# NC

### 1 – Russia Lunar Base PIC

#### CP Text – Ukraine should:

#### Increase private and civilian entity cooperation with the Russian Federation over a joint lunar base.

#### Ban all other appropriation of outer space by private entities in Ukraine.

#### The CP solves Ukraine-Russian relations that cement interdependence preventing conflict AND saves Russia’s Economy.

Beldavs 14 Vid Beldavs 8-25-2014 "An outer space solution to the Russia-Ukraine conflict" <https://www.thespacereview.com/article/2582/1> (Writer at the Space Review)//Elmer

Russia has chosen to invest heavily in military modernization but has let its R&D capacity deteriorate. Russia barely invests 1% of its GDP in R&D, far less than nations like Israel (4.2%), South Korea (3.7%), Sweden (3.3%), and Finland (3.1%.) The EU has a goal of 3% of GDP invested in R&D by 2020, the US invests about 2.7%, and China presently is at about 2% but has targeted 3% in the long term. If innovation is the primary driver of economic development, Russia’s choice of emphasizing the military is likely to have disastrous consequences, further exacerbating its brain drain. Bright people, particularly scientists, will continue to leave to do great science elsewhere. Deputy Prime Minister Rogozin often speaks of building a Russian Moon base. The capital flight that has occurred over the years could have funded multiple lunar bases and possibly a base on Mars. In 2014 the plans have become more elaborate, but less realizable after the Ukraine fiasco. Now Rogozin speaks of a permanent base, with a Russian presence on the Moon forever. Consider the money spent on the military after its modernization drive started in 2008. If a quarter of the hundreds of billions in military spending had gone into advanced space development, it could have been Russia-based asteroid mining companies that find and exploit the asteroids with trillions of dollars of recoverable resources. Instead it will be Deep Space Industries, SpaceX, Planetary Resources, and other American companies that will reap the rewards. Now that weapons have been purchased and the troops have been trained to use them, the impulse is to put the military to use. Russia is losing hundreds of billions due to a senseless war that did not have to take place. The Ukraine crisis started as a result of a gross misreading of Ukrainian public opinion by Russian leadership. About 75% of the public was for joining the EU in the fall of 2013, eagerly anticipating President Yanukovych to sign the Association Agreement. In the Ukrainian parliament, the Verkhovna Rada, 318 votes out of 449 has been cast for joining the EU, reflecting strong support from all regions of the country. The people of Ukraine—Russian, Polish, Tatar, Ukrainian, and other nationalities—had the hope that their country could finally get on the road to prosperity where they could live like their European neighbors. President Yanukovych had been elected in 2010 on the basis of his advocacy for Ukraine joining the EU. When Russian President Putin compelled the alternative solution, for Ukraine to join the new Eurasian Union led by Russia, the public was outraged. The Maidan revolution was a predictable consequence that had nothing to do with Victoria Nuland, NATO, or other Western influence. Russian interests would have been much better served if Yanukovych had simply been allowed to sign the EU Agreement. He would have increased his political standing in Ukraine while remaining a friend of Russia. Yanukovych is history, Petro Poroshenko is now president, and there have been thousands of casualties in a senseless war that harms Russia, Ukraine, and the EU. Economic growth in the EU is threatening to collapse, while the Russian and Ukrainian economies are imploding. The Russian and Ukrainian economies are deeply intertwined, particularly in the space and high technology sectors. The war in eastern Ukraine is affecting both economies and resulting in significant delays in Russian space efforts as Russia seeks to substitute its own production for imports from Ukraine. It is time to consider a solution to the problems of the region. A large-scale project that results in an investment of billions in the Russian, Ukrainian, and EU space and technology sectors could provide a highly visible re-unifier that generates jobs in eastern Ukraine and bolsters science and industrial development in Russia and drives innovation in the EU to lift it back to a growth path. Why not reframe the Russia-Ukraine-EU relationship towards a mutually positive future? Deputy Prime Minister Rogozin has already given the answer: build the Moon base as a joint Russia-Ukraine-EU project. Better yet, why not expand the opportunity and invite the US, China, Japan, and others to join? There is an existing structure that could make it work. It is the International Space Station (ISS): the largest international cooperation effort in technology development in human history. In fact, the ISS has been nominated for the Nobel Peace Prize. Such a project could begin the drive for industrial development of the Moon and beyond, and create a permanent Russian presence on the Moon forever, in partnership with Ukraine, the EU and the rest of the world. Stop the stupid war. Build the Moon base.

#### Russian Economic Decline causes Nuclear War.

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Scenario 1: Disintegration If the Russian economy continues to deteriorate and the regime continue to distance themselves from the West, the centre may not be capable to maintain legitimacy and keep the periphery together. Already, some regions and counties are highly indebted. In other parts, ethnic Russians are a minority. Regions in eastern Russia, rich in raw materials, may look to China for funding. It is, however, probable that Beijing will not want to undermine the stability in Russia. Closer to the region in focus in this report, Kaliningrad is an area that could distance itself from the Kremlin. Economic problems and security concerns form a background that could lead to a political uprising. A “Kaliningrad-Maidan” development is at the heart of this scenario. Triggers could also come from outside Kaliningrad, in or in the immediate surrounding of the Russian Federation, or from other factors such as severe pollution. The other countries in the region would in all probability remain cool in this situation, considering the county’s military importance for the Russian government. However, a mutiny like the ones in Kroonstad in June 1917, March 1921 or on the frigate Storozjevoj in November 1975 cannot be excluded. Economic and political tensions in Europe could weaken the EU and worsen the development at the same time. A Greek withdrawal from the EU, triggered by its exit from the Eurozone, could set such a movement in motion. A Podemos-led government in Spain could undermine confidence for the single market, at a time when Europe also faces the consequences of a highly unstable North Africa, with a large flow of migrants. Attempts by Russia to influence certain members in the EU, such as Hungary and Cyprus, could sow further discord in the EU. At the most severe levels of disintegration, France could adopt policies effectively blocking EU and NATO response in a time of increased tensions. Britain may opt out of the union altogether, or be forced out if their demands for special status is rejected by the other member states. In all varieties of disintegration, uncertainty concerning the control over the nuclear arsenals will increase. The US will become involved both diplomatically and financially in order to bring clarity and establish control over the arsenals. Should Russia, in that situation, ask for military support for this, it is highly probable that the US would acquiesce: such operations in other parts of the world were the object of joint US-Russian exercises just a few years ago. Scenario 2: Ultra-nationalism If Russian domestic and international policy continues to become more radicalised, it might take ever more drastic forms. As the economy deteriorates, wages fall and shortages become common, a focus on nostalgic nationalism, using belligerent rhetoric and demonstrations of military power, could be used to deflect growing discontentment. A logical target would be to “protect” zones which are perceived as Russian, e.g. where there are Russian ethnic minorities or even just Russian-speaking areas. Such rhetoric was and is used in the Ukraine. The coming years will tell what the Russian ambitions are in the Ukraine. Offensives to secure and expand their supply lines, and weakening those of the Ukraine, are probable, and more ambitious plans, such as the opening of new directions in Kharkiv or Odessa, are possible. As a distraction, conflicts in Moldavia can be fuelled. If the West, primarily the US, UK and Poland, support Ukraine with military means, the risk increases for further escalation of the conflict. Remaining passive, on the other hand, runs the risk that Russia perceives that it could act against other targets. A second country that could be the target of Russian nationalism is Belarus. Judging by president Putin’s justification of the annexation of Crimea, Belarus would similarly be a legitimate candidate for “re-inclusion” in Russia. There are indications that the regime in Belarus are worried about such a development and acting to thwart it. In late 2014, Lukashenko appointed a new government, and has increased the emphasis on “Belorussian”. The fragmented (and thoroughly infiltrated) opposition has declared that it will not field candidates in elections this autumn, since they deem the threat of president Putin to be greater than of Lukashenko himself. Belarus has also passed laws permitting prosecution of non-regular armed troops, as a consequence of the Russian method employed in the annexation of Crimea. In the economic sphere, Russia has complained that Belarus is profiting from sanctions against Russia. Any attempts from Russia to enter Belarus’ with military means would probably not be met by any effective resistance from the Belorussian security apparatus. The opportunities for Russia are in some ways more favourable here than in Ukraine, due to the close cooperation between the countries’ armies and intelligence services. Passive resistance cannot be ruled out but would not mean much in a short-term. However, tensions with other former Soviet Union republics, with the EU and with NATO would surely increase. Polish and Lithuanian forces would probably mobilize to counteract spillover effects. EU policy would be substantially revised. Belorussian citizens would attempt to flee, primarily to neighbouring Poland, Lithuania and Latvia. The Russian government would also threaten the Baltic states, in order to undermine their economies and try to influence policy in these countries. Estonia, Latvia and Lithuania would be in a precarious situation. While they need to strengthen their civil and military defence, they must retain credibility with their allies and not be perceived as to exaggerate the Russian threat. The higher the tensions, the more sensitive the world is to psychological influence. Russia would, in this scenario, also fan nationalism in other parts of Europe through political and financial support. West Balkan is particularly vulnerable, as the EU and the US have invested considerable political capital in the region with only mixed success. Bosnia, Kosovo and Macedonia have stagnated in their political and economic development with high levels of unemployment, political polarisation and even the establishing of Islamic fundamentalist cells: a fertile ground for nationalist movements. Finally, Russian ultra-nationalism would also be directed inwards, with an escalated persecution of the domestic political opposition, independent media, and nationalisation of foreign assets. This will be combined with attacks on minority groups, especially on Jews. This scenario could happen separately or as a precursor to the final, and most dangerous, scenario. Scenario 3: Test of strength In this scenario, Russia would attempt to break NATO through challenging of one or more of the Baltic states. The objective would be to demonstrate to alliance members that NATO’s response is too late and too weak. A precondition for success is a distraction through a crisis by an intermediator, which would tie down especially American attention and resources. The distraction could come in many forms, e.g. by partnering with North Korea, fanning war in the Middle East, or even hidden support for terrorists. If the current polarisation in US domestic politics continues, any reaction will be obstructed and delayed. An especially vulnerable window of opportunity is in the period between the presidential elections in November 2016 and the installation of the new president in January 2017, which could create a legitimacy problem for the American political system when it comes to the possibilities of directly confronting Russia quickly. An attack on any Baltic state would directly affect Swedish territory and air space. In the worst-case scenario, it will happen immediately before open conflict with NATO. The Baltic states each offer different opportunities for Russia, but they all have in common that they lack any strategic depth, which means that an open invasion would be accomplished in a few days, unless support from other alliance members is forthcoming. Estonia, which is the most powerful of the three, both economically and military, poses as a potential threat to the trade over St Petersburg. To control the maritime traffic through the Gulf of Finland is an important motive for Russia to influence Estonian politics. The population of Estonia, with 25 percent ethnic Russians, could be used to legimize action and as grounds for destabilisation, especially around the border town Narva where more than 90% of the population is ethnic Russian. Latvia is the most vulnerable of the three states. The economy is weaker; the Russian minority is about the same as in Estonia; and Russian organised crime has a strong hold. Especially the eastern parts of the country are vulnerable to Russian influence. Lithuania only have about six percent ethnic Russians and a stronger military tradition. On the other hand, Lithuania offers access to Kaliningrad. Lithuania’s attempts to decrease their dependence on energy from Russia has annoyed the Russian regime, as is evident in the harassments by the Russian navy of the cabling operation which will connect the Lithuanian grid to Sweden. There are also some tensions surrounding the Polish minorities in the country which Russia could exploit. How fast Sweden will become involved depends on the extent of open, armed actions against one or all of the Baltic States. If a confrontation occurs with non-regular or paramilitary means, maintaining dominance over Swedish territory and territorial waters will be in focus. The same will be the case for Finland, but Finnish action could be influenced by Russian fabrication of tensions in Karelia, that Helsinki could be blamed for. NATO would try to respond in a controlled manner, i.e. prioritizing transports by air and sea. This would mean greatly increased traffic in and over the Baltic Sea. Tensions will rise drastically, with increased risks of miscalculations on both sides. Sweden and Finland are expected to act together with the rest of the EU and the US. If no direct military threat emerges against Sweden, then Sweden cannot count on any enforcements from the rest of the world apart from mutual information exchange. The instance that the citizens in the Baltic states perceive a risk of a Russian incursion, the probability is high that a flow of refugees will commence. From Lithuania, the biggest flow will be to Poland while Latvian will flee to Sweden, mainly Gotland. Refugees from Estonia can be expected to flee towards Finland or Sweden depending on where in the country they live and where they have relations or connections. In the worst-case scenario, Swedish and Finnish territory will become an arena for hostilities. As Russian readiness exercises have shown, airborne and marine infantry could rapidly and with surprise occupy parts of Gotland and Åland. A possible option is also to mine the Danish Straits in connection with this. By supplies of surface-to-air and anti-ship missiles, Russian forces can temporarily extend their air and coastal defence in the Baltic Sea, protecting an incursion by land into the Baltic states. NATO would be faced with a fait accompli. The invasion does not need to happen in all three states nor include the entire territory of a country. The only thing that is needed is a demonstration of NATO’s inability to defend alliance members. This would establish a new security order. Depending on the level of conflict that Russia would be willing to risk, air and navy bases in Sweden and Finland could be struck with missiles from the ground, air and sea. It is, however, likely that the governments would be issued an ultimatum to remain neutral, with only a few hours to comply. Public announcement of the ultimatum would put immense pressure on the political system and weaken resistance. Such diplomatic tactics could be reinforced by forced cyber attacks on the electricity and telecommunication networks. During the coldest months of the year, the vulnerability would be the highest. At the same time, Sweden would be expected to support their Western partners’ need for transports into the theatre of action. If Russia would close the Danish Straits, any military support to the Baltic states would need to move over Swedish territory; such as air support Norwegian air bases or aircraft carriers in the Norwegian Sea. There would also be demands to clear of mines in Oresund, and possibly for allowing equipment and troop transports to harbours on the east coast for further transport across the Baltic Sea. The Swedish to such demands would have consequences for generations to come. If Gotland would not be occupied by Russian forces, NATO would demand to set up bases on the island. The smallest indication of acquiescing to such demands would have the Russians racing to the island. Furthermore, Russia would coordinate activities in the far north, with submarines of all kinds and possibly even direct action in northern Finland and even in northern Sweden, in order to expand Russian air defence. Faced with the risk of direct confrontations between Russian and American forces, Russia could mount land-based as well as amphibian operations in the north of Norway and on Svalbard, to improve the defence of Murmansk. Following a similar strategy, occupying parts of Bornholm would make it more difficult for NATO to support their members. This is probably not necessary, but it is a possible option. In most people’s minds, there is a sharp line between the Baltic states’ eastern borders and Russia, the crossing of which is unconceivable. By first gaining the control over Gotland and Åland, the Russian General Army Staff could circumvent a mental Maginot line, in the same way as Germany attacked France through Benelux in May 1940. Russian success in this scenario hinges on speed and the ability to contain the conflict. The first message to Washington will entail the understanding that this is not a direct conflict between the US. For Russia, the uncertainty is therefore how US interests are perceived from an American perspective. For the US, it is not just the credibility of NATO that is at stake but also the unity of the EU. This has global connotations since allies (and enemies) in the Middle East and Asia will also form assumptions regarding the willingness and ability of the US to act in order to protect their allies. The risk is obviously that Russia miscalculates and underestimates the difference between, for instance, the departing presidential administration perceptions of US security interests on the one hand with the wider US security establishment’s perception of these on the other. During the whole process, the threat of nuclear strikes would hover over all decision makers, which increases the degree of uncertainty. Nuclear tests in the period before a test of strength cannot be ruled out, especially since Russian emphasis on nuclear deterrence could lose credibility over time. Direct threats of using the nuclear weapons is, however, completely excluded in this scenario.

### 2 – China DA

#### Ukraine-China relations motivated by space cooperation – the Aff makes that impossible – that spills-over into other aspects of the relationship.

Ma and Soroka 20 Ma, B., and L. Soroka. "The Cooperation between China and Ukraine in Space Exploration: Genesis and Development. Advanced Space Law, 5, 58-70." (2020). (Ph.D. in Law, Professor, Guangdong University of Petrochemical Technology)//Elmer

Critical outcomes of bilateral China-Ukraine relations in space China and Ukraine do not provide complete open official information on aircraft and missile science, which complicates the analysis, including the analysis of trends and opportunities for further cooperation between China and Ukraine. However, available open sources enable to summarize some of the outcomes. In the space segment of bilateral cooperation, the developments should be highlighted as follows (Badrak, et al., 2009: 63): a) the exchange of information on the technical parameters of the Chinese Environment-1B project and the Ukrainian Sich-2 project to establish mutually beneficial cooperation in the field of space data exchange; b) delivery to China of a laboratory facility (including the transfer of production technology) for manufacturing non-plasma engines for spacecraft; c) closeness and interchangeability of the Ukrainian UNOSAT project and the Chinese seismic electromagnetic satellite project give the possibility of establishing mutually beneficial cooperation on these projects. According to the Agreement between Ukraine and China, Kharkiv Military University has started training Chinese air defense specialists (Training Aviation Command began operating in the military town “Rogan-1” near Kharkiv). It is possible that in the future Ukraine will begin to train cadets-pilots from the PRC, as well as provide medical support for the training of astronauts, which is especially important for the implementation of the Chinese Space Program “Project 921” (921 Project, 2020). To date, Ukraine’s position in the space sector is the strongest in the launch services market. While China is interested in developing its satellite navigation system, Ukraine is interested in acquiring microelectronics technology and investing. Therefore, constant and promising cooperation between the PRC and Ukraine can be established and stabilized in these sectors. However, nowadays, Ukraine should be more actively involved in projects within the framework of cooperation with China on legal, clearly stipulated contractual bases with the maximum contract validity to enhance its capabilities in this sector and gain competitive advantages in international markets. Promising forms of scientific and technical cooperation, such as the creation of technoparks, incubators, engineering and technology transfer, etc., are being implemented between China and Ukraine. Moreover, in the People’s Republic of China, the first industrial zones were established back in 1980. Currently, there are 54 technoparks in the country that provide about 10% of GDP and accumulate 30% of FDI. In Ukraine, 12 industrial parks are registered, and only a few of them are under construction. The rest is not functioning (Natalushka, 2017). The creation of technoparks will provide potential foreign investors with new opportunities for preferential taxation, as it has been done in Singapore. With such technoparks, the owner will be able to draw up all the necessary permits for Chinese investor companies, eliminating the need to run around the offices of officials. Along with the positive points in bilateral relations between China and Ukraine, factors that hinder the development of interstate partnerships remain and need to be addressed. First, these are a narrow foreign policy orientation of the Government of Ukraine to the countries of Europe and the USA, the inaction of the Ukrainian side in holding official meetings, visits to China with the participation of the first persons of the State, the absence of political continuity (every time after a change of power, a new plan, a new strategy of development occur) and the presence of corrupt schemes in legal regulation (Natalushka, 2017). Second, insufficient explanatory work on the meaning and ultimate purpose of socio-political transformation in Ukraine (for example, the Chinese will understand de-sovietization as a rejection of the negative heritage of the USSR and will not understand decommunization, because communism remains the official ideology of the PRC) (Goncharuk et al., 2016: 38). Third, the difficulty of a Ukrainian visa for the PRC citizens remains a huge obstacle to establishing effective relations with China, and there are problems with guaranteeing the safety of Chinese living in Ukraine, their businesses, and property. At the present stage, China and Ukraine have every opportunity to realize a considerable potential of bilateral cooperation in science, technology, and education, to be in close relation with the international scientific and technological community, and to participate in creating an innovative global society (Joint, 2018). Cooperation China’s role in the world becomes more significant. Expanding political, economic, cultural, and other relations with this country is one of the critical areas of Ukraine’s foreign policy. Before the declaration of independence in 1991, Ukraine, as part of the USSR, had been building its relations with the People’s Republic of China within the framework of the all-Union foreign policy doctrine. Only after the collapse of the USSR and the proclamation of its independence an independent policy became possible. Ukraine and the PRC are known to have much in common. This concerns geopolitics, which broadly defines the role and place of Ukraine and the PRC not only in the Eurasian region but also in the broader, global geopolitical context. The countries have mutual economic interests and close positions on the key problems of contemporary world political development. Both states face similar internal socio-economic issues. In both countries, a transition to a market economy occurs, a desire for a policy of openness exists. Both countries are in the Eurasian region, are neighbors of Russia, and are in the interests of the United States of America. The foreign policy of both countries is based on a realistic consideration of their national interests. Ukraine is an essential factor in European and world politics. It is respectful of the PRC’s growing role in contemporary international relations. Ukraine and the PRC have been productively and consistently working and coordinating their policies at the UN and other international organizations. According to Meng Hin, despite a great interest of politicians and the public regarding the issue of China-Ukraine cooperation in the 1990s of the twentieth century, it remains studied incompetently. However, for the first time in the history of the two countries, their relations have begun to develop on a broad legal basis (Meng, 2005). This requires an in-depth study of the various strands of relations between Ukraine and the PRC. The study of this issue will enable us to understand the main trends in the development of relations between the States and to offer recommendations on the implementation of comprehensive cooperation. Therefore, considering the benefits of scientific and technical cooperation, and existing areas of cooperation, the authors propose the following strategic approaches to expanding science and technology-based relationships, which form an overall strategy for long-term cooperation in space that could, in the long run, bring China and Ukraine to a new level of development, increase their competitiveness in the world markets: joint research and development; exchange of scientific and technical information and documentation, samples of products and materials, as well as the exchange of know-how and licenses on a compensatory basis; organization of scientific-technical seminars, symposia and scientific conferences, etc. Besides, the successful commercialization of space exploration products requires to develop and adopt regulatory acts promptly to create the necessary legal platform to realize the prospects for both China and Ukraine. In conclusion, some truths are eternal. Ancient Chinese philosopher Confucius said: “Those who do not care about their future will be in trouble soon.” If Ukraine had perceived the recommendation of its first president, “science can wait” as a ridiculous joke. Our current “famine of science” might not have occurred, or, as our Western colleagues say, “innocide” instead of innovation (Driga, 2017: 61).

#### That cements the BRI – Ukraine is a critical partner in Europe for China Trade.

Zeneli and Haluhan 19 Valbona Zeneli and Nataliia Haluhan 10-4-2019 "Why China is Setting its Sights on Ukraine" <https://thediplomat.com/2019/10/why-china-is-setting-its-sights-on-ukraine/> (Dr. Valbona Zeneli is the Chair of the Strategic Initiatives Department at the George C. Marshall European Center for Security Studies. Ms. Nataliia Haluhan is the Chief Consultant, National Institute for Strategic Studies (Ukraine). She is a former Marshall Center scholar.)//Elmer

As China continues to assert itself as an emerging world power, Europe remains a very important target. While Chinese investment has significantly increased, by 50 times in the last decade, the current figures underestimate the true scope of Beijing’s ambitions in the old continent. To achieve its goals, every European country is important for China: economically, geographically, or politically. Ukraine is no exclusion from the rule. Beijing’s multifaceted interests in Ukraine mainly relate to its strategic geographic location. It is highly attractive as a logistic transit hub within the Belt and Road (BRI) initiative that links China with European Union (EU) markets. Other attractive factors are its rich natural resources, opportunities for new infrastructure projects and its agricultural industry. These factors are all in line with the Chinese expansionist agenda in Europe. A member of OBOR since 2017, the business community and political leaders in Ukraine have shown increased interest in deepening cooperation with China. To serve this purpose, the “Belt and Road” Trade and Investment Promotion Center was established in Kyiv, seeing BRI as a tool to improve infrastructure, attract foreign investment from China, invest in energy projects and modernize agricultural technology. To date, there has been a lot of conversation, but projects are not clearly defined, nor transparent. Being attracted by the promises of the BRI as an opportunity for their country to unlock the potential of it being an “entrepot” to Europe, Ukrainian politicians had earlier expressed their willingness to deeper institutionalize relations with Beijing in offering to join the “16+1” mechanism, a platform created by Beijing to increase trade and economic relations with Central and Eastern Europe.

#### Solves Central Asian and South Asia War.

Muhammad et Al 19, Imraz, Arif Khan, and Saif ul Islam. "China Pakistan Economic Corridor: Peace, Prosperity and Conflict Resolution in the Region." (Lecturer, Department of Political Science, University of Buner)//Elmer

In the twenty first century, the geostrategic importance of South Asia is rising because of the China Pakistan Economic Corridor (CPEC) which is the important component of the **o**ne **b**elt **o**ne **r**oad initiative (BRI). CPEC, started point is Gawadar a deep water port connects to the China‘s province of Xinjiang. Being part of the BRI, once CPEC is completely started functioning, it **will improve** the **political, social and economic situation** of the regional states and will raise the geo-strategic importance. CPEC is the priority of both states China and Pakistan, for Pakistan, CPEC pass through Pakistan‘s geography, is outlet for the landlocked countries and provides access to the supply and demands market to regional countries, while it is very short route for China, CPEC replace 13000 km only into 2500 km to reach to Middle East.1 So both the states have an instinct desire to continue it irrespective of change in the government. Not only this, CPEC will **boost** up the **regional** states‘ **economy**, **ensure peace** and prosperity in the region. Political, social and economic degradation in South Asia, created a hurdle in the cooperation among the regional countries. Security issues, terrorism, over population, economic disparities, lacking of education and modern inventions, lacking of health facilities, poor economic setup, water issues etc. devastated the life style and hindered the progress, development and peace in the region. CPEC is a turning point in the history of Asians‘ countries, it is not only a game changer and a target for Pakistan and China but a project for the whole region. Goal of this project is to promote commerce and trade culture, integrate the regional states for the development of economy, agriculture and industries. Furthermore, it is a source of peace, prosperity and conflicts resolutions in the region through economic development, economic dependence and regional integration. CPEC is a sign of peace and affluence for the whole region as for Pakistan. Being economic zone it will bring political, social and especially economic growth in the region. However, this research work deals with analyse the CPEC role in bringing peace and prosperity on the one hand and led to conflict resolution in South Asia on the other hand. What is CPEC? The CPEC is the part of one belt, one road has featuring of common advantages and prosperity, containing on complimentary interest, cooperation and collaboration and mutual benefits. A widespread transport corridor, industrial and trade cooperative rout between China and Pakistan, having the potential of people to people contact and communication, sources of cultural diffusion and exchange. Additionally, CPEC has the ability of political, social and economic growth, bringing peace, prosperity and security in region2 The CPEC covers the areas starting from a muslim majority province Xinjiang Uygur in China and almost all provinces Pakistan. Main areas through which CPEC passes are Kashgar, Atushi, Tumshuq, Shule, Shufu, Akto, Tashkurgan Tajik, Gilgit, Peshawar, Dera Ismail Khan, Islamabad, Lahore, Multan, Quetta, Sukkur, Hyderabad, Karachi and Gwadar. Furthermore, the CPEC will comprise one belt, three passageways, and two axes and five functional zones. Peace, Prosperity and Conflict Resolutions Narrowly peace is defined as the passivity and acceptance of injustice and cruelty without showing reaction.3 It may also be turn as the complete absence of war which simply fall in the negative peace category, but actually **peace** is more than that, it is **based on the political,** social **and economic development** of society and elimination of the injustice, and violations of the human rights.4 More elaborately, peace focused on the modern concept of democracy, liberalism and postmodern society, which is really related to the deconstruction of the parochial society, snatch powers from single body and share with rest of the society, where there is popular democracy is observed. Where there is no exploitation of the individual and restriction on the abusive use of the authorities.5 Nonviolence, the philosophy of Gandhi and Bacha Khan, is the part of positive peace, where there is no violation of the law, demand for rights under the shadow of law, no threats are used during protest and strikes. So, by this way there is risk for the conflicts, violations and war. Demand for right by using violence fall under the umbrella of negative peace. Jonathan Schell fruitfully summarised the dilemma of non-violence as cooperation, collective action consist on the mutual consent against abusive and parochial power and compel those actions which are taken against them.6 However, it is a very emotive term which has many heads and tails has not absolute end, in short the think tankers are in seeking to find easy way to bring cooperation, consensus, mediations, resolutions and more effective ways to resolve the issues and disputes, and transform the causes of war into peace. Perpetual peace is possible in resolving the conflicts, but due to anarchy in the international community, there is conflict. Disagreements, irrational demands, denial and counter claim leads to conflicts. So, prevention of the conflicts, mediation, management and resolution fascinated the international community, because the cost of war and conflicts is higher. For the conflict resolution, various methods are used as the tactics of good offices, arbitration, enquiry, negotiation, problem setting workshop, second track diplomacy, reconciliation and judicial settlement.7 However, conflict resolution depends upon clear assurance from all parties. CPEC Role in Bringing Peace and Prosperity & Peace through Economic Growth & Regional Integration: Political, social and economic interdependence society, reduce the chances of conflicts and war. Liberal thinkers probe out that **free trade and** economic **interdependence** flourish peace and **eliminate** the risk of **militancy**. The theory of Economic Opportunity Cost Hypothesis investigated that economic interdependence increase the level of integration among nations, consequently there is the eruption of peace and alleviated the condition of war8 . Economically weak states, where is economically disintegrated states are mostly enhanced in conflicts with each other. So, it is the benefits of trade globalization which decreases conflicts among nations. The theory of Neo-Functionalism which discussed norms and values of the Europe integration, has focused that cooperation and harmonization in one sector open the routes of another for the cooperation.9 Where, further expansion of the chain of integration, cooperation and as a result peace enhances in society. Like European states, Afghanistan, Iran, India, **Pakistan**, China **and** other **central Asian states** **have** the **capacity of regional integration** through CPEC. The CPEC has the potential of cooperation, integration, economic growth, and forged unity among regional states. According to the norms of NeoFunctionalism, CPEC provides an opportunity of free trade, economic dependence, transportation and regional integration through functional cooperation. **South Asia** is the **most exacerbated region** in the world, because of militancy, conflicts, overpopulation, less development, lacking of education and specially the arm race among nations. Terrorism in the region (Afghanistan and Pakistan) created security dilemma and furthermore the conflicts of Pakistan and India over Kashmir worsen the situation, which disturb the economic chain in the region for a long time. **CPEC** **bestowed the best opportunity to resolve the conflicts** and created peace through geo-economics and geo-politics. This corridor has the capacity to create economic interdependence in the region and regional integration because of functional cooperation based on common interest and needs.10 CPEC network connected the regional and extra-regional countries through, economic trade, liberalization of economy, free policies and open membership, to get advancement in commerce and trade on global level.11 Being part of the of the Belt and Road Initiative (BRI), CPEC has the capacity to **interconnect** China, **Pakistan**, Iran, **India**, Afghanistan, **Central Asia**, West Asia, not only this other states of the Central Asia are also may connected with this corridor through India. After Passing through Asia, CPEC enter into Europe through ―One Belt, One Road‖ strategy.12 By this way CPEC created cooperation among adjacent and de-adjacent countries, and lead to peace and prosperity through economic dependence, as the China‘s Assistant Foreign Minister opined that peace, prosperity and economic development of CPEC not only limited to China and Pakistan but to the whole region.13 Similar view has been presented by the Ex-PM Nawaz Sharif during his visit to Turkmenistan, CPEC would be beneficial for everyone in the region in the socio-economic perspective, as he said that ―CPEC will offer opportunities for hundreds of millions of people.‖ But it is necessary to promote peace in the region because without peace, development remains just words on the tongue, as he further mentioned that peace and prosperity are connected with each other. Furthermore, flourishing the popular concept of happiness and prosperity Nawaz Sharif added, that my government will ensure Regional integration and connectivity. It will help us to work together towards pursuing our common objective of strengthening peace and bringing development in our region. In fact CPEC is an opportunity where Pakistan and other countries of the region have to work for the betterment of our people.‖14 So, through integration of the regional states, CPEC has a great role in the flourishing of the peace, prosperity and development in the region. The issue of terrorism, militancy, Kashmir disputes, crimes as piracy, human trafficking and problems around the Indian Oceans, are created severe affection over the region regarding international trade and commerce, crumpling of economy and security threats. These issues also devastating the security and economic situation of Pakistan, therefore, responding to these devastating issues is one of the foremost priorities of Pakistan and China. ChinaPakistan adopted joint struggle for the fortification of their maritime security to bring peace and stability in the region and secure the CPEC from insecurity.15

#### South Asia War goes Nuclear and causes Extinction.

Menon 19 Prakash Menon, The nuclear cloud hanging over the human race, Nov 15, 2019, [PhD from Madras University for his thesis “Limited War and Nuclear Deterrence in the Indo-Pak context”] [https://www.telegraphindia.com/opinion/the-nuclear-cloud-hanging-over-the-human-race/cid/1719608#](https://www.telegraphindia.com/opinion/the-nuclear-cloud-hanging-over-the-human-race/cid/1719608) SM

The nuclear cloud hanging over the human race Even a limited India-Pakistan nuclear conflict could pose an existential challenge to life on Earth The smoke injected into the stratosphere due to a nuclear attack would block the sunlight and result in a ‘Nuclear Winter' - freezing temperatures that pose an existential threat. One study estimates that in an India-Pakistan exchange, the immediate casualties could number 125 million lives The smoke injected into the stratosphere due to a nuclear attack would block the sunlight and result in a ‘Nuclear Winter' - freezing temperatures that pose an existential threat. One study estimates that in an India-Pakistan exchange, the immediate casualties could number 125 million lives iStock Prakash Menon | | Published 15.11.19, 08:04 PM With the recent administrative changes in Jammu and Kashmir, Indo-Pak hyphenation has come back to haunt India’s aspirations to break out of that narrow mould and be perceived as an independent player on the global stage. The clubbing of India with Pakistan is an echo of India’s political and strategic confinement to the sub-continent. Pakistan has always attempted to paint the Indo-Pak situation as a nuclear flashpoint essentially to invite international intervention in what India insists is a bilateral issue. A recent report in the Bulletin of Atomic Scientists by Toon et al entitled 'How an India-Pakistan Nuclear War Could Start and have Global Consequences' provides grist to the mill of the nuclear flashpoint theory. But it also raises an issue that has yet not found its place in the public imagination nor has sufficient cognisance been taken by the political and military leadership of nuclear weapon powers – the climatic consequences of nuclear explosions. It is well known that nuclear powers have and continue to base their targeting requirements of nuclear weapons on calculations that are restricted mostly to the major but immediate effects of nuclear explosions – blast, heat and radiation. According to General Lee Butler, the former United States, Strategic Forces Commander, during the cold war, the Standard Integrated Operation Plan (SIOP) had targeted Moscow with 400 nuclear weapons and Kiev with 40. Several scientific studies of the impact of nuclear explosions since the 1980s up to the present which utilises advanced computer models, confirm the effect of smoke injected into the stratosphere that would block sunlight from reaching the earth’s surface and is described as ‘Nuclear Winter’. In essence global temperatures would plunge below freezing point thus posing threats to life support systems especially food production. In short, it threatened human existence itself. Later studies that focused on regional nuclear wars especially in the Indo-Pak context, have indicated that the impact of a nuclear exchange would have an immediate significant and catastrophic impact in terms of death and destruction. The latest Toon study, estimates that in a situation where around 350 warheads are used by India and Pakistan, the immediate casualties would vary between 50 to 125 million lives depending on the yields of the weapons used which could vary between 15-100 Kilotons. (a Kiloton being the explosive equivalent power of 1000 tons of TNT). Such scales and speeds of destruction for both parties would indeed be of an existential nature. Therefore, both India and Pakistan despite the rhetoric during times of tension have so far displayed caution and refrained from getting into situations where nuclear weapons are alerted. The speedy de-escalation after Balakot is indicative of a cautionary approach. Of course, this is no guarantee that the next round would not witness a different outcome. For as long as nuclear weapons exist in the arsenals of both countries, the possibility of use remains, however low the probability. It is now well known (but widely ignored by the strategic cognoscenti) that even a regional Indo-Pak nuclear war with hundreds of low yield nuclear explosions can also pose an existential threat at the global level. The latest study states “In the India-Pakistan scenario, we calculated a total of 16.1 TG (1 TG is equivalent of one million tons of smoke) of black carbon injected into the upper atmosphere (11 from India and 5.1 from Pakistan) for weapons with yields of 15 kilotons; 27.3 TG (19.8 from India and 7.5 from Pakistan) for 50 kiloton weapons; and 36.6 TG (27.5 from India and 9.1 from Pakistan) for 100 kiloton weapons. The smoke would be heated by sunlight and lofted high into the stratosphere, where it could remain for years, since it does not rain in the stratosphere”. The Climate Model indicates that global average temperatures and precipitation would be significantly lowered and comparisons are drawn to the ice age that prevailed thousands of years ago. Agriculture around the world would be impacted and billions of people could face starvation. In earlier studies, even 5 TG of smoke produced (which is one third of what is expected in a lower scale Indo-Pak conflict), food production would change in China and the US for specific crops causing widespread shortages at the global level. Moreover, the ozone layer would be degraded as the rising smoke absorbs the sunlight and heats up the stratosphere that would permit ultra-violet rays of greater magnitude to reach the earth causing negative effects. The political and strategic implications of the long-term impact on climate change challenges the foundations of the edifice on which nuclear weapon strategy has been constructed. It is obvious that any deliberate initiation of nuclear war has a high probability of posing an existential threat to humanity. Even with the achievement of the complete destruction of an adversary’s arsenal through a first strike, the initiator cannot itself escape the existential threat posed by long term climate change. This indicates that the First Use doctrine in the name of strengthening deterrence stands fully exposed for its incredibility and the utter stupidity of the use of nuclear weapons.

### 3 – US Relations DA

#### The aff contradicts the Artemis Accords by banning mining and lunar property—decks relations with the U.S.

Nelson 20 “The Artemis Accords and the Future of International Space Law” Jack Wright Nelson [Jack Wright Nelson is a Research Associate at the Faculty of Law of the National University of Singapore and a Member of the International Institute of Space Law. The author is grateful to the Faculty's Centre for Banking & Finance Law for supporting his ongoing research.], December 10, 2020 <https://www.asil.org/insights/volume/24/issue/31/artemis-accords-and-future-international-space-law> SM

The Artemis Accords

The Accords' ten operative paragraphs can be grouped into three categories. The first category reinforces certain core tenets of international space law. In particular, the Accords emphasize that all space activities must be for "peaceful purposes" and performed "in accordance with relevant international law."[8] The Accords also reaffirm and expand upon astronaut assistance obligations from the Rescue Agreement and registration requirements from the Registration Convention.[9]

The second category of operative paragraphs concerns specific operational issues. To this end, the Accords promote transparency, interoperability, and the sharing of scientific data.[10] On the pressing issue of space debris, the Accords' signatories have committed to engage in mitigation planning.[11]

The first and second categories are unlikely to be controversial: the first restates well-accepted law, while the second codifies nascent best practice. But the third category of operative paragraphs aims to progress international space law by promoting particular interpretations of the Outer Space Treaty concerning lunar heritage protection, space resource extraction, and the "deconfliction"[12] of space activities. Further, there are potential conflicts between the Accords and the most recent treaty to emerge from COPUOS—the Moon Agreement.[13]

The Outer Space Treaty and the Moon Agreement

Regarding lunar heritage protection, the Accords state that signatories:

intend to preserve outer space heritage . . . compris[ing] historically significant human or robotic landing sites, artifacts, spacecraft and other evidence of activity on celestial bodies.[14]

Signatories to the Accords also:

affirm that the extraction of space resources does not inherently constitute national appropriation under Article II of the Outer Space Treaty.[15]

Reducing the legal uncertainty surrounding space resource extraction was a key impetus for the development of the Accords. They build upon an Executive Order issued in April 2020 by President Trump to internationally promote space resource extraction.[16] But it is a controversial issue. Ultimately, the Accords represent a compromise. They do not expressly state that space resource extraction is legal. Rather, they simply state a negative: that such activity would not in and of itself amount to national appropriation (which Article II of the Outer Space Treaty—as extracted below—expressly prohibits).

Regarding space activities deconfliction, the Accords provide detailed guidance on the establishment and operation of "safety zones" around lunar installations.[17] Safety zones are buffer areas in which lunar activities would be subject to specific notification and coordination procedures in order to reduce the risk of collisions or interference. However, carving out or otherwise demarcating portions of the lunar surface—whether required for lunar heritage protection, space resource extraction, or safety zones—may face legal hurdles.

First, dividing up the lunar surface could breach the fundamental principle of non-appropriation of celestial bodies. Article II of the Outer Space Treaty provides that:

[o]uter space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.

Second, a divided lunar surface could prevent states from exercising their exploration, use, and free access rights. Article I, paragraph 2 of the Outer Space Treaty provides that:

[o]uter space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.

#### US-Ukraine Relations solves Baltics War.

Pifer 17 Steven Pifer 4-12-2017 "Why should the United States be interested in Ukraine?" <https://www.brookings.edu/blog/order-from-chaos/2017/04/12/why-should-the-united-states-be-interested-in-ukraine/> (Nonresident Senior Fellow - Foreign Policy, Center for Security, Strategy, and Technology, Center on the United States and Europe, Arms Control and Non-Proliferation Initiative)//Elmer

BOLSTERING EUROPEAN SECURITY Above and beyond Ukraine, Russia’s aggression constitutes a fundamental challenge to the post-Cold War European security order and raises questions about what the Kremlin might try next. That is of interest to the United States, given that the trans-Atlantic relationship links us to our longest and closest friends and partners, and we are committed to their defense in NATO. Support for Ukraine, along with political and economic sanctions, are ways in which the West can make clear to Moscow that there will be consequences for its egregious misbehavior. The risk otherwise is that the Kremlin might undertake other actions that would further threaten European security and stability. Would Moscow use military force against the Baltic states, which are members of NATO? Most likely not. But five years ago, the answer would have been a resounding “no.” Supporting Ukraine and imposing costs on Russia for its aggression help ensure that Moscow does not miscalculate in a way that would lead to deeper crisis. Secretary Tillerson’s question, if odd coming from him, is one that many American might ask. However, there are very good reasons why the United States should take an interest in Ukraine.

#### Baltic conflict goes nuclear

Kofman ’16 [Michael; May 12; Analyst at CNA Corporation and fellow at the Wilson Center’s Kennan Institute, M.A. in International Security from the Edmund A. Walsh School of Foreign Service at Georgetown University; War On The Rocks, “Fixing NATO Deterrence in the East Or: How I Learned to Stop Worrying and Love NATO’s Crushing Defeat by Russia,” <https://warontherocks.com/2016/05/fixing-nato-deterrence-in-the-east-or-how-i-learned-to-stop-worrying-and-love-natos-crushing-defeat-by-russia/>; RP]

What’s the Right Force Posture for Nuclear Oblivion?

The other problem with the fixation on conventional deterrence in the Baltic fight is that just as in the old standoff between NATO and the Warsaw Pact, this battle is fraught with opportunities for nuclear escalation. Most Russian experts I know in the military analysis community, including those in Russia, don’t see much of a chance for conventional battle with NATO to stay conventional. RAND didn’t wargame that out, since theirs was an AirLand Battle exercise, but it makes the debate over how many brigades to stick into the Baltics somewhat moot. On any map, Russia’s exclave of Kaliningrad is a central problem in keeping this a conventional fight, because this is a piece of Russian territory that NATO must either bypass or neutralize to reinforce the Baltics. That’s not just a Russian fort, projecting long arcs of anti-access and area denial weaponry between Poland and Lithuania — it’s also liable to be a nuclear landmine.

There is a possibility that if Russian forces are sufficiently degraded or defeated in Kaliningrad that Moscow may resort to or threaten nuclear first use. Even if we fill all those hex squares with blue forces, it doesn’t get around the issue that NATO’s prize for its victory is not necessarily the successful rescue of the Baltics, but an inbound tactical nuclear warhead. RAND’s report alludes to the minor problem of escalation (all of us dying in nuclear oblivion), but such thoughts get in the way of gaming out how many heavy armor brigades one needs in on the eastern flank. Nuclear escalation is not assured, but given the impact of such an outcome, perhaps the best strategy is to make decisions that afford the most opportunities for managing escalation dynamics. That means a force posture oriented toward strategic flexibility, not entrenchment.

### 4 – Adv CP

#### CP: Ukraine ought to:

#### End exports of space technology to the Democratic People’s Republic of Korea

#### Ban private space companies from accepting Chinese investment

#### Move all nuclear reactors offline, dismantle nuclear reactors, and entomb them in concrete deep underground

#### Plank 1 solves advantage 1 – they said NoKo ballistic missile capabilities are dependent on the Ukrainian space industry but we end supply

#### Planks 2 and 3 solve advantage 2 – Ukraine not taking Chinese investment means no US alienation which preserves Biden’s support AND lack of nuclear reactors takes out the terminal impact

### 5 – Nationalize CP

#### CP: Ukraine ought to nationalize its space industry.

#### The aff doesn’t get rid of the industry or investments, just says appropriation is unjust – any solvency deficit to the counterplan making everything public is just an answer to the aff.

### Solvency

#### Couple major issues with this aff that means they can’t solve any of the advantages:

#### NUMBER 1 – it is not about appropriation

#### Article 2 of the Outer Space Treaty defines outer space and appropriation

OST 66 “2222 (XXI). Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.” UN Office for Outer Space Affairs, 1499th plenary meeting, Dec 19, 1966, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html> TG

ARTICLE II. Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.

#### Appropriation has to be permanent and exclusive control

Trapp 13, Timothy Justin. "Taking up Space by Any Other Means: Coming to Terms with Nonappropriation Article of the Outer Space Treaty." U. Ill. L. Rev. (2013): 1681. (JD Candidate at UIUC Law School)//Re-cut by Elmer

The issues presented in relation to the nonappropriation article of the Outer Space Treaty should be clear.214 The ITU has, quite blatantly, created something akin to “property interests in outer space.”215 It allows nations to exclude others from their orbital slots, even when the nation is not currently using that slot.216 This is directly in line with at least one definition of outer-space appropriation.217

[\*\*Start Footnote 217\*\*Id. at 236 (“Appropriation of outer space, therefore, is ‘the exercise of exclusive control or exclusive use’ with a sense of permanence, which limits other nations’ access to it.”) (quoting Milton L. Smith, The Role of the ITU in the Development of Space Law, 17 ANNALS AIR & SPACE L. 157, 165 (1992)). \*\*End Footnote 217\*\*]

The ITU even allows nations with unused slots to devise them to other entities, creating a market for the property rights set up by this regulation.218 In some aspects, this seems to effect exactly what those signatory nations of the Bogotá Declaration were try3ing to accomplish, albeit through different means.219

#### Outer space starts above the Karman line

World Atlas n.d. “What is the Karman Line?” World Atlas, <https://www.worldatlas.com/articles/what-is-the-karman-line.html> TG

Karman line is the boundary between the Earth's atmosphere and outer space.

Its 100km (62 miles) above sea level

Anything past the Karman line is not subject to control by countries like their airspace

The Karman line is an imaginary line that scientists use to define the border between outer space and the Earth’s [atmosphere](https://www.worldatlas.com/articles/the-layers-of-the-atmosphere.html). The Karman line is at an altitude of approximately 62 miles. It is considered to be the starting point of outer space in various space treaties and also for aerospace record keeping.

#### Their internal link evidence is NOT about appropriation—private companies in Ukraine don’t launch spacecraft they just make money selling parts to other countries or building spacecraft to contract out to the state—also doesn’t say that private companies can successfully compete—insert rehighlighting in yellow.

1AC Antonink 8/7 [(Daryna, studied journalism and communications at Taras Shevchenko National University in Kyiv. Antoniuk worked as a news editor, social media manager, and freelance journalist before she joined the Kyiv Post staff in February 2020.) “Ukraine’s space industry goes after private money” KyivPost, 8/7/2021. https://www.kyivpost.com/business/ukraines-space-industry-goes-after-private-money.html] BC

Lucrative industry

If space was once a political tool for world’s superpowers, today it is also a business opportunity for a new generation of entrepreneurs all over the world, including Ukraine.

Last year international private space companies attracted a record $9.1 billion to launch Earth monitoring or communications satellites into orbit or to build spacecraft that deliver people and cargo to space.

Investments in space are long-term and risky, Taftay said, but they pay off in the future.

“The space industry brings in seven times more money than it receives. For every dollar invested in the space industry, the country’s economy receives $6–7 in taxes and investment,” according to him.

As of today, Ukraine has 10 private space companies, Taftay said. Most of them — like Firefly Aerospace, Skyrora and Dragonfly — have become international stars and are now based in the U.S. or U.K., working with NASA and SpaceX.

But many Ukrainian space businesses export their products abroad because there is no money or work for them in Ukraine. “You can create your own space company here, but it is unclear what to do with it next. Who will be the customer?” Usov said.

In the U.S., nearly 80% of orders for space businesses come from the State Department or the Department of Defense, according to Usov. NASA astronauts even flew to the International Space Station on the Crew Dragon spacecraft manufactured by SpaceX.

For many decades Ukraine has only worked with state-owned enterprises like Pivdenmash and Pivdenne on its space projects. “This business model discouraged the development of new private companies,” Usov said.

To change this, the government passed a law in 2019 that allows private companies to build spacecraft in Ukraine and compete for contracts with state-owned enterprises or work together with them. In 2019, for example, Ukrainian-American aerospace company Firefly Aerospace ordered $15 million worth of missile parts from Ukrainian Pivdenmash.

But these agreements are rare. Ukraine’s main customer — the government — hasn’t yet signed any big contracts with private space companies. “There are no orders because we haven’t had financing or even a space program since 2018,” Taftay said.

$1 billion space program

Without a governmental space program, the Ukrainian space industry is frozen: “It hasn’t had any priorities, nor the conditions to develop,” said Oleg Uruskyi, the minister of strategic industries.

As a result, state-owned space enterprises have become less productive over the years. In 2018, state-owned space enterprises brought Ukraine $42 million in taxes, in 2019 — $34 million, in 2020 — $32 million. Last year was the most unfortunate for the Ukrainian space industry, according to Taftay.

Out of the country’s 15 state-owned space enterprises, five were loss-makers last year, four went bankrupt and one fired all of its employees. Together, they lost $30 million in 2020 compared to $16 million in 2019 and $2.7 million in 2018.

The space program submitted by Taftay will cost Ukraine over $1 billion — only half of this money will be covered by state funds, the other half — by export contracts.

Last year Ukrainian state-owned space companies produced $103 million worth of space-tech products and exported almost half of them — $64 million. Export usually takes up nearly 60–70% of the industry’s financing, according to Taftay.

Many European countries and the U.S. order Ukrainian-made rocket engines, navigation technology and rocket stages because they are cheap and reliable.

In the last 30 years, Ukrainian state-owned enterprises manufactured the components for 169 carrier rockets, including Cyclone, Zenith, Antares, Vega. These rockets launched 449 international spacecraft into orbit.

As of today, Ukraine only has two big international projects to rely on — the assembly of the first stage cores for NASA’s rocket Antares and the production of cruise propulsion engines for the European Space Agency’s rocket project Vega.

But they will not last forever, Usov said. Ukraine will need to secure more contracts with international partners but without a space program, it is impossible to do, according to Usov.

“Ukraine is still enjoying the perks it has gained in Soviet times — but it isn’t evolving. Other countries, in turn, invest in innovations and are catching up with Ukraine,” he said.

Future changes

To regain its power on the global market, Ukraine has to boost competition inside the country — between state-owned behemoths and private companies, according to Usov.

Today, the country’s space enterprises like Pivdenmash and Pivdenne in Dnipro, Kommunar and Hartron in Kharkiv or Kyivpribor in Kyiv cannot control their own assets or attract investment. They are also burdened by outdated infrastructure and a bloated workforce.

The giant Pivdenmash spaceship factory, which in the 20th century manufactured the most powerful rockets in the world, suffered $25 million losses in 2020. As the number of orders for its products has been decreasing, the factory descended into crisis: it didn’t have water for weeks, its sewage system didn’t work and employees weren’t paid properly.

To save state enterprises from the crisis, Ukraine plans to turn them into joint-stock companies, Taftay said. “It will make them more flexible and attractive for investors.”

Within the new space program, state enterprises will compete with private companies for the right to build six satellites — two each year starting in 2023, Taftay said. But first, Ukraine plans to send up the Sich 2–30 satellite in December using the U.S. launch vehicle Falcon 9 that belongs to SpaceX.

#### Their own evidence concedes Ukraine does not have a single satellite in space and does not have plans to launch a satellite that is profitable in any way OR that is created by the private sector.

1AC Antonink 8/7 [(Daryna, studied journalism and communications at Taras Shevchenko National University in Kyiv. Antoniuk worked as a news editor, social media manager, and freelance journalist before she joined the Kyiv Post staff in February 2020.) “Ukraine’s space industry goes after private money” KyivPost, 8/7/2021. https://www.kyivpost.com/business/ukraines-space-industry-goes-after-private-money.html] BC

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Ukraine will pay Elon Musk’s company $1 million to launch the satellite — eight times lower than planned. Ukraine will send the assembled satellite to the spaceport in the U.S. by plane, at the beginning of November, according to Taftay.

With this satellite, Ukraine could collect data to forecast crops and detect problems in the fields, analyze the usage of minerals and water, monitor the movement of troops.

Sich 2–30 was designed by the state design bureau Pivdenne in 2015 after Ukraine lost touch with another satellite, Sich 2. According to Taftay, the previous satellite broke down because it was made of low-quality components imported from Russia. The new satellite, however, will be all-Ukrainian, he said.

Compared to modern satellites, Sich 2–30 is outdated, Usov said. It was designed to go into space with the Ukrainian rocket Dnipro, not Falcon 9, meaning that Ukraine had to adjust it. It is also larger and less technologically advanced than the new generation of satellites.

“But given that Ukraine does not have its own satellite, it is a big step forward,” Usov said

#### No warrant for why ending Ukranian appropriation means they can’t build and sell parts cuz they aren’t the ones in space, AND no warrant for why continued appropriation is key to China’s continued investment

#### NUMBER 2

#### Ukraine's space program is too far dead, but even if it's revitalized, the public sector is an alt cause to both advantages:

#### A) the public sector can export privately developed tech to DPRK

#### B) it cooperates with Russia which increases Russian influence in Ukraine and alienates Biden

Holubeva 19 [Olena Holubeva, 112.ua journalist. Kyiv National Taras Shevchenko University; Institute of Journalism, television journalism. "Why Ukraine'S Space Sector Is Totally Dilapidated." 112 Ukraine, 6-5-2019, accessed 1-16-2022, https://112.international/article/why-ukraines-space-sector-is-totally-dilapidated-40437.html]

During Soviet times, Ukraine was famous for its rocket and space industry. After gaining independence, the country has retained the prestigious status of space power, but economic problems led to the fact that Ukraine began to move away from developing space industry. The enterprises of the space-rocket complex remained in state ownership, but the state does not finance them. And this is despite the fact that one dollar of investment in this industry brings 13-14 dollars of profit. As a result, the unique enterprises of Yuzhnoye and Yuzhmash design offices are forced to look for sources of financing, orders for their products in other countries. It’s a paradox, but Ukraine still has advanced technologies in the space industry, while not having a single satellite in orbit. And if everything remains in the same position, the technologies will soon become obsolete. While space is being explored by private “monsters” like SpaceX and Blue Origin, Ukrainian enterprises are stuck in the state captivity –no money and no particular prospects.

Related: SpaceX launches 60 Starlink satellites on Falcon 9 rocket

Glorious cosmic past

A significant part of the rocket-space complex of the former Soviet Union was deployed in Ukraine, and after its collapse, about a third of the entire scientific, technical and production potential in the field of rocket and space technologies remained. In particular, this is one of the best design bureaus in the world – Yuzhnoye and the Southern Machine-Building Plant (Dnipro) rocket-building enterprise, specializing in the production of intercontinental ballistic missiles, space launch vehicles and spacecraft. In 1990, Yuzhmash produced about 100 missiles a year: both combat and civilian. The Yuzhnoye design office was engaged in the construction of launch vehicles and spacecraft. Over the years, the design bureau created and launched into space more than 400 spacecraft, among them Earth remote sensing satellites, scientific satellites, Eduard Kuznetsov, an adviser to the chairman of the State Space Agency of Ukraine states.

Related: First Ukrainian floating spaceport might be created in Kherson

Also Ukraine had a group of enterprises, engaged in control systems: Khartron enterprise (Kharkiv) - development of control systems for launch vehicles, intercontinental ballistic missiles and spacecraft; Kommunar enterprise (Kharkiv) - manufacture of equipment for automated troop control systems and control systems for launch vehicles and intercontinental ballistic missiles; Kurs enterprise (Kyiv) - development of control systems for launch vehicles; Kyivpribor enterprise - engaged in the production of the onboard control system of Soyuz spacecraft; Kyiv Radio Plant enterprise - production of complex aircraft control systems; CheZaRa enterprise (Chernihiv) - onboard equipment of communications spacecraft and onboard telemetric systems of carrier rockets. Even until recently, Ukrainian missiles flew from 6 cosmodromes of the world. Ukraine was in fifth place among the countries with the space industry. Our state accounted for about 10% of the total share of missile launches in the world. Ukraine was a member of the Global Star satellite launch project in 1994-1995. "Over the past 27 years, 160 launch vehicles have been commissioned, completed with the participation of Ukrainian enterprises of the rocket and space industry. More than 380 space vehicles were commissioned by order from 24 countries. This brought millions of revenues to the Ukrainian budget," Kuznetsov says.

The main part of Ukraine’s space activities — launches of space launch vehicles — was carried out within the framework of joint projects, including with Russia, said Valeriy Borovyk, head of the board of the New Energy Alliance of Ukraine, founded in 2006 to implement innovative technologies in the energy, space and defense sectors (in 2008 the Alliance created the first non-state Laboratory of promising engines in Ukraine for the practical implementation of space and defense projects, and in 2015 the Ukrainian it produced in the laboratory was equipped with a Singapore satellite).

Joint projects with the Russian Federation:

Related: Chinese spacecraft lands on Moon's far side

- Sea Launch - Ukraine supplied the Zenit-2SL and Zenit-2SLB launch vehicles for to be launched from the naval launch platform and from the Baikonur cosmodrome. For the assembly of the launch vehicle, Russian enterprises supplied 1st stage propulsion engines, 2nd stage engine components, a complete control system, construction materials for the manufacture of a launch vehicle (aluminum), sensors;

- Cyclone-2 and Cyclone-3 projects - included the operation of regular rocket space complexes from the Baikonur (Cyclone-2) and Plesetsk (Cyclone-3) space centers. All launch vehicles were developed at Yuzhnoye design office and manufactured at Yuzhmash production association.

- launch of Soyuz and Proton launch vehicles. The missiles were equipped with control systems manufactured at Kommunar enterprise;

- the Dnipro project was based on the conversion use of the intercontinental ballistic missile 15A18 Satan (SS-18) for launching spacecraft into a low near-earth orbit from the Baikonur cosmodrome and the Yasny launch base. All rockets were manufactured at the Yuzhmash during Soviet times. The control system was developed by Hartron;

- Rokot project - a project of conversion use of intercontinental ballistic missiles 25А35 for launching spacecraft into a low near-earth orbit from the Plesetsk cosmodrome. Hartron was developer management system;

Related: Successful deployment of GPS III SV01 to medium Earth orbit confirmed, - SpaceX

- ensuring the operation of the International Space Station; - equipping spacecraft of the Soyuz type (for the crew) and Progres (transport spacecraft) with automatic docking systems and onboard equipment control systems.

As you can see, there were a lot of projects. And Ukraine has still not been able to completely part with Russia. “In 2014, when relations with the Russian Federation were destroyed, Petro Poroshenko prepared a decree that the restrictions should not concern international space projects. If there were no such document, it could have a negative impact on many projects, in particular, transportation of cargo and the stay of cosmonauts on the ISS would have been impossible," Kuznetsov noted.

Now Ukraine is making efforts to maintain cooperation with Russia in the Sea Launch project, which can actually provide work for Yuzhmash and load its production facilities.

### Adv 1

#### No US or NoKo strike – neither side can advantageously escalate

Friedman 3/5/19 [George Friedman, founder and chairman of Geopolitical Futures, U.S. geopolitical forecaster, and strategist on international affairs. After Hanoi: North Korea, the US and Japan. March 3, 2019. <https://www.realclearworld.com/articles/2019/03/05/after_hanoi_north_korea_the_us_and_japan_112981.html>]

The Hanoi talks ended in deadlock. Both sides – represented by U.S. President Donald Trump and North Korean leader Kim Jong Un – showed their anger by refusing to shake hands. The media labeled the talks a failure. But I’ve been involved in a number of negotiations in my life, and I see this as a normal part of the process. At some point, all parties will take positions designed to test the other side’s hunger for a deal, and prudent negotiators know that showing hunger can be devastating. So, ending the negotiation, particularly with a show of anger, is routine. At the same time, mutual rejection can be genuine, and now each side is trying to figure out how serious the other is. Establishing that you are prepared to walk away from the table is important – but sometimes the deal falls apart as a result.

Where Things Stand

War with North Korea is not a good option for the U.S. There’s the danger of artillery fire close to Seoul, the uncertainty of the location of North Korea’s nuclear weapons, and the U.S. aversion to the idea of getting bogged down in another war this century. North Korea, on the other hand, knows that one thing that would trigger a U.S. pre-emptive nuclear strike would be to develop weapons that can reach the U.S., and it wants to avoid such a strike at all costs. So, this failed negotiation leaves a reality in which war is not likely, giving both sides room for obstinacy.

#### Winning East Asian escalation requires China draw in which won’t happen – refugee flows, cross contamination, and SoKo ties

Lee 14 [8/14/14, Christopher Lee is an active duty Major in the U.S. Army. A graduate of West Point, he has served for eight years as an intelligence officer. He is currently a Foreign Area Officer for the Northeast Asia region and a graduate student at Columbia University., "Why Kim Jong-Un Won't Start a Second Korean War", [www.realcleardefense.com/articles/2014/08/14/north\_koreas\_dangerous\_invasion\_bluff\_107370.html](http://www.realcleardefense.com/articles/2014/08/14/north_koreas_dangerous_invasion_bluff_107370.html)]

Perhaps Kim would turn to China in a time of crisis to support a war against the south. Would China—based on mutual ideology and alliance—be obliged to aid the North and fight against joint forces of South Korea and the U.S.? What would Xi gain from a possible second Korean War? Beijing has every reason to deny supporting a war because the consequences would be disastrous. China is worried about instability and war along the border of northeastern China as it does not want “an influx of North Korean refugees across their shared 800 mile border.” A nuclear bombardment could also contaminate China, thus the possible effects on China’s economy would be catastrophic. And with its own difficult internal political problems, Beijing could hardly be enthusiastic about assuming responsibility for the mess left behind in North Korea by the Kim regime. Recently, despite its resilient impetus to keep Pyongyang as an ally, Beijing has been showing signs of frustration and skepticism. Kim’s uncooperative and erratic behavior – such as the public pillory of his uncle, Jang Song-Thaek, who served as a main conduit between North Korea and China – and a third nuclear underground test have forced Xi to snub North Korea. Indeed, for the first time in history, a Chinese leader officially visited South Korea before North Korea, a “little brother” with whom China once shared pain and sacrificed lives during the Korean War.

#### No China first strike – their impact card is straw manned to hell—they lined up all the parts of the cards that are the words of Admiral Richard that the article is DEBUNKING and highlighted it to say that means China first strike when actually the card concludes that China would NOT strike first—insert rehighlighting in yellow—drop the card.

Kulacki 20 [Dr. Gregory Kulacki focuses on cross-cultural communication between the United States and China on nuclear and space arms control and is the China Project Manager for the Global Security Program at the Union of Concerned Scientists, 2020. Would China Use Nuclear Weapons First In A War With The United States?, Thediplomat.com, https://thediplomat.com/2020/04/would-china-use-nuclear-weapons-first-in-a-war-with-the-united-states/] srey

Admiral Charles A. Richard, the head of the U.S. Strategic Command, recently told the Senate Armed Service Committee he “could drive a truck” through the holes in China’s no first use policy. But when Senator John Hawley (R-MO) asked him why he said that, Commander Richard backtracked, described China’s policy as “very opaque” and said his assessment was based on “very little” information. That’s surprising. **China** has been exceptionally **clear** **about** its **intentions** **on** the possible **first** **use** **of** **nuclear** **weapons**. On the day of its first nuclear test on October 16, 1964, China declared it “will never at any time or under any circumstdances be the first to use nuclear weapons.” That **unambiguous** **statement** **has** **been** a **cornerstone** **of** **Chinese** **nuclear** **weapons** policy for 56 years and has been repeated frequently in authoritative Chinese publications for domestic and international audiences, including a highly classified training manual for the operators of China’s nuclear forces. Richard should know about those publications, particularly the training manual. A U.S. Department of Defense translation has been circulating within the U.S. nuclear weapons policy community for more than a decade. The commander’s comments to the committee indicate a familiarity with the most controversial section of the manual, which, in the eyes of some U.S. analysts, indicates there may be some circumstances where **China** **would** **use** **nuclear** **weapons** **first** **in** a **war** **with** **the** **U**nited **S**tates. This U.S. misperception is understandable, especially given the difficulties the Defense Department encountered translating the text into English. The language, carefully considered in the context of the entire book, articulates a strong reaffirmation of China’s no first use policy. But it also reveals **Chinese** military planners are **struggling** **with** **crisis** **management** **and** **considering** **steps** **that** could **create** **ambiguity** **with** **disastrous** **consequences**. Towards the end of the 405-page text on the operations of China’s strategic rocket forces, in a chapter entitled, “Second Artillery Deterrence Operations,” the authors explain what China’s nuclear forces train to do if **“**a strong military power possessing nuclear‐armed missiles and an absolute advantage in high‐tech conventional weapons is carrying out intense and continuous attacks against our major strategic targets and we have no good military strategy to resist the enemy.**”** The military power they’re talking about is the United States. The authors indicate China’s nuclear missile forces train to take specific steps, including increasing readiness and conducting launch exercises, to “dissuade the continuation of the strong enemy’s conventional attacks.” The manual refers to these steps as an “adjustment” to China’s nuclear policy and a “lowering” of China’s threshold for brandishing its nuclear forces. Chinese leaders would only take these steps in extreme circumstances. The text highlights several triggers such as U.S. conventional bombing of China’s nuclear and hydroelectric power plants, heavy conventional bombing of large cities like Beijing and Shanghai, or other acts of **conventional** **warfare** **that** “**seriously** **threatened**” the “safety and **survival**” of the nation. U.S. Misunderstanding Richard seems to believe this planned adjustment in China’s nuclear posture means China is **preparing** **to** **use** **nuclear** **weapons** first under these circumstances. He told Hawley that there are a “number of situations where they may conclude that first use has occurred that do not meet our definition of first use.” The head of the U.S. Strategic Command appears to assume, as do other U.S. analysts, that the **Chinese** would **interpret** **these** types of U.S. conventional **attacks** **as** **equivalent** **to** a **U.S. first use** **of** **nuclear** **weapons** against China. But that’s not what the text says. “Lowering the threshold” refers to China putting its nuclear weapons on alert — it does not indicate Chinese leaders might lower their threshold for deciding to use nuclear weapons in a crisis. Nor does the text indicate Chinese nuclear forces are training to launch nuclear weapons first in a war with the United States. China, unlike the United States, keeps its nuclear forces off-alert. Its warheads are not mated to its missiles. China’s nuclear-armed submarines are not continuously at sea on armed patrols. The manual describes how China’s nuclear warheads and the missiles that deliver them are controlled by two separate chains of command. Chinese missileers train to bring them together and launch them after China has been attacked with nuclear weapons. All of these behaviors are consistent with a no first use policy. The “adjustment” Chinese nuclear forces are preparing to make if the United States is bombing China with impunity is to place China’s nuclear forces in a state of readiness similar to the state the nuclear forces of the United States are in all the time. This step is intended not only to end the bombing, but also to convince U.S. decision-makers they cannot expect to destroy China’s nuclear retaliatory capability if the crisis escalates. Chinese Miscalculation Unfortunately, alerting Chinese nuclear forces at such a moment could have terrifying consequences. Given the relatively small size of China’s nuclear force, a U.S. president might be tempted to try to limit the possible damage from a Chinese nuclear attack by destroying as many of China’s nuclear weapons as possible before they’re launched, especially if the head of the U.S. Strategic Command told the president China was preparing to strike first. One study concluded that if the United States used nuclear weapons to attempt to knock out a small fraction of the Chinese ICBMs that could reach the United States it may kill tens of millions of Chinese civilians. The authors of the text assume alerting China’s nuclear forces would “create a great shock in the enemy’s psyche.” That’s a fair assumption. But they also assume this shock could “dissuade the continuation of the strong enemy’s conventional attacks against our major strategic targets.” That’s highly questionable. There is a **substantial** **risk** **the** **U**nited **S**tates **would** **respond** **to** this implicit **Chinese** **threat** **to** **use** **nuclear** **weapons** **by** **escalating**, rather than halting, its **conventional** **attacks**. If China’s nuclear forces were targeted, it would put even greater strain on the operators of China’s nuclear forces. A **slippery** **slope** **to** **nuclear** **war** Chinese military planners are aware that attempting to coerce the United States into halting conventional bombardment by alerting their nuclear forces could fail. They also know it might trigger a nuclear war. But if it does, they are equally clear China won’t be the one to start it. Nuclear attack is often preceded by nuclear coercion. Because of this, in the midst of the process of a high, strong degree of nuclear coercion we should prepare well for a nuclear retaliatory attack. The more complete the preparation, the higher the credibility of nuclear coercion, the easier it is to accomplish the objective of nuclear coercion, and the lower the possibility that the nuclear missile forces will be used in actual fighting. They assume if China demonstrates it is well prepared to retaliate the United States would not risk a damage limitation strike using nuclear weapons. And even if the United States were to attack China’s nuclear forces with conventional weapons, China still would not strike first. In the opening section of the next chapter on “nuclear retaliatory attack operations” the manual instructs, as it does on numerous occasions throughout the entire text: According to our country’s principle, its stand of no first use of nuclear weapons, the Second Artillery will carry out a nuclear missile attack against the enemy’s important strategic targets, according to the combat orders of the Supreme Command, only after the enemy has carried out a nuclear attack against our country. Richard is wrong. There are no holes in China’s no first use policy. But the worse-case planning articulated in this highly classified military text is a significant and deeply troubling departure from China’s traditional thinking about the role of nuclear weapons. Mao Zedong famously called nuclear weapons “a paper tiger.” Many assumed he was being cavalier about the consequences of nuclear war. But what he meant is that they would not be used to fight and win wars. U.S. nuclear threats during the Korean War and the Taiwan Strait Crisis in the 1950s – threats not followed by an actual nuclear attack – validated Mao’s intuition that nuclear weapons were primarily psychological weapons. Chinese leaders decided to acquire nuclear weapons to free their minds from what Mao’s generation called “**nuclear** **blackmail**.” A former director of China’s nuclear weapons laboratories told me China developed them so its leaders could “sit up with a straight spine.” Countering nuclear blackmail – along with compelling other nuclear weapons states to negotiate their elimination – were the only two purposes Chinese nuclear weapons were meant to serve. Contemporary Chinese military planners appear to have added a new purpose: compelling the United States to halt a conventional attack. Even though it only applies in extreme circumstances, it **increases** the **risk** **that** a **war** between the United States and China **will** **end** **in** a nuclear exchange with unpredictable and **catastrophic** **consequences**. Adding this new purpose could also be the first step on a slippery slope to an incremental broadening the role of nuclear weapons in Chinese national security policy. Americans would be a lot safer if we could avoid that. The United States government should applaud China’s no first use policy instead of repeatedly calling it into question. And it would be wise to adopt the same policy for the United States. If both countries declared they would never use nuclear weapons first it may not guarantee they can avoid a nuclear exchange during a military crisis, but it would make one far less likely.

### Adv 2

#### Biden thumps – he backs down to Russia and hasn’t even sent Ukraine military aid

Lake 12/17 Eli Lake (Eli Lake is a columnist covering national security and foreign policy. He was the senior national security correspondent for the Daily Beast and covered national security and intelligence for the Washington Times, the New York Sun and UPI.), 12-17-2021, "Who’s Appeasing Putin Now?," Bloomberg, <https://www.bloomberg.com/opinion/articles/2021-12-17/who-s-appeasing-putin-now-biden-policy-on-ukraine-shows-weakness> mvp

Eleven months into Biden’s presidency, that harder line has yet to emerge. In the current crisis in Ukraine, for example, Biden and his administration have told Putin that there will be devastating sanctions if he orders the troops amassed on Ukraine’s border to invade. At the same time, Biden has invited Putin to a NATO summit to air his grievances about the alliance he seeks to break apart. The Biden administration has also sent mixed messages on whether Ukraine should give separatists in the Donbas region special political status before Russia withdraws its forces and dismantles the illegal armed groups it created during its first invasion of Ukraine in 2014.

Another aspect of Biden’s policy is that coercive measures against Russia are proposed as a consequence only if it invades. This makes Putin’s destabilizing troop buildup on Ukraine’s border essentially cost-free. Biden still hasn’t used his congressionally mandated authority to send up to $200 million in military aid to Ukraine, an authority that exists for just this type of an emergency. Last week a group of Democratic House lawmakers urged the White House to tap this fund.

The Biden administration has also declined to enforce significant sanctions against the Nord Stream 2 pipeline, which would bypass Ukraine and provide natural gas directly to Germany, depriving the struggling Ukrainian country of a critical source of revenue and a hedge against Russian belligerence. The U.S. has hinted that such sanctions would be enforced if there were an invasion, but for now Russia has a path to securing one of Putin’s strategic priorities.

The lack of action has caught the attention of Ukraine President Volodymyr Zelenskiy. “It is important to have sanctions applied before, rather than after, the conflict would happen,” he told reporters this week. “If they were applied after the conflict would happen, this would basically make them meaningless.”

Biden’s approach to Russia is part of a pattern. Consider the lack of response to Russia’s hack earlier this year of the Colonial oil pipeline, which led to gasoline shortages across the U.S. Biden warned Putin that the U.S. would respond if Russian hackers targeted critical infrastructure again, but did not respond to the pipeline hack itself.

Biden also appeased Russia during the U.S. withdrawal from Afghanistan. Initially, the U.S. wanted counterterrorism agreements with Afghanistan’s neighbors, such as Uzbekistan and Tajikistan. But Russia instructed those governments to decline to meet with the U.S., leading the Biden administration to pursue a counterterrorism partnership with Russia instead. This is a tacit acknowledgement of Putin’s claim to hold dominion over the republics that were once part of the Soviet Union.

Alina Polyokova, the president and CEO of the Center for European Policy Analysis, told me that while she has been pleased with some of the recent rhetoric from the administration, many of her interlocutors in Eastern Europe are shocked that Biden has not pursued a more hawkish policy against Russia. “A lot of this is revealing that much of the criticism of Russia from the Democratic side was because of Trump and doesn’t reflect policy,” she said.

This presents a political crisis for Democrats, in addition to the strategic crisis in Ukraine. For four years, Democrats portrayed themselves as a party of Russia hawks, in contrast to a president they saw as Putin’s lackey. But since Biden came into office, his administration has stopped enforcing major sanctions on Russia’s pipeline to Germany, held off on punishing Russian hacks of critical infrastructure and now seeks to deter a Russian invasion of Ukraine with threats alone.

Some might call that appeasement. Others might say Biden’s presidency so far has been a gift to Vladimir Putin.

### CWG (if time)

#### US-China war is structurally inevitable --- China delays it to buy time to modernize

Kazianis 18

Harry J. Kazianis. Harry J. Kazianis is director of defense studies at the [Center for the National Interest](https://cftni.org/), founded by former President Richard M. Nixon, “A US-China trade war is coming, but here's how to stop it.” Fox News. April 6, 2018. http://www.foxnews.com/opinion/2018/04/06/us-china-trade-war-is-coming-but-heres-how-to-stop-it.html

But even if a deal is struck to prevent most of the new tariffs from taking effect, we have crossed an important milestone in the U.S.-China relationship. Both sides now realize the nature of their ongoing geopolitical struggle. It is not out of the question to wonder whether ties between these countries with the two largest economies in the world are entering a heated, almost Cold War atmosphere.

[As I noted](http://www.foxnews.com/opinion/2018/04/04/china-is-no-friend-to-us-trump-is-right-to-take-them-on.html) in an op-ed for Fox News this week, clearly China is no friend of America. Our two nations have very different trade as well as diplomatic, economic and geopolitical goals that will naturally create tensions for perhaps decades to come. And as President Trump pointed out Thursday, each nation is understandably seeking to come out on top in any deal the two work out.

What’s needed now are tough and serious negotiations between China and the U.S. to reach a reasonable and fair compromise that gives each nation some of what it wants. But this is now a matter for diplomacy – not tweets or off-the-cuff comments. It would be a strategic mistake for the U.S. and China to engage in a tit-for-tat war of words in the media, simply adding gasoline to the fire of their trade dispute.

This is especially true because there are some indications that Beijing may be ready to blink – for strategic reasons.

Thursday night I spoke with several top-tier Chinese academics, scholars, and economists – all close to the government, all with good insights into Beijing’s thinking on escalating trade tensions with Washington. They all echoed a very similar opinion: there is a possibility of a deal with America, [even despite Beijing’s comments that no negotiations are likely](https://www.reuters.com/article/us-usa-trade-china/trump-threatens-tariffs-on-100-billion-more-china-goods-beijing-ready-to-strike-back-idUSKCN1HD0NW), for very clear reasons.

The experts I spoke with talked to me on the condition that I not identify them by name, so they could speak candidly.

“China was not ready for the sheer magnitude of President Trump coming after us on the so-called trade imbalance,” a senior Chinese economist with close ties to the government told me. “However, there is a deal that could be struck, as both sides have a lot to lose, especially China, as we are not ready for economic warfare with such a big power as America.”

The economist continued: “What scares me, and many government officials, is the rhetoric is heating up very quickly, leaving both sides very little room to work out a deal. Both sides are making a big mistake, as trying to score quick points for their own domestic political audiences is a big error. Now is the time to get both sides in a room, lock the doors, and work towards a deal that is fair to everyone.”

A Chinese scholar, also with close ties to the Beijing government, agreed with that sentiment, but with a twist.

“Chinese officials will likely offer some strong concessions to make sure we avoid a trade battle with Washington,” the scholar told me. “At the moment, we aren’t fully ready to take America on, and must continue to grow our economic and military power. This confrontation is not in our interest, and must be, at least for the moment delayed, until we are in a more powerful position.”

This scholar explained that it might even be in China’s interest to “fold” on this issue, because Beijing has much bigger issues that it must confront in the coming years.

“China must think correctly on all of this trade discussion,” the scholar said. “Our goal is to ensure our rise is not halted. We have greater strategic goals in mind. Winning a trade skirmish with America could come at the highest of prices – and turning America into an enemy that we can’t hope to defeat, at least not yet. We must delay that day for as long as we can.”

A White House official, who spoke to me Friday on condition that I not name him, also expressed hope that a deal could be worked.

“President Trump has always said he was willing to negotiate with Beijing, that is nothing new,” the U.S. official said. “But we are done being suckers to China. We want fair, reciprocal trade. I think we can get there.” However, the official expressed some caution, stating quite clearly that “the ball is now in China’s court.”

What happens now is really anyone’s guess. I would argue that a deal is most likely possible, with both sides making some concessions, especially China on intellectual property and access for U.S. products to its massive domestic markets in the years ahead.

But, at the same time, we should be cautious. The Trump administration has invested precious political capital in making sure China not only understands our intent but understands that we will defend our interests – even if that requires America to take an economic hit.

The U.S. must make sure that any agreement protects American workers, our technological base and other vital national priorities. Such a negotiation could take some time and cause us some economic pain, but would protect our long-term economic interests.

There is, however, a much bigger challenge looming just over the horizon: China’s changing strategic outlook.

Beijing is adjusting its gaze across the globe, seeing America as a very real strategic threat – and posing an increasing threat to America. Just this week, Chinese defense officials offered words of support to Russia[, forging ties that are looking more and more like a straight-up alliance](http://www.foxnews.com/world/2018/04/05/russia-china-hail-burgeoning-ties.html).

Washington must be prepared for the long haul and be ready to confront Chinese power in the months and years to come.

A Chinese economist, based out of Hong Kong, who I have known for a long time now, put it bluntly: “Washington and Beijing are set to clash. It’s just a matter of when and how.”

#### US wins now, but by 2025 A2/AD makes it game over --- strikes stay conventional and neutralize military targets

Majumdar 16

Dave Majumdar, Defense Editor of the National Interest, “New Report Details Why a War between China and America Would be Catastrophic.” The National Interest. August 1, 2016. <https://nationalinterest.org/blog/the-buzz/new-report-details-why-war-between-china-america-would-be-17210?page=0%2C1>

A war between the United States and China would cause severe losses on both sides, but—today at least—Beijing would bear the brunt of the casualties. However, as China’s anti-access/area denial (A2/AD) capabilities continue to improve—the balance of losses would shift more towards Beijing’s favor by 2025. Nonetheless, China would still suffer more losses than Washington even at that stage—according to a new report from [the RAND Corporation](http://www.rand.org/pubs/research_reports/RR1140.html#relatedProducts). Victory for either side might prove to be elusive as the conflict could degenerate into inconclusive bloodletting.

“As its military advantage declines, the United States will be less confident that a war with China will conform to its plans,” reads the new report by [David C. Gompert](http://www.rand.org/about/people/g/gompert_david_c.html), [Astrid Cevallos](http://www.rand.org/pubs/authors/c/cevallos_astrid.html)and [Cristina L. Garafola](http://www.rand.org/about/people/g/garafola_cristina_l.html). “China’s improved military capabilities, particularly for anti-access and area denial (A2AD), mean that the United States cannot count on gaining operational control, destroying China’s defenses, and achieving decisive victory if a war occurred.”

A war with China—now and in the future—would likely be fought at sea and in the air, but cyber and space capabilities would play a significant role, according to the report. But the RAND researchers expect that should a war breakout, it would remain a conventional fight. “Each side’s increasingly far-flung disposition of forces and growing ability to track and attack opposing forces could turn much of the Western Pacific into a ‘war zone,’ with grave economic consequences,” reads the report. “It is unlikely that nuclear weapons would be used: Even in an intensely violent conventional conflict, neither side would regard its losses as so serious, its prospects so dire, or the stakes so vital that it would run the risk of devastating nuclear retaliation by using nuclear weapons first.”

Moreover, while the RAND study postulates that the United States would strike heavily at the Chinese mainland, the researchers don’t believe that Beijing would strike at the U.S. homeland except via cyber attacks. “We also assume that China would not attack the U.S. homeland, except via cyberspace, given its minimal capability to do so with conventional weapons,” the report states. “In contrast, U.S. nonnuclear attacks against military targets in China could be extensive.”

A Sino-American war could develop in a number of ways—including short bloody war or a long and devastating war. Moreover, modern technologies incentivize either side to launch a preemptive attack first. “Sensors, weapon guidance, digital networking, and other information technologies used to target opposing forces have advanced to the point where both U.S. and Chinese military forces seriously threaten each other,” the report reads. “This creates the means as well as the incentive to strike enemy forces before they strike one’s own. In turn, this creates a bias toward sharp, reciprocal strikes from the outset of a war, yet with neither side able to gain control and both having ample capacity to keep fighting, even as military losses and economic costs mount.”

In the case of a brief war fought today, American losses would be significant, but Chinese losses might be catastrophic. “If either U.S. or Chinese political leaders authorize their military commanders to carry out plans for sharp strikes on enemy forces, a severely violent war would erupt,” the report reads. “As of 2015, U.S. losses of surface naval and air forces, including disabled aircraft carriers and regional air bases, could be significant, but Chinese losses, including to homeland-based A2AD systems, would be much greater. Within days, it would be apparent to both sides that the early gap in losses favoring the United States would widen if fighting continued.”

By 2025, however, China’s military capabilities are likely to have expanded to a point where it will not sustain as many losses. “By 2025, though, U.S. losses would increase because of enhanced Chinese A2AD. This, in turn, could limit Chinese losses, though these would still be greater than U.S. ones,” the report reads. “It could be unclear then whether continued fighting would result in victory for either side.”

A longer war would be far more devastating—and could leave both military forces in shambles. “As of 2015, the longer a severe war dragged on, the worse the results and prospects would be for China,” the report states. “By 2025, however, inconclusive results in early fighting could motivate both sides to fight on despite heavy losses incurred and still expected. Although prospects for U.S. military victory then would be worse than they are today, this would not necessarily imply Chinese victory.”

#### And—continued modernization causes China to MIRV ICBMs

Killalea 17

Debra Killalea, Writer for AU News, “China: New missile, DF-41, expected to be deployed next year.” AU News. December 1, 2017. <https://www.news.com.au/world/asia/china-new-missile-df41-expected-to-be-deployed-next-year/news-story/5f0989eb732ab8f4c6b6a00db3eecae5>

CHINA has unveiled its most powerful weapon yet and its new intercontinental ballistic missile is a force to be reckoned with.

The DF-41 ICBM can carry up to 10 manoeuverable warheads ranging from 100 to 200 kilotonnes to megaton size and has a range of between 12,000kms and 15,000kms.

In comparison, North Korea’s Hwasong-15, which was launched yesterday, has an estimated range of 13,000km.

China’s[People Daily](http://en.people.cn/n3/2017/1128/c90000-9297997.html?mkt_tok=eyJpIjoiTnpkaFpUSTBOR00wWTJNNSIsInQiOiJuWmYrSTNYR0RzRlNnU2k2a3dQZTk5WUxYUlowSGQyZnBcL0xpbFV1ck9ISDNIVzFzN1dGb1BZQ3FDbUJ1NGpqcExMTHZcL0ZsWWhrczU0d0c1YXh6TUF4T0l4R1FOTTVCR1JUYWNaQUtSbW83TXl4cmJLandrMHhrcDkrZ1kyUkFtIn0%3D)newspaper revealed the DF-41 could enter service as early as the first half of next year.

Military expert Yang Chengjun told a TV program broadcasted on China Central Television (CCTV) earlier this week the DF-41 is China’s latest strategic missile and was quick, mobile and precise.

“The missile can hit every corner of the earth, allowing China to counter a nuclear strike on the country,” Mr Yang said.

According to the newspaper, the test launches have had a 100 per cent success rate.

Dr Malcolm Davis, a senior analyst in defence strategy and capability at the Australian Strategic Policy Institute, said this was China’s most advanced ICBM.

“It’s a road-mobile, solid fuelled ICBM with the range to cover all targets in the continental United States,” Dr Davis said.

“Its MIRVed — MIRV standing for multiple independently targeted re-entry vehicles.

“This means the missile can carry multiple nuclear warheads — up to 10 warheads each with yields of around 150 kilotons (150,000 tons TNT equivalent) — or a single warhead with a yield up to 3 megatons (millions of tons of TNT).”

Dr Davis said 24 of these missiles could deliver between 240 warheads against the US.

“The North Korean Hwasong-15 would by contrast carry a single warhead,” he said.

“It would also carry penetration aids (‘penaids’) designed to confuse US missiles defences.”

Dr Davis said China is also developing ‘MARVs’ — manoeuvring re-entry vehicles — that would give them the ability to further defeat US missile defence, and potentially, attack mobile targets.

“They are also developing hypersonic glide vehicles which would carry individual warheads and glide at up to Mach 20 at very high altitude on a highly evasive trajectory, with the hypersonic glide vehicle (called a ‘DZ-ZF’) being launched atop the DF-41 in place of the regular payload of warheads,” he said.

Beijing’s overall objective is to ensure Chinese ICBMs like the DF-41 can defeat US missile defence systems, Dr Davis said.

ULTIMATE WEAPON

Nuclear disarmament campaigner John Hallam said the DF-41 was simply the most powerful nuclear missile in the world and was the “ultimate doomsday weapon”.

“It’s a whopper, comparable to the biggest Russian missiles, which it resembles, including the recently tested Sarma,” Mr Hallam said.

He said there have been rumours and claimed sightings of this missile for some time and that it has been tested before.

“The backbone of China’s strategic force has always been the somewhat ancient DF-5 missile, each with a single 5 megaton warhead (by far) the biggest warhead in actual military use,” Mr Hallam said.

“For a long time there were just 20 of these things, but a few years back the Chinese started to upgrade, update, and add to the DF5’s, so there might be 30 now, and they started to deploy something called the DF-41 — the same designation as this one.”

The missile also could have a deadly impact if used in conflict.

“Just one of these missiles, with 10 warheads each of 100kt plus range, could essentially destroy either the major cities or the significant military capacity of the United States, especially if command and control nodes are prioritised,” Mr Hallam said.

“The DF-41 with multiple big warheads and probably a middling accuracy is ideally suited for incinerating cities, and its being mounted on a TEL (Transporter-Erector-Launcher), is consistent with that — it moves around so it can’t easily be targeted like a silo.

#### US missile defense ensures deployment – competition draws in India and escalates

Kristensen, director of the Nuclear Information Project at the Federation of American Scientists, ‘15

(Hans M., “Pentagon Report: China Deploys MIRV Missile,” May 11, https://fas.org/blogs/security/2015/05/china-mirv/)

**Why Chinese MIRV?**

The big question is why the Chinese leadership has decided to deploy MIRV on the silo-based, liquid-fuel DF-5A.

Chinese officials have for many years warned, **and US officials have predicted**, that advanced US non-nuclear capabilities such as missile defense systems could cause China to deploy MIRV **on some of its missiles.** The Pentagon report **repeats this analysis** by stating that China’s “new generation of mobile missiles, with warheads consisting of MIRVs and penetration aids, are intended to ensure the viability of China’s strategic deterrent in the face of continued advances in U.S. and, to a lesser extent, Russian strategic ISR, precision strike, and **missile defense capabilities**.”

Conclusions

**Chinese MIRV on the DF-5 ICBM is a** bad day for nuclear constraint.

Seen in the context of China’s other ongoing nuclear modernization programs – deployment of several types of mobile ICBMs and a new class of sea-launched ballistic missile submarines – the deployment of a MIRVed version of the DF-5 ICBM reported by the Pentagon’s annual report **strains the credibility of China’s official assurance** that it only wants a minimum nuclear deterrent and is not part of a nuclear arms race.

MIRV on Chinese ICBMs changes the calculus that other nuclear-armed states will make about China’s nuclear intensions and capacity. Essentially, **MIRV allows a much more rapid increase of a nuclear arsenal than single-warhead missile.** If China also develops MIRV for a mobile ICBM, then it would further deepen that problem.

To its credit, the Chinese nuclear arsenal is still much smaller than that of Russia and the United States. So this is not about a massive Chinese nuclear buildup. Yet the development underscores that a technological nuclear competition among the nuclear-armed states is in full swing – one that China also contributes to.

Although it is still unclear what has officially motivated China to deploy a MIRVed version of the DF-5 ICBM now, previous Chinese statements and US intelligence assessments **indicate that it may be a** reaction to the US development and deployment of missile defense systems **that can threaten China’s ability to retaliate with nuclear weapons.**

If so, **how ironic that the US missile defense system** – intended to reduce the threat to the United States – instead **would seem to have increased the threat by triggering development of MIRV** on Chinese ballistic missiles that could destroy more US cities in a potential war.

The deployment of a MIRVed DF-5 also raises serious questions about China’s strategic relationship with India. The Pentagon report states that in addition to US missile defense capabilities, “India’s nuclear force is an additional driver behind China’s nuclear force modernization.” **There is little doubt that Chinese MIRV has the potential to** nudge India into the MIRV club as well.

Indian weapons designers have already hinted that India may be working on its own MIRV system and the US Defense Intelligence Agency recently stated that “India will continue developing an ICBM, the Agni-VI, which will reportedly carry multiple warheads.”

**If** Chinese MIRV triggers Indian MIRV **it would** deepen nuclear competition **between the two Asian nuclear powers and reduce security for both**. This calls for both countries to show constraint but it also requires the other MIRVed nuclear-armed states (Britain, France, Russia and the United States) to limit their MIRV and offensive nuclear warfighting strategies.

#### Defense—

#### 1] War’s inevitable, which means only our offense---if we need to have it, better now than later when China modernizes

#### 2] No escalation --- we’d use counterforce strikes

Lieber and Press 16

Keir A. Lieber and Daryl G. Press. Keir A. Lieber is Director of the Security Studies Program and Associate Professor in the Edmund A. Walsh School of Foreign Service at Georgetown University. Daryl G. Press is Associate Professor in the Department of Government at Dartmouth College. “The New Era of Nuclear Weapons, Deterrence, and Conflict.” Strategic Studies Quarterly. Vol. 10, No. 5. 2016.

https://www.jstor.org/stable/pdf/26271621.pdf?refreqid=excelsior%3A928c663c72c835e2ad1bf2512a0f4eb3

“The United States is not seeking to neutralize adversary deterrent forces.”

Some critics argue that the United States is not seeking strategic primacy. They reject any intent behind the emergence of US nuclear primacy and downplay the effort to neutralize adversary deterrent forces in US military strategy. Instead of the United States bolstering its counterforce capabilities, critics emphasize how it is minimizing the role of nuclear weapons in national security strategy—as only this is consistent with international arms control and nonproliferation efforts aimed at convincing other states to forego strategic weapons, reduce existing arsenals, or cancel modernization programs. The implication is that we have mistakenly imputed sinister motives to US defense programs and planning.

Disavowal of the US pursuit of strategic primacy comes most frequently from those who work inside or outside the government on arms control and nonproliferation policy. Yet, those who work on US regional war plans and counterproliferation policy typically see nothing controversial in our claim that the United States seeks the ability to neutralize adversary strategic weapons. In fact, this effort appears to be official US policy. As a simple Internet search shows, the US government does not hide the wide range of research and planning efforts underway that fall under the rubric of “defeat WMD” or “combatting WMD.” And the underlying logic behind those efforts is simple: deterrence may fail, especially during conventional wars, and therefore the United States needs the ability to defend US forces, allies, and the US homeland from enemy WMD using, depending on the circumstances, conventional strikes, missile defenses, special operations, offensive cyber attacks, and in extreme cases nuclear strikes. In short, “defeating WMD” and “seeking strategic primacy” are essentially synonymous: protecting oneself from others’ strategic weapons (which sounds reasonable) and neutralizing others’ strategic deterrent forces (which sounds more malicious) are simply two phrases describing the same behavior.

**That kills 700 max**

**Lieber 17**

Keir A. Lieber, Associate Professor in the Edmund A. Walsh School of Foreign Service and the Department of Government at Georgetown University, and Daryl G. Press, Associate Professor in the Department of Government at Dartmouth College, The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence, Volume 41, Number 4, Spring 2017

Third, the emergence of a new era of counterforce raises the question of whether it is wise, for the United States in particular, to continue improving nuclear and nonnuclear counterforce capabilities. On the one hand, improved **counterforce capabilities** could be invaluable in a range of plausible scenarios.11 Improved offensive capabilities could help the United States **deter** weak countries from **initiating conventional conflicts** or from **escalating** in the midst of war. Enhanced counterforce capabilities could also help **protect U.S. forces, allies, and the U.S. homeland from nuclear attack if a conventional war did escalate**. On the other hand, better counterforce could be a source of danger: not only might improved disarming strike capabilities—in any country's hands—increase the temptation to attack, but also potential victims of disarming strikes will seek to escape their vulnerability, thereby possibly triggering arms racing and incentives to strike preemptively.12 Both views may be correct. The net benefit of decisions to enhance counter-force capabilities will therefore depend on the particular case. For countries that perceive a highly malign threat environment, face aggressive nuclear [End Page 12] armed adversaries, or have ambitious foreign policy goals, the benefits of developing advanced counterforce capabilities may outweigh the costs. For those countries that face a benign environment and have more modest goals, however, the secondary costs of enhancing counterforce may be too great. In any case, these contentious issues have not received sufficient attention; analysts and policymakers have largely overlooked the ways that rapidly changing technologies are eroding the foundation of deterrence. The remainder of this article is organized as follows. We first discuss the key role that arsenal survivability plays in nuclear deterrence theory. Second, we describe the main strategies that planners employ to ensure arsenal survivability in practice. Next, we explore one of the major technological trends eroding survivability, the **great leap in weapons accuracy**, and illustrate how improved accuracy creates new possibilities for counterforce strikes. We then focus on the second major trend, **dramatic improvements in remote sensing**, and how the resulting increase in transparency threatens **concealed and mobile nuclear forces**. We conclude with a summary of our findings and their implications for international politics and U.S. national security. Nuclear Survivability in Theory At its core, nuclear deterrence theory rests on two simple propositions. First, countries will not attack their adversaries if they expect the costs to exceed the benefits. Second, nuclear weapons allow countries, even relatively weak ones, to inflict unprecedented levels of damage on those who attack them. Taken together, these propositions suggest that nuclear weapons are the ultimate instruments of deterrence: no conceivable benefit of attacking a nuclear-armed state could be worth the cost of getting hit with nuclear weapons in retaliation. As long as nuclear arsenals are survivable, that is, able to withstand an enemy's first strike and retaliate, nuclear weapons are a tremendous force for peace. The theory of the nuclear revolution builds on the logic of deterrence theory and extends its implications. Because nuclear weapons make countries fundamentally secure, countries can escape the most pernicious consequences of anarchy. According to the theory of the nuclear revolution, once countries deploy survivable arsenals they no longer need to fear conquest.13 As a result, they [End Page 13] can stop worrying about the relative balance of power;14 engaging in arms races;15 or competing for alliance partners and strategic territory.16 Proponents of the theory of the nuclear revolution have always recognized the discrepancy between their theory's predictions and the actual behavior of countries in the nuclear era. The Cold War competition between the United States and the Soviet Union, in particular, is filled with empirical anomalies: extensive arms racing, intense concerns about relative power gains and losses, and competition for allies and control of strategic territory—all occurring at a time when the main adversaries appeared to be invulnerable to disarming strikes.17 World War III was averted, as nuclear deterrence theory would predict, [End Page 14] but the transformation of international politics that advocates of the theory of the nuclear revolution anticipated never materialized. Today, nuclear powers still eye each other's economic power and military capabilities warily; strive for superiority over their adversaries in conventional and nuclear armaments; aim to control strategically relevant areas of land, air, sea, and space; seek to build and maintain alliances; and prepare for war. The discrepancy between the theory of the nuclear revolution and the behavior of states stems from the theory's misplaced confidence in the survivability of nuclear arsenals.18 Proponents of the theory believe that nuclear weapons deployed in even moderate numbers are inherently survivable.19 Moreover, according to the argument, survivability is a one-way street: once a country deploys a survivable arsenal, it will remain that way. Yet, what if survivability is reversible? If arsenal survivability depends on the uncertain course of technological change and the efforts of adversaries to develop new technologies, states will feel compelled to arms race to ensure that their deterrent forces remain survivable in the face of adversary advances. They will worry about relative gains, because a rich and powerful adversary will have more resources to invest in technology and military forces. They will value allies, which help contribute resources and valuable territory. Moreover, states may be enticed to develop their own counterforce capabilities in order to disarm their adversaries or limit the damage those adversaries can inflict in case of war. In short, if nuclear stalemate can be broken, one should expect countries to act as they always have when faced with military threats: by trying to exploit new technologies [End Page 15] and strategies for destroying adversary capabilities. If arsenals have been more vulnerable than theorists assume, or if survivability and stalemate are reversible, then the central puzzle of the nuclear era—continued geopolitical competition—is no longer a puzzle. We argue not only that stalemate is reversible in principal, but also that changes in technology occurring today are making all countries' arsenals less survivable than they were in the past. The fear of suffering devastating retaliation will still do much to deter counterforce attacks, but countries will increasingly worry that their adversaries are trying to escape stalemate, and they will feel pressure to do the same. Deterrence will weaken as arsenals become more vulnerable. In extreme circumstances—for example, if an adversary threatens escalation (or begins to escalate) during a conventional war—the temptation to launch a disarming strike may be powerful.20 In short, in stark contrast to the expectations of the theory of the nuclear revolution, security competition has not only endured, but also will intensify as enhanced counterforce capabilities proliferate. Nuclear Survivability in Practice The survivability of retaliatory arsenals has long been a crucial objective of real-world military planning, not just a fertile topic of theoretical analysis. Military planners have employed three basic approaches to protect their countries' nuclear forces from attack: hardening, concealment, and redundancy. In terms of hardening, planners deploy missiles in reinforced silos designed to resist blast, heat, ground shock, and the other effects of nuclear detonations; place aircraft in hardened shelters; create protective sites for patrolling mobile missile launchers; and bury command and control sites, as well as the secure means used to communicate launch orders. Nuclear planners also rely heavily on concealment. Concealment is the foundation of survivability for mobile delivery systems, such as ballistic missile submarines (SSBNs) or mobile missile launchers (known as "transporter erector launchers," or TELs), both of which hide in vast deployment areas. Aircraft are harder to hide because they require airfields for takeoff and landing, but they too can employ concealment by dispersing to alternate airfields or remaining [End Page 16] airborne during alerts. Even the most difficult facilities to hide, hardened missile silos or command bunkers, can be concealed using camouflage and decoys. Finally, redundancy is used to bolster every aspect of the nuclear mission, especially force survivability. Most nuclear-armed states use multiple types of delivery systems and warheads to complicate enemy strike plans and protect against warhead design flaws. They spread their forces and warheads across multiple bases. Moreover, the most powerful nuclear-weapon states employ redundant communication networks, command and control arrangements, and early warning systems. No single strategy of survivability is ideal, because each entails important trade-offs. Hardening is attractive, but it comes at the price of concealment: for example, it is difficult to hide the major construction entailed in building a nuclear silo. Also, hardened sites are not mobile; once discovered, they remain so.21 Similarly, concealment comes at the price of hardening. If mobile forces are discovered, they tend to be easy to destroy. Concealment has another significant drawback: it is a "fail deadly" strategy, meaning that if an adversary develops a way to locate one's forces, one's arsenal might go from highly survivable to completely vulnerable almost overnight. Even worse, one might not know that the nuclear balance has shifted in such a calamitous manner.22 Some countries have adopted operating doctrines that attempt to capitalize on the advantages of both hardening and concealment: China today, for example, appears to plan to disperse its mobile missiles in a nuclear crisis from its peacetime garrisons to remote protective sites.23 Such approaches capture the [End Page 17] benefits of both strategies, but they also pay the costs. For example, China's strategy **leaves its forces vulnerable if an attacker has identified its dispersal sites** or detects mobile missiles in transit.24 Major technological trends are **directly undermining** these strategies of survivability. Leaps in weapons accuracy threaten nuclear forces that rely on hardening, while an unfolding revolution in remote sensing threatens nuclear forces that depend on concealment. (Another major change since the end of the Cold War, **far smaller nuclear arsenals** among potential adversaries, weakens the third strategy of survivability: redundancy.)25 Developing survivable forces is not impossible, but **a new age of vulnerability has begun**. Counterforce in the Age of Accuracy For most of the nuclear age, neither bombers nor ballistic missiles could deliver weapons accurately enough to reliably destroy hardened targets. Too many variables affected the impact point of a bomb—such as the aircraft's speed and altitude; the air defense environment; and atmospheric conditions including wind, temperature, and humidity—for even highly skilled crews to deliver bombs precisely.26 Long-range ballistic missiles were even less accurate. Although their initial deployment conjured fears of "bolt-from-the-blue" disarming strikes, throughout the 1970s long-range missiles were not accurate enough to destroy fields of hardened silos.27 **Technological improvements chipped away** at the sources of inaccuracy, however. Leaps in navigation and guidance, including advanced inertial sensors [End Page 18] with stellar updates, improved the ability of missiles to precisely determine their position in flight and guide themselves, as needed, back on course. Other breakthroughs allowed mobile delivery systems, such as submarines and mobile land-based launchers, to accurately determine their own position prior to launch, greatly improving their accuracy.28 As a result of these innovations, new missiles emerged in the mid-1980s with far better accuracy than their predecessors, rendering hardened targets vulnerable as never before. For bombers, onboard computers now continuously measure the variables that previously confounded bombardiers. Data on aircraft speed and location are uploaded from the aircraft into the computers of "smart" bombs and cruise missiles, which in turn automatically plot a flight path from the release location to the target. The weapons adjust their trajectory as they fly to remain on course.29 **As a result, bombs and missiles can achieve levels of accuracy unimaginable at the start of the nuclear age.** The leap in munitions accuracy has been showcased repeatedly during conventional wars: videos of missiles and bombs guiding themselves directly to designated targets now appear mundane. Although the effects of the accuracy revolution on nuclear delivery systems are equally dramatic, they have received far less attention, despite huge implications for the survivability of hardened targets. IMPROVED MISSILE ACCURACY Figure 1 illustrates one consequence of the accuracy revolution, as applied to nuclear forces, by comparing the effectiveness of U.S. ballistic missiles in 1985 to those in the current U.S. arsenal.30 We use formulas, employed by nuclear analysts for decades, to estimate the effectiveness of missile strikes against a [End Page 19] Figure 1. The Growing Vulnerability of Hard Targets, 1985–2017 NOTE: The calculations underlying this figure assume targets hardened to withstand 3,000 pounds per square inch (psi). Data for 1985 are based on the most capable U.S. land-based intercontinental ballistic missile (ICBM) and submarine-launched ballistic missile (SLBM) at the time: the Minuteman III ICBM armed with a W78 warhead and the Trident I C-4 SLBM armed with a W76 warhead. The 2017 ICBM data are based on the same Minuteman III / W78, with an improved guidance system. The 2017 SLBM data show both contemporary configurations of the Trident II D-5 missile: one version armed with the W76 and the other with higher-yield W88 warheads. The data and sources for U.S. weapon systems are in the online appendix, , table A1. Click for larger view View full resolution Figure 1. The Growing Vulnerability of Hard Targets, 1985–2017 NOTE: The calculations underlying this figure assume targets hardened to withstand 3,000 pounds per square inch (psi). Data for 1985 are based on the most capable U.S. land-based intercontinental ballistic missile (ICBM) and submarine-launched ballistic missile (SLBM) at the time: the Minuteman III ICBM armed with a W78 warhead and the Trident I C-4 SLBM armed with a W76 warhead. The 2017 ICBM data are based on the same Minuteman III / W78, with an improved guidance system. The 2017 SLBM data show both contemporary configurations of the Trident II D-5 missile: one version armed with the W76 and the other with higher-yield W88 warheads. The data and sources for U.S. weapon systems are in the online appendix, http://dx.doi:10.7910/DVN/NKZJVT, table A1. typical hardened silo.31 The figure distinguishes three potential outcomes of a missile strike: hit, miss, and fail. "Hit" means that the warhead detonates within the lethal radius (LR) of the aimpoint, thus destroying the target. "Miss" means that the warhead detonates outside the LR, leaving the target undamaged. "Fail" means that some element of the attacking missile system malfunctioned, leaving the target undamaged. [End Page 20] Figure 1 shows that the accuracy improvements of the past three decades have led to substantial leaps in counterforce capabilities. In 1985 a U.S. intercontinental ballistic missile (ICBM) had only about a 54 percent chance of destroying a missile silo hardened to withstand 3,000 pounds per square inch (psi) overpressure. In 2017 that figure exceeds 74 percent. The improvement in submarine-launched weapons is starker: from 9 percent to 80 percent (using the larger-yield W88 warhead). Figure 1 also suggests, however, that despite vast improvements in missile accuracy, the weapons still are not effective enough to be employed individually against hardened targets. Even modern ballistic missiles are expected to miss or fail 20–30 percent of the time. The simple solution to that problem, striking each target multiple times, has never been a feasible option because of the problem of fratricide: the danger that incoming weapons might destroy or deflect each other.32 The accuracy revolution, however, also offers a solution to the **fratricide problem**, opening the door to assigning **multiple warheads against a single target**, and thus paving the way to **disarming counterforce strikes**. THE FADING PROBLEM OF FRATRICIDE One type of fratricide occurs when the prompt effects of nuclear detonations—radiation, heat, and overpressure—destroy or deflect nearby warheads. To protect those warheads, targeters must separate the incoming weapons by at least 3–5 seconds.33 A second source of fratricide is harder to overcome. Destroying hard targets typically requires low-altitude detonations (so-called ground bursts), which vaporize material on the ground. When the debris begins to cool, 6–8 seconds after the detonation, it solidifies and forms a dust cloud that envelops the target. Even small dust particles can be lethal to incoming warheads speeding through the cloud to the target. Particles in the debris cloud take approximately 20 minutes to settle back to ground.34 For decades, these two sources of fratricide, acting together, posed a major [End Page 21] problem for nuclear planners.35 Multiple warheads could be aimed at a single target if they were separated by at least 3–5 seconds (to avoid interfering with each other); yet, all inbound warheads had to arrive within 6–8 seconds of the first (before the dust cloud formed). As a result, assigning more than two weapons to each target would produce only marginal gains: if the first one resulted in a miss, the target would likely be shielded when the third or fourth warhead arrived.36 Improvements in accuracy, however, have greatly mitigated the problem of fratricide. As figure 1 shows, the proportion of misses—the main culprit of fratricide—compared to hits is fading. To be clear, some weapons will still fail; that is, they will be prevented from destroying their targets because of malfunctioning missile boosters, faulty guidance systems, or defective warheads. Those kinds of failures, however, do not generally cause fratricide, because the warheads do not detonate near the target. Only those that miss—that is, those that travel to the target area and detonate outside the LR—will create a dust cloud that shields the target from other incoming weapons. In short, leaps in accuracy are essentially reducing the set of three outcomes (hit, fail, or miss) to just two: hit or fail. The "miss" category, the key cause of fratricide, has **virtually disappeared**.37 THE CUMULATIVE CONSEQUENCES FOR COUNTERFORCE The end of fratricide is just one development that has helped negate hardening and increased the vulnerability of nuclear arsenals. The computer revolution has led to other improvements that, taken together, **significantly increase counterforce capabilities**. First, improved accuracy has transformed the role of ballistic missile submarines, turning these instruments of retaliation against population centers into potent counterforce weapons. Recall (from figure 1 above) that a 1985 submarine-launched ballistic missile (SLBM) had only a 9 percent chance of destroying a hardened target. This meant that although ballistic missile submarines could destroy "soft" targets (e.g., cities), they could not destroy the hardened sites that would be a key focus of a disarming attack. Increased [End Page 22] SLBM accuracy has added hundreds of SLBM warheads to the counterforce arsenal; it has also unlocked other advantages that submarines possess over land-based missiles. For example, submarines have flexibility in firing location, allowing them to strike targets that are out of range of ICBMs or that are deployed in locations that ICBMs cannot hit.38 Submarines also permit strikes from close range, reducing an adversary's response time. And because submarines can fire from unpredictable locations, SLBM launches are more difficult to detect than ICBM attacks, further reducing adversary response time before impact. Second, upgraded fuses are making ballistic missiles even more capable than figure 1 reports. In a compelling new analysis, Theodore Postol explores the implications of new "compensating" fuses that exist on most U.S. SLBMs and that will soon be deployed on the entire force.39 Reentry vehicles equipped with this fusing system use an altimeter to measure the difference between the actual and expected trajectory of the reentry vehicle, and then compensate for inaccuracies by adjusting the warhead's height of burst.40 Specifically, if the altimeter reveals that the warhead is off track and will detonate "short" of the target, the fusing system lowers the height of burst, allowing the weapon to travel farther (hence, closer to the aimpoint) before detonation. Alternatively, if the reentry vehicle is going to detonate beyond the target, the height of burst is adjusted upward to allow the weapon to detonate before it travels too far.41 Without this technology, as figure 1 shows, the lower-yield W76 warheads are much less effective against hardened targets than their higher-yield cousins, the W88s. The improved fuse cuts the effectiveness gap roughly in half, making the hundreds of W76s in the U.S. arsenal potent counterforce weapons for the first time.42 **The consequences** of the new fuse [End Page 23] **are**, therefore, **profound**, essentially **tripling the size of the U.S. submarine-based arsenal against hard targets**.43 More broadly, the technology at the core of compensating fuses is available to any state capable of building modern multistage ballistic missiles.44 A third key improvement, rapid missile retargeting, increases the effectiveness of ballistic missiles by reducing the consequence of malfunctions. As figure 1 illustrates, when accuracy increases, missile reliability becomes the main hurdle to attacks on hardened targets. For decades analysts have recognized a solution to this problem: if missile failures can be detected, the targets assigned to the malfunctioning missiles can be rapidly reassigned to other missiles held in reserve.45 The capability to retarget missiles in a matter of minutes was installed at U.S. ICBM launch control centers in the 1990s and on U.S. submarines in the early 2000s, and both systems have since been upgraded.46 We do not know if the United States has adopted war plans that fully exploit rapid reprogramming to minimize the effects of missile failures.47 Nevertheless, such a targeting approach is within the technical capabilities of the United States and other major nuclear powers and may already be incorporated into war plans.48 [End Page 24] Table 1 illustrates the consequences of these improvements against two hypothetical target sets: 100 moderately hard mobile missile shelters and 200 hardened missile silos.49 Row 1 shows the approximate counterforce capabilities of a 1985-era U.S. Minuteman III ICBM strike; a 2-on-1 attack would have been expected to leave 8 mobile missile shelters intact. A strike against 200 hardened silos would fare worse, with 42 targets expected to survive. The remaining rows in table 1 highlight the implications of the changes that have occurred from 1985 to 2017. Row 2 illustrates the impact of improved Minuteman III guidance, which reportedly reduced circular error probable (CEP) from 183 to 120 meters. Row 3 employs the most capable missile and warhead combination in the current U.S. arsenal: the Trident II armed with a high-yield W88 warhead. As the results in both rows show, upgraded missiles perform better than their predecessor, but not well enough to conduct effective disarming strikes against large target sets. Rows 4–7 demonstrate how the various improvements in missile technology have combined to create transformative counterforce capabilities. In row 4, we use a more realistic figure for missile system reliability. Although 80 percent missile reliability is traditionally used as a baseline, **much evidence suggests that the actual reliability of modern missiles exceeds 90 percent**.50 Row 4 shows attack outcomes for a Trident II/W88 with 90 percent reliability. Row 5 shows the consequences if the United States can reprogram its missiles [End Page 25] Table 1. The Demise of Hard Target Survivability NOTE: Results are displayed for 100 mobile missile shelters hardened to withstand up to 1,000 pounds per square inch (psi) or 200 missile silos hardened to 3,000 psi. Yield is in kilotons and circular error probable (CEP) is in meters. The column "Attack Plan" indicates the number of warheads assigned to each target; "R" (for reprogramming) means that the attacker uses reserve missiles to replace boost phase malfunctions. The columns titled "p(K)" list the probability that each individual target is destroyed, and "Survives" is the expected number of targets surviving the attack. The designation of "0.99+" under p(K) indicates 99.9 percent or greater chance of destroying each individual target. Light shaded cells indicate successful disarming attacks; darker cells indicate very successful strikes. Note that a single surviving mobile missile shelter does not necessarily imply that a mobile missile survived, whereas a surviving silo suggests a surviving missile. Click for larger view View full resolution Table 1. The Demise of Hard Target Survivability NOTE: Results are displayed for 100 mobile missile shelters hardened to withstand up to 1,000 pounds per square inch (psi) or 200 missile silos hardened to 3,000 psi. Yield is in kilotons and circular error probable (CEP) is in meters. The column "Attack Plan" indicates the number of warheads assigned to each target; "R" (for reprogramming) means that the attacker uses reserve missiles to replace boost phase malfunctions. The columns titled "p(K)" list the probability that each individual target is destroyed, and "Survives" is the expected number of targets surviving the attack. The designation of "0.99+" under p(K) indicates 99.9 percent or greater chance of destroying each individual target. Light shaded cells indicate successful disarming attacks; darker cells indicate very successful strikes. Note that a single surviving mobile missile shelter does not necessarily imply that a mobile missile survived, whereas a surviving silo suggests a surviving missile. [End Page 26] to replace boost-phase failures. As row 5 reveals, a 2-on-1 attack with reprogramming would be expected to destroy every hardened shelter or silo. Row 6 omits reprogramming, but it demonstrates the impact of the decline in fratricide by adding a third warhead to each target, resulting again in the destruction of either target set. Row 7 illustrates the impact of compensating fuses. This row, unlike the others, employs the lower-yield warhead on the Trident II missiles (the W76). With the compensating fuse, a 2-on-1 attack using W76s would be expected to destroy all the mobile missile shelters and all but one of the hardened silos. (An attack that mixed W88s and W76s could destroy the entire hardened silo force.) The results in table 1 are simply the output of a model. In the real world, the effectiveness of any strike would depend on many factors not modeled here, including the skill of the attacking forces, the accuracy of target intelligence, the ability of the targeted country to detect an inbound strike and "launch on warning," and other factors that depend on the political and strategic context. As a result, these calculations tell us less about the precise vulnerability of a given arsenal at a given time—though one can reach arresting conclusions based on the evidence—and more about trends in how technology is undermining survivability.51 One crucial consequence of the accuracy revolution is not captured in the above results. Yet, its impact on the vulnerability of nuclear arsenals may be just as profound. The accuracy revolution has rendered **low-casualty counter-force attacks** plausible for the **first time**. THE DAWN OF LOW-CASUALTY COUNTERFORCE In nuclear deterrence theory, the primary factor preventing nuclear attack is the attacker's fear of retaliation. In reality, however, additional sources of inhibition exist, including the terrible civilian consequences of an attempted counterforce strike. If a leader contemplating a disarming strike knows that such an attack will inflict massive casualties on the enemy, that leader will also understand that the failure to disarm the enemy will provoke a massive punitive response, foreclosing the possibility of a limited nuclear exchange. Furthermore, if a disarming strike would cause enormous civilian casualties in the target country, but also possibly in allied and neutral neighboring countries, leaders who value human life or the fate of allies would contemplate such an [End Page 27] attack in only the direst circumstances. The link between civilian casualties and nuclear inhibition explains why many arms control advocates oppose the development of less destructive nuclear weapons; they worry that such weapons are more "usable."52 Counterforce was tantamount to mass casualties throughout the nuclear age, **but the accuracy revolution is severing that link**. In the past, the main impediment to low-casualty nuclear counterforce strikes has been **radioactive fallout**. Targeters would have had to rely on ground bursts to maximize destructive effects against hardened facilities such as silos and storage sites. Detonations close to the ground have a major drawback, however: debris is sucked up into the fireball, where it mixes with radioactive material, spreading radiation wherever it settles. Although the other effects of nuclear detonations (e.g., blast and fire) can have large-scale consequences for civilians, in many circumstances those effects can be minimized.53 If a strike produces fallout, however, the consequences are potentially vast and difficult to predict.54 In theory, it has always been possible to employ nuclear weapons without creating much fallout. If weapons are detonated at high altitude (above the "fallout threshold"), very little debris from the ground will be drawn up into the fireball, greatly reducing fallout.55 In practice, however, this targeting strategy has never been feasible against hardened sites. The problem is that any high-yield weapon that detonates low enough to destroy a hardened target will also be low enough to create fallout. Low-yield weapons could do the job and remain above the fallout threshold, but that has always been impractical because low-yield weapons would need to be delivered with great precision to destroy hardened sites, which was previously impossible.56 [End Page 28] Figure 2. The Potential for Low-Fallout Nuclear Counterforce NOTE: "Target hardness" (the horizontal axis) is measured in pounds per square inch (psi), with a typical range of psi for hardened mobile missile shelters and missile silos noted. "Yield" (the vertical axis) is measured in kilotons and plotted on a logarithmic scale. The curve depicts the maximum weapon yield that can destroy a given target from above the fallout threshold. Any weapon yield/target hardness combination above the line that is effective enough to destroy the target will necessarily result in fallout. Points below the line indicate that weapons can be detonated at an altitude that will destroy the target yet produce little or no fallout. See the online appendix for calculations. Click for larger view View full resolution Figure 2. The Potential for Low-Fallout Nuclear Counterforce NOTE: "Target hardness" (the horizontal axis) is measured in pounds per square inch (psi), with a typical range of psi for hardened mobile missile shelters and missile silos noted. "Yield" (the vertical axis) is measured in kilotons and plotted on a logarithmic scale. The curve depicts the maximum weapon yield that can destroy a given target from above the fallout threshold. Any weapon yield/target hardness combination above the line that is effective enough to destroy the target will necessarily result in fallout. Points below the line indicate that weapons can be detonated at an altitude that will destroy the target yet produce little or no fallout. See the online appendix for calculations. Figure 2 illustrates why high-yield strikes against hard targets inevitably create fallout, and it highlights the potential low-yield solution to the fallout problem. The vertical axis reflects weapon yield, and the horizontal axis depicts the hardness of potential targets—with the approximate values for mobile missile shelters and missile silos indicated. The solid black line shows the maximum yield of a weapon that can generate enough overpressure to destroy a target from above the fallout threshold. For example, figure 2 shows that for a 3,000 psi target, the highest-yield weapon that can destroy it while remaining above the fallout threshold is 0.35 kilotons. A larger-yield weapon will necessarily cause fallout if it destroys the target. A low-fallout strike against a 1,000 psi mobile missile shelter would require a weapon with 50 kilo [End Page 29] tons yield, or less. In short, low-fatality nuclear counterforce is possible, but it requires low-yield weapons, and hence very accurate delivery. The accuracy of nuclear delivery systems is now to the point that low-casualty disarming strikes are possible. For example, a 0.3 kiloton bomb would require a CEP of 10–15 meters to be highly effective against hard targets;57 that level of accuracy is likely within the reach of the new guided B61-12, which is slated to replace all nuclear gravity bombs in the U.S. arsenal.58 Similarly, a 5-kiloton missile warhead, which may approximate the yield of the fission primary on many existing ballistic missiles, could destroy a hardened target if its CEP was approximately 50 meters.59 That level of accuracy was implausible for most of the Cold War, yet it is within reach of many countries today.60 By detonating weapons above the fallout threshold, targeters can greatly reduce fallout relative to ground bursts. But how significant are these reductions? How many fewer deaths would be caused in comparison with ground burst strikes? To compare the fallout and potential fatalities from high-yield and low-yield counterforce operations, we used unclassified U.S. Defense Department software, called Hazard Prediction and Assessment Capability (HPAC).61 We modeled two different counterforce strikes, one using a "traditional" high-yield approach and one employing low-yield airbursts, against five hardened targets in North Korea (e.g., nuclear storage sites or hardened mobile missile shelters). Because there is no available unclassified information about the location of North Korea's nuclear storage sites, we modeled strikes against notional locations around the DPRK's periphery. [End Page 30] Figure 3. Low-Fallout Counterforce Option against North Korea NOTE: The figure illustrates the potential fallout consequences of two alternative counter-force strikes against five notional North Korean hardened nuclear sites. In both strike options, each target is destroyed with **greater than 95 percent probability**. The high-yield attack employs ten W88 warheads (455-kiloton yield), with two warheads against each target. Because high-yield weapons cannot destroy hardened sites from above the fallout threshold, the W88s are ground bursts. The low-yield attack uses twenty B61 bombs (0.3-kiloton yield), set to detonate at an altitude that maximizes effectiveness while minimizing fallout. The fallout patterns and casualty figures were generated using unclassified U.S. Defense Department software, called Hazard Prediction and Assessment Capability. Click for larger view View full resolution Figure 3. Low-Fallout Counterforce Option against North Korea NOTE: The figure illustrates the potential fallout consequences of two alternative counter-force strikes against five notional North Korean hardened nuclear sites. In both strike options, each target is destroyed with greater than 95 percent probability. 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As long as the targets were located outside North Korean cities, the number of Korean fatalities from a low-yield strike would be comparable to the human losses from conventional operations. In fact, the fallout contours that are visible in figure 3 for the low-yield scenario correspond to annual radiation levels deemed acceptable by the U.S. Occupational Safety and Health Administration. The precise results of the HPAC simulation should be treated with skepticism: wind speed and direction change constantly, altering fallout patterns. The amount of fallout generated in the low-yield scenario is so low, however, that the results of figure 3 are robust regardless of which way the wind blows: [End Page 31] few people located away from the actual targets would be killed. The point of figure 3 is not to predict the outcome of a counterforce strike on North Korea, but to reveal the relationship between accuracy and fallout. When accuracy was poor, the only approach to nuclear counterforce was high-yield strikes, which would create catastrophic results such as the one depicted above. The accuracy revolution has **changed the calculus**, however; **low-fatality nuclear strikes are now possible**.62 The accuracy revolution is ongoing. As accuracy continues to improve, the effectiveness of conventional attacks on hard targets will continue to increase. Today, low-yield nuclear weapons can destroy targets that once required very large yield detonations. In the future, many of those targets will be vulnerable to conventional attacks. In sum, from the start of the nuclear age to the present, force planners have relied on hardening as a key strategy for ensuring the survivability of their arsenals. That strategy made sense, and until recently ensured that disarming strikes would not only fail, but also kill millions of civilians in the process. Technology never stands still, however, and the technical foundations of deterrence, particularly for the strategy of hardening, have been greatly undermined by leaps in accuracy. Counterforce in the Age of Transparency While advances in accuracy are negating hardening as a strategy for protecting nuclear forces, leaps in remote sensing are undermining the other main approach: concealment. Finding concealed forces, particularly mobile ones, remains a major challenge. Trends in technology, however, are eroding the security that mobility once provided. In the ongoing competition between "hiders" and "seekers," waged by ballistic missile submarines, mobile land-based missiles, and the forces that seek to track them, the hider's job is growing more difficult than ever before. Five trends are ushering in an age of unprecedented transparency.63 First, [End Page 32] sensor platforms have become more diverse. The mainstays of Cold War technical intelligence—satellites, submarines, and piloted aircraft—continue to play a vital role, and they are being supplemented by new platforms. For example, remotely piloted aircraft and underwater drones now gather intelligence during peacetime and war. Autonomous sensors, hidden on the ground or tethered to the seabed, monitor adversary facilities, forces, and operations. Additionally, the past two decades have witnessed the development of a new "virtual" sensing platform: cyberspying.64 Second, sensors are collecting a widening array of signals for analysis using a growing list of techniques. Early Cold War strategic intelligence relied heavily on photoreconnaissance, underwater acoustics, and the collection of adversary communications—all of which remain important. Now, modern sensors gather data from across the entire electromagnetic spectrum; they employ seismic and acoustic sensors in tandem; and they emit radar at various frequencies depending on their purpose, for example, to maximize resolution or to penetrate foliage. Modern remote sensing exploits an increasing number of analytic techniques, including spectroscopy to identify the vapors leaking from faraway facilities, interferometry to discover underground structures, and signals processing techniques (such as those underpinning synthetic aperture radars) that allow radars to perform better than their antenna size would seem to permit.65 Third, remote sensing platforms increasingly provide persistent observation. At the beginning of the Cold War, strategic intelligence was hobbled by sensors that collected snapshots rather than streams of data. Spy planes sprinted past targets, and satellites passed overhead and then disappeared over the horizon. Over time those sensors were supplemented with platforms that remained in place and soaked up data, such as signals intelligence antennas, undersea hydrophones, and geostationary satellites. The trend toward persistence is continuing. Today, remotely piloted vehicles can loiter near enemy targets, and autonomous sensors can monitor critical road junctures for months or years. Persistent observation is essential if the goal is not merely to count enemy weapons, but also to track their movement. [End Page 33] The fourth factor in the ongoing remote sensing revolution is the steady improvement in sensor resolution. In every field that employs remote sensing technology, including medicine, geology, and astronomy, improved sensors and advanced data processing are permitting more accurate measures and fainter signals to be discerned from background noise. The leap in satellite image resolution is but one example: the first U.S. reconnaissance satellite (Corona) could detect objects as small as 25 feet across. Today, even commercial satellites (e.g., DigitalGlobe's WorldView-3 and WorldView-4) can collect images with 1-foot resolution, and U.S. spy satellites are reportedly capable of resolutions less than 4 inches.66 Advances in resolution are not merely transforming optical remote sensing systems; they are extending what can be seen by infrared sensors, advanced radars, interferometers and spectrographs, and many other sensors. The fifth key trend is the huge increase in data transmission speed. During the first decades of the Cold War, it took days or longer to transmit information from sensors to analysts. At least a full day passed before the photographs snapped by U-2 aircraft were developed and analyzed. Early satellites were slower: the satellite had to finish its roll of film, and then eject the canister, which would be caught midair and flown to a facility for development and analysis. All told, images collected at the beginning of a satellite mission might take weeks before they arrived at an analyst's desk. Today, by contrast, intelligence gathered by aircraft, satellites, and drones can be transmitted in nearly real time. The data can be transmitted to intelligence analysts, political leaders, and in some cases directly to military commanders conducting operations. None of these technological trends alone is transformative. Taken together, however, they are creating a degree of transparency that was unimaginable even two decades ago. These new remote sensing technologies are not proliferating around the world evenly; the United States, for example, seems to have exploited new sensing technologies more intensively than other countries. Many countries are developing expertise in advanced sensing, however. The sensing revolution is a global phenomenon, with implications for the survivability of all countries' nuclear arsenals. Remote sensing technologies have improved greatly, but the crucial question is whether these advances have meaningfully increased the vulnerability of the two most elusive types of nuclear delivery systems: SSBNs and mobile land-based missiles. If the ability to track submarines at sea or mobile missiles [End Page 34] on patrol remains out of reach, then the counterforce improvements we identify are less significant, at least for now. In fact, SSBNs have never been as invulnerable as analysts typically assume, and advances in remote sensing appear to be reducing the survivability of both submarines and mobile missiles. REMOTE SENSING AND TRACKING SUBMARINES During the Cold War, the competition between submariners and antisubmarine warfare operators was shrouded in secrecy, but that history is finally being revealed. We now know that the United States was able to locate, and even track, Soviet SSBNs during extended periods of the Cold War.67 The core of U.S. ASW efforts against the Soviet Union lay in a series of breakthroughs in passive sonar and signals processing, as well as doctrine and tactics to exploit those advances. Starting in the 1950s, the United States deployed an expanding network of underwater hydrophones designed to identify and locate adversary submarines. Data from the hydrophones were transmitted across undersea cables to onshore computing facilities, where powerful computers discerned the faint sounds of submarines from ocean noise. Potential targets were then passed along to aircraft and attack submarines (SSNs) for further location and tracking. U.S. capabilities to track Soviet submarines leapt forward in the late 1960s and 1970s, as the United States deployed new attack submarines, which were equipped with powerful sonars in their bows, towed sonar arrays, and improved on-ship computing power, giving U.S. SSNs an unprecedented combination of acoustic gathering and data processing capabilities.68 The competition between Soviet SSBNs and the pack of U.S. submarines, aircraft, and surface ships hunting them varied throughout the Cold War. There were periods in which U.S. forces were winning, trailing every Soviet SSBN on patrol, from port to sea and back. In later periods, after discovering their vulnerability, the Russians pulled their forces into protected "bastions" near Soviet territory to counter the U.S. ASW strategy. The United States did not give up, and worked until the end of the Cold War (and beyond) to regain undersea superiority. [End Page 35] The duration of U.S. Cold War ASW superiority cannot be accurately assessed today because of enduring classification constraints. But for periods of the superpower competition, U.S. naval leaders believed they had the ASW problem well in hand. As the former commander of the U.S. Pacific Fleet in the mid-1980s remarked, the United States was able to "identify by hull number the identity of Soviet subs…and know exactly where they were. In port or at sea. If they were at sea, N3 [director for operations] had an SSN [on them]."69 There are three key lessons to draw from the Cold War ASW competition. First, previous advances in remote sensing greatly increased the vulnerability of deployed submarines.70 Second, escaping vulnerability was no easy task. In the late 1960s, the Soviet Union learned that its submarines were vulnerable. But despite Moscow's significant economic and technological resources, it took the Soviet navy more than a decade to develop good countermeasures against the evolving U.S. ASW capabilities.71 Third, and most broadly, the Cold War ASW competition demonstrates that the deployment of ballistic missile submarines neither ended the Cold War nuclear competition nor negated hopes on either side of attaining military superiority. The United States led the undersea competition for a time because of its superior technology and tactics; the Soviet Union developed countermeasures because it discovered its vulnerabilities and innovated. This back-and-forth struggle between hiders and seekers looks more like a traditional struggle for naval superiority than the common depiction of invulnerable submarines. Today's technological advances in remote sensing, data processing, and communication are occurring at a rapid pace, and their ultimate impact on the submarine competition is too uncertain to predict with confidence (especially given the tight controls over information on contemporary ASW capabilities). Yet, there are good reasons to suspect that the dramatic leaps in remote sensing are increasing the transparency of the seas and undermining the ability of submarines to remain concealed.72 Some of the promising new anti-submarine [End Page 36] technologies include improved acoustic sensors (including low-frequency active sonars and new networks of seabed passive sonars); non-acoustic techniques (such as laser detection); sophisticated "big data" analysis (which exploits leaps in processor speed to sift vast quantities of sensor data); and a variety of unmanned and autonomous undersea vehicles (including those designed to find and shadow adversary submarines for weeks or months).73 The point is not that submarines are now easy to locate or that the challenges of ASW have been solved. Locating technologically sophisticated, well-operated submarines in vast ocean sanctuaries remains a substantial challenge. Rather, the key point is that even the nuclear delivery system sometimes touted as the most survivable has been vulnerable in the past and appears to be increasingly vulnerable today, as ASW efforts and capabilities rapidly improve. What about mobile land-based missiles? Are breakthroughs in sensing technology increasing their vulnerability as well? REMOTE SENSING AND HUNTING MOBILE MISSILES We illustrate the impact of two advanced surveillance systems, radar satellites and remotely piloted aircraft, on the survivability of mobile land-based nuclear missiles. The effectiveness of sensing systems depends on the characteristics of the target country—for example, its size, location, topography, and defenses. As such, their impact is difficult to quantify in the abstract. Instead, we explore the potential contributions of two advanced sensor systems in a hypothetical case: a U.S.-led operation to destroy a small arsenal of North Korean nuclear-tipped mobile missiles.74 We assume that North Korea's TELs are postured like most other countries' mobile missiles; they remain in hardened shelters during peacetime, with plans to disperse a portion of the force during a conflict.75 U.S. and allied strategic intelligence would have at least three critical roles in [End Page 37] support of a military operation against North Korean TELs. The first, a peacetime mission called "intelligence preparation of the battlefield" (IPB), involves locating North Korea's nuclear and missile facilities, identifying the patrol routes utilized by its missile forces, learning its organizational routines, and mapping its command and communication network. The other two roles are principally wartime missions. "Detection" refers to sensing possible targets; it typically involves sensors that can monitor large areas, but that have inadequate resolution for positive identification or targeting. "Identification" is the next step; once a possible target is detected, other platforms (often with higher-resolution sensors) are cued to identify and precisely locate the target.76 SATELLITES/SAR SENSORS A core element of U.S. surveillance capabilities lies in a constellation of satellites that use synthetic aperture radar to image targets on the ground. Satellites provide a unique capability to peer deep into adversary territory, and they are especially useful for missions that require frequent observations of critical facilities. Whereas manned aircraft and unmanned aerial vehicles (UAVs) are often restricted from adversary airspace, satellites routinely overfly adversary territory. Moreover, unlike satellites with optical or infrared sensors, radar satellites can image targets at night and through cloudy weather. Until recently, the type of radar employed on most satellites—synthetic aperture radar (SAR)—could not image moving targets, limiting the effectiveness of space-based sensors for hunting mobile missiles.77 But over the past two decades, engineers have developed data-processing techniques that enable SAR systems to detect moving targets and determine their speed and direction of travel.78 Although the precise capabilities of intelligence satellites are classified, [End Page 38] civilian radar satellites can scan approximately 150-kilometer-wide swaths along the ground as they pass overhead with sufficient resolution to detect truck-sized moving vehicles.79 New techniques are being developed that may soon double or triple the width of the swath that can be scanned on each pass.80 SAR-equipped satellites, now able to find mobile targets, have the potential to transform counter-TEL operations. If U.S. intelligence satellites can detect moving vehicles within a 150-kilometer-wide swath along the ground, a conservative assumption given that a civilian satellite launched nearly a decade ago can do so, then centering the radar on a mobile missile garrison would put all the roads within two hours' drive-time of that facility within the radar's swath width.81 A single satellite can generate up to twelve 150 kilometer x 150 kilometer swaths in a single pass over North Korea, enough to image all the country's roads more than once—and key sections multiple times—before passing over the horizon.82 Although SAR satellites have become powerful tools for hunting TELs, they have important limitations. Surveillance satellites provide only intermittent coverage of key areas, passing overhead and then descending over the horizon. Thus, even if a constellation of satellites could image the entire road network in North Korea every hour, North Korean TELs might be able to disperse without being observed, by seeking shelter whenever a satellite approaches. Furthermore, if many of North Korea's critical facilities are located in its mountainous regions, topography may block the satellite's line-of-sight, which would allow targets within the swath to be hidden from the radar. The potential effectiveness of radar satellites for hunting mobile missiles, therefore, depends [End Page 39] on two key factors: the time interval between satellite passes and the percentage of road network that is observable in a given pass.83 To assess the effectiveness of SAR satellites for hunting North Korean mobile missiles, we conducted an analysis with three key steps. First, we created a digital map of North Korea's roads. Second, we used geospatial analysis software to determine the visible portion of those roads as a function of a satellite's position. Third, we calculated the frequency with which satellites pass within an orbital band that provides high levels of visibility of the road network.84 Our analysis of satellite orbits and North Korean topography reveals that satellites passing through an orbital band that stretches as far as 1,500-kilometer lateral distance from the Korean Peninsula can view, on average, 90 percent of North Korean roads. A typical radar satellite (which operates in low earth orbit) will pass through such a band, what we call a "usable pass," roughly 2.5 times per day. The total number of usable passes per day thus depends on the number of SAR satellites in orbit that are available for hunting mobile missiles. The number of available satellites, in turn, depends on the willingness of the United States and its close allies to share sensitive satellite imagery, the technical preparations that have been undertaken to facilitate that sharing, and the precise technical capabilities of the satellites. Table 2 shows the implications of different assumptions about those uncertainties. If the United States and key allies create the political and technical arrangements to share satellite data during wartime, North Korean TEL commanders would have little time between passes—specifically, as few as 24 minutes.85 Twenty-four minutes between satellite passes could provide enough time for TELs or other vehicles to move quickly from shelter to shelter, but that strategy requires precise information on satellite orbits, and the short time interval between passes leaves little margin for error for vehicles racing for cover. Moreover, the challenge for TEL operators is more serious than the data suggest. The analysis here focuses on the twenty military and intelligence SAR [End Page 40] satellites, not the half dozen or more U.S. and allied civilian platforms that might be pressed into service in wartime.86 Nor does the analysis count the optical and infrared satellites that supplement SAR coverage. Finally, the number and capability of radar satellites available to the United States is growing.87 As that number increases, the window for mobile missiles to scoot away without being observed will narrow further. Table 2. Synthetic Aperture Radar (SAR) Satellites and Frequency of Usable Passes NOTE: The category "Number of SAR Satellites" counts major military and intelligence SAR satellites operated by the United States and key allies. The other columns are cumulative and show how satellite coverage grows when one adds the assets of various U.S. partners. "Usable Passes per Day" indicates the daily satellite overflights that pass through an orbital band that offers, on average, 90 percent coverage of North Korean roads. Click for larger view View full resolution Table 2. Synthetic Aperture Radar (SAR) Satellites and Frequency of Usable Passes NOTE: The category "Number of SAR Satellites" counts major military and intelligence SAR satellites operated by the United States and key allies. The other columns are cumulative and show how satellite coverage grows when one adds the assets of various U.S. partners. "Usable Passes per Day" indicates the daily satellite overflights that pass through an orbital band that offers, on average, 90 percent coverage of North Korean roads. SAR satellites do not solve the problem of locating mobile targets. For one thing, Russia and China are improving their ASAT capabilities, partly in response to U.S. capabilities.88 Furthermore, adversaries will seek to place missile garrisons and conduct deterrent patrols in locations that are difficult to observe.89 Those choices, however, force adversaries into ever-narrower zones, which then become the focus of other surveillance tools—for example, stealthy penetrating UAVs and unattended ground sensors. [End Page 41] In terms of the three key sensing missions (IPB, detection, and identification), SAR-equipped satellites offer a high level of capability for the IPB mission, because they can repeatedly image stationary or moving targets in peacetime. They also contribute a high level of capability to detection, by offering frequent wide-area coverage of North Korean roads. Finally, SAR satellites offer fairly good capability for the identification mission: they can produce high-resolution images of stationary TELs and enough resolution of moving vehicles to determine that a target is "truck-sized."90 UAVS/SAR SENSORS A second set of sensing capabilities lies in a fleet of aircraft, including manned and remotely piloted vehicles, that use powerful radars to scan adversary territory. These aircraft carry SARs, and many are equipped with Ground Moving Target Indicator (GMTI) radars, allowing them to create high-resolution images of stationary targets or track a large number of moving vehicles. Most surveillance aircraft must operate from "standoff" distances to reduce their vulnerability to air defenses. Some drones, however, are stealthy and can penetrate adversary airspace. Below we illustrate the capabilities of standoff SAR/GMTI platforms and penetrating UAVs in the context of a U.S. and allied operation against North Korean mobile missiles. The United States uses several types of aircraft for standoff radar-reconnaissance missions; we base our model on one of them: the remotely piloted RQ-4 Global Hawk. We explore the potential effectiveness of radar surveillance from four continuous orbits 80 kilometers outside North Korean territory.91 ArcGIS software allows us to identify orbital locations that maximize coverage of North Korean roads, as well as calculate the visible percentage of the road network from those locations.92 Figure 4 shows the results. Figure 4 reveals that even against a small country such as North Korea, standoff airborne radars cannot, by themselves, provide complete coverage of key roads and regions. Four orbits can observe 54 percent of North Korea's roads; the remainder is out of sensor range or shielded by mountainous terrain. These results also suggest, however, that standoff UAVs could play a crucial role in a sensing operation; that is, the ability to continuously monitor [End Page 42] roughly half of North Korea's road network during a conflict would compel North Korea to constrain its mobile missile operations to the north-central region of the peninsula. Figure 4. Coverage of North Korea with Standoff Unmanned Aerial Vehicles (UAVs) NOTE: The white circles depict potential orbital locations for four UAVs; the locations were selected to maximize surveillance of North Korea's road network. The orbits are located 80 kilometers from North Korea's territory at an altitude of 60,000 feet, which reflect plausible operations for RQ-4 Global Hawks. White road segments are observable from at least one of the locations. For additional discussion of the underlying analysis, see the online appendix at . The image was created using ArcGIS and road data from OpenStreetMap and DIVA-GIS. Click for larger view View full resolution Figure 4. Coverage of North Korea with Standoff Unmanned Aerial Vehicles (UAVs) NOTE: The white circles depict potential orbital locations for four UAVs; the locations were selected to maximize surveillance of North Korea's road network. The orbits are located 80 kilometers from North Korea's territory at an altitude of 60,000 feet, which reflect plausible operations for RQ-4 Global Hawks. White road segments are observable from at least one of the locations. For additional discussion of the underlying analysis, see the online appendix at http://dx.doi:10.7910/DVN/NKZJVT. The image was created using ArcGIS and road data from OpenStreetMap and DIVA-GIS. In addition to standoff UAVs, the United States has developed drones for so-called penetrating operations.93 These UAVs reduce their visibility to enemy radar [End Page 43] by utilizing stealth technologies and a combination of passive sensors and "low-probability of intercept" (LPI) radars to observe targets on the ground.94 Even sophisticated, stealthy UAVs are vulnerable to air defenses. To some extent their vulnerability depends on technical questions, for example, the state of competition between radar engineers and designers of stealth technology. The vulnerability of penetrating drones, however, depends greatly on their mission. Of the two critical wartime missions, "detection" is likely more dangerous than "identification." The detection mission—continuously monitoring a large area to detect possible targets—would require a drone to remain within the line-of-sight of a large portion of adversary territory. The mission would, therefore, require the drone to fly at high altitude (to maximize line-of-sight) and possibly use active sensors (to maximize the drone's sensor range). The identification mission, on the other hand, would allow penetrating drones to protect themselves better: to operate at lower altitude so that terrain would shield them from enemy sensors, and fly (when cued by detection systems) to investigate a possible TEL. Only then would the penetrating UAV employ LPI or passive sensors to examine the potential target. We used ArcGIS to explore the potential capability of penetrating drones in the identification mission by determining the percentage of the North Korean road network that would be visible using four UAV orbits. Because the penetrating UAVs would need to rapidly identify the vehicles detected by other sensors, we restricted the UAVs to 5 minutes of flight time to maneuver into position to observe the suspected TEL.95 Furthermore, because LPI radars and passive sensors have shorter range than the powerful radars on standoff platforms, we limit the sensor range to 50 kilometers.96 Our analysis reveals that four penetrating drones, operating as we describe above, can identify targets along 84 percent of North Korea's roads.97 As figure 5 [End Page 44] shows, penetrating and standoff systems would be particularly effective in combination, increasing the road network coverage to 97 percent. Assuming that penetrating UAVs can be cued by other reconnaissance systems, such as satellites, unattended ground sensors, or (near the coast) standoff drones, North Korean TEL operators would have great difficulty moving safely along the country's road network without being detected. If U.S. and South Korean intelligence had identified mobile missile garrisons and operating areas before the conflict, the regions surrounding those zones might be fully covered by only one or two drone orbits.98 Figure 5. Coverage of N. Korea with Standoff and Penetrating Unmanned Aerial Vehicles NOTE: The white circles depict potential orbital locations for four UAVs operating 80 kilometers outside North Korea's territory. The black circles depict the area over North Korea that four penetrating UAVs can overfly within five minutes of flight time starting from the center of each circle. Road segments are coded as visible (white) if they are observable from either a standoff or penetrating UAV. For discussion of the underlying analysis, see the online appendix at . The image was created using ArcGIS and road data from OpenStreetMap and DIVA-GIS. Click for larger view View full resolution Figure 5. Coverage of N. Korea with Standoff and Penetrating Unmanned Aerial Vehicles NOTE: The white circles depict potential orbital locations for four UAVs operating 80 kilometers outside North Korea's territory. The black circles depict the area over North Korea that four penetrating UAVs can overfly within five minutes of flight time starting from the center of each circle. Road segments are coded as visible (white) if they are observable from either a standoff or penetrating UAV. For discussion of the underlying analysis, see the online appendix at http://dx.doi:10.7910/DVN/NKZJVT. The image was created using ArcGIS and road data from OpenStreetMap and DIVA-GIS. [End Page 45] Each of the sensing systems explored here has important limitations. For example, radar satellites provide wide-area coverage, but do so intermittently and at only moderate resolution. Standoff drones provide persistent coverage, but only near the coast. Penetrating drones can provide persistent coverage inland (at the cost of increased risk to the aircraft) or intermittent inland coverage at lower risk. In many cases, however, the capabilities of one system can offset the limits of another. Moreover, this analysis merely scratches the surface in terms of new sensing platforms (e.g., unattended ground and seabed systems), signals (e.g., high-resolution spectroscopy), and approaches (e.g., cyber intrusions), many of which would be employed together for the same mission. Old assumptions about the survivability of mobile forces need to be revised in light of new sensing technologies and capabilities. Concealment is not impossible, of course. An adversary's mobile delivery systems can remain secure if its air defenses can keep UAVs at bay, its navy can keep enemy ASW forces from its coastal waters, and anti-satellite technology can blind satellites. But in this new era of transparency, whether concealed forces are survivable or not depends on the state of competition between opposing intelligence and military organizations. Survivability through concealment can no longer be assumed. What About Countermeasures? Countries will surely address the growing vulnerability of their nuclear arsenals by trying to develop countermeasures to thwart advanced sensor and strike systems. They will seek to deploy radar jammers, anti-satellite weapons, and decoys. They will try to adapt mobile missile doctrines to reduce vulnerability, for example, by timing movements to elude satellites and minimizing communications to thwart signals intelligence efforts. The new era of counter-force will not be static; it will be characterized by vigorous efforts to develop countermeasures, as well as equally vigorous efforts to overcome them. Yet, there are good reasons to expect that the net result of these efforts will leave nuclear delivery systems more vulnerable than they have been in the recent past. First, hunters are poised to do well in the back-and-forth battle of countermeasures. Counterforce is the domain of the powerful; those that are seeking to track enemy nuclear forces typically have greater resources than their rivals.99 Additionally, the countries that are leaders in sensing technology [End Page 46] have an advantage in the race to build (and thwart) countermeasures. As Brendan Green and Austin Long observe about the Cold War ASW competition, U.S. superiority in passive acoustics helped the United States quiet its own SSBNs, which in turn allowed it to practice and hone its tracking capabilities.100 Expertise in sensors and countermeasures go hand in hand. Perhaps most importantly, many countermeasures reduce one vulnerability at the cost of exacerbating others. For example, limiting communications between mobile missiles or submarines and their command authorities reduces vulnerability to signals intercepts, but it increases vulnerability to attacks designed to sever (or simulate) their command and control.101 Avoiding coastal roads neutralizes offshore sensors, but it channels forces into a smaller zone, easing the search problem. Even the simplest countermeasures, such as increasing security near sensitive facilities to prevent the emplacement of unattended ground sensors or improving air defenses around key sites to thwart UAVs, may cue hunters to the presence of high-value sites. Second, the potential targets of disarming strikes cannot merely respond to a single counterforce technology; they must respond to a daunting list of them. The revolutions in accuracy and sensing have had multiple, synergistic effects in bolstering counterforce. The task for hiders is not simply to thwart a single platform, such as SAR satellites, but rather to develop countermeasures to the entire array of (known) capabilities deployed by the hunters. For example, North Korea may find ways to interfere with U.S. radar satellites, but that still leaves its missiles vulnerable to detection by optical satellites; UAVs; unattended ground sensors; and a variety of tagging, tracking, and locating capabilities. Third, some vulnerabilities are difficult to fix. In the late 1960s, the Soviet Union learned that its SSBNs were being tracked by the United States, but it took more than a decade to counter this U.S. capability. Consider the challenge faced by China today in building a survivable ballistic missile submarine force; China deployed its first submarines in the 1960s, but more than half a century later Chinese submarines are still so noisy that experts predict it will be decades before Beijing can field survivable submarines.102 [End Page 47] The battle between countermeasures and corresponding attempts to defeat them is under way, and its outcome will likely depend on the strategic context. Rich countries with advanced research and development infrastructure are developing technology and doctrine to protect their nuclear forces in the face of improvements in weapons accuracy and remote sensing. Weaker countries with modest resources, however, will be hard pressed to develop effective countermeasures to the full spectrum of emerging means of counterforce. Conclusion For most of the nuclear age, there were many impediments to effective counterforce. Weapons were too inaccurate to reliably destroy hardened targets; fratricide prevented many-on-one targeting; the number of targets to strike was huge; target intelligence was poor; conventional weapons were of limited use; and any attempt at disarming an adversary would be expected to kill vast numbers of people. Today, in stark contrast, highly accurate weapons aim at shrinking enemy target sets. The fratricide problem has been swept away. Conventional weapons can destroy most types of counterforce targets, and low-fatality nuclear strikes can be employed against others. Target intelligence, especially against mobile targets, remains the biggest obstacle to effective counterforce, but the technological changes under way in that domain are revolutionary. Of the two key strategies that countries have employed since the start of the nuclear age to keep their arsenals safe, hardening has been negated, and concealment is under great duress. The new era of counterforce helps solve one of the enduring theoretical puzzles of the nuclear age. For decades, scholars of the theory of the nuclear revolution wondered why leaders seemed to be ignoring the profound implications of nuclear weapons for international politics. In theory, nuclear weapons make states that possess them so secure that they need not engage in traditional forms of competition with adversaries, such as arms racing, alliance building, relative gains competition, and rivalry over strategic territory. In practice, all those behaviors have endured. Scholars blame the persistent discrepancy between theory and practice on misperception, illogic, or other decisionmaking pathologies. The new era of counterforce suggests, however, that leaders have been correct to perceive that stalemate can be broken, and that the nuclear balance can vary dramatically across cases. If today's secure arsenal can become tomorrow's first-strike target, then there is little reason to expect [End Page 48] the geopolitical competition between countries to end with the deployment of seemingly secure nuclear weapons. **The policy implications of the new era of counterforce are** also **important**. First, if nuclear forces are becoming increasingly vulnerable to counterforce, then states need to improve their retaliatory arsenals just to maintain the same level of deterrence. Given that nuclear delivery systems are expensive and must last for decades, the challenge for force planners is extraordinary: deploy weapon systems that will remain survivable for multiple generations, even as technology improves at an ever-increasing pace. Second, the growing threat to nuclear arsenals (from nuclear strikes, conventional attacks, missile defenses, ASW, and cyber operations) raises major questions about the wisdom of cutting the size of nuclear arsenals. In the past, many arms control advocates believed that arms cuts reduced the incentives for disarming strikes; whether right or wrong in the past, that assumption is **increasingly dubious** as a recipe for **deterrence stability** today. Finally, leaps in accuracy and remote sensing should **reopen** debates in the United States about **the wisdom of** pursuing effective **counterforce** systems. Fielding those capabilities—nuclear, conventional, and other—may prove invaluable: enhancing deterrence during conventional wars and, if deterrence fails, allowing the United States to defend itself and its allies. Enhancing counterforce capabilities, however, may trigger arms races and other dynamics that exacerbate political and military conditions. In the past, technological conditions bolstered those who favored restraint: disarming strikes seemed impossible, so enhancing counterforce would likely trigger arms racing without much strategic benefit. Today, technological trends appear to **validate the advocates of counterforce**: remote sensing, conventional strike capabilities, ASW, and cyberattack techniques will continue to improve and increasingly threaten strategic forces **whether or not** the United States seeks to maximize its counter-force capabilities. In this new era of counterforce, technological **arms racing seems inevitable**, so exercising restraint may **limit options** **without yielding much benefit**. Nuclear deterrence can be robust, but **nothing about it is automatic** or everlasting. Nuclear stalemate might endure among some pairs of states, and technology could someday reestablish the ease of deploying survivable arsenals. Today, however, **survivability is eroding**, and **it will continue to do so** in the foreseeable future. Weapons will grow even more accurate. Sensors will improve. The new era of counterforce will likely yield benefits to those countries that best adapt to the new landscape, and costs to those that fall behind. The first step in understanding these dynamics is to recognize the new strategic reality confronting nuclear powers today.

#### 3] If China goes first, they’ll do countervalue strikes against cities --- this causes massive pollutants and nuclear winter

Goldstein 18

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When one reads enough Chinese naval literature, diagrams of multi-axial cruise missile saturation attacks against aircraft carrier groups may begin to seem normal. However, one particular graphic from the [October 2015 issue](http://202.38.93.11/newreader/bookan.html?id=279814)(p. 32) of the naval journal Naval & Merchant Ships [舰船知识] stands out as both unusual and singularly disturbing. It purports to map the impact of a Chinese intercontinental ballistic missile (ICBM) strike by twenty nuclear-armed rockets against the United States.

Targets include the biggest cities on the East and West Coasts, as well as in the Midwest, as one would expect. Giant radiation plumes cover much of the country and the estimate in the caption holds that the strike “would yield perhaps 50 million people killed” [可能造成5000 万死亡]. The map below that graphic on the same page illustrates the optimal aim point for a hit on New York City with a “blast wave” [火风量] that vaporizes all of Manhattan and well beyond.

 That makes the North Korean “threat” look fairly insignificant by comparison, doesn’t it? But what’s really disturbing is that the scenario described above envisions a strike by China’s largely antiquated DF-5 first generation ICBM. In other words, the illustration is perhaps a decade or more out of date. As China has deployed first the road-mobile DF-31, then DF-31A and now JL-2 (a submarine-launched nuclear weapon), China’s nuclear strategy has moved from [“assured retaliation”](http://www.mitpressjournals.org/doi/pdf/10.1162/ISEC_a_00215)to what one may term “completely assured retaliation.”

Indeed, the actual theme of the article featuring those graphics concerns recent reports regarding testing of the DF-41 mobile ICBM. The author of that article, who is careful to note that his views do not represent those of the publication, observes that when a Chinese Defense Ministry spokesperson was queried about the test on August 6, 2015, the spokesperson “did not deny that the DF-41 exists” [并没有否认‘东风’41 的存在]. The author also cites U.S. intelligence reports, concluding that four tests have now been conducted, including one that demonstrates multiple-reentry vehicle (MIRV) technology. The author estimates that DF-41 will finally provide China with the capability to launch missiles from north central China and hit all targets in the U.S. (except Florida). With the goal of better understanding the rapidly evolving strategic nuclear balance between China and the U.S. and its significance, this Dragon Eye surveys some recent Mandarin-language writings on the subject of Chinese nuclear forces.

### 6 – Theory

#### Interpretation—the aff must disclose the plan text, framework, and advantage areas 30 minutes before the round.

#### Violation—they didn’t

#### Neg prep—4 minutes of prep is not enough to put together a coherent 1nc or update generics—30 minutes is necessary to learn a little about the affirmative and piece together what 1nc positions apply and cut and research their applications to the affirmative

#### Implication – we get infinite condo

#### Independently, 1AR theory is skewed towards the aff – a) the 2NR must cover substance and over-cover theory, since they get the collapse and persuasive spin advantage of the 3min 2AR, b) their responses to my counter interp will be new, which means 1AR theory necessitates intervention, c) they have a 7-6 advantage on all 1AR offs.

#### Implications – a) drop the arg to minimize the chance the round is decided unfairly, b) use reasonability with a bar of defense or the aff always wins since the 2AR can line by line the whole 2NR without winning real abuse.