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## 1AC

### Advantage

#### Plan: Ukraine should ban the appropriation of outer space by private entities.

#### The Ukrainian space sector is weak now, but newly legal private investments could revitalize it

Zoria 7/26 [(Yuri, author at Euromaidan Press and a former a journalist in a Luhansk online media) “How Ukraine wants to make its space industry great again” Euromaidan Press, 7/26/2021. https://euromaidanpress.com/2021/07/26/how-ukraine-wants-to-make-its-space-industry-great-again/] BC

Despite all the challenges faced by the Ukrainian space program, Volodymyr Taftay, head of the State Space Agency of Ukraine, remains optimistic:

“Ukraine’s space activities are now in a difficult situation, because over the past 5-7 years (following the Russian occupation of Ukraine’s Crimea and the Donbas, – editor), domestic space companies lost multiple customers. Among the large customers was the Russian Federation. Ukraine has lost a lot from the termination of contracts with it, but at the same time, it gives an opportunity to establish cooperation with other foreign partners,” he said in his interview with Ukrinform.

At the end of 2021, SpaceX is going to launch the Ukrainian satellite Sich-2-30 previously known as Sich-2-1 on the Falcon 9 rocket. In total, Ukraine is going to create a constellation of seven Ukrainian satellites in the upcoming years. Sich-2-30 is the first Ukraine satellite of this kind to be launched in 10 years.

Currently, Yuzhnoye has been developing the rocket Cyclone-4M, which is going to be launched from Nova Scotia by Canadian company Maritime Launch Services. The rocket’s maiden flight is set for 2022.

Another rocket-launcher project of Yuzhnoye, which however hasn’t left the drawing boards yet, is the new rocket family Mayak. The family is going to include a number of rockets, including light, medium, and heavy-lift vehicles.

In 2019, the Ukrainian parliament amended the law “On space activities” to allow private space companies space activities which potentially may boost Ukraine space capabilities, though the new legislation didn’t yield any results so far. The Ukrainian space startups are at their very early stages now and it is too early to make any predictions about them.

For example, Promin Aerospace that raised $500,000 of investment in a pre-seed round for developing the smallest orbital rocket in history was founded only in January 2021. Nevertheless, the Ukrainian Government’s space program for 2021-2025 envisages full-scale cooperation of the state with the private sector and expanding international space cooperation.

Also, Ukraine has plans on creating a domestic cosmodrome, according to Taftay, however, it remains unclear whether it would be a land-based launch site or a mobile sea platform similar to Sea Launch.

Volodymyr Taftay hopes that the national space agency would join the European Space Agency (ESA) in 2-3 years from now.

“In the near future, Ukraine will take part in NASA’s Moon exploration program Artemis. We have recently signed a memorandum of cooperation. In addition, we plan to participate in programs that involve the study of Mars,” says Taftay

It is also noteworthy that two private UK and US-based space companies have Ukrainian connections: UK-based Skyrora has an R&D facility in Dnipro, Ukraine, while the American Firefly Airspace company founder Max Polyakov is originally from the Ukrainian city of Zaporizhia. Both companies are still preparing their first launches: Skyrora is going to finish the development of its three-stage orbital launch vehicle Skyrora XL by late 2022, while Firefly Airspace prepares its Alpha rocket for its debut launch later this year.

#### The space industry collapses without private companies

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.

#### Even exported products would still be under Ukrainian jurisdiction

SpaceWatch 19 [(SpaceWatch, ) “Ukraine Passes Commercial Space Law Allowing Private Space Activities in 2020” SpaceWatch 11/2019. https://spacewatch.global/2019/11/ukraine-passes-commercial-space-law-allowing-private-space-activities-in-2020/] BC

The new Ukrainian commercial space law will allow private Ukrainian citizens and companies to commercially exploit and explore Earth orbit and beyond from Ukraine and under Ukrainian jurisdiction. A parallel aim, apparently, is to also reduce the role in the supervision of Ukrainian space activities by traditional state operators.

Under the new law, private companies seeking to conduct commercial space activities in and from Ukraine will have to submit a declaration to government authorities. Commercial space activities that will involve rocket engine testing, satellite launch, and the control of satellites from Ukrainian territory will require a state permit.

#### Scenario 1 is Korean war

#### Advancements in North Korean ballistic missile capabilities are dependent on the Ukrainian space industry

Fuhrman 6/30 [(Eli, a contributing writer for The National Interest.) “Ukraine Gave Up Its Nukes — And Some of Its Secrets to North Korea” National Interest, 6/30/2021. https://nationalinterest.org/blog/korea-watch/ukraine-gave-its-nukes-%E2%80%94-and-some-its-secrets-north-korea-188945] BC

North Korea’s ability to make such substantial progress in the development of its ballistic missile capabilities – particularly with regards to its long-range missiles – is likely the result of a number of factors, including simply the progress that can be expected to emerge from sustained and dedicated efforts. Since coming to power in 2011, North Korean leader Kim Jong Un has presided over a significant increase in North Korean ballistic missile tests. This increased effort has borne fruit, producing breakthroughs that have themselves resulted in additional breakthroughs; North Korea’s development of its Hwasong-12 intermediate-range ballistic missile (IRBM) that is capable of hitting the island of Guam, for example, proved to be the foundation upon which the Hwasong-14 was built.

But North Korea’s progress in the development of its ballistic missiles has also most assuredly been the result of new technology becoming available to the DPRK, and one important source of this technology has likely been Ukraine.

Scientists have been a favorable group within North Korea for much of the country’s existence, and Kim Il Sung is believed to have sent North Korean scientists to study in various parts of the Soviet Union and the socialist world, which may well have included Ukraine. The country is also believed to have attempted to recruit suddenly out of work Soviet scientists and missile engineers after the collapse of the Soviet Union, which is again likely to have included efforts to woo Ukrainian experts.

But scientific exchanges and rogue scientists and engineers likely do not form the entirety – or even the most important aspect – of the connection between Ukraine and the North Korean ballistic missile program. Instead, the more significant connection likely revolves around a particular rocket factory near the Ukrainian city of Dnipro known as Yuzhmash. The factory was once a major production site for advanced Soviet ballistic missiles, but has now shifted its focus to the production of such things as rockets designed to launch satellites into space; the site did, however, remain a common storage site for space ballistic missile components, including engines.

North Korea has for many years had an interest in the site, with one former employee of the factory recalling a tour he gave to North Koreans posing as tourists in the early 2000s. They were almost certainly not tourists, however, and the United Nations Panel of Experts has confirmed that in 2011-2012 North Korean operatives attempted to steal missile designs from the factory before they were apprehended by the Ukrainian Security Services.

Despite the failure of that operation, North Korea does appear to have successfully acquired Soviet missile technology that has proven essential in the development of its own ballistic missile capabilities. Analysis of the Hwasong-14 has revealed that the missile looks to be powered by several Soviet RD-250 engines, which may have come from the Yuzhmash facility. It is not entirely clear how North Korea acquired the engines though the most likely explanation involves a DPRK black market purchase.

Regardless, the connection between Ukraine and the North Korean ballistic missile program reveals both how North Korea was able to so quickly advance its long-range missile capabilities and the lengths to which the country will go in order to do so, as well as the degree of difficulty associated with preventing advances in North Korea’s missile program.

#### Future ballistic missile capabilities are used in a nuclear attack

Bennett et al. 21 [(Bruce W. Bennett is an adjunct international/defense researcher at the RAND Corporation. He works primarily on research topics such as strategy, force planning, and counterproliferation within the RAND International Security and Defense Policy Center. Bennett's work applies wargaming, risk management, deterrence-based strategy, competitive strategies, and military simulation and analysis. He specializes in “asymmetric threats” such as weapons of mass destruction (WMD) and how to counter those threats with new strategies, operational concepts, and technologies. He is an expert in Northeast Asian military issues, having visited the region over 120 times and written much about Korean security issues. He has also done work on the Persian/Arab Gulf region. His Northeast Asian research has addressed issues such as future ROK military force requirements, understanding and shaping the ongoing Korean nuclear weapon crisis, Korean unification, the Korean military balance, counters to North Korean chemical and biological weapon threats in Korea and Japan, potential Chinese intervention in Korean contingencies, changes in the Northeast Asia security environment, and deterrence of nuclear threats (including strengthening the U.S. nuclear umbrella). He has worked with the Office of the Secretary of Defense, the Defense Threat Reduction Agency, U.S. Forces Korea and Japan, the U.S. Pacific Command and Central Command, the ROK and Japanese militaries, and the ROK National Assembly.) “Countering the Risks of North Korean Nuclear Weapons” RAND, 4/2021. https://www.rand.org/pubs/perspectives/PEA1015-1.html] BC

North Korea’s nuclear and ballistic missile capabilities have been for many years and continue to be top policy challenges for the United States and one of its key allies, the ROK. Not only are these two issues extremely important because of the threat that they present in the region, but now, with North Korea’s demonstrated ICBM capability, these two issues (nuclear weapons and ballistic missiles as a platform to carry them) clearly present a real threat to the security of North Korea’s neighbors, to the United States, and to its other allies around the world (through proliferation). But because it takes time (usually years) to develop counters, we focus on the threat that North Korea could likely pose in the late 2020s. (We use 2027 as our target date.)

This chapter addresses North Korea’s nuclear weapons and ballistic missiles that likely would be used for nuclear weapon delivery in the 2027 time frame. North Korea has used both plutonium and highly enriched uranium (HEU) to build nuclear weapons. We address North Korea’s efforts to produce these critical nuclear materials and how this production provides us with a means for estimating the actual number of North Korean nuclear weapons. We also address what North Korea’s nuclear weapon tests tell us about the explosive power (yield) of these weapons. In addition, although there has never been definitive proof of nuclear warheads in Pyongyang’s missile payloads, most analysts project (and the evidence strongly suggests) that North Korea produces nuclear warheads for delivery via its ballistic missiles. Evidence shows that the most-likely warheads are HEU. Ballistic missiles in the inventory include Scud B, C, D, and ER; the No Dong; the Musudan; and the Hwasong-12, -14, and -15. All of these missiles are assessed to be capable of carrying a nuclear warhead (depending on its size and weight), and we will address their capabilities as we analyze them in the missile section of this chapter. Finally, we will address the stockpile of nuclear weapons—both North Korea’s present stockpile of nuclear weapons and how we expect them to develop, based on disclosed evidence.

#### The US and South Korea have a military advantage now but continued ballistic missile development gives North Korea the leverage it needs to achieve dominance in the region

Bennett et al. 21 [(Bruce W. Bennett is an adjunct international/defense researcher at the RAND Corporation. He works primarily on research topics such as strategy, force planning, and counterproliferation within the RAND International Security and Defense Policy Center. Bennett's work applies wargaming, risk management, deterrence-based strategy, competitive strategies, and military simulation and analysis. He specializes in “asymmetric threats” such as weapons of mass destruction (WMD) and how to counter those threats with new strategies, operational concepts, and technologies. He is an expert in Northeast Asian military issues, having visited the region over 120 times and written much about Korean security issues. He has also done work on the Persian/Arab Gulf region. His Northeast Asian research has addressed issues such as future ROK military force requirements, understanding and shaping the ongoing Korean nuclear weapon crisis, Korean unification, the Korean military balance, counters to North Korean chemical and biological weapon threats in Korea and Japan, potential Chinese intervention in Korean contingencies, changes in the Northeast Asia security environment, and deterrence of nuclear threats (including strengthening the U.S. nuclear umbrella). He has worked with the Office of the Secretary of Defense, the Defense Threat Reduction Agency, U.S. Forces Korea and Japan, the U.S. Pacific Command and Central Command, the ROK and Japanese militaries, and the ROK National Assembly.) “Countering the Risks of North Korean Nuclear Weapons” RAND, 4/2021. https://www.rand.org/pubs/perspectives/PEA1015-1.html] BC

Since failing to conquer and control the Republic of Korea (ROK) in the 1950–1953 Korean War, the leaders of North Korea have sought dominance of the Korean Peninsula. However, they have lacked the economic, political, and conventional military means to achieve that dominance. Instead, their nuclear weapon and ballistic missile programs have become their means for empowering their regime and working toward dominance. Today, even a few of the likely dozens of North Korean nuclear weapons could cause millions of fatalities and serious casualties if detonated on ROK or U.S. cities.1 Unfortunately, the major ROK and U.S. strategy to moderate the growing North Korean nuclear weapon threat has been negotiating with North Korea to achieve denuclearization, and this effort has failed and seems likely to continue failing.2 Despite some ROK and U.S. efforts to enhance defense and deterrence, there is a growing gap between the North Korean nuclear weapon threat and ROK and U.S. capabilities to defeat it. Because these capabilities will take years to develop, the ROK and the United States must turn their attention to where the threat could be in the mid to late 2020s and identify strategy options that can be employed in the coming years to counter it. To simplify doing so, we estimate (in Chapter Three of this Perspective) that, by 2027, North Korea could have 200 nuclear weapons and several dozen intercontinental ballistic missiles (ICBMs) and hundreds of theater missiles for delivering the nuclear weapons. The ROK and the United States are not prepared, and do not plan to be prepared, to deal with the coercive and warfighting leverage that these weapons would give North Korea.

#### Continued development causes nuclear war, Chinese entanglement, and destruction of the US-ROK alliance -- ballistic missiles are key to North Korea’s second-strike capability which is the only factor that makes it a credible threat

Garlauskas 12/23 [(Markus, a nonresident senior fellow with the Scowcroft Center for Strategy and Security’s Asia Security Initiative. He is an independent author and consultant, specializing in Northeast Asian security issues and strategic analysis. Garlauskas served in the US government for nearly twenty years. He was appointed to the Senior National Intelligence Service as the National Intelligence Officer (NIO) for North Korea on the National Intelligence Council from July 2014 to June 2020. As NIO, he led the US intelligence community’s strategic analysis on North Korea issues and expanded analytic outreach to non-government experts. He also provided direct analytic support to top-level policy deliberations, including the presidential transition, as well as the Singapore and Hanoi summits with North Korea. Garlauskas served for nearly twelve years overseas at the headquarters of United Nations Command, Combined Forces Command and US Forces Korea in Seoul. His staff assignments there included chief of the Intelligence Estimates Branch and director of the Strategy Division. For his service in Korea, he received the Joint Civilian Distinguished Service Award, the highest civilian award from the Chairman of the Joint Chiefs of Staff.) “Proactively countering North Korea’s advancing nuclear threat” Atlantic Council, 12/23/2021. https://www.atlanticcouncil.org/in-depth-research-reports/report/proactively-countering-north-koreas-advancing-nuclear-threat/] BC

SHIFT FROM SURVIVAL TO COERCION— EVEN WARFIGHTING

Given how much of a deterrent North Korea has garnered from its longstanding ability to hold Seoul at risk with conventional artillery and chemical weapons, it is an open question how much additional nuclear capability—if any— North Korea actually needs to deter even a limited attack.35 As a result, the plans for expanded capabilities that Kim outlined at the party congress strongly suggest purposes beyond a simple regime-preserving deterrent. Former National Security Advisor H. R. McMaster, among others, argues that Kim’s pursuit of greater nuclear capabilities is intended to give him the leverage to break the US-South Korea alliance and reunify the Korean peninsula under his regime.36 Though reunification figures into North Korea’s propaganda, and its efforts to coerce South Korea are likely to continue, a full-scale invasion-and-occupation scenario is probably impractical for the foreseeable future.37

Regardless of the reasons why Kim has ordered the development of these systems, once fielded, they would change the dynamics of confrontation and conflict on the Korean peninsula. Once Kim has at his disposal a robust and diverse nuclear arsenal—with numerous small tactical nuclear weapons alongside many larger nuclear-armed missiles that can strike bases in the region and threaten the US homeland—it would vastly increase the scope of options and freedom of action he would have available for coercion and warfighting. Given the past behavior of Kim and his predecessors, it would require a triumph of hope over experience to believe that Kim would not assume calculated risks to take full advantage of these new capabilities. Were Kim to overreach and begin a major conflict, he might even believe that limited use of tactical nuclear weapons on the battlefield could be just the tool to impose a military stalemate and to convince Washington not to escalate further because US cities would be the next nuclear targets.

RISK OF ALLIANCE DECOUPLING AND THE CHINA FACTOR

Continued unchecked growth in North Korea’s nuclear capabilities could be particularly destabilizing and problematic due to the consequences of North Korea demonstrating a reliable, credible second-strike capability to reach the US homeland with thermonuclear warheads. It is not difficult to imagine that North Korea’s Kim regime would be willing to use nuclear weapons if backed into a corner and pushed to the brink of destruction. Academic experts on escalation theory have laid out a range of scenarios where limited first use of nuclear weapons followed by threats of further nuclear escalation could make sense to Pyongyang as a means to end a conflict on terms that would allow the regime to survive.38 If anything, Kim seems to have a harder time convincing some in the United States that North Korea will make rational calculations about use of nuclear weapons to the point that it can be treated like other nuclear-armed states.39 What has primarily been in question to date, instead, is how much capability North Korea has to retaliate with nuclear weapons if pushed to the brink of destruction.

North Korea’s limited number of ICBM tests and its small, cumbersome, liquid-fueled mobile ICBM force—combined with high confidence in US NMD—lend little credibility to a potential North Korean retaliatory second strike against the US homeland today.40 This could quickly change, for example, if North Korea were to test and field solid-propellant mobile ICBMs carrying multiple RVs, which is exactly the sort of capability Kim publicly ordered for the years ahead in January 2021. The as-yet untested “monster” ICBM that North Korea first displayed in October 2020, for example, looks likely to be able to carry multiple RVs.41 Similarly, though a more faroff threat, North Korea could field capabilities that allow its ICBMs to evade defenses rather than overwhelm them, such as hypersonic glide vehicles (HGVs), maneuvering reentry vehicles (MaRVs) for its ICBMs, or even a fractional orbital bombardment system (FOBS).42 Though the fielding of such systems capable of reaching the United States now appears to be well in the future, Kim has publicly announced the development of HGVs, and North Korea conducted an initial test of such a HGV design on a shorter-range missile in September 2021.43

If North Korea is able to field this level of capability—presuming it is unchecked by improved US NMD—a North Korean second strike against the US homeland would be much more credible. In this event, Washington would have a tough case to make that it is willing to push a conflict with Pyongyang to the point that North Korea could retaliate by killing tens of millions of American civilians in a thermonuclear attack on the continental United States. In turn, this development would call into question Washington’s willingness to back Seoul if it faces renewed threats or aggression from Pyongyang.

The erosion of the credibility of US commitment to the defense of South Korea as North Korea’s nuclear capabilities advance is further exacerbated by North Korea’s close geographic and political connections with the People’s Republic of China (PRC). If a military conflict with North Korea threatens to go nuclear, Beijing would face increasing incentives to engage in political and military intervention to protect its interests in the context of the US-PRC strategic rivalry.

Questions about US resolve to escalate during a conflict would only grow alongside North Korea’s nuclear capabilities. Could the United States credibly threaten full-scale nuclear retaliation if North Korea made limited tactical use of nuclear weapons and it was able to hold the US homeland at risk for a second strike? Would Washington really be willing to use nuclear weapons against targets near North Korea’s border with China? Would Washington even be willing to press for an end to the Kim regime—as the Department of Defense’s (DOD’s) 2018 Nuclear Posture Review calls for, should North Korea employ a nuclear weapon—while Beijing opposed it and Pyongyang was ready to fight on with nuclear weapons?44 These questions are not easily answered. However, unchecked advancement of North Korean nuclear and missile capabilities would bring them to the forefront—straining Washington’s alliance with Seoul possibly to the breaking point, potentially emboldening Pyongyang, and introducing new risks into US-PRC strategic competition.

#### Nuclear war causes extinction – famine and climate change

Starr 15 [(Steven, Director of the University of Missouri’s Clinical Laboratory Science Program and a senior scientist at the Physicians for Social Responsibility) “Nuclear War, Nuclear Winter, and Human Extinction,” Federation of American Scientists, 10/14/2015] DD

While it is impossible to precisely predict all the human impacts that would result from a nuclear winter, it is relatively simple to predict those which would be most profound. That is, a nuclear winter would cause most humans and large animals to die from nuclear famine in a mass extinction event similar to the one that wiped out the dinosaurs.

Following the detonation (in conflict) of US and/or Russian launch-ready strategic nuclear weapons, nuclear firestorms would burn simultaneously over a total land surface area of many thousands or tens of thousands of square miles. These mass fires, many of which would rage over large cities and industrial areas, would release many tens of millions of tons of black carbon soot and smoke (up to 180 million tons, according to peer-reviewed studies), which would rise rapidly above cloud level and into the stratosphere. [For an explanation of the calculation of smoke emissions, see Atmospheric effects & societal consequences of regional scale nuclear conflicts.]

The scientists who completed the most recent peer-reviewed studies on nuclear winter discovered that the sunlight would heat the smoke, producing a self-lofting effect that would not only aid the rise of the smoke into the stratosphere (above cloud level, where it could not be rained out), but act to keep the smoke in the stratosphere for 10 years or more. The longevity of the smoke layer would act to greatly increase the severity of its effects upon the biosphere.

Once in the stratosphere, the smoke (predicted to be produced by a range of strategic nuclear wars) would rapidly engulf the Earth and form a dense stratospheric smoke layer. The smoke from a war fought with strategic nuclear weapons would quickly prevent up to 70% of sunlight from reaching the surface of the Northern Hemisphere and 35% of sunlight from reaching the surface of the Southern Hemisphere. Such an enormous loss of warming sunlight would produce Ice Age weather conditions on Earth in a matter of weeks. For a period of 1-3 years following the war, temperatures would fall below freezing every day in the central agricultural zones of North America and Eurasia. [For an explanation of nuclear winter, see Nuclear winter revisited with a modern climate model and current nuclear arsenals: Still catastrophic consequences.]

Nuclear winter would cause average global surface temperatures to become colder than they were at the height of the last Ice Age. Such extreme cold would eliminate growing seasons for many years, probably for a decade or longer. Can you imagine a winter that lasts for ten years?

The results of such a scenario are obvious. Temperatures would be much too cold to grow food, and they would remain this way long enough to cause most humans and animals to starve to death.

Global nuclear famine would ensue in a setting in which the infrastructure of the combatant nations has been totally destroyed, resulting in massive amounts of chemical and radioactive toxins being released into the biosphere. We don’t need a sophisticated study to tell us that no food and Ice Age temperatures for a decade would kill most people and animals on the planet.  Would the few remaining survivors be able to survive in a radioactive, toxic environment?

#### Scenario 2 is Russian invasion

#### A strong commercial space industry incentivizes Chinese investment – alienates the US by going against encouraged defense sector reforms

Detsch 6/16 [(Jack, Foreign Policy’s Pentagon and national security reporter.) “Biden’s Worried About Ukraine’s China Fling” Foreign Policy, 6/16/2021. https://foreignpolicy.com/2021/06/16/biden-ukraine-china-russia-defense-policy-weapons-spending/] BC

Since former U.S. President Donald Trump’s administration, U.S. officials have urged their Ukrainian counterparts to halt sales of defense companies to China, including Motor Sich, an aerospace engineering company that designs engines for helicopters and larger aircraft, and Trident Defense, a manufacturer of .50-caliber machine guns. The acquisition of Motor Sich is currently being challenged in Ukrainian courts.

“The Ukrainians have a world-class military and security apparatus,” said one former U.S. defense official, speaking on condition of anonymity. “It’s a ripe target for the Chinese to try and go in and garner control of.” China is also looking into purchasing a handful of lower-level Ukrainian defense logistics companies, U.S. officials said.

“It’s more malleable; they have more leverage in that area,” the former defense official said of Chinese efforts in Ukraine. “Establishing a beachhead there is important to them.”

Since the Obama administration, the Motor Sich purchase has been challenged on the U.S. side, one former official said, and the Biden administration has continued high-level warnings also sounded during the Trump years. But the issue is again coming into focus as top Ukrainian officials, including Ukrainian President Volodymyr Zelensky, used the NATO summit in Brussels this week to push for their inclusion into the 30-nation bloc, sending a tweet indicating the alliance’s leaders “confirmed” Ukraine would join.

Biden and NATO Secretary-General Jens Stoltenberg downplayed those remarks, saying there was an “open door” for Ukrainian membership but not until it completes defense sector reforms. And the Chinese purchases are likely to raise eyebrows within the alliance as it begins to take a harder tack on Beijing’s assertive foreign policy that presents “systemic challenges to the rules-based international order,” NATO leaders said in a joint communique this week.

Even as the alliance has locked its sights on the tectonic movements of great powers after two decades of war in the Middle East, members of the bloc have still courted Chinese and Russian weapons purchases, mostly notably Turkey’s $2.5 billion purchase of Moscow’s S-400 air defense system.

In particular, Motor Sich is seen as a developer of advanced engine capabilities that worry Western officials if they end up in the hands of the Chinese. “There’s nothing to say that the Chinese couldn’t convert these engines into fighter or bomber capability as well,” said Alexander Gray, chief of staff on the National Security Council until January.

A State Department spokesperson told Foreign Policy the United States is encouraging Ukraine to protect “sensitive technologies and strategically vital enterprises” like Motor Sich.

“PRC state-owned and controlled enterprises are not interested in Ukraine’s defense industry to create commercial opportunities or job growth in Ukraine,” the spokesperson said. “They use these acquisitions to gain control over strategic supply chains and access to foreign technology in support of their strategic and military-industrial objectives, which are contrary to U.S. national security interests and those of our allies and partners.”

The State Department spokesperson added the United States “welcomed” Ukrainian sanctions in January against Skyrizon, a Chinese company trying to consolidate shares to gain majority control over Motor Sich. The Biden administration has also been encouraging the Ukrainians to set up a mechanism to review foreign investments for national security risks. “A review mechanism would allow Ukraine to identify and resolve national security risks arising from foreign investment transactions, including those involving companies holding sensitive technology and know-how that would affect our collective national security,” the spokesperson said.

Chinese interest in the Ukrainian defense industry is also part of a delicate dance Beijing is playing in its relationship with Russia, experts said. Ukraine was at the heart of the Soviet Union’s defense industry during the Cold War, designing tanks, heavy rocket motors, and space technology. Today, Ukraine has become an end-around for China to get spare parts and upgrades for Soviet-era equipment without leaning on the Russians, since the relationship between those two powers has become more tense with China’s rise.

“There’s enough commonality to make it worthwhile for the Chinese to get their talons into the defense industry there and get around the Russians,” said Jim Townsend, former deputy assistant secretary of defense for European and NATO policy during the Obama administration.

But the marriage is also one of convenience for Ukraine and China: The Ukrainians need investment to keep their defense factories running, and that money isn’t coming from the West. Beyond getting a secondary market for Russian equipment, China is also buying up seasoned and relatively cheap Ukrainian engineering talent and expanding their influence further into Eastern Europe, U.S. and European officials said.

#### Biden’s support for-Ukraine is key to deter Russian invasion

Grady 12/24 [(John, a former managing editor of Navy Times, retired as director of communications for the Association of the United States Army. His reporting on national defense and national security has appeared on Breaking Defense, GovExec.com, NextGov.com, DefenseOne.com, Government Executive and USNI News.) “Panel: West Must be Prepared to Send More Military Aid to Ukraine to Deter Russia” USNI, 12/24/2021. https://news.usni.org/2021/12/24/panel-west-must-be-prepared-to-send-more-military-aid-to-ukraine-to-deter-russia] BC

The West must be ready to send air defense systems and anti-ship missiles to Kyiv while preparing to slap harsher sanctions on Moscow to deter the Kremlin’s bullying of Ukraine, five experts in European security said this week.

Alexander Vershbow, a former NATO deputy secretary general, said, to Russian President Vladimir Putin reining in a Ukraine is “a matter of survival,” during a Wednesday Atlantic Council discussion. The panel warned against rewarding Putin with a summit meeting this winter with President Joseph Biden “without any pullback of troops” from the Ukrainian border.

“Russia escalates, gets a summit,” said Heather Conley, director of the Europe, Russia and Eurasia program at the Center for International Study. But Putin “set a bar so high” that talks likely would be fruitless.

Conley was referring to Putin’s demand in recent days that Ukraine remain a buffer between NATO and Russia, and the alliance stop supplying military aid to former Soviet republics.

“We’re seeing he’s quite serious about his paranoia about NATO” if Kyiv joined the alliance, Vershbow added.

“He really believes if he doesn’t act now” he will lose Ukraine forever and put his regime’s survival at risk.

News reports put Russian troop strength close to the border at 120,000.

As Putin demanded recognition of clearly divided “spheres of influence,” Kremlin military officials were ‘fabricating stories that the U.S. was putting Tomahawk missiles and deploying chemical weapons units to Ukraine, Andriy Zagorodynuk, a former Ukrainian defense minister said. The false claims were designed to build a case for a possible invasion.

Now at the Atlantic Council, John Herbst, a former ambassador to Ukraine, said to deter a military move “major, major sanctions” need to be in place, more arms, especially integrating air defense systems and coastal defense, also should be rushed to Kyiv and NATO bolster forces in Poland and the Balkans.

“It should be done now,” he said.

Other panelists suggested possibly moving anti-ship cruise missiles into NATO countries bordering the Black Sea as a signal to Russia its naval forces at Sebastopol would be vulnerable to attack if Ukraine were invaded.

Herbst said, “the Kremlin has been provoking us” through cyber attacks since July despite Biden’s warning to Putin to back off. “Putin learned in cyber he could push Biden around” and also use it repeatedly as a weapon to destabilize Ukraine.

“The game [with Putin] is show strength” and he will back off, Herbst added. “We have a position of strength.”

One of those positions of strength in NATO is the experience of the Baltic states in standing up to Russia military threats and cyber attacks.

Retired Air Force Gen. Philip Breedlove, a former top commander in Europe, said, “gray zone [attacks on Ukraine] has only intensified in the last few weeks.”

He added “I like to use the word ‘resistance’” like Lithuania, Estonia and Latvia developed to assert their independence from Moscow, “as a model” Ukraine could use.

Picking up on that Zagorodynuk said while Russian military forces “can do a lot of damage” to Ukraine in an all-out air, naval, land and cyber invasion. “These actions will not bring any support to Putin” from Ukrainians who would resist any takeover even if more sections of the country as it did in 2014.

“Where is [Putin] going to find people to administer” any conquered territory in Ukraine.

He added Ukrainian military and security officials firmly back President Volodymyr Zelensky’s government. “Ukraine will be defending itself” vigorously if invaded.

“The only thing we ask of the West is not to show weakness.”

#### Extinction -- Russian invasion of Ukraine sparks catastrophic nuclear reactor failure, causing an unprecedented nuclear emergency

Hooper 12/28 [(Craig, Founder and CEO of the Themistocles Advisory Group, he focus on communications and government relations as well as maritime, homeland defense and chemical, biological, radiological and nuclear (CBRN) challenges. Previously, he served as an executive for naval shipbuilder Austal USA, helping deliver Littoral Combat Ships and Expeditionary Fast Transports to the U.S. Navy. With a Ph.D. in Immunology and Infectious Diseases from Harvard University, I have taught at the University of California, the Naval Postgraduate School, and the Monterey Institute of International Studies. In my spare time, he supports think-tank studies, discuss naval matters at NextNavy.com or write about the Navy, publishing op-eds and papers in places like the Washington Post, the Los Angeles Times, The New York Times, the Naval War College Review, theU.S. Naval Institute Proceedings and beyond.) “A Ukraine Invasion Could Go Nuclear: 15 Reactors Would Be In War Zone” Forbes, 12/28/2021. https://www.forbes.com/sites/craighooper/2021/12/28/a-ukraine-invasion-will-go-nuclear-15-reactors-are-in-the-war-zone/?sh=1bf80db427aa] BC

As Russia’s buildup on the Ukrainian border continues, few observers note that an invasion of Ukraine could put nuclear reactors on the front line of military conflict. The world is underestimating the risk that full-scale, no-holds-barred conventional warfare could spark a catastrophic reactor failure, causing an unprecedented regional nuclear emergency.

The threat is real. Ukraine is heavily dependent upon nuclear power, maintaining four nuclear power plants and stewardship of the shattered nuclear site at Chernobyl. In a major war, all 15 reactors at Ukraine’s nuclear power facilities would be at risk, but even a desultory Russian incursion into eastern Ukraine is likely to expose at least six active reactors to the uncertainty of a ground combat environment.

The world has little experience with reactors in a war zone. Since humanity first harnessed the atom, the world has only experienced two “major” accidents—Chernobyl and Japan’s Fukushima disaster. A Russian invasion, coupled with an extended conventional war throughout Ukraine, could generate multiple International Atomic Energy Agency “Level 7” accidents in a matter of days. Such a contingency would induce a massive refugee exodus and could render much of Ukraine uninhabitable for decades.

Turning the Ukraine into a dystopian landscape, pockmarked by radioactive exclusion zones, would be an extreme method to obtain the defensive zone Russian President Vladimir Putin seems to want. Managing a massive Western-focused migratory crisis and environmental cleanup would absorb Europe for years. The work would distract European leaders and empower nativist governments that tend to be aligned with Russia’s baser interests, giving an overextended Russia breathing room as the country teeters on the brink of technological, demographic, and financial exhaustion.

Put bluntly, the integrity of Ukrainian nuclear reactors is a strategic matter, critical for both NATO and non-NATO countries alike. Causing a severe radiological accident for strategic purposes is unacceptable. A deliberate aggravation of an emerging nuclear catastrophe—preventing mitigation measures or allowing reactors to deliberately melt down and potentially contaminate wide portions of Europe—would simply be nuclear warfare without bombs.

Such a scenario can’t be ruled out. Russia has repeatedly used Ukraine to test out concepts for “Gray Zone” warfare, where an attacker dances just beyond the threshold of open conflict. Given Russia’s apparent interest in radiation-spewing nuclear-powered cruise missiles, robotic undersea bombs with a radiological fallout-oriented payload, destructive anti-satellite tests and other nihilistic, world-harming weapons, Russia’s ongoing dalliance with “Gray Zone” warfare in Ukraine may, for the rest of Europe, become a real matter of estimating radiological “grays,” or, in other words, estimating the amount of ionizing radiation absorbed by humans.

### Framing

**The standard is maximizing expected wellbeing**

**First, pleasure and pain are intrinsically valuable. People consistently regard pleasure and pain as good reasons for action, despite the fact that pleasure doesn’t seem to be instrumentally valuable for anything.**

**Moen 16** [Ole Martin Moen, Research Fellow in Philosophy at University of Oslo “An Argument for Hedonism” Journal of Value Inquiry (Springer), 50 (2) 2016: 267–281] SJDI

Let us start by observing, empirically, that a widely shared judgment about intrinsic value and disvalue is that pleasure is intrinsically valuable and pain is intrinsically disvaluable. On virtually any proposed list of intrinsic values and disvalues (we will look at some of them below), pleasure is included among the intrinsic values and pain among the intrinsic disvalues**.** This inclusion makes intuitive sense, moreover, for there is something undeniably good about the way pleasure feels and something undeniably bad about the way pain feels, and neither the goodness of pleasure nor the badness of pain seems to be exhausted by the further effects that these experiences might have. “Pleasure” and “pain” are here understood inclusively, as encompassing anything hedonically positive and anything hedonically negative.2 The special value statuses of pleasure and pain are manifested in how we treat these experiences in our everyday reasoning about values**.** If you tell me that you are heading for the convenience store, I might ask: “What for?” This is a reasonable question, for when you go to the convenience store you usually do so, not merely for the sake of going to the convenience store, but for the sake of achieving something further that you deem to be valuable**.** You might answer, for example: “To buy soda.” This answer makes sense, for soda is a nice thing and you can get it at the convenience store. I might further inquire, however: “What is buying the soda good for?” This further question can also be a reasonable one, for it need not be obvious why you want the soda. You might answer: “Well, I want it for the pleasure of drinking it.” If I then proceed by asking “But what is the pleasure of drinking the soda good for?” the discussion is likely to reach an awkward end. The reason is that the pleasure is not good for anything further; it is simply that for which going to the convenience store and buying the soda is good.3 As Aristotle observes**:** “We never ask [a man] what his end is in being pleased, because we assume that pleasure is choice worthy in itself.”4 Presumably, a similar story can be told in the case of pains, for if someone says “This is painful!” we never respond by asking: “And why is that a problem?” We take for granted that if something is painful, we have a sufficient explanation of why it is bad. If we are onto something in our everyday reasoning about values, it seems that pleasure and pain are both places where we reach the end of the line in matters of value.

**Moreover, *only* pleasure and pain are intrinsically valuable. All other values can be explained with reference to pleasure; Occam’s razor requires us to treat these as instrumentally valuable.**

**Moen 16** [Ole Martin Moen, Research Fellow in Philosophy at University of Oslo “An Argument for Hedonism” Journal of Value Inquiry (Springer), 50 (2) 2016: 267–281] SJDI

I think several things should be said in response to Moore’s challenge to hedonists. First, **I do not think the burden of proof lies on hedonists to explain why the additional values are not intrinsic values. If someone claims that X is intrinsically valuable, this is a substantive, positive claim, and it lies on him or her to explain why we should believe that X is in fact intrinsically valuable.** Possibly, this could be done through thought experiments analogous to those employed in the previous section. Second, **there is something peculiar about the list of additional intrinsic values** that counts in hedonism’s favor**: the listed values have a strong tendency to be well explained as things that help promote pleasure and avert pain.** To go through Frankena’s list, life and consciousness are necessary presuppositions for pleasure; activity, health, and strength bring about pleasure; and happiness, beatitude, and contentment are regarded by Frankena himself as “pleasures and satisfactions.” The same is arguably true of beauty, harmony, and “proportion in objects contemplated,” and also of affection, friendship, harmony, and proportion in life, experiences of achievement, adventure and novelty, self-expression, good reputation, honor and esteem. Other things on Frankena’s list, such as understanding, **wisdom, freedom, peace, and security, although they are perhaps not themselves pleasurable, are important means to achieve a happy life, and as such, they are things that hedonists would value highly.** **Morally good dispositions and virtues, cooperation, and just distribution of goods and evils, moreover, are things that, on a collective level, contribute a happy society, and thus the traits that would be promoted and cultivated if this were something sought after.** To a very large extent, the intrinsic values suggested by pluralists tend to be hedonic instrumental values. Indeed, pluralists’ suggested intrinsic values all point toward pleasure, for while the other values are reasonably explainable as a means toward pleasure, pleasure itself is not reasonably explainable as a means toward the other values. Some have noticed this. Moore himself, for example, writes that though his pluralistic theory of intrinsic value is opposed to hedonism, its application would, in practice, look very much like hedonism’s: “Hedonists,” he writes “do, in general, recommend a course of conduct which is very similar to that which I should recommend.”24 Ross writes that “[i]t is quite certain that by promoting virtue and knowledge we shall inevitably produce much more pleasant consciousness. These are, by general agreement, among the surest sources of happiness for their possessors.”25 Roger Crisp observes that “those goods cited by non-hedonists are goods we often, indeed usually, enjoy.”26 What Moore and Ross do not seem to notice is that their observations give rise to two reasons to reject pluralism and endorse hedonism. The first reason is that if **the suggested non-hedonic intrinsic values are potentially explainable by appeal to just pleasure and pain** (which, following my argument in the previous chapter, we should accept as intrinsically valuable and disvaluable), **then—by appeal to Occam’s razor—we have at least a pro tanto reason to resist the introduction of any further intrinsic values and disvalues. It is ontologically more costly to posit a plurality of intrinsic values and disvalues, so in case all values admit of explanation by reference to a single intrinsic value and a single intrinsic disvalue, we have reason to reject more complicated accounts.** **The fact that suggested non-hedonic intrinsic values tend to be hedonistic instrumental values does not, however, count in favor of hedonism solely in virtue of being most elegantly explained by hedonism; it also does so in virtue of creating an explanatory challenge for pluralists.** The challenge can be phrased as the following question: **If the non-hedonic values suggested by pluralists are truly intrinsic values in their own right, then why do they tend to point toward pleasure and away from pain?**27

**Moral uncertainty means preventing extinction should be our highest priority.  
Bostrom 12** [Nick Bostrom. Faculty of Philosophy & Oxford Martin School University of Oxford. “Existential Risk Prevention as Global Priority.” Global Policy (2012)]  
These reflections on **moral uncertainty suggest** an alternative, complementary way of looking at existential risk; they also suggest a new way of thinking about the ideal of sustainability. Let me elaborate.¶ **Our present understanding of axiology might** well **be confused. We may not** nowknow — at least not in concrete detail — what outcomes would count as a big win for humanity; we might not even yet **be able to imagine the best ends** of our journey. **If we are** indeedprofoundly **uncertain** about our ultimate aims,then we should recognize that **there is a great** option **value in preserving** — and ideally improving — **our ability to recognize value and** to **steer the future accordingly. Ensuring** that **there will be a future** version of **humanity** with great powers and a propensity to use them wisely **is** plausibly **the best way** available to us **to increase the probability that the future will contain** a lot of **value.** To do this, we must prevent any existential catastrophe.

**Reducing the risk of extinction is always priority number one.   
Bostrom 12** [Faculty of Philosophy and Oxford Martin School, University of Oxford.], Existential Risk Prevention as Global Priority.  Forthcoming book (Global Policy). MP. http://www.existenti...org/concept.pdfEven if we use the most conservative of these estimates, which entirely ignores the   possibility of space colonization and software minds, **we find that the expected loss of an existential   catastrophe is greater than the value of 10^16 human lives**.  **This implies that the expected value of   reducing existential risk by a mere one millionth of one percentage point is at least a hundred times the   value of a million human lives.**  The more technologically comprehensive estimate of 10  54 humanbrain-emulation subjective life-years (or 10  52  lives of ordinary length) makes the same point even   more starkly.  Even if we give this allegedly lower bound on the cumulative output potential of a   technologically mature civilization a mere 1% chance of being correct, we find that the expected   value of reducing existential risk by a mere one billionth of one billionth of one percentage point is worth   a hundred billion times as much as a billion human lives. **One might consequently argue that even the tiniest reduction of existential risk has an   expected value greater than that of the definite provision of any ordinary good, such as the direct   benefit of saving 1 billion lives.**  And, further, that the absolute value of the indirect effect of saving 1  billion lives on the total cumulative amount of existential riskâ€”positive or negativeâ€”is almost   certainly larger than the positive value of the direct benefit of such an action.