or clash between the U.S. and China does seems unlikely in the near term, President Biden stated in November 2022 that war is unlikely in next two years, although he also stated that he expected the PRC to increase pressure on Taiwan as it expands its military capabilities for an amphibious invasion.<sup>29</sup>

### ***Growing Chinese Ties to Russia?***

At the same time, serious questions exist about the extent to which U.S. and other security efforts to deal with China can be separated from those necessary to deal with Russia. Although most experts feel there are serious limits to the level of “friendship” and alliance between the two countries, this is far from certain. For example, Japan's 2022 defense white paper noted that Russian and Chinese overflights and naval exercises have sharply increased in the areas north of Japan, and treats them as a serious potential threat.<sup>30</sup>

The U.S. *National Security Strategy* issued in October 2022 made it clear that the U.S. saw both China and Russia as major threats to the international order, but – as noted earlier – it gave primacy to China and saw each threat as different in character:<sup>31</sup>

The People's Republic of China harbors the intention and increasingly, the capacity to reshape the international order in favor of one that tilts the global playing field to its benefit, even as the United States remains committed to managing the competition between our countries responsibly....The most pressing strategic challenge facing our vision is from powers that layer authoritarian governance with a revisionist foreign policy. It is their behavior that poses a challenge to international peace and stability—especially waging or preparing for wars of aggression, actively undermining the democratic political processes of other countries, leveraging technology and supply chains for coercion and repression, and exporting an illiberal model of international order. Many non-democracies join the world's democracies in forswearing these behaviors.

Unfortunately, Russia and the People's Republic of China (PRC) do not. Russia and the PRC pose different challenges. Russia poses an immediate threat to the free and open international system, recklessly flouting the basic laws of the international order today, as its brutal war of aggression against Ukraine has shown. The PRC, by contrast, is the only competitor with both the intent to reshape the international order and, increasingly, the economic, diplomatic, military, and technological power to advance that objective.

... we recognize that globalization has delivered immense benefits for the United States and the world but an adjustment is now required to cope with dramatic global changes such as widening inequality within and among countries, the PRC's emergence as both our most consequential competitor and one of our largest trading partners, and emerging technologies that fall outside the bounds of existing rules and regulations. We have an affirmative agenda for the global economy to seize the full range of economic benefits of the 21st century while advancing the interests of American workers. Recognizing we have to move beyond traditional Free Trade Agreements, we are charting new economic arrangements to deepen economic engagement with our partners, like the Indo-Pacific Economic Framework for Prosperity (IPEF); a global minimum tax that ensures corporations pay their fair share of tax wherever they are based in the world; the Partnership for Global Investment and Infrastructure (PGII) to help low- and middle- income countries secure high-standard investment for critical infrastructure; updated rules of the road for technology, cyberspace, trade, and economics; and ensuring the transition to clean energy unlocks economic opportunities and good jobs around the world.

... The world is now at an inflection point. This decade will be decisive, in setting the terms of our competition with the PRC, managing the acute threat posed by Russia, and in our efforts to deal with shared challenges, particularly climate change, pandemics, and economic turbulence.

The key question for the future is whether Russia and China see the United States and America's strategic partners as common threat that drive the two countries to cooperate more closely. Russia and China are already holding more frequent joint exercises in the Pacific, and the Japanese defense white paper for 2022 stresses the importance of their growing cooperation. At the same time, both differ sharply in their overall areas and levels of civil global economic influence. Russia and China compete for influence in Central Asia. And, each state has good reasons to avoid taking the risk of becoming involved a major war by supporting the other power a major theater conflict. This is particularly true if there is a risk of nuclear escalation,

These divisions explain why many experts feel there will be serious limits to the level of a "friendship" and alliance between the two countries, but this is far from certain. China has cooperated with Russia in the Shanghai Cooperation Organization since the days when it was the Shanghai Five. China has also based much of its military modernization on Russian weapons and technology, and Japan's 2022 defense white paper notes that Russian and Chinese overflights and naval exercises have sharply increased in the areas north of Japan, and treats them as a serious potential threat.<sup>32</sup>



It also seems likely that Russia will ultimately emerge from the war in the Ukraine in greater need of a major outside strategic partners. More broadly, China and Russia could both gain from a stronger partnership in the strategic aspects of their wars in energy, economics, and technology, and building up their military strength in gaining military leverage and in the event of any serious regional or theater conflict. It is true that authoritarian regimes tend to seek partnerships that serve the ambitions of their individual leader, but in this case that ambitions may increasingly coincide.

## The “Winter Wars” in Fragile, Divided, Authoritarian, and Undeveloped States

The “winter wars” involving the major powers present the worst risks of broad theater-wide and global conflicts, but they are only part of the overall threat posed by winter wars. There are major regional “winter wars” in regions like the Middle East and Asia, and in much of the developing world, where many states face tensions or conflicts with their neighbors, and a majority have increasing problems in terms of food supplies, energy imports, and poverty this winter, as well as serious damage from climate change and global warming.

Iran and the civil wars in the Middle East and North Africa are one key source of regional winter wars. The Koreas and Taiwan are another. As for more local or internal conflicts, there is a long list of states where these are key problems and many face a more trouble situation because of the War in the Ukraine’s impact on food exports and energy costs, and many of these problems are the result of internal tensions and violence.

It is no coincidence that the World Bank list of “Fragile and Conflict Affected Situations” in FY2022 shown in **Figure Nineteen** includes so many countries governed by regimes that have failed to develop effectively, that have failed to heal the division between their peoples, have elites that are actively exploit much of the population, and/or have regimes that are highly authoritarian and repressive.<sup>33</sup>

The full scale of the current level of global conflicts is illustrated in the fact that the summary list of ongoing conflicts that is available on Wikipedia is four pages long, although this list ignores many smaller ethnic, sectarian, tribal, and other low-level internal civil conflicts.<sup>34</sup> ACLED also provides an extensive analysis of such conflicts.<sup>35</sup>

The comparisons of total military spending provide another rough way of showing the global scale of military competition and the potential for violence. These data are summarized in the estimate by the Stockholm International Institute of Peace Research (SIPRI) shown in **Figure Twenty**. Such data are often uncertain, and some of the nations listed in this Figure are not directly involved in actual combat or major winter wars. At the same time, the data do make it clear that other nations and region are now spending over two trillion dollars a year on military competition, often at a serious cost to national economic development.

### Figure Nineteen: World Bank List of Fragile States and Conflict Situations in 2022

#### **HIGH-INTENSITY CONFLICT**

**Afghanistan**  
**Somalia**  
**Syrian Arab Republic**  
**Yemen, Rep.**

#### **HIGH-INTENSITY CONFLICT (INTERNATIONAL)**

**Armenia**  
**Azerbaijan**

#### **MEDIUM-INTENSITY CONFLICT**

**Burkina Faso**  
**Burundi**  
**Cameroon**  
**Central African Republic**  
**Chad**  
**Congo, Dem. Rep.**  
**Ethiopia**  
**Haiti**  
**Iraq**  
**Libya**  
**Mali**  
**Mozambique**  
**Myanmar**  
**Niger**  
**Nigeria**  
**South Sudan**

#### **HIGH INSTITUTIONAL AND SOCIAL FRAGILITY**

#### **NON SMALL STATES**

**Congo, Rep.**  
**Eritrea**  
**Guinea-Bissau**  
**Kosovo**  
**Lebanon**  
**Papua New Guinea**  
**Sudan**  
**Venezuela, RB**  
**West Bank and Gaza (territory)**  
**Zimbabwe**

#### **SMALL STATES**

**Comoros**  
**Kiribati**  
**Marshall Islands**  
**Micronesia, Fed. Sts.**  
**Solomon Islands**

Source: Adapted from World Bank, data base,

<https://thedocs.worldbank.org/en/doc/bb52765f38156924d682486726f422d4-0090082021/original/FCSList-FY22.pdf>

## Figure Twenty-One: The “Winter War” in Military Spending by Region and Major Spender in 2021-Part One

### By Region

Region and subregion	Spending (\$ b.), 2021	Change (%)		World share (%), 2021
		2020–21	2012–21	
<b>World</b>	<b>2 113</b>	<b>0.7</b>	<b>12</b>	<b>100</b>
<i>Africa<sup>a</sup></i>	(39.7)	1.2	2.5	(1.9)
North Africa	(19.6)	–1.7	29	(0.9)
Sub-Saharan Africa <sup>a</sup>	20.1	4.1	–14	1.0
<i>Americas<sup>b</sup></i>	883	–1.2	–4.2	42
Central America and the Caribbean <sup>b</sup>	11.0	–2.5	58	0.5
North America	827	–1.2	–5.1	39
South America	45.3	–0.6	4.7	2.1
<i>Asia and Oceania<sup>c</sup></i>	586	3.5	48	28
Central Asia <sup>d</sup>	1.8	–0.8	14	0.1
East Asia <sup>e</sup>	411	4.9	55	19
Oceania	35.3	3.5	43	1.7
South Asia	95.1	0.8	36	4.5
South East Asia	43.1	–2.3	25	2.0
<i>Europe</i>	418	3.0	19	20
Central and Western Europe	342	3.1	20	16
Eastern Europe	76.3	2.3	15	3.6
<i>Middle East<sup>f</sup></i>	(186)	–3.3	5.6	(8.8)

### Top 40 spenders

Rank			Spending (\$ b.), 2021	Change (%)		Spending as a share of GDP (%) <sup>b</sup>		World share (%), 2021
2021	2020 <sup>a</sup>	Country		2020–21	2012–21	2021	2012	
1	1	United States	801	–1.4	–6.1	3.5	4.5	38
2	2	China	[293]	4.7	72	[1.7]	[1.7]	[14]
3	3	India	76.6	0.9	33	2.7	2.6	3.6
4	6	United Kingdom	68.4	3.0	3.7	2.2	2.4	3.2
5	5	Russia	65.9	2.9	11	4.1	3.7	3.1
<b>Subtotal top 5</b>			<b>1 305</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>62</b>
6	8	France	56.6	1.5	13	1.9	1.9	2.7
7	7	Germany	56.0	–1.4	24	1.3	1.2	2.7
8	4	Saudi Arabia	[55.6]	–17	–15	[6.6]	[7.7]	[2.6]
9	9	Japan	54.1	7.3	18	1.1	1.0	2.6
10	10	South Korea	50.2	4.7	43	2.8	2.5	2.4
<b>Subtotal top 10</b>			<b>1 578</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>75</b>
11	11	Italy	32.0	4.6	9.8	1.5	1.4	1.5
12	12	Australia	31.8	4.0	42	2.0	1.7	1.5
13	13	Canada	26.4	3.1	40	1.3	1.1	1.3
14	18	Iran	24.6	11	–17	2.3	2.8	1.2
15	14	Israel	24.3	3.1	35	5.2	5.6	1.2
<b>Subtotal top 15</b>			<b>1 717</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>81</b>

## Figure Twenty-One: The “Winter War” in Military Spending by Region and Major Spender in 2021-Part Two

### Top 40 spenders

Rank			Spending (\$ b.),	Change (%)		Spending as a share of GDP (%) <sup>b</sup>		World share (%)
2021	2020 <sup>d</sup>	Country		2021	2020–21	2012–21	2021	
Subtotal top 15			1 717	..	..	..	..	81
16	17	Spain	19.5	5.6	5.2	1.4	1.4	0.9
17	15	Brazil	19.2	−4.3	−5.3	1.2	1.4	0.9
18	16	Turkey	15.5	−4.4	63	2.1	2.0	0.7
19	20	Netherlands	13.8	−0.5	26	1.4	1.2	0.7
20	19	Poland	13.7	−5.2	58	2.1	1.8	0.6
21	21	Taiwan	13.0	1.4	7.9	1.7	2.1	0.6
22	..	Qatar	11.6	..	..	4.8	..	0.5
23	22	Pakistan	11.3	−0.7	47	3.8	3.5	0.5
24	23	Singapore	11.1	7.1	24	3.0	3.1	0.5
25	25	Colombia	10.2	4.7	30	3.4	3.2	0.5
26	24	Algeria	9.1	−6.1	16	5.6	4.5	0.4
27	30	Kuwait	9.0	25	34	6.7	3.4	0.4
28	27	Mexico	8.7	−3.4	63	0.7	0.5	0.4
29	26	Indonesia	8.3	−15	35	0.7	0.7	0.4
30	28	Norway	8.3	0.8	39	1.8	1.4	0.4
31	37	Greece	8.1	46	54	3.9	2.4	0.4
32	32	Sweden	7.9	14	46	1.3	1.1	0.4
33	29	Thailand	6.6	−8.5	16	1.3	1.4	0.3
34	36	Belgium	6.3	9.2	17	1.1	1.0	0.3
35	38	Chile	6.2	8.6	34	2.0	2.0	0.3
36	34	Ukraine	[5.9]	−8.5	142	[3.2]	[1.6]	[0.3]
37	45	Finland	5.9	36	50	2.0	1.5	0.3
38	33	Oman	[5.8]	−9.6	−43	[7.3]	[12]	[0.3]
39	31	Switzerland	5.7	−13	22	0.7	0.7	0.3
40	39	Romania <sup>c</sup>	5.6	3.1	161	2.0	1.2	0.3
Subtotal top 40			1 963	..	..	..	..	93
World			2 113	0.7	12	2.2	2.3	100

.. = data not available or not applicable; [] = SIPRI estimate; GDP = gross domestic product.

<sup>a</sup> Rankings for 2020 are based on updated military expenditure figures in the current edition of the SIPRI Military Expenditure Database. They may therefore differ from the rankings for 2020 given in *SIPRI Yearbook 2021* and in other SIPRI publications in 2021.

<sup>b</sup> The figures for military expenditure as a share of GDP are based on estimates of 2021 GDP from the International Monetary Fund World Economic Outlook and International Financial Statistics databases.

<sup>c</sup> Romania's military burden in 2021 was 1.95% of GDP, which is rounded here to 2.0%.

Sources: SIPRI Military Expenditure Database, Apr. 2022; International Monetary Fund, World Economic Outlook Database, Oct. 2021; and International Monetary Fund, International Financial Statistics Database, Sep. 2021.

Source: Tables excerpted from De Silvea, Nan Tian, Beraud-Sudreau, Marksteiner, and Liang, , *Trends in World Military Expenditures, 2021*, SIPRI, April 2022, [https://www.sipri.org/sites/default/files/2022-04/fs\\_2204\\_milex\\_2021\\_0.pdf](https://www.sipri.org/sites/default/files/2022-04/fs_2204_milex_2021_0.pdf).

### *Economics, Development, and Governance as Causes of Global Conflict*

Once again, military developments are only part of the elements shaping such wars, and political and economic tensions and conflicts, and using military forces to win objectives without fighting are key sources of conflict and one where non-military factors can be as important as military strength.

The new U.S. National Security Strategy recognizes the existence of a growing global food crisis and energy problems. The various NGO lists of fragile states also reflect a growing number of what are called “fragile states,” also they often should really be called “failed states” with governments – something that is all too clear when the rankings of “fragile states” are compared with the corruption rankings of Transparency International and the governance rankings of the World Bank. It is scarcely surprising that Transparency International rated nations with higher levels of violence like the Congo, Libya, Afghanistan, North Korea, Yemen, Afghanistan, Syria, Somalia, and the South Sudan, as some of the most corrupt nations in the world in 2021.

The *UN Human Development Report for 2022*, reports record levels of political polarization, and negative views of the world, and that more than 6 in 7 people polled feel insecure about the level of global progress. It notes that declines on the Human Development Index (HDI) were widespread, with over 90 percent of countries enduring a decline in 2020 or 2021.<sup>36</sup> The Global Peace Index, which covers 163 countries, found the 11th deterioration in peacefulness in the last fourteen years.<sup>37</sup>

More generally, the World Bank governance indicators show major gap in the equality of every aspect of governance, including violence, between low income and high come states. This comparison is summarized in **Figure Twenty-Two**.

These negative trends have – and are being – exacerbated this winter by the impact of COVID, and the inflation and food crisis caused by the War in the Ukraine, but they have also been driven by failed national governance over periods of several decades. In any case, the end result is that there has been a steady rise in global political extremism, and in ethnic, sectarian, and tribal tensions and conflicts. It has also been a more than 100% increase in the number of refugees since 2011, and an 8% increase in 2021 alone

The UNHCR report on the global trends in refugees for 2022 reports that by the end of 2021, there were 27.1 million refugees globally and 53.2 million people displaced within their home countries.<sup>38</sup> In virtually every case, the country involved at most received humanitarian aid and only provided temporary relief, and failed to make any serious advances in development or providing lasting solutions to the problems that were creating more refugees.

Economic development is another key cause of such “winter wars” and violence. Most of the world’s poorer states are the product of long periods of failed governance, and internal turmoil, but global economics are also a major cause. The global trends in the winter of 2022-2023, and the risks they create of more serious forms of war, are a clear case in point. The IMF *World Economic Outlook for 2022*, issued in October 2022, warns that,<sup>39</sup>

Our latest forecasts project global growth to remain unchanged in 2022 at 3.2 percent and to slow to 2.7 percent in 2023—0.2 percentage points lower than the July forecast—with a 25 percent probability that it could fall below 2 percent. More than a third of the global economy will contract this year or next, while the three largest economies—the United States, the European Union, and China—will continue to stall. In short, the worst is yet to come, and for many people 2023 will feel like a recession. Russia’s invasion of Ukraine continues to powerfully destabilize the global economy.

Beyond the escalating and senseless destruction of lives and livelihoods, it has led to a severe energy crisis in Europe that is sharply increasing costs of living and hampering economic activity. Gas prices in Europe have increased more than four-fold since 2021, with Russia cutting deliveries to less than 20 percent of their 2021 levels, raising the prospect of energy shortages over the next winter and beyond. More broadly, the conflict has also pushed up food prices on world markets, despite the recent easing after the Black Sea grain deal, causing serious hardship for low-income households worldwide, and especially so in low-income countries.

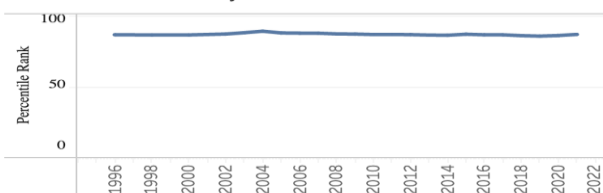
Persistent and broadening inflation pressures have triggered a rapid and synchronized tightening of monetary conditions, alongside a powerful appreciation of the US dollar against most other currencies. Tighter global monetary and financial conditions will work their way through the economy, weighing demand down and helping to gradually subjugate inflation. So far, however, price pressures are proving quite stubborn and a major source of concern for policymakers. We expect global inflation to peak in late 2022 but to remain elevated for longer than previously expected, decreasing to 4.1 percent by 2024

The World Bank warns that while the rise in global poverty caused by COVID may now be declining, this decline is uncertain and that some 75 to 95 additional millions of people are still in a state of dire poverty. Its *2022 Poverty and Prosperity Report* indicates that, “nearly half the world – over 3 billion people – lives on less than US \$6.85 per day, which is the average of the national poverty lines of upper-middle-income countries,” and that “574 million people – nearly 7 percent of the world’s population – will still be living on less than US \$2.15 a day in 2030.”<sup>40</sup>

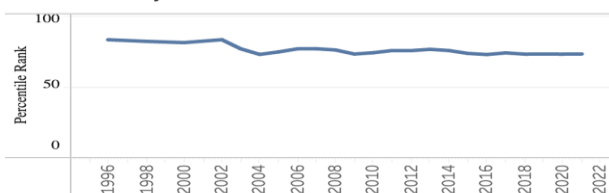
## Figure Twenty-Two: The Comparative Quality of Governance in High and Low Income States

### High Income OECD

Voice and Accountability



Political Stability and Absence of Violence/Terrorism



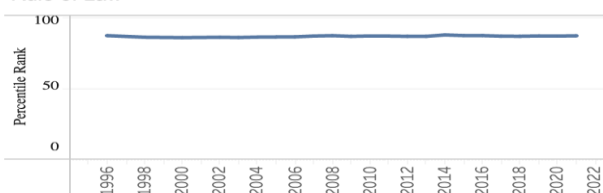
Government Effectiveness



Regulatory Quality



Rule of Law



Control of Corruption



### Low Income

Voice and Accountability



Political Stability and Absence of Violence/Terrorism



Government Effectiveness



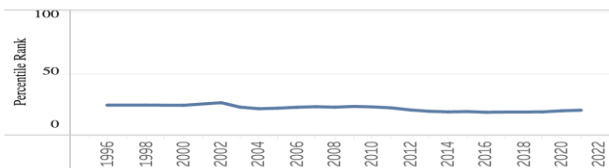
Regulatory Quality



Rule of Law



Control of Corruption



Source: World Bank, *Governance Indicators*, <https://info.worldbank.org/governance/wgi/Home/Reports>



### ***Population Growth, Hyperurbanization, Climate Change and Water: Structural Causes of International Violence***

UN estimates of population growth, and various failed state indices of NGOs warn that this population growth is major problem for poorer and less developed states that gets far too little practical attention. **Figure Twenty-Three** provides a clear warning of just how serious population growth has been – and will be – in creating tensions within and between states.

Population growth, however, is only one of the major ongoing structural causes of violence that affect every state in the world. Such changes are harder to quantify, and vary sharply by country. It is clear, however, that many cases they have indirect impacts on the violence in neighboring countries that do not have a major internal problem.

Population growth also leads to massive shifts in the way given elements of the population interact and national economics. **Figure Twenty-Three** also provides a graph of the massive increase in urbanization since 1960, and a projection through 2045.

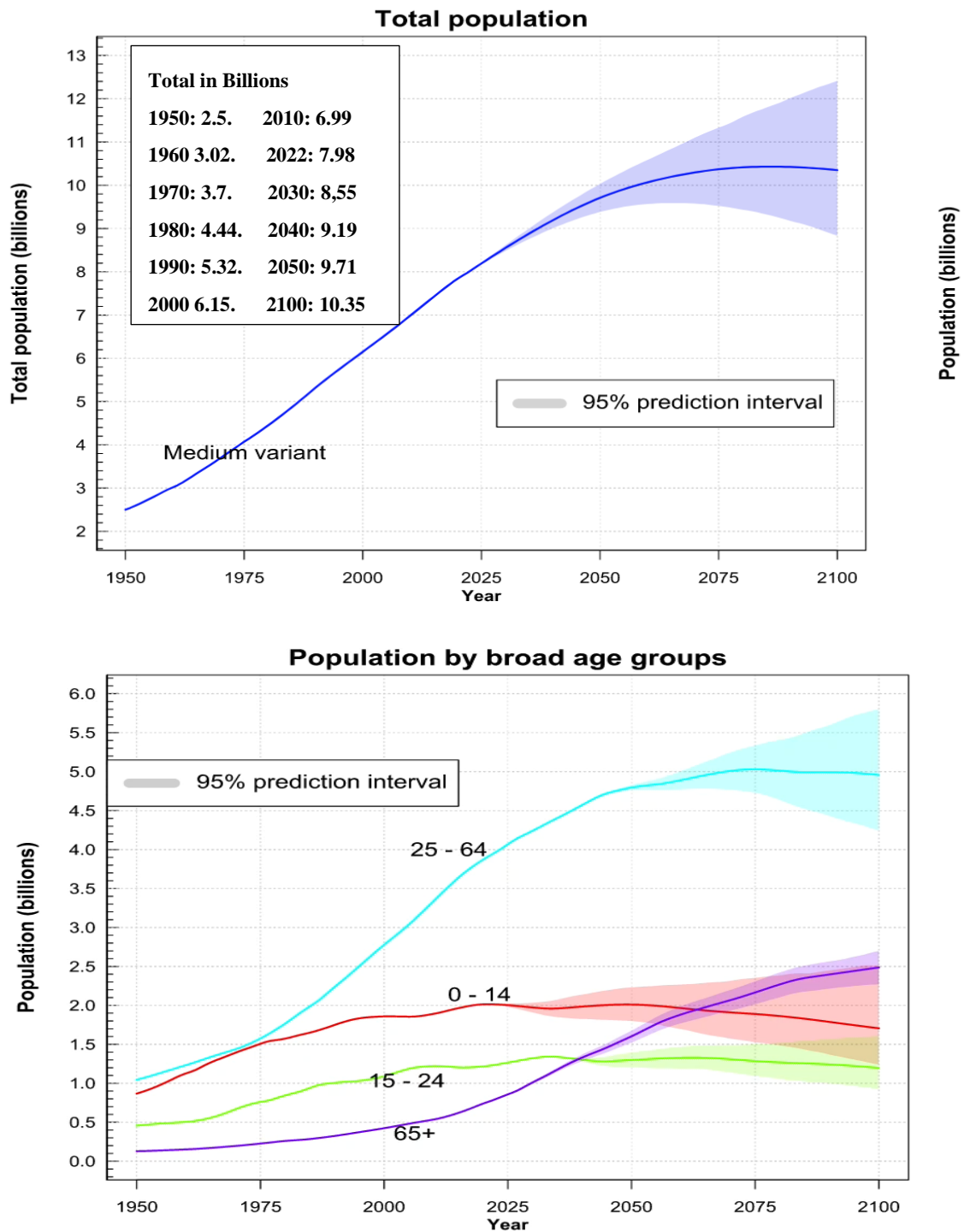
This growth has often been productive more developed and better governed countries. It has had very different impacts in many of the countries which have internal “winter wars.” In all too many countries in the world with serious racial, religious, ethnic, tribal, and regional divisions; the rise in urbanization has broken down the traditional structure of separation between them and forced them together.

It has led to massive social change, often with conflicting values, and competition for jobs and income of market terms – ending the ability of large elements of the total population to live through subsistence or near-subsistence agriculture. In most such countries, the cost of urban living has also raised the real-world per capita cost of emerging out of poverty – often to levels that current estimates of poverty do not reflect.

There are other structural changes are also rising source of violence or potential violence that are harder to quantify. These include climate change and water. The data on climate change are still highly uncertain, and the real prospects for action in dealing with such problems are even more uncertain. Many countries are already facing some degree of strain, however, including most of the Middle East and North Africa. The issue is no longer “whether?” It is how soon and how much, and how well the world can deal with the result. So far, there is far more rhetoric about solutions than probability.

The data on water already do reflect a crisis or near crisis problem in given states. Once again, estimate differ by source, but the trend is clear. More and more states face local or national crises in obtaining adequate water as they deal with climate change, rising consumption of national water supplies by other states, rising population, and the draining of fossil underground aquifers. Ironically, such states include nations like Iraq, where the “land of two rivers” now suffers from climate change, Turkish and Iran upstream competition, and terrible governance.

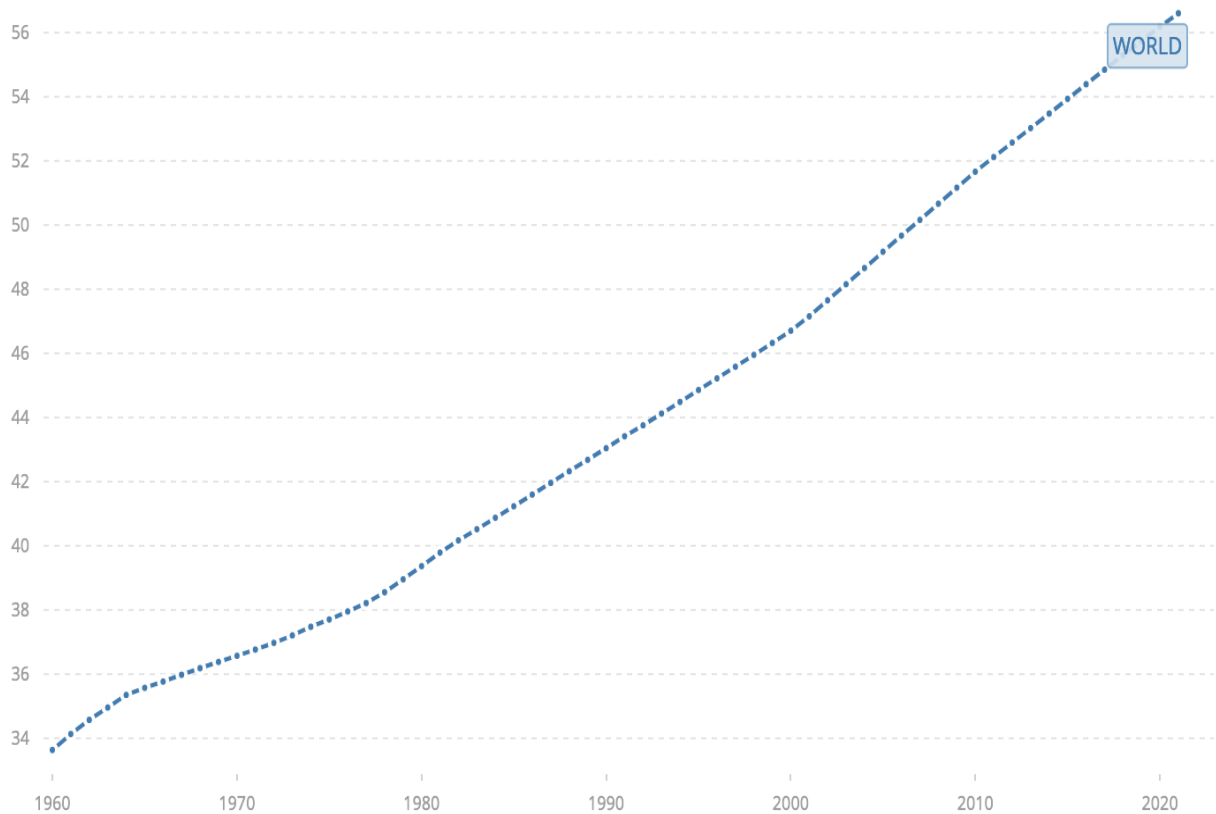
**Figure Twenty-Three: The Growing Global Threat from Population Pressure: 1950-2020 – Part One**



Source: United Nations, *World Population Prospects*, <https://population.un.org/wpp/graphs/> and, <https://population.un.org/dataportal/data/indicators/49/locations/900/start/1950/end/2100/line/linetimeplotsingle>.

**Figure Twenty-Three: The Growing Global Threat from Population Pressure: 1950-2020 – Part Two**

**Percent of Global Hyperurbanization: 1960-2020**



**The World Bank estimates that 55% of the world's population lived in cities in 2020, and that the current population would increase by 1.5 times by 2045, adding 2 billion more to create a total of 6 billion**

Source: World Bank database, <https://data.worldbank.org/topic/urban-development>.

### ***The Interaction Between Other States and the Major Powers in “Winter Wars” in Grey Area, Spoiler, and Proxy Campaigns***

The wars listed in **Figure Nineteen** involve the major powers on an increasingly global basis. In many—if not most cases—regional and local “winter wars” are directly linked to the competition between the major powers. Russia, China, the U.S., European powers, and developed Asia states compete or confront each other politically, economically, and in military terms by using aid, trade, diplomatic influence, arms transfers, advisory missiles, and the direct use of force at the regional or local level.

In some cases, like the Libyan civil war – such conflicts are not only proxy wars for larger powers, but are wars where the mixture of intervening outside states cuts across the normal lines of alignment with the major power. In some cases, outside peace keeping missions have the practical impact of extending the life or intensity of local wars by other means.

There is no way to predict what existing or new grey area, spoiler, or proxy campaigns will escalate to the point where they become serious problems for the U.S. or its partners, but many risks already exist – including ones in Latin America and the rest of Africa, and rising tensions with China and Russia will inevitably increase this risk over time.

As noted earlier, Russia’s trade war with the West qualifies as a serious level of grey area operations, as does the West’s proxy war in the Ukraine, and Russia’s more direct proxy roles in Syria and Libya. So do Western and other trade, technology, and military confrontations with China, and China’s matching trade, technology, and military efforts, many aspects of its belt and road programs, and efforts to control critical mineral and manufacturing resources in solid state devices, batteries, and other areas.

Here again, the confrontation with China has become more serious than the confrontation with Russia. The U.S. and its strategic partners have come to realize how serious industrial and technology espionage and efforts to dominate key areas of trade have become, and that these are serious forms of grey area warfare that they have taken actions to address that approach to economic warfare. The same seems to be true of Chinese efforts to control strategic minerals and investment patterns that have been designed to give China added economic leverage, particularly in areas like the materials need for advanced batteries and solid-state devices – area critical to both civil and military technology.

There is no easy way to summarize these interactions, and most maps of comparative U.S., Western, Russia, and U.S. strategic agreements with other nations, basing and advisory efforts are now too complex to summarize and present in this analysis. What is clear, however, is the scale, complexity, and role of the major powers in arms transfers shown in **Figure Twenty-Four**. This Figure also only tells part of the story. It only covers 32 countries in a world where virtually every regional and local power is involved in some form of security-related relationship and arms transfers with either the major powers or their strategic partners but it does at least illustrate the size and level of connection between the major powers and the rest of the world.

**Figure Twenty-Four: The Role of Key Middle Eastern and North Africa States in the Global Arms Race**

Importer	Share of global arms imports (%)		Per cent change from 2012–16 to 2017–21 <sup>d</sup>	Main suppliers (share of importer's total imports, %), 2017–21					
	2017–21	2012–16		1st	2nd	3rd			
1 India	11	14	-21	Russia	(46)	France	(27)	USA	(12)
2 Saudi Arabia	11	8.2	27	USA	(82)	France	(5.1)	UK	(5.0)
3 Egypt	5.7	3.2	73	Russia	(41)	France	(21)	Italy	(15)
4 Australia	5.4	3.2	62	USA	(67)	Spain	(24)	Switzerland	(3.3)
5 China	4.8	4.4	4.1	Russia	(81)	France	(9.1)	Ukraine	(5.9)
6 Qatar	4.6	1.3	227	USA	(46)	France	(36)	Italy	(6.1)
7 South Korea	4.1	2.3	71	USA	(63)	Germany	(27)	France	(7.8)
8 Pakistan	3.0	3.2	-11	China	(72)	Sweden	(6.4)	Russia	(5.6)
9 UAE	2.8	4.5	-41	USA	(61)	France	(6.2)	Russia	(5.3)
10 Japan	2.6	1.0	152	USA	(98)	UK	(1.7)	Sweden	(0.7)
11 Algeria	2.6	3.9	-37	Russia	(81)	Germany	(6.4)	France	(3.7)
12 United Kingdom	2.5	1.4	74	USA	(77)	South Korea	(16)	Germany	(3.2)
13 United States	2.4	2.5	-9.6	UK	(23)	Netherlands	(13)	France	(12)
14 Israel	1.9	1.5	19	USA	(92)	Germany	(6.9)	Italy	(1.0)
15 Indonesia	1.7	2.1	-24	South Korea	(23)	USA	(23)	Netherlands	(19)
16 Norway	1.6	0.3	343	USA	(83)	South Korea	(10)	Italy	(3.5)
17 Turkey	1.5	3.2	-56	Italy	(30)	USA	(22)	Spain	(21)
18 Singapore	1.4	1.6	-20	France	(54)	USA	(22)	Germany	(7.9)
19 Netherlands	1.3	0.6	116	USA	(94)	Germany	(5.0)	Australia	(0.3)
20 Viet Nam	1.3	2.9	-56	Russia	(56)	Israel	(19)	South Korea	(6.6)
21 Iraq	1.2	3.4	-66	Russia	(44)	USA	(35)	Italy	(10)
22 Italy	1.2	1.0	15	USA	(72)	Germany	(17)	Israel	(5.8)
23 Thailand	1.1	0.9	20	South Korea	(28)	China	(20)	Ukraine	(9.9)
24 Bangladesh	1.0	1.5	-35	China	(71)	Russia	(9.2)	UK	(5.2)
25 Morocco	1.0	1.3	-27	USA	(76)	China	(14)	France	(8.4)
26 Afghanistan	0.9	0.9	-4.1	USA	(97)	Brazil	(2.0)	Belarus	(1.1)
27 Oman	0.9	1.3	-34	UK	(63)	Turkey	(16)	Norway	(8.1)
28 Kuwait	0.9	0.9	-6.3	USA	(56)	France	(26)	Italy	(9.4)
29 Philippines	0.9	0.3	142	South Korea	(53)	USA	(16)	Israel	(8.7)
30 Canada	0.9	1.0	-14	USA	(43)	Australia	(23)	Israel	(12)
31 Kazakhstan	0.8	0.7	8.1	Russia	(91)	Spain	(2.2)	China	(2.1)
32 Jordan	0.7	0.6	11	USA	(37)	Netherlands	(17)	UAE	(14)

Source: Pieter d. Wiseman, Alexandra Kuimova and Siemon T. Wezeman, "TRENDS IN INTERNATIONAL ARMS TRANSFERS, 2021," SIPRI, [https://www.sipri.org/sites/default/files/2022-03/fs\\_2203\\_at\\_2021.pdf](https://www.sipri.org/sites/default/files/2022-03/fs_2203_at_2021.pdf)

## The “Winter Wars” in the Middle East and the Gulf

North Africa, the Middle East, and the Persian/Arab Gulf. Algeria and Libya are key centers of instability and civil tension in North Africa and areas where regional and local “winter wars” already present serious threats. Syria and Iran are key centers of instability in the Middle East. Iraq’s stability and unity is uncertain, and it seems likely that the Sudan, Ethiopia, Eritrea, Tigray, Somalia, and Yemen will continue to be flashpoints or additional areas of conflict at least in the near to mid-term.

**Figure Twenty-Four** has already shown that North African and Middle Eastern states play a key role in global arms transfers and are the center of several major arms races. **Figure Twenty-Five** shows these competing trends by supplier in more detail, although it does not extend to 2022, and reflect a major shift away from the U.S. because of its pressure on human rights issues in some countries like Egypt and Saudi Arabia coupled to a shift of Russian imports from Iran and North Korea to obtain weapons for the war in the Ukraine, Korea, a rise in Russian sales to other countries, and the fact that new Chinese weapons systems are making China a more competitive exporter.

Several Middle Eastern states like Saudi Arabia, the UAE, and Qatar among the world’s leading states in the effort changing their forces to reflect the advances to take advantage of emerging and disruptive technologies. **Figure Twenty-Six** shows that many other Middle Eastern states are also acquiring new strike systems.

These development and the high level of regional violence helps explain why the U.S. has been actively involved in warfare in the Persian/Arab Gulf region since at least the first Gulf War in 1990, although it was indirectly involved in the Iran-Iraq War during 1980-1988, as well as every major Arab-Israeli conflict. It is still involved in the fighting in eastern Syria, and support its strategic partners in their fight against terrorism and their deterrence of external threats. Russia is involved in the civil war in Libya and Syria.

Algeria, Libya, Tunisia, Egypt, Lebanon, Syria, Iraq, Bahrain, and Yemen are all countries with serious internal stability problems or “winter wars in the form of civil conflict, but Iran is currently the most serious regional threat in the region. Iran’s war with Iraq between 1980 and 1988 was bloodier than any of the Arab Israeli conflicts. The unclassified computer data bases of SIPRI and the U.S. State Department both estimate that the size of the arms race between the Iranian and Arab Gulf states since the end of the Iran-Iraq War has been so large that it alone has been the equivalent of a “winter war” for political and military leverage, and one where Iran has transferred arms to and other support to pro-Assad forces in Syria, the Houthi in Yemen, the Hezbollah in Lebanon, and has been involved in clashes in the Gulf.

Israel remains the only nuclear power in the region, but Iran is also a potential nuclear power, and one that sees far more likely to either actively use nuclear weapons to gain political leverage or escalate to their use. It has enriched Uranium to fissile grade levels at least 60%, and weapons grade Uranium is 80% to 90% depending on the weapons design. Iran may have completed the design and passive testing of nuclear weapons using less-enriched Uranium to test its designs – a path to development export early by both India and Pakistan.

Iran has supplied missile and drones to Russia for its war in the Ukraine, and there have been reports that Iran may form serious security and economic ties to Russia and China. Iran has

significant military ties to Syria, Iraq, Yemen, and the Hezbollah in Lebanon, and may be able to form a more serious security alliance.

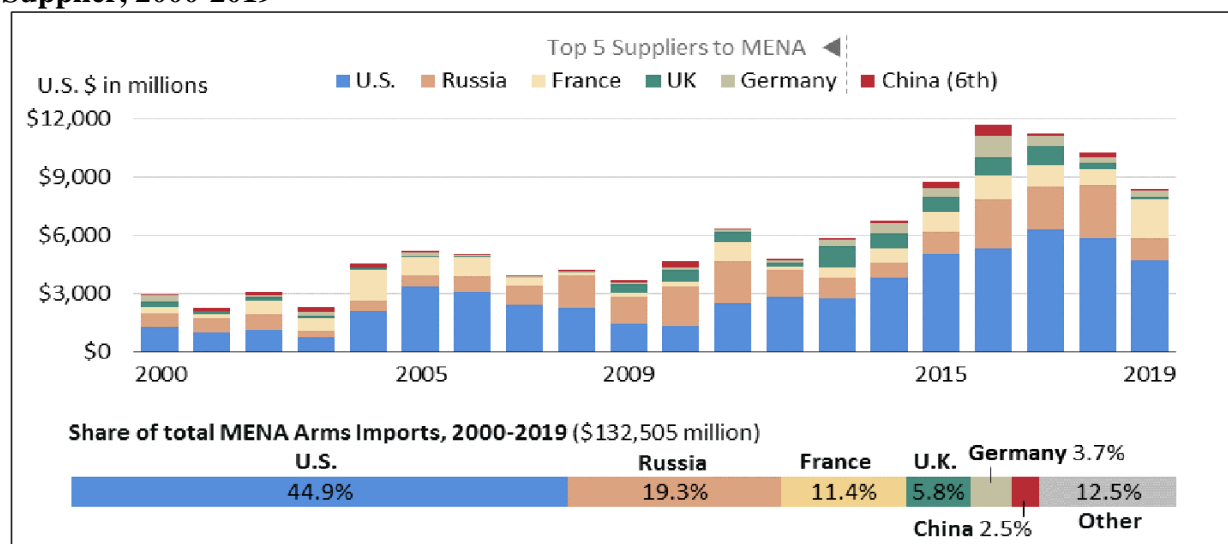
China and Russia are both competing with the U.S., Britain, and France for added military influence and leverage in the region. China now has a military base in Djibouti, is playing a major role in the development of Pakistan's ports and may be seeking to create more serious ties to Iran that include port facilities on its territory outside the Gulf. Russia is buying missiles and drones from Iran and Russian mercenaries have been active in the Libyan civil war. In contrast, U.S. ties to Egypt and the Arab Gulf states are weakening, as is European influence and ability to deploy land and air forces east of Suez. It is also clear that extremist and terrorist movements continue to be a threat.

**Figure Twenty-Seven** shows that the Middle East and nearby areas in North Africa and Asia are also major centers of terrorism and extremism. The terrorist activities sometimes interact on a regional basis, and most are driven by both failed governance and economic development, and at least low-level fighting between sects, ethnic groups, and tribes

As yet, these internal conflicts and shifts do not seem to pose serious risks of major new levels of actual armed conflict, but they already often involve serious internal violence and do have that potential. Moreover, U.S. relations with Turkey, Egypt, and the Arab Gulf states to seem to be steadily more distant, and debates over human rights and limits on oil and gas export prices growing out of the Ukraine War have steadily reduce U.S. influence

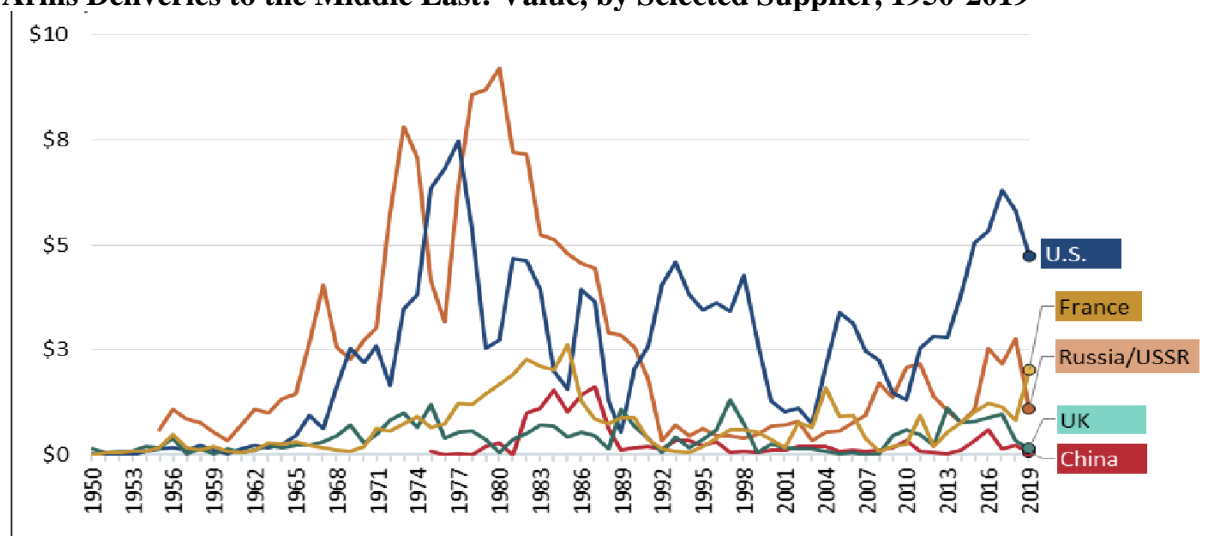
**Figure Twenty-Five: Sources of Arms Transfers to the Middle East and North Africa: 2000-2019**

**Arms Suppliers to the Middle East and North Africa (MENA) Value and Rank, by Supplier, 2000-2019**



**Source:** Stockholm International Peace Research Institute (SIPRI), importer/exporter total trend-indicator value (TIV) tables. Figure created by CRS.

**Arms Deliveries to the Middle East: Value, by Selected Supplier, 1950-2019**



**Source:** Stockholm International Peace Research Institute (SIPRI), importer/exporter total trend-indicator value (TIV) tables. Figure created by CRS.

**Note:** Total exports by supplier to all Middle Eastern states.<sup>11</sup>

Source: Thomas, Sharp, Blanchard & Arabia, *Arms Sales in the Middle East: Trends and Analytical Perspectives for U.S. Policy*, Congressional Research Service, R44984, Updated November 23, 2020, <https://sgp.fas.org/crs/mideast/R44984.pdf>.



**Figure Twenty-Six: Missile Strike Systems in North Africa and the Middle East – Part One**

Operator	Missile name	Range (km)	Payload (kg)	Fuel type	Circular error probable (CEP) (m)
Israel	LORA	430	240	Solid	10
Israel	<i>Jericho 2*</i>	1,800	1,000	Solid	?
Israel	<i>Jericho 3*</i>	4,000	750	Solid	?
Israel	<i>Rampage</i> (air-launched ballistic missile)	?	?	Solid	10
Iran	<i>Shahab-1</i>	300	1,000	Liquid	700–1,000
Iran	<i>Shahab-2</i>	500	730	Liquid	>1,500
Iran	<i>Qiam-1</i>	800	500	Liquid	>1,000
Iran	<i>Qiam-1 mod. (Qiam-2?)</i>	800	500	Liquid	~100
Iran	<i>Shahab-3</i>	800–1,000	760–1,000	Liquid	2,500
Iran	<i>Ghadr-1</i>	1,600	750	Liquid	300
Iran	<i>Emad</i>	1,600	700	Liquid	?
Iran	<i>Khorramshahr-1/-2</i>	2,000	500–1,800	Liquid	1,500
Iran	<i>Tondar</i>	150	190	Solid/liquid	300
Iran	<i>Fateh-110</i>	300	450	Solid	<100
Iran	<i>Khaliq Fars</i>	300	450	Solid	<100
Iran	<i>Hormuz-1/-2</i>	300	450	Solid	<100
Iran	<i>Fateh-313</i>	500	350	Solid	<100
Iran	<i>Fateh Mobin</i>	500	350	Solid	<100
Iran	<i>Raad-500</i>	500	350	Solid	<100
Iran	<i>Zolfaghar</i>	700	350	Solid	<100
Iran	<i>Zolfaghar Basir</i>	700	350	Solid	<100
Iran	<i>Dezful</i>	1,000	350	Solid	?
Iran	<i>Shahid Haj Qasem</i>	1,400	350	Solid	?
Iran	<i>Sajjil-1/-2</i>	2,000	700	Solid	300

\* Service status uncertain

Source: Adapted from Dr. Hassan Elbahtimy, *Ballistic and cruise missiles in the Middle East: the current landscape and options for arms control*, IISS, January 2022, p. 6

**Figure Twenty-Six: Missile Strike Systems in North Africa and the Middle East – Part Two**

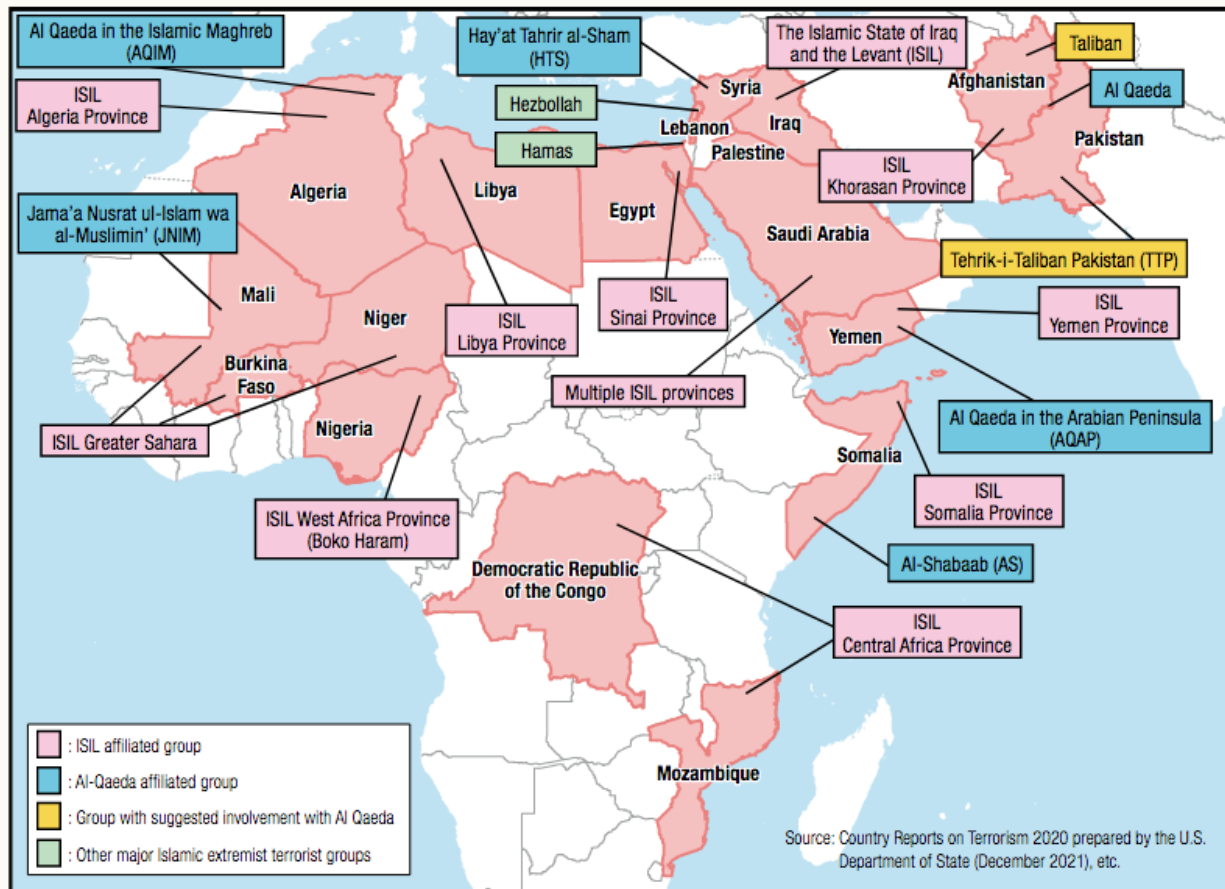
Operator	Missile name	Range (km)	Payload (kg)	Fuel type	Circular error probable (CEP) (m)
Algeria	9K720 <i>Iskander-E</i> (RS-SS-26 <i>Stone</i> )	280	480	Solid	<10
Bahrain**	MGM-140A ATACMS	165–300	174–221	Solid	>50
Egypt	9K72 <i>Elbrus</i> (RS-SS-1C <i>Scud-B</i> )	300	770–950	Liquid	1,000
Egypt	9K72 <i>Elbrus</i> (RS-SS-1D <i>Scud-C</i> )	600	770–950	Liquid	<1,000
Qatar	BP-12A (CH-SS-14 Mod 2)	280	480	Solid	?
Saudi Arabia	DF-3 (CH-SS-2)	2,780	2,000	Liquid	1,000–4,000
Saudi Arabia	DF-21 (CH-SS-5)	2,150	600	Solid	300
Syria	OTR-21 <i>Tochka U</i> (RS-SS-21 <i>Scarab B</i> )	120	482	Solid	<100
Syria	M-600 (license-built <i>Fateh-110</i> )*	250–300	450–500	Liquid	500
Syria	9K72 <i>Elbrus</i> (RS-SS-1C <i>Scud-B</i> )*	300	770–950	Liquid	1,000
Syria	9K72 <i>Elbrus</i> (RS-SS-1D <i>Scud-C</i> )*	600	770–950	Liquid	<1,000
Syria	9K72 <i>Elbrus</i> (RS-SS-1E <i>Scud-D</i> )*	700	770–950	Liquid	50
Turkey	J-600T <i>Yildirim I</i>	150	480	Solid	150
Turkey	J-600T <i>Yildirim II</i>	300	480	Solid	<150
Turkey	MGM-140A ATACMS	300	213–247	Solid	>50
Turkey	<i>Bora</i>	280	470	Solid	<10
UAE	9K72 <i>Elbrus</i> (RS-SS-1C <i>Scud-B</i> )	300	770–950	Liquid	1,000
UAE	MGM-168 ATACMS	300	221	Solid	>50
UAE	9K72 <i>Elbrus</i> (RS-SS-1D <i>Scud-C</i> )	600	770–950	Liquid	<1,000

\* Service status uncertain

\*\* Which variant of the MGM-140A Bahrain purchased is uncertain.

Sources: <https://www.govinfo.gov/content/pkg/FR-2018-11-08/html/2018-24403.htm>; <https://missilethreat.csis.org/missile/ss-21/>; <http://www.nukestrat.com/us/afn/NASIC2006.pdf>, page 8; <https://www.dsca.mil/press-media/major-arms-sales/bahrain-m31-guided-multiple-launch-rocket-system-gmlrs-unitary-and>; <https://twitter.com/19Kyrue/status/1235930736043208705>.

Source: Adapted from Dr. Hassan Elbahtimy, *Ballistic and cruise missiles in the Middle East: the current landscape and options for arms control*, IISS, January 2022, p. 6

**Figure Twenty-Seven: Major Terrorist Groups in Africa and the Middle East**

Adapted from Japan, Ministry of Defense, *Defense of Japan* 2022, August 2022, p. 43,  
[https://s3.documentcloud.org/documents/22187264/doj2022\\_en\\_full.pdf](https://s3.documentcloud.org/documents/22187264/doj2022_en_full.pdf)

## The “Winter War” in Asia and the Koreas

Asia is another source of serious “winter wars.” The Afghan conflict seems to be over, but the Taliban have been increasingly repressive and have yet to show they can actually govern effectively. The rest of Asia the Indian Ocean region present a continuing range of regional and internal security problems and the own range of wars for territory and military influence.

China has recently clashed with India. India and Pakistan are steadily arming for another possible round of war, that could involve the use of nuclear weapons. Myanmar is a nightmare of internal conflict and repression, Afghanistan faces major internal instability, and there is a wide range of religious and ethnic tensions that include Chinese repression of the Uyghurs.

One of the most serious current risks of a major conflict in the in the region seems to be the rising level of tension and arms race between North Korea and South Korea, which could easily escalate to involve the U.S. and Japan, and possibly Russia and China. An estimate of the current conventional military balance in the Koreas is shown in first half of **Figure Twenty-Eight**, although both China and Taiwan are actively modernizing and expanding their military capabilities for la conflict, and it seems likely that the level of U.S. forces in South Korea would change so quickly if a serious war seemed likely to begin that such a Figure can only provide limited insight into the risks involved. It also does not address North Korea’s possession of nuclear weapons

The second half of **Figure Twenty-Eight** warns that North Korea has begun a new kind of “winter war” by sharply increasing its missile firings, and this chart does not include the further massive increases in missile tests, and violations of South Korean territory in October and November of 2022. By early November. North Korea had already launched 86 missiles – an annual record – and fired 23 missiles in one day.<sup>41</sup>

These Northern Korean missile tests have also illustrated its potential threat to Japan, and to U.S. military bases in Japan and Guam, and North Korea seems to have tested an ICBM-like missile in November 2022, although the test failed. It is clear that North Korea is increasing its nuclear weapons inventory, is making extensive use of its centrifuge facilities to produce more fissile material, and may conduct its first nuclear weapon test in years during the winter of 2022-2023.

At present, this rising level of confrontation seems to be designed more to use military force to gain influence than present a near-term risk of any major conflict. Nevertheless, the possibility remains of that incident could trigger such a conflict. North Korea’s ties to China, its recent sales of artillery weapons Russia, and the sheer extremism of North Korea’s authoritarian leader are all warnings that such an incident could occur in ways that involve all of the major powers.

As noted earlier, both China and Russia have also carried out steadily larger and more provocative joint exercises and overflights near Japan. Again, these seem to be “winter wars” designed more to exert political pressure than escalate to actual fighting, but they are helping to trigger the overall arms races in the region, as are tensions between India and China, India and Pakistan, repressive violence in Myanmar and number of other local conflicts and crises.

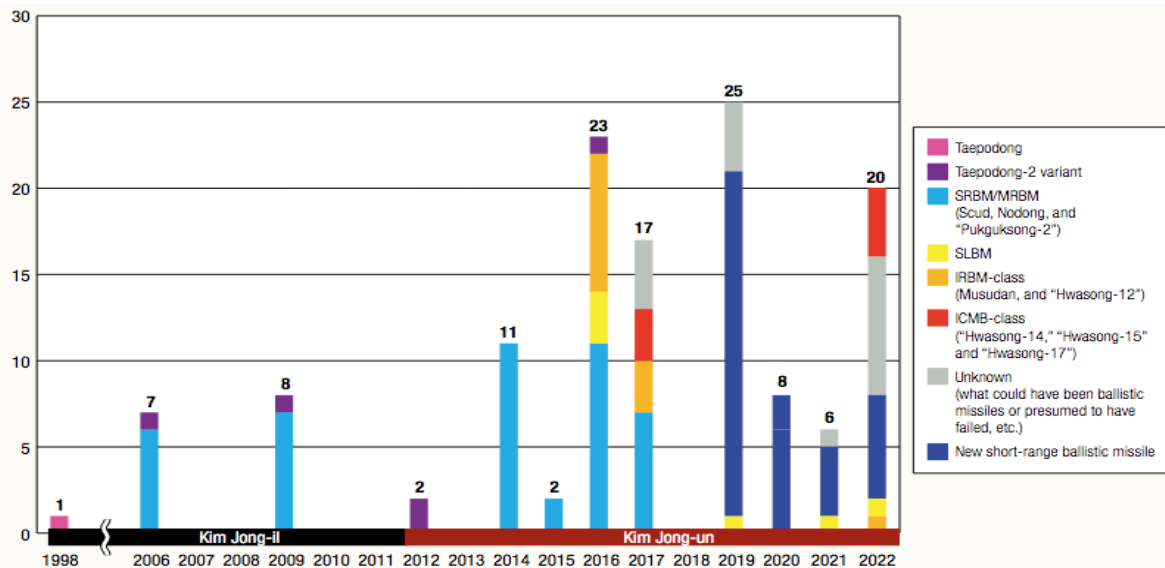
## Figure Twenty- Eight: Developments in the Korean Military Balance – Part One

### Conventional Military Balance

		North Korea	ROK	U.S. Forces Korea
Total armed forces		Approx. 1.28 million personnel	Approx. 560,000 personnel	Approx. 30,000 personnel
Army	Ground troops	Approx. 1.1 million personnel	Approx. 420,000 personnel	Approx. 20,000 personnel
	Tanks	T-62, T-54/55, etc. Approx. 3,500	M-48, K-1, T-80, etc. Approx. 2,070	M-1A2SEPV2
Navy	Naval vessels	Approx. 800 110,000 tons	Approx. 220 280,000 tons	Supporting corps only
	Destroyers		12	
	Frigates	6	12	
	Submarines	25	18	
Air Force	Marines		Approx. 29,000 personnel	
	Combat aircraft	Approx. 550	Approx. 660	Approx. 80
	Third, fourth and fifth generation fighters	MiG-23 × 56 MiG-29 × 18	F-4 × 30 F-15 × 59 F-16 × 162 F-35 × 36	F-16 × 60
Reference	Population	Approx. 25.83 million	Approx. 51.72 million	
	Term of service	Men: 10 years Women: 7 years	Army: 18 months Navy: 20 months Air Force: 21 months	

Note: Data from "The Military Balance 2022," etc.

### Rise in North Korean Missile Tests: 1998 to May 2022



- Increase of ranges:** Development of intercontinental ballistic missiles-class ballistic missiles (since 2017) with a range exceeding 10,000km
- Enhancement of the accuracy and operational capabilities necessary for saturation attacks:** Repeated launches from unprecedented locations in the early morning and late hours of the night using TELs, often in multiple numbers (since 2014). Some ballistic missiles are said to be equipped with a Maneuverable Reentry Vehicle (MaRV) (since 2017).
- Enhancement of secrecy and instantaneity and the ability to conduct surprise attacks:** Launches of SLBMs (since 2016) and acceleration of the development of solid-fueled ballistic missiles (since 2016)
- Irregular trajectories:** Launches of short-range ballistic missiles having a shape similar to that of the Russian "Iskander," which are said to be able to fly at a lower altitude than conventional ballistic missiles and with irregular trajectories (since 2019)
- Diversification of the forms of launches:** Ballistic missile launches assumed to have used a lofted trajectory have been confirmed (since 2016).

Adapted from Japan, Ministry of Defense, *Defense of Japan* 2022, August 2022, pp. 77 and 120, [https://s3.documentcloud.org/documents/22187264/doj2022\\_en\\_full.pdf](https://s3.documentcloud.org/documents/22187264/doj2022_en_full.pdf)

## Putting Terrorism and Extremism in Perspective

No region in the world is free of other forms of “winter war,” and the “winter wars” caused by terrorism and extremism represent yet another kind of serious challenge. The level of global terrorism and extremism have risen in recent years. This is shown in the graphs showing the trends in global terrorism developed by START shown in **Twenty-Nine**, and in the series of maps in available in the *Counterterrorism Guide* of the U.S. Director of National Intelligence.<sup>42</sup> It also is all too clear from the 2021 *U.S. State Department Country reports on Terrorism*.<sup>43</sup>

A key irony behind any focus terrorism and extremism, however, is that they are a relatively minor part of the overall patterns in violence, particularly in lower incomes states. If one examines the country-by-country lists of violent states listed in **Figure Nineteen**, the trends in poor governance, corruption and leadership summarized in **Figure Twenty-Two** the ways in which power and development efforts favor given internal factions, the result in failed development efforts, and the level of repression committed by given regimes, failed or fragile governments clearly do more to threaten their populations than terrorists or extremists.<sup>44</sup>

This is especially true of the many governments in **Figure Nineteen** and other regimes that analysts like Steven Levitsky and Lucan Way have characterized as competitive authoritarianism: “In competitive authoritarian regimes, formal democratic institutions are widely viewed as the principal means of obtaining and exercising political authority. Governments that control a pliant or cowed media as well as the security services and many elements of the economy and where the regime fails to meet conventional minimum standards for democracy.”<sup>45</sup>

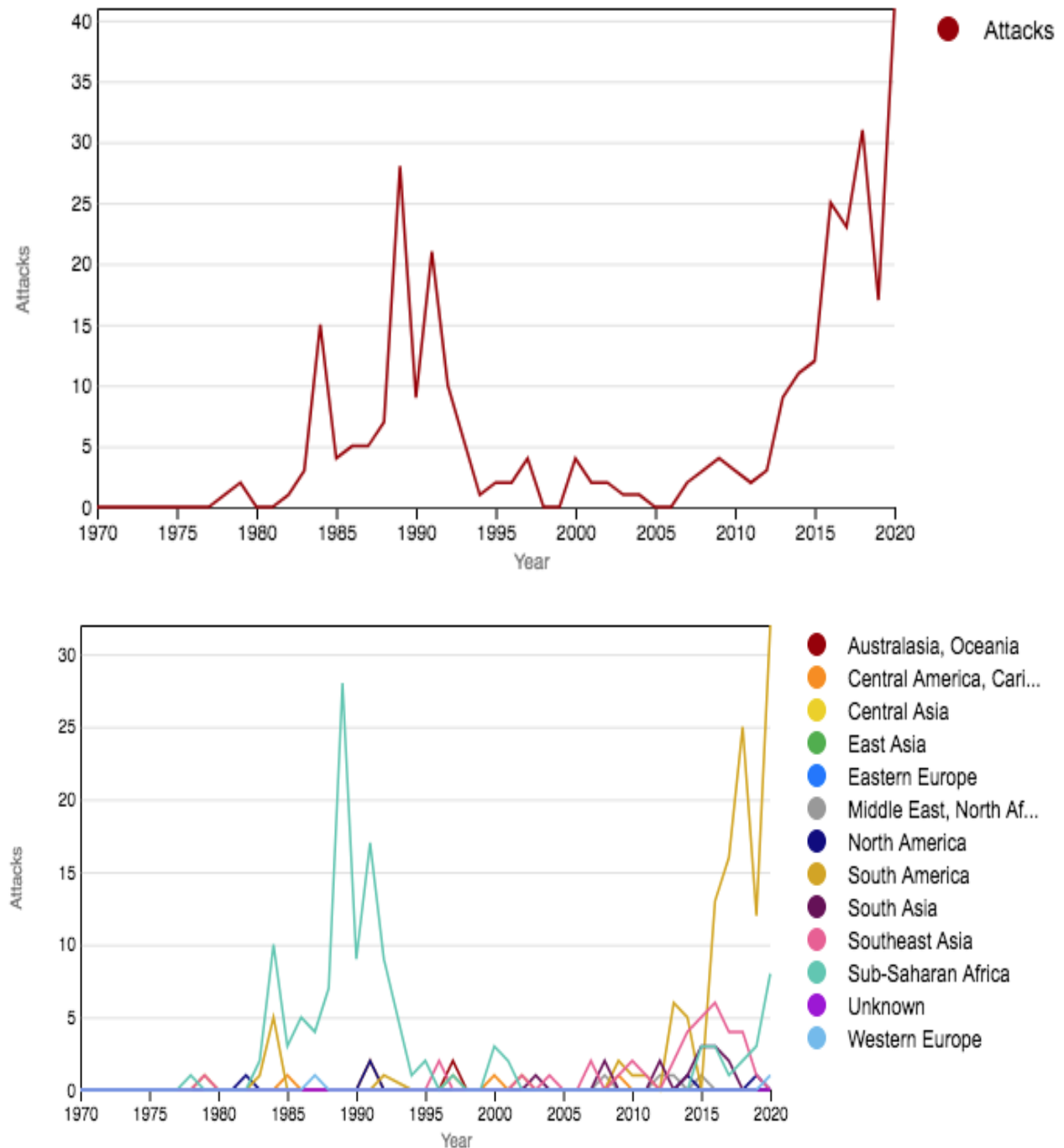
In fact, authoritarian governments probably do at least an order of magnitude more damage to their peoples than terrorist and extremist movements. They also make their countries more vulnerable to exploitation by more developed powers, and encourage more developed powers to exploit their weakness and instability interact with the forces creating instability. One key example is Assad’s Syria. His Russian-backed war to reestablish his power and control has been estimated to have killed as many as 499,700 to 600,000 by March 2022. More conservative estimates put the figure at over 350,000.<sup>46</sup>

Estimates of the total deaths caused by terrorism and extremism differ sharply, but a high estimate indicates that they average around 26,000 per year over the same ten-year period as the estimate for Syria, or a total 260,000. Statista reports annual figures ranging from 11,098 to 32,763, or 250,141 for the eleven years of the Syrian civil war. The *Global Terrorism Index For 2022* reports only 7,142 deaths from terrorism and extremism, in 2021, and an uneven pattern of decline in deaths from a peak of only 10,669 in 2015.<sup>47</sup>

And, Syria is only the worst of many countries where governments kill their peoples. No similar estimates are available, but there are all too many examples. Myanmar is certainly one of the worst. Iran is another, and there are all too many additional states in Africa and Asia.<sup>48</sup>

And, it should be remembered that all of these trends generally interact with failures to adequately cope with disease, global warming, and population growth. The first two of these trends are already the source of global attention, but as **Figure Twenty-Three** has shown a massive rate of actual population growth between 1950 and 2020 that makes the additional threat from population pressure all too clear.

**Figure Twenty-Nine: START Estimate of Trends in Global Terrorism: 1970-2020**



Source: START, University of Maryland,  
<https://www.start.umd.edu/gtd/search/Results.aspx?chart=overtime&search=map>.

## **From Peace, “Globalism,” and a “Global Village” to a World Filled with Global Tensions and “Winter Wars”**

In conclusion, this discussion of “winter wars” may seem to be deliberately pessimistic and to focus on worst cases. It also included “winter wars” have already gone on for years, most of which will go on for far longer periods than the current winter. Some have already gone on for decades, and many seem likely to go on for a decade or more after the winter of 2022-2023.

It is still striking, however, such a focus on current trends describes overall patterns in global violence and conflicts a world where it has taken less than a decade to go from a political and analytic focus on how the world might come together in some form of “globalism” – a world that approximates a peaceful and cooperative “global village” – to a world with so many tensions and risks.

As for the broad use of the term “war” in this analysis, it does depart from the normal usage of the term. However, it makes it all too clear that Sun Tzu was all too correct in stating that “The supreme art of war is to subdue the enemy without fighting.” Yet, the history of his time made it clear that few wars or confrontations ended in anything approaching this supreme art.

The preceding analysis shows that major powers and developed nations are actively involved in an equivalent effort to achieve the “supreme art of war.” The list of “winter wars” makes it all too clear that major powers are now focusing on political and economic conflicts and confrontations, and on efforts to use military force that are limited to exploiting political and military leverage without engaging in combat.

While the major powers still seem to find it obligatory to at least mention “cooperation,” and actively seek to keep some degree of real world cooperation in the areas where all sides can still benefit from cooperation, the primary focus of their political and economic confrontation, and military build-ups, has clearly shifted.

They are all trying to achieve their strategic objectives by creating a far more confrontational set of military goals and plans, and to taking more serious risks in terms of political and economic struggles that at least approach a form of warfare and increase the risk of some form of escalation to the actual use of force.

The recent history of the world also warns that that the “winter wars” being fought by the major powers can escalate just as unexpectedly as past wars, and World War I and World War II have proven how easy it can be to escalate to global conflicts. It is all too clear that the current relations between the great powers, and between the more advanced and developed democracies and authoritarian and repressive states, have shifted from the image of cooperation to active confrontation. At the same time, advances in conventional weapons, emerging technologies, and today’s world of nuclear weapons, tightly integrated global supply chains, and steadily more lethal forms of conventional combat has greatly increased the damage a truly major war could inflict.

Moreover, this analysis has understated the full threat of “winter wars” to the extent it has touched relatively briefly on the number of developing and poorer states that are experiencing serious internal violence, and where the failures of their governments to come to grips with internal tensions, population growth, and sustained development makes them as much of a threat to their peoples as any terrorist or extremist faction. It has not tried to address the combined impact of war,



climate change, population pressure, and disease – although all of these problems reinforce each other, and climate change, population pressure, and disease – like failed governance – often have greater impact.

Finally, it should be noted that the analysis has concentrated on the current nature and scale of political, economic, and military conflict, and not on whether any given side has a clear strategic objective in trying to “win.” This lack of clearly defined strategic objectives posed its own risks. Putin’s grand strategic objective seems to focus on rebuilding the former Soviet Union and strategic partnerships, but there is no way to know how real this goal really is. China’s grand strategic objectives which are equally broad and vague.

The U.S. new national strategy does talk about the creation of a world with a common economic system and set of international rules – one most of its strategic partners support, but does not present any plan for achieving it. As for all too much of the rest of the world – rhetoric aside – the national grand strategic goal of its leadership seems to be to retain or expand their power at the national, local, and regional level. The current process of a given “winter war” is clear, but the grand strategic goal is not defined beyond some broad level of rhetoric.

Santana once warned that, “he who forgets the past is condemned to repeat it.” In some ways, the world already did this in the period before each of the two World Wars. In spite of the military tensions and naval arms race that preceded World War I, most Europeans assumed that the equivalent of a stable level of deterrence had been established following the war of 1870, which would prevent any major European conflict in spite of the arms races that were increasing the lethality and size of European forces, and the dependence on the immediate and full implementation of massive mobilization and deployment plans.

The results of World War One were devastating, but the U.S. then retreated into isolationism and Europe made similar assumptions about postwar stability until the depression and the collapse of the Weimar democracy in Germany. Even then, the growing likelihood of another global conflict was grossly underestimated until the German invasion of Poland. The result was World War II – a war that did even more damage on a global basis than World War I, and then helped to create a Cold War that may well be returning in more lethal and even more global form.

If anything, this analysis of the current state of “winter wars” warns that the corollary to Santana’s thesis may well be that, “we repeat the past regardless of whether we remember it or not.”

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<sup>1</sup> International Energy Agency (IEA), *World Energy Outlook for October 2022*, October 27, 2022, <https://iea.blob.core.windows.net/assets/c282400e-00b0-4edf-9a8e-6f2ca6536ec8/WorldEnergyOutlook2022.pdf>.

<sup>2</sup> See Anthony H. Cordesman, *U.S. Strategy: Rebalancing Global Energy between Europe, Russia, and Asia, and U.S. Security Policy in the Middle East and the Gulf*, May 12, 2021, pp. 21-30, <https://www.csis.org/analysis/us-strategy-rebalancing-global-energy-between-europe-russia-and-asia-and-us-security-policy> ; Anthony H. Cordesman with the assistance of Paul Comarie, *A New Energy Strategy for a Post Ukraine War World*, CSIS, August 22, 2022, <https://www.csis.org/analysis/creating-new-energy-strategy-post-ukraine-war-world>, and Energy Information Agency, *China*, April 18, 2022

<sup>3</sup> *US National Security Strategy*, Office of the Secretary of Defense, October 27, 2022, <https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf>.

<sup>4</sup> See Catherine Belton, “Russia Works to subvert Moldova’s pro-West Government,” *Washington Post*, November 6, 2022, p. A23.

Anthony H. Cordesman, with the assistance of Paul Cormarie, *Major Powers and Strategic Partners: A Graphic Net Assessment*, CSIS, October 14, 2022, [https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/221017\\_Cordesman\\_Major\\_Power.pdf?qe3u\\_LPWVU76NNkoKQUH.iiUJLyQ5h0m](https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/221017_Cordesman_Major_Power.pdf?qe3u_LPWVU76NNkoKQUH.iiUJLyQ5h0m).

<sup>6</sup> Anthony H. Cordesman, with the assistance of Paul Cormarie, *Major Powers and Strategic Partners: A Graphic Net Assessment*, CSIS, October 14, 2022, [https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/221017\\_Cordesman\\_Major\\_Power.pdf?qe3u\\_LPWVU76NNkoKQUH.iiUJLyQ5h0m](https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/221017_Cordesman_Major_Power.pdf?qe3u_LPWVU76NNkoKQUH.iiUJLyQ5h0m).

<sup>7</sup> See World Bank, Database, <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>. The NATO data are taken from Table 5 of NATO, *Defense Expenditure of NATO countries*, and are converted from 2015 constant dollars to 2021 dollars using a CPI Ends year multiplier of 1.18.

<sup>8</sup> See World Bank, Database, <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>. The NATO data are taken from Table 5 of NATO, *Defense Expenditure of NATO countries*, and are converted from 2015 constant dollars to 2021 dollars using a CPI Ends year multiplier of 1.18.

<sup>9</sup> The IISS definition of military spending is standardize in ways the differ from national reporting. These figures are taken from the country chapters of the IISS *Military Balance for 2022*.

<sup>10</sup> “Putin says Russia could adopt US preemptive strike concept,” Associated Press, December 9, 2022, 3:23 p.m. EST; Jamey Keaten, “NATO chief fears Ukraine war could become a wider conflict,” *Washington Post*, December 9, 2022, [https://www.washingtonpost.com/world/nato-chief-fears-ukraine-war-could-widen-into-wider-conflict/2022/12/09/674dcc50-77d1-11ed-a199-927b334b939f\\_story.html](https://www.washingtonpost.com/world/nato-chief-fears-ukraine-war-could-widen-into-wider-conflict/2022/12/09/674dcc50-77d1-11ed-a199-927b334b939f_story.html); “Remarks by Secretary of Defense Lloyd J. Austin III at the U.S. Strategic Command Change of Command Ceremony (As Delivered),” Department of Defense, December 9, 2022, <https://www.defense.gov/News/Speeches/Speech/Article/3241858/remarks-by-secretary-of-defense-lloyd-j-austin-iii-at-the-us-strategic-command/>.

<sup>11</sup> For more detail, see the work of Hans M. Kristensen and Max Korda in the *Nuclear Notebook, 2021*, in the *Bulletin of Atomic Scientists*, 2021, Volume 77, Number 1.

<sup>12</sup> See Shanon Bugos and Julia Masterson, *New Chinese Missile Silo Fields Discovered*. Arms Control Today, September 2021, <https://www.armscontrol.org/act/2021-09/news/new-chinese-missile-silo-fields-discovered>; and Timothy Gardner, *UPDATE 1-China reactors will yield weapons-grade plutonium -U.S. commander*, Reuters, April 21, 2021, <https://www.reuters.com/article/usa-china-nuclear-plutonium/update-1-china-reactors-will-yield-weapons-grade-plutonium-u-s-commander-idUSL1N2ME1U8>.

<sup>13</sup> Helene Cooper, “China Could Have 1,000 Nuclear Warheads by 2030, Pentagon Says,” *New York Times*, November 3, 2022, <https://www.nytimes.com/2021/11/03/us/politics/china-military-nuclear.html?smid=nytcore-ios-share&referringSource=articleShare>; David E. Sanger & William J. Broad, “China’s Weapon Tests Close to a ‘Sputnik Moment,’ U.S. General Says,” *New York Times*, October 27, 2022, <https://www.nytimes.com/2021/10/27/us/politics/china-hypersonic-missile.html>.

<sup>14</sup> Source: Excerpted from Department of Defense, *China Military Power: 2022*, pp. 96-99, <https://media.defense.gov/2022/Nov/29/2003122279/-1/-1/1/2022-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>

<sup>15</sup> U.S. Department of Defense, 2022, National Defense Strategy of the United states of America, October 2022, pp. 9-10: <https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF>.

<sup>16</sup> Hans M. Kristensen. Matt Korda, and Robert Norris, “Status of World Nuclear Forces,” 2022, <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces>

<sup>17</sup> See Kelsey Davenport and Daryl Kimball, *Nuclear Weapons: Who Has What at a Glance*, Arms Control Association, January 2022, <https://www.armscontrol.org/factsheets/Nuclearweaponswhohaswhat>.

<sup>18</sup> *US National Security Strategy*, Office of the Secretary of Defense, October 27, 2022, <https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf>

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<sup>19</sup> Excerpted from U.S. Department of Defense, Secretary of Defense Lloyd J. Austin III and Army General Mark A. Milley, Chairman, Joint Chiefs of Staff, Hold a Press Briefing Following Ukrainian Defense Contact Group Meeting,” Nov. 16, 2022, <https://www.defense.gov/News/Transcripts/Transcript/Article/3220910/secretary-of-defense-loyd-j-austin-iii-and-army-general-mark-a-milley-chairman/>.

<sup>20</sup> Excerpted from Department of Defense, *China Military Power: 2022*, pp. III-VI, <https://media.defense.gov/2022/Nov/29/2003122279/-1/-1/1/2022-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>

<sup>21</sup> *US National Security Strategy*, Office of the Secretary of Defense, October 27, 2022, <https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf>

<sup>22</sup> Excerpted from Department of Defense, *China Military Power: 2022*, pp. VII-IX, <https://media.defense.gov/2022/Nov/29/2003122279/-1/-1/1/2022-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>

<sup>23</sup> An Analysis of the Navy’s Fiscal Year 2023 Shipbuilding Plan, Congressional Budget Office, November 10, 2022, <https://www.cbo.gov/publication/58447>; Naval Shipyards: Ongoing Challenges Could Jeopardize Navy’s Ability to Improve Shipyards, General Accountability Office, May 10, 2022, <https://www.gao.gov/products/gao-22-105993>, and Report to Congressional Committees, Weapons System Annual Assessment, June 2022, <https://www.gao.gov/assets/gao-22-105230.pdf>.

<sup>24</sup> Anthony H. Cordesman, with the assistance of Paul Cormarie, *Major Powers and Strategic Partners: A Graphic Net Assessment*, CSIS, October 14, 2022, [https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/221017\\_Cordesman\\_Major\\_Power.pdf?qe3u\\_LPWVU76NNkoKQUH.iiUJLyQ5h0m](https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/221017_Cordesman_Major_Power.pdf?qe3u_LPWVU76NNkoKQUH.iiUJLyQ5h0m)

<sup>25</sup> *US National Security Strategy*, Office of the Secretary of Defense, October 27, 2022, <https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf>

<sup>26</sup> John Grady, “China Will Increase Pressure on Taiwan in Next Two Years Rather Than Invade, Says Pentagon Official,” *USNI News*, November 7, 2022 2:39 PM, [https://news.usni.org/2022/11/07/china-will-increase-pressure-on-taiwan-in-next-two-years-rather-than-invade-says-pentagon-official?ct=\(USNI NEWS DAILY\)&mc\\_cid=7cf69a4b76](https://news.usni.org/2022/11/07/china-will-increase-pressure-on-taiwan-in-next-two-years-rather-than-invade-says-pentagon-official?ct=(USNI%20NEWS%20DAILY)&mc_cid=7cf69a4b76), and Katie Rogers and Chris Buckley, “Biden Sees No Imminent Invasion of China by Russia,” *New York Times*, November 14, 2022, <https://www.nytimes.com/live/2022/11/14/world/biden-xi-meeting>.

<sup>27</sup> *US National Security Strategy*, Office of the Secretary of Defense, October 27, 2022, <https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf>.

<sup>28</sup> Katie Rogers and Chris Buckley, “With Tensions Mounting, Biden and Xi Try a Warmer Tone,” *New York Times*, November 14, 2022, <https://www.nytimes.com/2022/11/14/world/asia/biden-xi-bali-g20.html?smid=nytcore-ios-share&referringSource=articleShare>; Ishaan Tharoor, “Biden says no ‘Cold War’ with China, but tensions may flare soon,” *The Washington Post*, November 15, 2022, <https://mail.google.com/mail/u/0/#inbox/FMfcgzGqRZgKkDRbCLJLcrxTWbqmvjx>; The White House, *Readout of President Joe Biden’s Meeting with President Xi Jinping of the People’s Republic of China*, November 14, 2022, <https://www.whitehouse.gov/briefing-room/statements-releases/2022/11/14/readout-of-president-joe-bidens-meeting-with-president-xi-jinping-of-the-peoples-republic-of-china/>; and the White House, *Remarks by President Biden and President Xi Jinping of the People’s Republic of China Before Bilateral Meeting*, November 14, 2022, <https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/11/14/remarks-by-president-biden-and-president-xi-jinping-of-the-peoples-republic-of-china-before-bilateral-meeting/>.

<sup>29</sup> John Grady, “China Will Increase Pressure on Taiwan in Next Two Years Rather Than Invade, Says Pentagon Official,” *USNI News*, November 7, 2022 2:39 PM, [https://news.usni.org/2022/11/07/china-will-increase-pressure-on-taiwan-in-next-two-years-rather-than-invade-says-pentagon-official?ct=\(USNI NEWS DAILY\)&mc\\_cid=7cf69a4b76](https://news.usni.org/2022/11/07/china-will-increase-pressure-on-taiwan-in-next-two-years-rather-than-invade-says-pentagon-official?ct=(USNI%20NEWS%20DAILY)&mc_cid=7cf69a4b76), and Katie Rogers and Chris Buckley, “Biden Sees No

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<sup>30</sup> See Japan, Ministry of Defense, *Defense of Japan 2022*, August 2022, [https://s3.documentcloud.org/documents/22187264/doj2022\\_en\\_full.pdf](https://s3.documentcloud.org/documents/22187264/doj2022_en_full.pdf)

<sup>31</sup> *US National Security Strategy*, Office of the Secretary of Defense, October 27, 2022, <https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf>.

<sup>32</sup> See Japan, Ministry of Defense, *Defense of Japan 2022*, August 2022, pp 103-119, [https://s3.documentcloud.org/documents/22187264/doj2022\\_en\\_full.pdf](https://s3.documentcloud.org/documents/22187264/doj2022_en_full.pdf)

<sup>33</sup> Transparency International Corruption Index, <https://www.transparency.org/en/cpi/2021>.

<sup>34</sup> See Wikipedia, (*List of Ongoing Armed Conflicts*), [https://en.wikipedia.org/wiki/List\\_of\\_ongoing\\_armed\\_conflicts](https://en.wikipedia.org/wiki/List_of_ongoing_armed_conflicts).

<sup>35</sup> See <https://acleddata.com/about-acledd/>.

<sup>36</sup> United Nations, *Human Development Report, 2022*, p. 11, [https://hdr.undp.org/system/files/documents/global-report-document/hdr2021-22pdf\\_1.pdf](https://hdr.undp.org/system/files/documents/global-report-document/hdr2021-22pdf_1.pdf).

<sup>37</sup> Vision for Humanity, *Global Peace Index, 2022*, p.2, <https://www.visionofhumanity.org/wp-content/uploads/2022/06/GPI-2022-web.pdf>.

<sup>38</sup> UNHCR, *Global Trends Report*, June 2022, <https://www.unhcr.org/en-us/globaltrends.html>.

<sup>39</sup> IMF *World Economic Outlook for 2022*, October 2022, p. XIII, <https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022>.

<sup>40</sup> World Bank, *Poverty and Prosperity Report, 2022*, p. xii, <https://openknowledge.worldbank.org/bitstream/handle/10986/37739/9781464818936.pdf>.

<sup>41</sup> Choe Sand Hun, “North Korea Sees New Opportunities in ‘Neo-Cold War’,” *New York Times*, November 14, 2022, <https://mail.google.com/mail/u/0/#inbox/FMfcgzGqRZfCBQLnDtvCnTvhSMMcPkTh>.

<sup>42</sup> See <https://www.dni.gov/nctc/groups.html>.

<sup>43</sup> U.S. State Department, *Country Reports on Terrorism*, <https://www.state.gov/country-reports-on-terrorism-2/>.

<sup>44</sup> For summary ranking of the problem in governance see World Bank, *Worldwide Governance Indicators, 2021*, <https://info.worldbank.org/governance/wgi/> and for analyses of corruption, see the work of Transparency International, and its *Corruptions Perceptions Index*, <https://www.transparency.org/en/cpi/2021>.

<sup>45</sup> Steven Levitsky and Lucan A. Way. “Elections Without Democracy: The Rise of Comparative Authoritarianism,” *Journal of Democracy*, 2002, [https://scholar.harvard.edu/levitsky/files/SL\\_elections.pdf?utm\\_campaign=wp\\_todays\\_worldview&utm\\_medium=email&utm\\_source=newsletter&wpisrc=nl\\_todayworld](https://scholar.harvard.edu/levitsky/files/SL_elections.pdf?utm_campaign=wp_todays_worldview&utm_medium=email&utm_source=newsletter&wpisrc=nl_todayworld); and in the “New Competitive Authoritarianism,” *Journal of Democracy*, January 2020, [https://muse.jhu.edu/article/745953?utm\\_campaign=wp\\_todays\\_worldview&utm\\_medium=email&utm\\_source=newsletter&wpisrc=nl\\_todayworld](https://muse.jhu.edu/article/745953?utm_campaign=wp_todays_worldview&utm_medium=email&utm_source=newsletter&wpisrc=nl_todayworld).

<sup>46</sup> Wikipedia, <https://www.google.com/search?client=firefox-b-1-d&q=Casualties+in+Syria+civil+war+>, and UNHCR, *Presentation of the report on civilian deaths in the Syrian Arab Republic*, June 30, 2022, <https://www.ohchr.org/en/statements/2022/06/presentation-report-civilian-deaths-syrian-arab-republic>.

<sup>47</sup> Institute for Economic and Peace, *Global Terrorism Report, 2022*, March 2022, p.12, [file:///Users/anthonycordesman/Desktop/GTI-2022-web\\_110522-1-2.pdf](file:///Users/anthonycordesman/Desktop/GTI-2022-web_110522-1-2.pdf).

<sup>48</sup> For example, see Anthony J. Blinken’s statement in his Designation of the Burmese Regime’s Military Aircraft Suppliers that, “Burma’s military regime has waged a brutal campaign of violence against the people of Burma, carrying out lethal air strikes against the political opposition and the broader civilian population. On October 23, the regime carried out one of its deadliest aerial bombings since the coup, firing upon an ethnic community gathering in

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an attack that killed as many as 100 people and claimed the lives of artists, performers, and concertgoers in Kachin state. We stand with the people of Burma in the face of the regime's increasingly brazen attempts to terrorize and intimidate them, while suppressing their aspirations for a democratic, inclusive, and prosperous future." U.S. State Department, <https://mail.google.com/mail/u/0/#inbox/FMfcgzGqRQJksfqiJnhpKXQzXsbKPBzp>.