## NC

### T

#### Interp: Affirmatives may not defend only specific instances of outer space appropriation by private entities as unjust.

#### Violation: They only identify asteroid mining as unjust

#### Moral statements are generic normative principles – necessitates the generic interpretation

McDonald 09 [Hugh P. McDonald, professor of philosophy at the New York City College of Technology. "Principles: The Principles of Principles." The Pluralist, vol. 4, no. 3, [University of Illinois Press, Society for the Advancement of American Philosophy], 2009, pp. 98–126, https://www.jstor.org/stable/20708996] HWIC

"Principle" has a great many meanings: origin, beginning, cause, rule, axiom, and so on.5 However, we cannot assume any necessary relation of these meanings. They may be distinct meanings without relations. Neverthe less we can trace some common roots and thereby interconnections of the meanings. I will concentrate here on certain meanings relevant to the prin ciple of principles, that principles are actual. One meaning is that principles are the "ultimate source, origin, or cause of something" or the "originating or actuating agency or force." Principles are connected with the origin and cause of any "something." Moreover, principles may cause the actuality of the something. A second meaning of principles is that they regulate change, whether internally, as the "method of operation of a thing," or as an external cause. That is, principles are regulative, especially including rules for opera tions, involving changes. As rules, they are universal for a kind, although there may be exceptions to them in certain modes. A principle, then, is an originating rule that universally regulates the formation, operation, or other changes of any actuality, which as universal applies to that kind of thing. Machines may be built according to a principle and operate on the same or even a different principle. Ships presume the principle of floatation but may be built according to principles of woodworking or those of other materials. The principle can have different modes?whether necessary, as in logical inference; general, as in scientific laws; or actualization of possibilities, as in machines or as in moral principles that we follow, but could do otherwise.6 I will cover modes below.

Principles are also a cause as regulative, combining cause and rule. The principle can be external, as in a chemical catalyst; or internal, as in geneti cally caused changes.7 Both kinds of causes involve relations. Internal prin ciples exhibit "tendencies," to borrow the word used in the dictionary. They continue to operate across time. Actions that come under principles may be of kinds whose causes are separate in time, since we may cease an action for a time and then take it up again; while genetic characteristics are tenden cies whose causes are connected by reproduction. As causal, principles may be originary for a kind. Especially in new technologies, for example, flying machines, the principle that organisms could fly (birds, bats, and insects) preceded the invention of the technology, although the principles of aero dynamics were discovered later. However, flying utilized and actualized the latter principles. In this sense, principles can be constitutive rules as the origin of a kind, whether generic or specific.

External principles are regulative and not attributes. They regulate change, such that change is not chaotic. Principles are not bodies, objects, or entities but are the basis of the judgment or evaluation that the latter will persist, since they follow or are regulated by principles. Moreover, there is another sense in which principles are not attributes, since the relation of bodies, ob jects, or other terms for actualities implies a common principle, an identity that is regulated and constituted by the same actual principle. "Object" is a principle uniting instances normatively, for example, that solids persist unless acted upon by heat, etc.

Scientific, engineering, and practical laws are cases of principles. The "law of gravity" is the principle of gravity. Rules of "right conduct" also exhibit laws. Principles form an identity of different instances that fall under the law, whether generally or invariably. Laws and rules are regulative identities, applicable to different instances, and whether originary, constitutive, or ex ternally regulative. Voluntary adherence to a rule is bringing actions in line with a principle or enacting a principle.

Since principles are general, the statement of a principle includes an abstraction of some identity element of the instance. Principles, then, can constitute the elements in any instance insofar as there are identical ele ments, such as matter, species, and genera. This abstraction both identifies the instance as alike with other instances in some respect and differentiates it from those that do not exhibit the principle. The instance may contain several principles conjointly, matter, the state of the matter, function, aes thetic element, and many others. Thus principles connect like instances in a very complex set of relations. A diamond and a painting may share aesthetic qualities but their material, functional, and cultural principles may be quite different. Since identity and difference are correlative terms, every identity is also a difference and this principle applies to actual principles in the world, one principle of principles. To identify a rock of a certain type as consisting in certain chemical combinations connects it with that kind of mineral in general but also certain chemical elements in general, their physical proper ties (such as consisting of a certain atomic number of protons, electrons, and the like), and other principles. However, it also differentiates the rock from other types with their own specific principles, although some generic prin ciples may overlap, namely, the physical properties of all chemical elements as consisting in protons, electrons, and other principles of atoms. Principles then mark both a difference and an identity. The principles identify a distinc tion, but such identifications differentiate from other identifying principles. The wavelengths for green light are identical at different times of emission from the sun but are not identical with those for red.

#### Negate –

**1] Precision:**

**A] Topicality is the most basic aff burden**

**B] Jurisdiction -- you can’t vote affirmative if they haven’t affirmed**

**C] It’s the only predictable stasis point**

**2] Limits: every specific instance of appropriation can be the aff of the week which kills our core generics and explodes our prep burden**

**T is DTD – our 1NC was influenced by the plantext and there’s no going back**

**Competing interps on T – topicality is a yes/no question, you can’t be reasonably topical, only competing interps create norms -- reasonability is arbitrary and invites judge intervention causing a race to the bottom**

**No RVIs – sandbagging, illogical**

### CP

#### CP –

#### The United States should fully fund a program to cover 4.8% of the surface of the Earth’s oceans in a monolayer of 0.1 micrometer-diameter latex particles, , bearing a conventional stabilization system that is inactivated in salt water.

#### States ought to pool funds and invest 30 billion into the African economy per asteroid mining

#### The United States and Japan should fully fund the RIKEN Laser Cannon

#### First plank solves warming – the counterplan’s reforms avoid any solvency deficit.

Morgan ‘11 (John Morgan, PhD in physical chemistry, runs R&D programmes at a Sydney startup company, research experience in chemical engineering in the US and at the Commonwealth Scientific and Industrial Research Organisation, Australia's national science agency, 10/8/11, “Low intensity geoengineering – microbubbles and microspheres,” <http://bravenewclimate.com/2011/10/08/low-intensity-geoengineering-microbubbles-and-microspheres/>; DS)

Is there another way to look at this? The Achilles heel of the hydrosol approach is the short bubble lifetime. But are there other ways to brighten water? Are there any other micron sized light scattering particles cheaply available in prodigious quantities, which float in water and don’t dissolve? It turns out the answer is yes. Synthetic latex is produced on a huge scale – 1010 kg in 2005. A latex is a dispersion of polymer microspheres in water (Figure 5). The particle size is typically around 0.1 – 0.5 μm. The polymer content is high – about 50% by weight. And its cheap – a bit over a dollar per kilo wet. It looks like a bright white opaque liquid, like wood glue, which is a polyvinylacetate latex. Its a bulk commodity used in adhesives, paper coatings, paint and many other applications. The common polymers are acrylates, polystyrene and its copolymers, PVA, and others. These polymers themselves are inert and non toxic. Whether they present any physical risk to the biota needs to be determined but given the small particle size and low concentration in a milieu already loaded with natural micro- and nanoparticles it seems low risk. The main safety concern in my opinion would be any residual monomers, which are toxic. But these can be eliminated, certainly to the point where these materials can be safely unleashed on the public as paints and glues. The chief virtues of latex particles over bubbles is **they don’t dissolve, they don’t coalesce, they are durable, and they can be made much smaller**. They have a density of just over 1 g cm-3 so they sink, but at 0.2 micron the sedimentation velocity is too slow to matter. This presents a different problem – the chief loss mechanism now is not dissolution but loss by convection to deeper waters. Is there some way to keep these particles afloat? I think there is. Most of these latex polymers, polystyrene, for example, are hydrophobic – they’re water repellent. To keep the particles in suspension requires added surfactants, or putting electrically charged groups on the surface. But when diluted with salt water, both these stabilization mechanisms fail. **Without stabilization a polystyrene sphere will attach to the water surface**. Breaking waves will drive them under, but rising bubbles will scavenge them back to the surface again. This mechanism is well known and extensively studied in the mineral separation process of flotation, where particles of mineral ores are recovered from slurries by attachment to rising bubbles. The natural bubble population from breaking waves could keep even submicron particles concentrated at and near the ocean surface (Figure 6). The use of latex technology opens other doors for engineering particle properties. For instance, rather than producing a particle composed of a single polymer, its possible to construct a particle with two different polymers in a core-shell morphology, or even hollow particles. Such particles can have much higher scattering power than simple spheres, and are also made in bulk at commodity prices. Indeed, they are used as opacifiers in paint. We could paint the oceans white. Lets run the numbers on this and ask, what would it take to reverse current warming? First we need to know how much light these particles scatter back to space. I used Mie theory to analyse scattering of 500 nm wavelength light (roughly the solar peak) from 0.1 μm diameter polystyrene spheres, as if the sun were overhead. The back scattering from these very small particles is intense – 42% of overhead light returns to space. And this is just direct scattering. Some of the light that scatters forward will scatter off a second particle, and a third. **Multiple scattering will see more than 42% of light returned to space.** Since these particles attach to the surface, lets consider, for the moment, a monolayer on the water surface. This requires 1014particles per square metre, with a volume of 5.2×10-8 m3 per m2(or 5 parts per billion of the top 10 m, for comparison with Seitz’ figures). Polystyrene has a density of 1050 kg m-3, so that’s a mass of 55 mg m-2. Over 3.16×1014 m2 of ocean that’s 1.7×1010 kg polymer. What would this do to the earth’s energy balance? Average insolation (accounting for cloud cover [Jin et al. 2002, cited by Seitz]) is 239 Wm-2. The monolayer cross sectional area fraction is pi/4. So the energy returned by direct overhead scattering is about 78 W. That’s huge compared to the current CO2 forcing of about 2.25 Wm-2. Modelling reported by Seitz indicates an increase of ocean albedo of 0.05 translates to an increase of planetary albedo by 0.031 [Seitz 2010; Figure 5]. So I’ll assume planetary albedo increase is 60% of the ocean albedo increase, which means we need ocean backscattering of 3.75 Wm-2. **We would only need 4.8% of a monolayer to offset current CO2 forcing** (ignoring the contribution from multiple scattering). 4.8% of a whole ocean monolayer is 8.3×108 kg of dry polymer, or about 1.7×109 kg wet latex. At say $1.20 per kg, this would cost $2.0 billion and account for 17% of 2005 global production capacity. This is, surprisingly, well within reach. $2.0b to reverse global warming is cheap. Restricting dispersal to the mid latitudes where the greatest effect is achieved, using core-shell latex technology, and properly accounting for multiple scattering would see this cost drop even further. Annual growth in latex production grew organically by 4.5% per annum between 2000-2005. Ramping production by 17% would be completely feasible. The ongoing cost depends on the residence time of the particles at the ocean surface. Equatorial currents run at about 1 ms-1, which would imply a traversal time of about 1 year for the Pacific ocean. Mid latitude the currents are much slower. The latex particles themselves will degrade in the environment, and there will be losses by association and entrainment in a complex marine environment. But let’s provisionally estimate a cost of $2b per year. This is significantly cheaper than, say, stratospheric sulfur aerosol injection which is estimated at $25-50b per year, let alone space sunshades. And it doesn’t require exotic engineering, enabling R&D, or orbital launches – it uses existing materials at a rate well inside existing production capacity. Conclusion So consider this final elaboration of Russell Seitz’ bright idea: 0.1 μm diameter latex particles, possibly hollow, or of core-shell morphology, bearing a conventional stabilization system that is inactivated in salt water ensuring that the particles are retained at and near the surface, are produced in bulk using about 17% of existing production capacity and using commercial recipes, and are sprayed onto the sea from tanks aboard ships or crop dusting aircraft, oil rigs, and other structures, in the mid latitudes. For a cost in the order of a mere $2b per year **we could offset current global warming**, subject to the many disclaimers and qualifications discussed above, and many others not mentioned. More limited, local applications, such as the direct cooling of coral reefs as envisaged by Seitz for the microbubble concept, are also possible.

#### Second plank saves the african economy – your card says 30 billion per asteroid

Oni 19 [(David, a space industry and technology analyst at Space in Africa. He’s a graduate of Mining Engineering from the Federal University of Technology Akure.) “The Effect of Asteroid Mining on Mining Activities in Africa,” Africa News, 9/24/19, <https://africanews.space/the-effect-of-asteroid-mining-on-mining-activities-in-africa/>]

At the moment, Asteroid mining poses no threat to terrestrial mining; however, this will not hold for long. The space industry is progressing at such a rapid pace, and the prospects are unequivocally mouth-watering. The big question is, will asteroid mining lure away investors in Africa? The planetary resources company estimates that a single 30-m asteroid may contain 30 billion dollars in platinum alone and a 500m rock could contain half the entire world resources of PGM. Considering the abundance of minerals in asteroids, once asteroid mining materialises, it will severely affect the precious metals market, usurp the prices of rare earth minerals, and a whole lot more because minerals that are usually somewhat scarce on earth will be easily accessible on asteroids. While foreign investors run the majority of the large-scale mining activities in the region, reports say that many African countries are dangerously dependent on mining activities. For some African countries, despite massive mineral wealth, their mining sectors are underdeveloped, and this is as a result of much focus on oil resources and a couple of other challenges. The million-dollar question is, what will become of the mining activities in Africa?

#### Last plank totally deals with debris

Powell 15

Corey S Powell (science journalist and editor in chief at discover magazine, wrote 3 books with Bill Nye!!), May 20 2015, "Space Junk is a Problem. Is a Laser Cannon the Solution?," https://www.discovermagazine.com/the-sciences/space-junk-is-a-problem-is-a-laser-cannon-the-solution#.VV4ENGRViko, // HW AW, bracketed cause I don’t like reading big numbers

There’s a general rule in media reporting called Betteridge’s Law: Whenever a headline poses a question--especially a sensational one--the answer is “no.” I’m going to break the law this time. **An orbiting laser cannon is not only an intriguing technology but, yes, it’s one of the most promising ways to clean up the ever-thickening cloud of dangerous debris surrounding the Earth**. And just to be clear, space junk is a danger. There are about 25,000 human-made objects larger than your fist flying around in orbit, and about half a million pieces bigger than a dime. If you include millimeter-scale shrapnel, the number of rogue bits reaches deep into the millions. Typical speeds in low-Earth orbit are about 30,000 kilometers per hour (18,000 miles per hour), ten times the velocity of a rifle bullet. You see the problem: A little impact can pack a big wallop. So far, there have not been any space-junk catastrophes remotely resembling the sensationalized events in the movie Gravity, but the reality is still disconcerting. In 2009, a $50 million Iridium communications satellite was destroyed by a collision with a defunct Russian satellite. Three years later, the [Fermi space observatory](https://www.nasa.gov/mission_pages/GLAST/news/bullet-dodge.html) had a near miss with another Soviet-era satellite. NASA had to clad the International Space Station in shielding to protect it from repeated small impacts, and the agency sometimes moves the whole station to dodge larger pieces of junk. Orbiting debris adds cost and risk to the space business.The proposed space-station laser cannon (upper left) would work in conjunction with a telescope called EUSO to track and destroy space debris. (Credit: RIKEN) The amount of junk in orbit is increasing rapidly, meaning that those costs and risks are increasing, too. Once junk gets up there, it takes a long time to come back down: years to centuries in low orbits, and essentially forever in geosynchronous orbit (40,000 kilometers up, where many communications satellites are located). Most disconcerting, collisions in orbit create more junk, which leads to more collisions. Potentially this could lead to a runaway process called [Kessler Syndrome](http://en.wikipedia.org/wiki/Kessler_syndrome). **This is where the laser cannon comes in**. Toshikazu Ebisuzaki and a team of researchers at the RIKEN lab in Japan have [formulated a plan](http://www.riken.jp/en/pr/press/2015/20150421_2/) to clear out near-Earth space by zapping pieces of space junk with a high-power blast of focused radiation. The laser doesn’t need to be able to destroy the whole piece of debris. All it has to do is vaporize enough of the object to slow its orbit and send it spiraling into Earth’s atmosphere, **where it will burn up harmlessly before reaching the ground. It’s an ingenious solution**. Ebisuzaki’s concept was inspired by a science project called the Extreme Universe Space Observatory, currently under development for the International Space Station. [EUSO](http://jemeuso.riken.jp/en/), which will be installed on the station in 2017, is a fascinating instrument in its own right; it will study extremely high-cosmic rays by watching the light they create when they collide with air molecules. But EUSO’s sensitive, wide-field optics also make it well suited to spotting and tracking small bits of space debris, which are hard to locate from the ground. Finding targets is the crucial first step toward getting rid of them. The next step, of course, is the laser. RIKEN’s concept (which is not yet funded) would start with a 10-watt laser prototype, mounted on the International Space Station, capable of firing 100 laser pulses a second. That would pave the way for a larger system powerful enough to blast away any pieces of space junk within a 100-kilometer range, and eventually lead to a dedicated garbage-cleanup satellite equipped with a [five-hundred-thousand]500,000-watt laser that can fire [fifty-thousand]50,000 times per second. Such a satellite could remove 100,000 pieces of junk a year, the Japanese researchers claim, **fast enough to bring the whole orbital debris problem under control.** The fast-growing population of space debris. "LEO" refers to low-Earth orbit. (Credit: Surrey Space Centre) There are significant technical hurdles to overcome, including the data-processing capacity needed to spot the bits of debris and the considerable energy supply needed to keep such a powerful laser operating for years. Building a giant laser-cannon satellite would not be cheap, either. But this is exactly the kind of ambitious thinking needed to tackle the space-junk mess. Several additional cleanup technologies are also under development. A separate Japanese-led team has proposed trapping and eliminating space debris with a huge [electromagnetic tether](http://www.academia.edu/1265073/Space_Demonstration_of_Bare_Electrodynamic_Tape-Tether_Technology_on_the_Sounding_Rocket_S520-25http:/). A European project called [e.DeOrbit](http://www.esa.int/Our_Activities/Space_Engineering_Technology/Clean_Space/How_to_catch_a_satellite) would snare big pieces of space junk using a net or harpoon and dispatch them Earthward. Other concepts under study would use puffs of [pressurized gas](http://www.nasa.gov/directorates/spacetech/niac/gregory_space_debris_elimination.html), large [magnetized nets](http://www.spacesafetymagazine.com/space-debris/debris-removal/electrodynamic-debris-eliminator-receives-funding/), or a [slingshot-style satellite](http://aero.tamu.edu/news/removing-space-debris-tamu-sweeper-sling-sat). The laser cannon has some obvious advantages over all of these options, however. It could tackle the small fry, not just the big pieces, and it could deal with far more targets than would be possible for any spacecraft that is going after them one by one. If all of these ideas sound a little wacky, there's a good reason: Getting rid of space junk is a really, really hard problem. There is a lot of space to scour for debris. The individual pieces are mostly small and nearly invisible, and they each follow a unique orbit. Hard problems call for creative (and sometimes wacky) solutions. Further complicating things, nobody has devoted much money to cleanup, and any mission that can remove space junk could potentially remove active satellites as well--a delicate political issue. **If the RIKEN laser cannon never happens, it will more likely be due to budget** and political **obstacles than to technical ones**. In the long run, the best way to deal with space junk is never to create it in the first place. One of the most important principles here is what is called [design for demise](http://www.esa.int/Our_Activities/Space_Engineering_Technology/Clean_Space/Space_debris_mitigation)--that is, engineering satellites so that they will automatically de-orbit and remove themselves from the trash pile within, say, 25 years of the end of their mission. A simple way to do this is to equip a satellite with a small sail that would pop open when it is no longer needed. The so-called [gossamer sail](https://theconversation.com/cleaning-up-space-debris-with-sailing-satellites-20384) would act like a space parachute, using the pressure of sunlight and the extremely thin traces of atmosphere in orbit to create drag. The drag would then pull the satellite down to a fiery demise. Simulated view of Earth from the Planetary Society's new LightSail, launched on May 20. Space sails could be used to clear away satellite debris--or to take humanity on great ventures of exploration. (Credit: Josh Spradling/Planetary Society) A gossamer sail is very similar in function to a solar sail--like the prototype [LightSail](http://sail.planetary.org/) launched today by the Planetary Society. That creates a neat kind of symmetry to the story. Powerful space lasers may be useful for clearing debris, but they could also be used to launch high-speed spacecraft. Solar sails could be used to de-orbit satellites, but they could also provide new ways to navigate to new worlds. In short, the kinds of technological solutions needed to clear a path through our local garbage dump could be the exact same ones needed to blaze a path to the stars.

### Case - mining

#### Mining solves extinction from scarcity.

Pelton 17—(Director Emeritus of the Space and Advanced Communications Research Institute at George Washington University, PHD in IR from Georgetown).. Pelton, Joseph N. 2017. The New Gold Rush: The Riches of Space Beckon! Springer. Accessed 8/30/19.

Are We Humans Doomed to Extinction? What will we do when Earth’s resources are used up by humanity? The world is now hugely over populated, with billions and billions crammed into our overcrowded cities. By 2050, we may be 9 billion strong, and by 2100 well over 11 billion people on Planet Earth. Some at the United Nations say we might even be an amazing 12 billion crawling around this small globe. And over 80 % of us will be living in congested cities. These cities will be ever more vulnerable to terrorist attack, natural disaster, and other plights that come with overcrowding and a dearth of jobs that will be fueled by rapid automation and the rise of artifi cial intelligence across the global economy. We are already rapidly running out of water and minerals. Climate change is threatening our very existence. Political leaders and even the Pope have cautioned us against inaction. Perhaps the naysayers are right. All humanity is at tremendous risk. Is there no hope for the future? This book is about hope. We think that there is literally heavenly hope for humanity. But we are not talking here about divine intervention. We are envisioning a new space economy that recognizes that there is more water in the skies that all our oceans. Th ere is a new wealth of natural resources and clean energy in the reaches of outer space—more than most of us could ever dream possible. There are those that say why waste money on outer space when we have severe problems here at home? Going into space is not a waste of money. It is our future. It is our hope for new jobs and resources. The great challenge of our times is to reverse public thinking to see space not as a resource drain but as the doorway to opportunity. The new space frontier can literally open up a “gold rush in the skies.” In brief, we think there is new hope for humanity. We see a new a pathway to the future via new ventures in space. For too long, space programs have been seen as a money pit. In the process, we have overlooked the great abundance available to us in the skies above. It is important to recognize there is already the beginning of a new gold rush in space—a pathway to astral abundance. “New Space” is a term increasingly used to describe radical new commercial space initiatives—many of which have come from Silicon Valley and often with backing from the group of entrepreneurs known popularly as the “space billionaires.” New space is revolutionizing the space industry with lower cost space transportation and space systems that represent significant cost savings and new technological breakthroughs. “New Commercial Space” and the “New Space Economy” represent more than a new way of looking at outer space. These new pathways to the stars could prove vital to human survival. If one does not believe in spending money to probe the mysteries of the universe then perhaps we can try what might be called “calibrated greed” on for size. One only needs to go to a cubesat workshop, or to Silicon Valley or one of many conferences like the “Disrupt Space” event in Bremen, Germany, held in April 2016 to recognize that entrepreneurial New Space initiatives are changing everything [ 1 ]. In fact, the very nature and dimensions of what outer space activities are today have changed forever. It is no longer your grandfather’s concept of outer space that was once dominated by the big national space agencies. The entrepreneurs are taking over. The hopeful statements in this book and the hard economic and technical data that backs them up are more than a minority opinion. It is a topic of growing interest at the World Economic Forum, where business and political heavyweights meet in Davos, Switzerland, to discuss how to stimulate new patterns of global economic growth. It is even the growing view of a group that call themselves “space ethicists.” Here is how Christopher J. Newman, at the University of Sunderland in the United Kingdom has put it: Space ethicists have offered the view that space exploration is not only desirable; it is a duty that we, as a species, must undertake in order to secure the survival of humanity over the longer term. Expanding both the resource base and, eventually, the habitats available for humanity means that any expenditure on space exploration, far from being viewed as frivolous, can legitimately be rationalized as an ethical investment choice. (Newman) On the other hand there are space ethicists and space exobiologists who argue that humans have created ecological ruin on the planet—and now space debris is starting to pollute space. Th ese countervailing thoughts by the “no growth” camp of space ethicists say we have no right to colonize other planets or to mine the Moon and asteroids—or at least no right to do so until we can prove we can sustain life here on Earth for the longer term. However, for most who are planning for the new space economy the opinion of space philosophers doesn’t really fl oat their boat. Legislators, bankers, and aspiring space entrepreneurs are far more interested in the views of the super-rich capitalists called the space billionaires. A number of these billionaires and space executives have already put some very serious money into enterprises intent on creating a new pathway to the stars. No less than five billionaires with established space ventures—Elon Musk, Paul Allen, Jeff Bezos, Sir Richard Branson, and Robert Bigelow—have invested millions if not billions of dollars into commercializing space. They are developing new technologies and establishing space enterprises that can bring the wealth of outer space down to Earth. This is not a pipe dream, but will increasingly be the economic reality of the 2020s. These wealthy space entrepreneurs see major new economic opportunities. To them space represents the last great frontier for enterprising pioneers. Th us they see an ever-expanding space frontier that offers opportunities in low-cost space transportation, satellite solar power satellites to produce clean energy 24h a day, space mining, space manufacturing and production, and eventually space habitats and colonies as a trajectory to a better human future. Some even more visionary thinkers envision the possibility of terraforming Mars, or creating new structures in space to protect our planet from cosmic hazards and even raising Earth’s orbit to escape the rising heat levels of the Sun in millennia to come. Some, of course, will say this is sci-fi hogwash. It can’t be done. We say that this is what people would have said in 1900 about airplanes, rocket ships, cell phones and nuclear devices. The skeptics laughed at Columbus and his plan to sail across the oceans to discover new worlds. When Thomas Jefferson bought the Louisiana Purchase from France or Seward bought Alaska, there were plenty of naysayers that said such investment in the unknown was an extravagant waste of money. A healthy skepticism is useful and can play a role in economic and business success. Before one dismisses the idea of an impending major new space economy and a new gold rush, it might useful to see what has already transpired in space development in just the past five decades. The world’s first geosynchronous communications satellite had a throughput capability of about 500 kb / s. In contrast, today’s state of the art Viasat 2 —a half century later— has an impressive throughput of some 140 Gb/s. Th is means that the relative throughput is nearly 300,000 greater, while its lifetime is some ten times longer (Figs. 1.1 and 1.2 ). Each new generation of communications satellite has had more power, better antenna systems, improved pointing and stabilization, and an extended lifetime. And the capabilities represented by remote sensing satellites , meteorological satellites , and navigation and timing satellites have also expanded their capabilities and performance in an impressive manner. When satellite applications first started, the market was measured in millions of dollars. Today commercial satellite services exceed a quarter of a billion dollars. Vital services such as the Internet, aircraft traffi c control and management, international banking, search and rescue and much, much more depend on application satellites. Th ose that would doubt the importance of satellites to the global economy might wish to view on You Tube the video “If Th ere Were a Day Without Satellites?” [ 2 ]. Let’s check in on what some of those very rich and smart guys think about the new space economy and its potential. (We are sorry to say that so far there are no female space billionaires, but surely this, too, will come someday soon.) Of course this twenty-fi rst century breakthrough that we call the New Space economy will not come just from new space commerce. It will also come from the amazing new technologies here on Earth. Vital new terrestrial technologies will accompany this cosmic journey into tomorrow. Information technology, robotics, artificial intelligence and commercial space travel systems have now set us on a course to allow us humans to harvest the amazing riches in the skies—new natural resources, new energy, and even totally new ways of looking at the purpose of human existence. If we pursue this course steadfastly, it can be the beginning of a New Space renaissance. But if we don’t seek to realize our ultimate destiny in space, Homo sapiens can end up in the dustbin of history—just like literally millions of already failed species. In each and every one of the five mass extinction events that have occurred over the last 1.5 billion years on Earth, some 50–80 % of all species have gone the way of the T. Rex, the woolly mammoth, and the Dodo bird along with extinct ferns, grasses and cacti. On the other hand, the best days of the human race could be just beginning. If we are smart about how we go about discovering and using these riches in the skies and applying the best of our new technologies, it could be the start of a new beginning for humanity. Konstantin Tsiokovsky, the Russian astronautics pioneer, who fi rst conceived of practical designs for spaceships, famously said: “A planet is the cradle of mankind, but one cannot live in a cradle forever.” Well before Tsiokovsky another genius, Leonardo da Vinci, said, quite poetically: “Once you have tasted flight, you will forever walk the earth with your eyes turned skyward, for there you have been, and there you will always long to return.” The founder of the X-Prize and of Planetary Resources, Inc., Dr. Peter Diamandis, has much more brashly said much the same thing in quite diff erent words when he said: “The meek shall inherit the Earth. The rest of us will go to Mars.” The New Space Billionaires Peter Diamandis is not alone in his thinking. From the list of “visionaries” quoted earlier, Elon Musk, the founder of SpaceX; Sir Richard Branson, the founder of Virgin Galactic; and Paul Allen, the co-founder of Microsoft and the man who financed SpaceShipOne, the world’s first successful spaceplane have all said the future will include a vibrant new space economy. Th ey, and others, have said that we can, we should and we soon shall go into space and realize the bounty that it can offer to us. Th e New Space enterprise is today indeed being led by those so-called space billionaires , who have an exciting vision of the future. They and others in the commercial space economy believe that the exploitation of outer space may open up a new golden age of astral abundance. They see outer space as a new frontier that can be a great source of new materials, energy and various forms of new wealth that might even save us from excesses of the past. Th is gold rush in the skies represents a new beginning. We are not talking about expensive new space ventures funded by NASA or other space agencies in Europe, Japan, China or India. No, these eff orts which we and others call New Space are today being forged by imaginative and resourceful commercial entrepreneurs. Th ese twenty-fi rst century visionaries have the fortitude and zeal to look to the abundance above. New breakthroughs in technology and New Space enterprises may be able to create an “astral life raft” for humanity. Just as Columbus and the Vikings had the imaginative drive that led them to discover the riches of a new world, we now have a cadre of space billionaires that are now leading us into this New Space era of tomorrow. These bold leaders, such as Paul Allen and Sir Richard Branson, plus other space entrepreneurs including Jeff Bezos of Amazon and Blue Origin, and Robert Bigelow, Chairman of Budget Suites and Bigelow Aerospace, not only dream of their future in the space industry but also have billions of dollars in assets. These are the bright stars of an entirely new industry that are leading us into the age of New Space commerce. These space billionaires, each in their own way, are proponents of a new age of astral abundance. Each of them is launching new commercial space industries. They are literally transforming our vision of tomorrow. These new types of entrepreneurial aerospace companies—the New Space enterprises—give new hope and new promise of transforming our world as we know it today. The New Space Frontier What happens in space in the next few decades, plus corresponding new information technologies and advanced robotics, will change our world forever. These changes will redefi ne wealth, change our views of work and employment and upend almost everything we think we know about economics, wealth, jobs, and politics. Th ese changes are about truly disruptive technologies of the most fundamental kinds. If you thought the Internet, smart phones, and spandex were disruptive technologies, just hang on. You have not seen anything yet. In short, if you want to understand a transition more fundamental than the changes brought to the twentieth century world by computers, communications and the Internet, then read this book. There are truly riches in the skies. Near-Earth asteroids largely composed of platinum and rare earth metals have an incredible value. Helium-3 isotopes accessible in outer space could provide clean and abundant energy. There is far more water in outer space than is in our oceans. In the pages that follow we will explain the potential for a cosmic shift in our global economy, our ecology, and our commercial and legal systems. These can take place by the end of this century. And if these changes do not take place we will be in trouble. Our conventional petro-chemical energy systems will fail us economically and eventually blanket us with a hydrocarbon haze of smog that will threaten our health and our very survival. Our rare precious metals that we need for modern electronic appliances will skyrocket in price, and the struggle between “haves” and “have nots” will grow increasingly ugly. A lack of affordable and readily available water, natural resources, food, health care and medical supplies, plus systematic threats to urban security and systemic warfare are the alternatives to astral abundance. The choices between astral abundance and a downward spiral in global standards of living are stark. Within the next few decades these problems will be increasingly real. By then the world may almost be begging for new, out of- the-box thinking. International peace and security will be an indispensable prerequisite for exploitation of astral abundance, as will good government for all. No one nation can be rich and secure when everyone else is poor and insecure. In short, global space security and strategic space defense, mediated by global space agreements, are part of this new pathway to the future.

#### Asteroid mining enables space colonization – even if Earth species goes extinct, we can escape if we mine asteroids

Ravisetti 21

Monisha Ravisetti (science writer @ CNET BA in philosophy NYU), 10-4-2021, "Rare asteroids near Earth may contain precious metals worth $11.65 trillion," CNET, https://www.cnet.com/news/rare-asteroids-near-earth-may-become-targets-for-space-mining/, // HW AW

Scientists just calculated that one of two metallic asteroids floating in Earth's vicinity may contain precious metals worth about $11.65 trillion. The expensive nugget, in fact, could boast more iron, nickel and cobalt than the entirety of our global metal reserves. Called metal-rich near-Earth asteroids, these rare, hefty mineral deposits measure over a mile wide. The one reckoned to be a metal motherlode is labeled 1986 DA, and the other, 2016 ED85. The duo "could be possible targets for asteroid mining in the future," according to the [new analysis published Friday](https://iopscience.iop.org/article/10.3847/PSJ/ac235f) in The Planetary Science Journal. Space mining has gained traction in the scientific community because experts believe the feat could provide [cost-effective metals](https://science.howstuffworks.com/asteroid-mining.htm) for a lunar or Mars-based colony, ultimately extending humanity's reach in exploring space. With a cosmic mine, building materials wouldn't have to withstand the expensive shuttle from Earth to space. Further, the team behind the math suggests these unique floating orbs may shed much-needed light on the authenticity of another metallic treasure NASA is [headed to in 2022](https://www.jpl.nasa.gov/missions/psyche) -- the mysterious shiny space globe known as 16 Psyche. 16 Psyche has its own allure for space mining enthusiasts. An artist's illustration shows what asteroid 16 Psyche might look like. Maxar/ASU/P.Rubin/NASA/JPL-Caltech Instead of trees, oceans or stretches of soil, the bizarre body is thought to consist of hills and valleys made of pure metal. Scientists contend it's the remaining core of an ancient rocky planet that was once destroyed. Interestingly, Earth's covered-up core looks awfully similar. Aptly dubbed "mini Psyches," the valuable smaller asteroids described in the new study are presumably pieces that have broken off from a similar naked center, though the research team notes they don't think these fragments are offshoots of 16 Psyche in particular. Still, 16 Psyche has become a rather hot topic of discussion among [scientists](https://earthsky.org/space/asteroid-psyche-metal-or-rubble-pile/) and even the [public](https://www.forbes.com/sites/jamiecartereurope/2020/12/05/a-bizarre-trillion-dollar-asteroid-worth-more-than-our-planet-is-now-aligned-with-the-earth-and-sun/?sh=689f08431c9a) -- it's suspected to hold minerals worth $10,000 quadrillion. Let that sink in. The exorbitant figure, however, has generated [considerable doubt](https://www.cnet.com/news/10000-quadrillion-asteroid-psyche-may-not-be-as-valuable-as-first-thought/) because scientists can't be sure what 16 Psyche is made of until a spacecraft inspects it. It's too far away for precise spectrum analysis, a scientific method that leverages electromagnetic emission and absorption signals to learn about objects' compositions. Until such an examination can happen, something NASA's mission intends to perform, researchers have to consider the option that it's merely some sort of rubble. That's what makes data from the "mini Psyches" indispensable -- they may offer a first look at their namesake's features. Proximity to our home planet deems it much easier for scientists to capture the rocks' spectral info from Earth. "It is rewarding that we have discovered these 'mini Psyches' so close to the Earth," Vishnu Reddy, associate professor at the University of Arizona's Lunar and Planetary Laboratory and principal investigator of the NASA grant that funded the work, said [in a statement](https://www.eurekalert.org/news-releases/930288). Sifting through the collected data, researchers found the orbiting blocks are made of 85% metal, such as iron and nickel, and only 15% silicate, which is basically regular rock. As such, some ambiguity about 16 Psyche might soon be alleviated thanks to the baby versions of it -- including whether it'll add to the crew of treasure troves for future space miners. Regardless, while the trio of metallic hunks definitely seem to hint at our sci-fi fantasies of space mining inching toward reality, one thing is absolutely certain: They're a pretty hard-core squad.

#### Space colonization is an insurance policy which guarantees human survival and avoids nearly every single extinction threat

Worrall 18 [Simon Worrall has written for publications all over the world, including The Smithsonian, The London Sunday Times, The Guardian, Paris Review, Conde Nast Traveler and The New Yorker. Since 1997, he has been a regular contributor to National Geographic Magazine, with assignments to London, Wales, Patagonia and China, and now curates a weekly column on the NG website called Book Talk. Michio Kaku is an American theoretical physicist, futurist, and popularizer of science. He is a professor of theoretical physics in the City College of New York and CUNY Graduate Center. “There’s Only One Way For Humanity to Survive. Go To Mars.” National Geographic. March 2, 2018. <https://www.nationalgeographic.com/science/article/there-s-only-one-way-for-humanity-to-survive--go-to-mars->] HW AL

Right at the beginning of the book, you make the shocking prediction: “**Either we must leave the Earth or we will perish.**” Are humanity’s prospects really that dire? And doesn’t this play into the nihilistic feeling that there is nothing we can do to save this planet? If you take a look at evolution on Earth, 99.9 percent of all life forms have gone extinct. When things change, either you adapt or die. That’s the law of Mother Nature. We face various hazards. First of all, we have self-inflicted problems like global warming, nuclear proliferation and bio-engineered germ warfare. Plus, Mother Nature has hurled at the Earth a number of extinction cycles. The dinosaurs, for example, didn’t have a space program. And **that’s why the dinosaurs are not here today.** On the other hand, we shouldn’t use this as an excuse to pollute the Earth, or let global warming run amok. We should cure these problems without having to leave for Mars or another planet, because it’s impossible to remove the entire population of Earth to Mars. **We’re talking about an insurance policy—a backup plan in case something does happen to the Earth.** I once talked to Carl Sagan about this, who said, “We live in the middle of a shooting gallery with thousands of asteroids in our path that we haven’t even discovered yet. So, let’s be at least a two-planet species, as a backup plan.” One of the beautiful images you conjure is of ballet dancing on Mars. Explain why this may one day be less fanciful than it seems. We have the Olympics, where we have athletes that understand the laws of gravity on Earth, but once we’re on the moon and Mars, we have a totally different set of physical constraints. Here, ice skaters can’t do anything more than a quad; four rotations in the air and that’s it! No one has ever done a quint. However, on Mars the gravity is only 30 percent of Earth, so one day we may have an Olympics on Mars where people could do four, five, six, seven rotations in the air, and ballet, or acrobatics, and gymnastics. A whole new set of athletes could be formed because they are adapted to a new environment where the gravity and air pressure is lower. The astronaut Alan Shepard was the first one to golf—golf—on the moon! He snuck on a pair of golf irons. NASA was horrified, yet in the Smithsonian Museum now, you can see a replica of the golf clubs he used, to prove that interstellar sports could become a real possibility. You use the phrase “the fourth wave of science.” Explain what this means and how it could one day make it possible to terraform Mars. We’ve had three waves of scientific innovation. The first wave, the Industrial Revolution, gave us the steam engine, the locomotive, and factories. The second wave was electricity and magnetism, whereby we had TV, internal combustion cars, a beginning of the space program. The third revolution is high tech: computers, lasers, the Internet. Now we have the fourth wave of innovation: artificial intelligence, biotech, and nanotech. That’s going to change the way we view Mars. Many people say Mars is cold and desolate, and there’s nothing to grow there. We can genetically modify plants and algae to thrive in the Martian atmosphere. But who’s going to do the heavy lifting? We all would like to see futuristic cities on Mars, but robots are going to become much more adapted to working in these harsh environments by the end of this century, so we expect to see robotic construction workers building the fantastic domed cities you see in science fiction novels.

#### Turns case - Technology developed from space exploration is K2 solving climate DiCicco ‘21

{Mike DiCicco, April 21, 2021, DiCicco is a senior science write at NASA, “NASA Technologies Spin off to Fight Climate Change”, <https://climate.nasa.gov/ask-nasa-climate/3075/nasa-technologies-spin-off-to-fight-climate-change/>, //NL}

Trapping Greenhouse Gases Carbon dioxide, a greenhouse gas, is the most prominent driver of climate change on Earth. On Mars, however, where most of the atmosphere is CO2, the gas could come in handy. Under **NASA** contracts, one **engineer helped develop technology to capture Martian carbon dioxide** and break it into carbon and oxygen **for** other uses, from **life support** to fuel for a journey home. Although it never flew, Perseverance will test out a similar idea, using an experimental system called MOXIE (Mars Oxygen In-Situ Resource Utilization Experiment). Meanwhile, **the** earlier **tech**nology **led to a system that now captures natural gases at oil wells, instead of wastefully burning them off and dumping the resulting CO2 into the atmosphere.** And another version of the system helps beer breweries go “greener” by capturing carbon dioxide from the brewing process, rather than venting it, and using it for carbonation instead of buying more. Conserving Energy Conserving energy is a crucial consideration for space travel, and many innovations NASA has come up with in that arena are now widespread in improving energy efficiency on Earth. For example**, NASA helped create** a type of **reflective insulation** to efficiently maintain a comfortable temperature within spacecraft and spacesuits. In the decades since, this insulation has been **adapted and used in homes and buildings** around the world. **Another material** pioneered **to insulate cryogenic rocket fuel** against the balmy weather around the launch pad at Cape Canaveral, Florida, **now saves energy by preserving temperatures at industrial facilities.** And a coating invented to protect spacecraft during the extreme heat of atmospheric entry **improves the efficiency of incinerators, boilers, and refractories, ovens, and more.** Shrinking Air Travel’s Carbon Footprint Air travel is a major contributor to human-made greenhouse gases. **Designing aircraft to fly more efficiently reduces** the amount of fuel they burn, and in turn, their resulting **emissions.** And many of the improvements that make modern aircraft more efficient come straight from NASA. In fact, some of the agency’s most significant contributions to aeronautic fuel efficiency can be traced back to the work of a single NASA engineer in the 1960s and ’70s. Richard Whitcomb designed and tested an entirely new wing shape – the supercritical wing – that significantly increased efficiency at high speeds and eliminated weight. He then designed upturned wingtips that make use of air vortices that would otherwise create drag. Now incorporated into nearly all commercial planes**, these advances combined save billions of dollars’ worth of fuel, along with associated CO2 emissions, every year.** In the decades since, NASA has continued to work with industry partners to improve airplane efficiency, and the agency is now supporting the cutting edge of all-electric flight. Advancing Renewable Energy Because there are no fossil fuels on Mars, **NASA** became interested in wind energy to power future Martian operations. So, the space agency **helped** a company **develop a wind turbine that could operate in** a similarly **harsh environment – the South Pole**. Rugged and designed for easy maintenance and efficiency at extremely low temperatures**, more than 800 of the resulting turbines are now generating power on Earth.** Unexpectedly, software NASA supported for **improved aircraft** design and maintenance has **also led to more efficient, long-lasting wind turbines.** And several solar panel manufacturers have benefited from the agency’s long reliance on the sun for energy.

#### Asteroid mining solves water conflict and Kessler syndrome via refueling satellites – turns case

Tillman 19

Nola Taylor Tillman (contributing writer for space.com, loves astronomy and space, and this article cites an asteroid researcher at Johns Hopkins, it is not Nola’s own analysis), 9-29-2019, "Tons of Water in Asteroids Could Fuel Satellites, Space Exploration," Space, https://www.space.com/water-rich-asteroids-space-exploration-fuel.html, // HW AW

When it comes to mining space for water, the best target may not be the moon: Entrepreneurs' richest options are likely to be [asteroids](https://www.space.com/51-asteroids-formation-discovery-and-exploration.html) that are larger and closer to Earth. A recent study suggested that roughly 1,000 water-rich, or hydrated, asteroids near our planet are easier to reach than the lunar surface is. While most of these space rocks are only a few feet in size, more than 25 of them should be large enough to each provide significant water. Altogether, the [water locked in these asteroids](https://www.space.com/how-much-water-in-asteroids.html) should be enough to fill somewhere around 320,000 Olympics-size swimming pools — significantly more than the amount of water locked up at the lunar poles, the new research suggested. Because asteroids are small, they have less gravity than Earth or the moon do, which makes them easier destinations to land on and lift off from. If engineers can figure out how to mine water from these space rocks, they could produce a source of ready fuel in space that would allow spacecraft designers to build [refuelable models](https://www.space.com/orbit-fab-demonstrates-satellite-refueling-technology-on-iss.html) for the next generation of satellites. Asteroid mining could also fuel human exploration, saving the expense of launching fuel from Earth. In both cases, would-be space-rock miners will need to figure out how to free the water trapped in hydrated minerals on these asteroids. "Most of the hydrated material in the near-Earth population is contained in the largest few hydrated objects," Andrew Rivkin, an asteroid researcher at Johns Hopkins University Applied Physics Research Laboratory in Maryland, told Space.com. Rivkin is the lead author on the paper, which estimated that near Earth asteroids could contain more easily accessible water than the lunar poles. Related: [NASA Wants a New Space Telescope to Protect Us All from Dangerous Asteroids](https://www.space.com/nasa-to-build-near-earth-asteroid-hunter-telescope.html) "A sure thing" According to the United Nations Office for Outer Space Affairs, more than 5,200 of the objects launched into space are still in orbit today. While some continue to function, the bulk of them buzz uselessly over our heads every day. **They carry fuel on board, and when they run out, they are either lowered into destructive orbits or left to become** [**space junk**](https://www.space.com/16518-space-junk.html)**, useless debris with the potential to cause enormous problems for working satellites.** [**Refueling satellites in space**](https://www.space.com/8339-wet-asteroid-space-gas-station.html) **could change that model, replacing it with long-lived, productive orbiters.** "It's easier to bring fuel from asteroids to geosynchronous orbit than from the surface of the Earth," Rivkin said. "If such a supply line could be established, it could make [asteroid mining](https://www.space.com/39363-planetary-resources-asteroid-mining-satellite-launches.html) very profitable." Hunting for space water from the surface of the Earth is challenging because the planet's atmosphere blocks the wavelength of light where water can be observed. The asteroid warming as it draws closer to the sun can also complicate measurements. Instead, Rivkin and his colleagues turned to a class of space rocks called Ch asteroids. Although these asteroids don't directly exhibit a watery fingerprint, they carry the telltale signal of oxidized iron seen only on [asteroids](https://www.space.com/51-asteroids-formation-discovery-and-exploration.html) with signatures of water-rich minerals, which means the authors felt confident assuming that all Ch asteroids carry this rocky water. Based on meteorite falls, a previous study estimated that Ch asteroids could make up nearly 10% of the [near-Earth objects](https://www.space.com/nasa-to-build-near-earth-asteroid-hunter-telescope.html) (NEOs). With this information, the researchers determined that there are between 26 and 80 such objects that are hydrated and larger than 0.62 miles (1 km) across. Right now, only three NEOs have been classified as Ch asteroids, although others have been spotted in the asteroid belt. Most NEOs are discovered and observed at wavelengths too short to reveal the iron band that marks the class. Carbon-rich asteroids, which include Ch asteroids and other flavors, are also darker than the more common stony asteroids, making them more challenging to observe. Although Ch asteroids definitely contain water-rich minerals, that doesn’t necessarily mean that they will always be the best bet for space mining. It comes down to risk. Would an [asteroid-mining](https://www.space.com/moon-asteroid-space-mining-with-concentrated-sunlight.html) company rather visit a smaller asteroid that definitely has a moderate amount of water, or a larger one that could yield a larger payday but could also come up dry? "Whether getting sure things with no false positives, like the Ch asteroids, is more important or if a greater range of possibilities is acceptable with the understanding that some asteroids will be duds is something the miners will have to decide," Rivkin said. Not too big, not too small In addition to estimating the number of large, water-rich asteroids might be available, the study also found that as many as 1,050 smaller objects, roughly 300 feet (100 meters) across, may also linger near Earth. Their small bulk will make them [easier to mine](https://www.space.com/30213-asteroid-mining-planetary-resources-2025.html) because their low gravity will require less fuel to escape from, but they will produce less water overall, and Rivkin expects that the handful of larger space rocks will be the first targets. "It seems likely that the plan for these companies will be to find the largest accessible asteroid with mineable material with the expectation that it will be more cost-effective than chasing down a large number of smaller objects," Rivkin said. "How 'accessible' and 'mineable material' and 'cost-effective' are defined by each company is to be seen." But asteroids will certainly be more accessible than the moon, another [potential source](https://www.space.com/41164-mining-moon-water-plans-take-shape.html) of space-based water-rich minerals. According to Rivkin, landing safely on the lunar surface takes more than a hundred times the change of velocity required to land on an asteroid. Similarly, taking off from the moon means breaking free from its gravity, requiring even more fuel. "Even asteroids that are a bit farther from the Earth than the moon can be reached with less fuel than the lunar surface," Rivkin said.

#### Global water war is inevitable in the squo – extraction, climate change, drought – best analysis

Milne 21

Sandy Milne (austrailian journalist, has written a whole lot of articles about austrialian military), 16 aug 21, "How water shortages are brewing wars," BBC, https://www.bbc.com/future/article/20210816-how-water-shortages-are-brewing-wars, // HW AW

**Unprecedented levels of dam building and water extraction by nations on great rivers are leaving countries further downstream increasingly thirsty, increasing the risk of conflicts**. Speaking to me via Zoom from his flat in Amsterdam, Ali al-Sadr pauses to take a sip from a clear glass of water. The irony dawning on him, he lets out a laugh. "Before I left Iraq, I struggled every day to find clean drinking water." Three years earlier, al-Sadr had joined protests in the streets of his native Basra, demanding the authorities address the city's growing water crisis. "Before the war, Basra was a beautiful place," adds the 29-year-old. "They used to call us the Venice of the East." Bordered on one side by the Shatt al-Arab River, the city is skewered by a network of freshwater canals. al-Sadr, a dockhand, once loved working alongside them. "But by the time I left, they were pumping raw sewage into the waterways. We couldn't wash, the smell [of the river] gave me migraines and, when I finally fell sick, I spent four days in bed." In the summer of 2018, tainted water sent [120,000 Basrans to the city's hospitals](https://news.yahoo.com/more-basra-water-crises-unless-iraq-govt-fixes-090656526.html) – and, when police opened fire on those who protested, al Sadr was lucky to escape with his life. "Within a month I packed my bags and left for Europe," he says. Around the world, stories like al Sadr's are becoming far too common. As much as a quarter of the world's population now [faces severe water scarcity](https://news.trust.org/item/20200902202142-ku0o2) at least one month out of the year and – as in al-Sadr's case – it is leading many to seek a more secure life in other countries. "If there is no water, people will start to move," says Kitty van der Heijden, chief of international cooperation at the Netherlands' foreign ministry and an expert in hydropolitics. **Water scarcity affects roughly 40% of the world's population and, according to predictions by the United Nations and the World Bank, drought could put up to** [**700 million people at risk of displacement**](https://www.unccd.int/actions/drought-initiative) **by 2030**. People like van der Heijden are concerned about what that could lead to. "If there is no water, politicians are going to try and get their hands on it and they might start to fight over it," she says. Over the course of the 20th Century, global water use grew at more than twice the rate of population increase. Today, **this dissonance is leading many cities – from** [**Rome**](https://www.bbc.com/news/world-europe-41081066) **to** [**Cape Town**](https://www.wri.org/insights/3-things-cities-can-learn-cape-towns-impending-day-zero-water-shut)**,** [**Chennai**](https://www.npr.org/sections/goatsandsoda/2019/06/25/734534821/no-drips-no-drops-a-city-of-10-million-is-running-out-of-water?t=1626365858497) **to** [**Lima**](http://news.bbc.co.uk/1/hi/world/americas/3697647.stm) **– to ration water. Water crises have been ranked in the top five of the World Economic Forum's** [**Global Risks by Impact**](http://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2021.pdf) **list nearly every year since 2012**. In 2017, severe droughts contributed to the [worst humanitarian crisis since World War Two](https://www.un.org/press/en/2017/sc12748.doc.htm), when 20 million people across Africa and the Middle East were forced to leave their homes due to the accompanying food shortages and conflicts that erupted. Peter Gleick, head of the Oakland-based Pacific Institute, has spent the last three decades studying the link between water scarcity, conflict and migration and believes that water conflict is on the rise. "With very rare exceptions, no one dies of literal thirst," he says. "But more and more people are dying from contaminated water or conflicts over access to water." Falling water quality around Basra, southern Iraq, has been exacerbated by reduced river flows due to damming in Turkey (Credit: Haidar Mohammed Ali/AFP/Getty Images) Gleick and his team are behind the [Water Conflict Chronology](http://www.worldwater.org/conflict/map/): a log of 925 water conflicts, large and small, stretching back to the days of the Babylonian king Hammurabi. It is not, by any means, exhaustive and the conflicts listed vary from full blown wars to disputes between neighbours. But what they reveal is that the relationship between water and conflict is a complex one. "We categorised water conflicts in three groups," says Gleick. "As a 'trigger' of conflict, where violence is associated with disputes over access and control of water; as a 'weapon' of conflict, where water or water systems are used as weapons in conflicts, including for the use of dams to withhold water or flood downstream communities; and as 'casualties' or 'targets' of conflicts, where water resources or treatment plants or pipelines are targeted during conflicts." Leaf through the records he and his colleagues have compiled, however, and it becomes clear that the bulk of the conflicts are agriculture-related. It's perhaps not surprising as agriculture [accounts for 70%](https://www.worldbank.org/en/topic/water-in-agriculture#:~:text=Currently%2C%20agriculture%20accounts%20(on%20average,to%20the%20evapotranspiration%20of%20crops).) of freshwater use. In the semi-arid Sahel region of Africa, for example, there are regular reports of herdsmen and crop farmers clashing violently over scarce supplies of water needed for their animals and crops. But as demand for water grows, so too does the scale of the potential conflicts. You might also like: [The city running out of water](https://www.bbc.com/future/article/20181011-how-to-solve-delhis-water-crisis) [How long can you survive without water?](https://www.bbc.com/future/article/20201016-why-we-cant-survive-without-water) [The megacity digging a million wells](https://www.bbc.com/future/article/20201006-india-why-bangalore-is-digging-a-million-wells) "The latest research on the subject does indeed [show water-related violence increasing over time](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3076402/)," says Charles Iceland, global director for water at the World Resources Institute. "Population growth and economic development are driving increasing water demand worldwide. Meanwhile, climate change is decreasing water supply and/or making rainfall increasingly erratic in many places." Nowhere is the dual effect of water stress and climate change more evident than the wider Tigris-Euphrates Basin – comprising Turkey, Syria, Iraq and western Iran. According to satellite imagery, the region is [losing groundwater faster than almost anywhere else in the world](https://www.stimson.org/2021/joint-working-group-on-international-and-eu-water-diplomacy-in-focus-the-euphrates-tigris-river-basin/). And as some countries make desperate attempts to secure their water supplies, their actions are affecting their neighbours. India's Northern Plains are one of the most fertile farming areas in the world, yet today, villagers regularly clash over water scarcity During June 2019, as Iraqi cities sweltered through a [50C (122F) heatwave](https://www.independent.co.uk/climate-change/news/climate-change-apartheid-poor-iraq-effects-heatwave-a9049206.html), Turkey said it would [begin filling its Ilisu dam](https://www.reuters.com/article/us-turkey-dam-idUSKCN1US194) at the origins of the Tigris. It is the latest in a long-running project by Turkey to build 22 dams and power plants along the Tigris and the Euphrates that, according to a report by the French International Office for Water, is significantly [affecting the flow of water into Syria, Iraq and Iran](https://www.oieau.org/eaudoc/system/files/documents/40/204634/204634_doc.pdf). It claims that when complete Turkey's Guneydogu Anadolu Projesi (GAP) could include as many as [90 dams and 60 power plants](https://www.oieau.org/eaudoc/system/files/documents/40/204634/204634_doc.pdf). (See [how dams such as the Ilisu are reshaping our planet](https://www.bbc.com/future/article/20201021-how-dams-have-reshaped-our-planet).) As water levels behind the mile-wide Ilisu dam rose, [the flow from the river into Iraq halved](https://www.independent.co.uk/news/world/middle-east/iraq-water-rivers-shortage-drought-baghdad-war-isis-a8426766.html). Thousands of kilometres away in Basra, al-Sadr and his neighbours saw the [quality of their water deteriorate](https://www.hrw.org/report/2019/07/22/basra-thirsty/iraqs-failure-manage-water-crisis). In August, hundreds of people began pouring into Basra's hospitals suffering from rashes, abdominal pain, vomiting, diarrhoea, and even cholera, [according to Human Rights Watch](https://www.hrw.org/report/2019/07/22/basra-thirsty/iraqs-failure-manage-water-crisis). "There's actually two parts to the story in Basra," Iceland says. "Firstly, you have the obvious discharge of wastewater into local waterways without any treatment. But you've also got to consider the damming at the Turkish border – with less freshwater flowing down the Tigris and Euphrates, saltwater is intruding further up the river (from the Persian Gulf). Over time, it's ruining crops and it's making people sick." It's a complicated picture, but this ability to see links between the seemingly disparate has informed Iceland's work with the Dutch government-funded Water, Peace and Security (WPS) partnership, a group of six American and European NGOs (including the Pacific Institute and the World Resources Institute). They've developed a [Global Early Warning Tool](https://waterpeacesecurity.org/map), which uses machine learning to predict conflicts before they happen. It combines data about rainfall, crop failures, population density, wealth, agricultural production, levels of corruption, droughts, and flooding, among many other sources of data to produce conflict warnings. They are displayed on a red-and-orange Mercator projection down to the level of administrative districts. Currently it is warning of around 2,000 potential conflict hotspots, with an accuracy rate of 86%. (Read more about [how AI can help to identify conflicts before they happen](https://www.bbc.com/future/article/20190219-how-artificial-intelligence-could-unlock-world-peace).) The Indus River is a vital water source for northern India and Pakistan, but originates in the mountains of Tibet that are controlled by China (Credit: Nadeem Khawar/Getty Images) But while the WPS Tool can be used to identify locations where conflicts over water are at risk of breaking out, it can also help to inform those hoping to understand what is happening in areas that are already experiencing strife due to water scarcity. India's Northern Plains, for example, are one of the most fertile farming areas in the world, yet today, [villagers regularly clash over water scarcity](https://www.thekashmirmonitor.net/2-haryana-villages-clash-over-water-8-bikes-set-on-fire-12-injured/). The underlying data reveals that population growth and high levels of irrigation have outstripped available groundwater supplies. Despite the area's lush-looking cropland, the WPS map ranks nearly every district in Northern India as "extremely high" in terms of baseline water stress. Several key rivers which feed the area – the Indus, Ganges and Sutlej – all originate on the Tibetan side of the border yet are vital for water supplies in both India and Pakistan. compounds the problem. Several border skirmishes have broken out recently between India and China, which lays claim to upstream areas. A violent clash in May last year in the Galwan Valley, through which a tributary to the Indus flows, left 20 Indian soldiers dead. Less than a month later there were reports that China was building "structures" that might dam the river and so restrict its flow into India. But the data captured by the Global Early Warning tool also reveals some strange trends. In some of the most water-stressed parts of the world, there appears to be a net-migration of people into these areas. Oman, for example, suffers higher levels of drought than Iraq but received hundreds of thousands of migrants per year prior to the pandemic. That's because Oman fares far better than the latter in terms of corruption, water infrastructure, ethnic fractionalisation, and hydropolitical tension. "A community's vulnerability to drought is more important than the drought itself," says Lina Eklund, of a physical geography researcher at Sweden's Lund University

#### History agrees

Kolmannskog 8(Vikram Odedra, April, Norweigan Refugee Council, “Future floods of refugees: A comment on climate change, conflict and forced migration”, http://www.nrc.no/arch/\_img/9268480.pdf, Accessed 6/28/08)

**Water scarcity may trigger distributional conflicts**. Water scarcity by itself does not necessarily lead to conflict and violence, though. There is an interaction with other socio-economic and political factors: The potential for conflict often relates to social discrimination in terms of access to safe and clean water. The risk can therefore be reduced by ensuring just distribution so that people in disadvantaged areas also have access to the safe and clean water. As already pointed out, **a main problem today (and probably for the near future) is still the so-called economic water scarcity, and good water management can prevent conflict. Within states, groups have often defended or challenged traditional rights of water use: In semi-arid regions such as the Sahel there have been tensions between farmers and nomadic herders**. According to *The Stern Review on The Economics of Climate Change*,41 **the droughts in the Sahel in the 1970s and 1980s may have been caused partly by climate change and contributed to increased competition for scarce resources between these groups. The Tuareg rebellion in Mali in the beginning of the 1990s, is also mentioned as an example of a climate change-related conflict. Many of the drought-struck nomads sought refuge in the cities or left the country. The lack of social networks for the returnees, the continuing drought, competition for land with the settled farmers and dissatisfaction with the authorities, were factors that fuelled the armed rebellion. In the past there have been few examples of “water wars” between states**. In fact there are several cases of cooperation (for example between Palestine and Israel), but these have generally concerned benefit-sharing, not burden-sharing. According to Fred Pearce, the defining crises of the 21st century will involve water.42 He sees the Six Day War in 1967 between Israel and its neighbours as the first modern “water war”, specifically over the River Jordan. **Most of the world’s major rivers cross international boundaries, but are not covered by treaties. According to Pearce, this is a recipe for conflict and for upstream users to hold downstream users to ransom**. This could be helped by internationally brokered deals for sharing such rivers.

#### No war over collisions– hotlines prevent miscalc

Banerjee 15 — Brinda Banerjee, is a researcher working on security, armed conflict and military policies. She holds a Bachelor’s in Journalism (with Honors), a Master’s in Peace and Conflict Studies and is currently pursuing her Ph.D. in state responses to internal conflict. Brinda writes extensively about current events, conflict resolution and geopolitical dynamics in the modern world, 11-27-2015 ("China, U.S. To Launch Space Hotline To Avoid Space War," ValueWalk, 11-27-2015, Available Online at http://www.valuewalk.com/2015/11/china-u-s-launch-space-hotline-avoid-space-war/, Accessed 6-23-2016, RJS)

That space is the new- perhaps even final- frontier is a widely acknowledged fact. Even as territorial expansionism and resource-driven ambitions continue to dominate international relations, the new-age marker of geopolitical supremacy is space. And China knows this. Which is why Beijing is working hard to establish China’s preeminence in space. However, security experts in China and elsewhere have clearly realized that the risk of in-space collisions and accidents is high and such an incident could easily lead to war back home on earth. Given that the relationship between China and the United States is particularly defined by the desire to outcompete one another, the possibility of a space collision is particularly worrying. And so, Beijing and Washington have decided to set up a “space hotline” to address these concerns. China, U.S. Start ‘Space Hotline’ The space hotline is going to allow direct communication between Beijing and Washington; The Financial Times reports that the hotline will enable the two governments to quickly and efficiently exchange information about each other’s projects and actions in space. The hotline has been conceptualized for the express purpose of avoiding run-ins and unintentional confrontations in space. Using the hotline, officials in China and the United states hope to be able to discuss plans, tests and the likelihood of their paths meeting in space. The hotline will serve as a conduit between military authorities and space program officials. An assistant secretary of state in the United States has shared that the U.S. hopes to cut down on the time it takes to be able to communicate effectively with China on space-related matters. Typically, if Washington wants to convey a message to Beijing, it will start with the Joint Space Operations Center (JspOC) contacting the Pentagon, from where the message is transmitted to the State Department and then onto the U.S. Embassy in Beijing, which will relay it to a Chinese contact and then, once an answer is confirmed, the message is sent back through the chain. The U.S. assistant secretary of state said that in the past Washington has had to “send notifications to the Chinese via their Ministry of Foreign Affairs” and the entire process of contacting the Chinese authorities and receiving a response takes too much time- and in some cases of space-related emergencies and enquiries, neither side has enough time to engage in bureaucratic protocol. In case an impending accident or possible threat is identified, authorities on both ends should be able to quickly reach other and enact a situation-appropriate response strategy without expending too much time on communication and clarification. It is believed that the space hotline will prove helpful in doing just that. The space hotline with China is not the first time the U.S. has chosen to pursue faster communications systems and cooperation with a rival power: in the post-Cold War era, Russia and the United States established a direct line between Moscow and Washington, known as the “red telephone”. Direct links such as these are developed to help traditional competitors avoid catastrophes because the tenuous nature of their ties may trigger off a conflict at any given moment. Authorities Want To Avoid Space Warfare As problematic as space collisions are as of themselves, Beijing and Washington are particularly worried about accidents being interpreted as acts of aggression. A chance encounter may create severe misunderstandings between the two countries and could be incorrectly understood as an act of war, thus inciting actual conflict between the states. The two governments have identified potential risks that may create such a misunderstanding; for instance, experts suggest that unintentionally harming another country’s orbiting satellites would render that country’s intelligence and other systems useless: while this may not, in fact, be a desired outcome it would no doubt be received badly and may force the affected state to enforce counter-measures or retaliate in kind. These concerns are informed by real-life experiences: in 2007, China inadvertently destroyed an orbiting satellite while testing its own anti-satellite weapons systems and the incident sparked off a raging debate on space warfare. The satellite in question was a non-operational weather satellite and while the incident itself did not pose a military threat, it did reveal potential for the same.

#### Space is huge – no collisions

Fange 17

Daniel Von Fange, senior enginneer @ Origin Protocol, 5-21-2017, "Kessler Syndrome is Over Hyped," Braino.org, <http://braino.org/essays/kessler_syndrome_is_over_hyped/> //MLT

Let’s imagine a worst case scenario. An evil alien intelligence chops up everything in High LEO, turning it into 1cm cubes of death orbiting at 1000km, spread as evenly across the surface of this sphere as orbital mechanics would allow. Is humanity cut off from space? I’m guessing the world has launched about 10,000 tons of satellites total. For guessing purposes, I’ll assume 2,500 tons of satellites and junk currently in High LEO. If satellites are made of aluminum, with a density of 2.70 g/cm3, then that’s 839,985,870 1cm cubes. A sphere for an orbit of 1,000km has a surface area of 682,752,000 square KM. So there would be one cube of junk per .81 square KM. If a rocket traveled through that, its odds of hitting that cube are tiny - less than 1 in 10,000. So even in the worst case, we don’t lose access to space. Now though you can travel through the debris, you couldn’t keep a satellite alive for long in this orbit of death. Kessler Syndrome at its worst just prevents us from putting satellites in certain orbits. In real life, there’s a lot of factors that make Kessler syndrome even less of a problem than our worst case though experiment. Debris would be spread over a volume of space, not a single orbital surface, making collisions orders of magnitudes less likely. Most impact debris will have a slower orbital velocity than either of its original pieces - this makes it deorbit much sooner. Any collision will create large and small objects. Small objects are much more affected by atmospheric drag and deorbit faster, even in a few months from high LEO. Larger objects can be tracked by earth based radar and avoided. The planned big new constellations are not in High LEO, but in Low LEO for faster communications with the earth. They aren’t an issue for Kessler. Most importantly, all new satellite launches since the 1990’s are required to include a plan to get rid of the satellite at the end of its useful life (usually by deorbiting) So the realistic worst case is that insurance premiums on satellites go up a bit. Given the current trend toward much smaller, cheaper micro satellites, this wouldn’t even have a huge effect. I’m removing Kessler Syndrome from my list of things to worry about.

### Case – Africa

**Space resources aren’t used terrestrially – they’re for colonization**

**Whittington 17** [(Mark, writes frequently on space, politics, and popular culture. He has been published in the Wall Street Journal, Forbes, USA Today, and the Hill. He is the author of, most recently, Why is it So Hard to Go Back to the Moon? and The Man from Mars: The Asteroid Mining Caper. as well as Dark Crusade: A Vampire Gabriella Adventure) “Why mining asteroids and the moon will not destroy the world's economy,” Blasting News, 1/17/17, <https://us.blastingnews.com/opinion/2017/01/why-mining-asteroids-and-the-moon-will-not-destroy-the-world-s-economy-001401771.html>] TDI

The idea that asteroid mining is going to destroy the world economy exhibits a misunderstanding about how the new industry will work. The market for most Space materials, whether from the asteroids or the moon, **will not be on Earth,** for the most part, but in space. Water from the moon would be used to make rocket fuel and to support a lunar colony. Metals from worlds like 16 Psyche would be used to build things in space, not brought back to Earth as a building material. That arrangement would eliminate the need to ship everything from Earth.

**No escalation**

**Barrett 05** [(Robert Barrett, PhD Conflict & Post Doctoral Fellow, Conflict Analysis - University of Calgary & Principal and Senior Partner De Novo Group LLC) “Understanding the Challenges of African Democratization through Conflict Analysis,” IACM 18th Annual Conference, June 1, 2005]

Westerners eager to promote democracy must be wary of African politicians who promise democratic reform without sincere commitment to the process. Offering money to corrupt leaders in exchange for their taking small steps away from autocracy may in fact be a way of pushing countries into anocracy. As such, world financial lenders and interventionists who wield leverage and influence must take responsibility in considering the ramifications of African nations who adopt democracy in order to maintain elite political privileges. The obvious reason for this, aside from the potential costs in human life should conflict arise from hastily constructed democratic reforms, is the fact that Western donors, in the face of intrastate war would then be faced with channeling funds and resources away from democratization efforts and toward conflict intervention based on issues of human security. This is a problem, as Western nations may be increasingly wary of intervening in Africa hotspots after experiencing firsthand the unpredictable and unforgiving nature of societal warfare in both Somalia and Rwanda. On a costbenefit basis, **the West continues to be somewhat reluctant to get to get involved in Africa’s** dirty **wars**, evidenced by its political hesitation when discussing ongoing sanguinary grassroots conflicts in Africa. Even as the world apologizes for bearing witness to the Rwandan genocide without having intervened, the United States, recently using the label ‘genocide’ in the context of the Sudanese conflict (in September of 2004), has only proclaimed sanctions against Sudan, while dismissing any suggestions at actual intervention (Giry, 2005). Part of the problem is that traditional military and diplomatic approaches at separating combatants and enforcing ceasefires have yielded little in Africa. **No powerful nations want to get embroiled in conflicts they cannot win** – **especially those conflicts in which the intervening nation has very little interest.** It would be a false statement for me to say that there has never been a better time to incorporate the holistic insights of conflict analysis. The most opportune time has likely come and gone. Yet, Africa remains at a crossroads – set amidst the greatest proliferation of democratic regimes in history. It still has a chance. Yet, it is not only up to the West, but also Africans themselves, to stand against corruption, to participate in civil society and to ultimately take the initiative in uncovering and acknowledging the deep underlying issues perpetuating African conflict in order to open the door to democratic advancement and global interaction. Analysis will be the key that unlocks that door.

#### Aff doesn’t solve- war economies make conflict inevitable

Prendergrast 15

(John, 8-10-15, the Founding Director of the Enough Project (EnoughProject.org) and the Co-Founder of The Sentry (TheSentry.org), a new investigative initiative to counter the financing of Africa's deadliest wars. He was formerly a Director of African Affairs at the National Security Council., How to Destroy a War Economy, <http://foreignpolicy.com/2015/08/10/how-to-destroy-a-war-economy-sentry-smugglers-africa-conflict-enough-sentry-clooney/>, JKS)

Throughout history, war may have been hell, but for small groups of conflict profiteers it has also been very lucrative. Today’s deadliest conflicts in Africa — such as those in Sudan, South Sudan, Somalia, northern Nigeria, and the Democratic Republic of the Congo — are sustained by extraordinary opportunities for illicit self-enrichment that emerge in war economies, where there is a visible nexus between grand corruption and the instruments of mass atrocities. State armies and rebels use extreme violence to control natural resources, labor, and smuggling networks. Violence becomes self-financing from pillaging, natural resource looting, and the theft of state assets with connections that extend to New York, London, Dubai, and other global financial centers.¶ During the final year and a half of his presidency, President Barack Obama has a real opportunity to make a difference in helping to stop these wars — a cause he committed to during his recent trip to Africa. “If African governments and international partners step up with strong support, we can transform how we work together to promote security and peace in Africa,” Obama said in a [July 28 speech](https://www.whitehouse.gov/the-press-office/2015/07/28/remarks-president-obama-people-africa) in Ethiopia. He also threatened consequences for those who are unwilling to make peace. Speaking on Aug. 4 about a peace deal aimed at ending the South Sudan war, he [warned](http://news.yahoo.com/obama-heaps-pressure-warring-south-sudan-leaders-190447014.html) that the United States would have to “recognize that those leaders are incapable of creating the peace that is required” and find a new way forward if the country’s warring leaders miss an Aug. 17 deadline. But if the war economies that keep them going are not addressed, peace processes and counterterrorism efforts like the ones he focused on in South Sudan and Somalia during his trip stand little chance of success.

#### It’s the biggest factor in producing conflict- hijacked governments are untouched by other actors and rely on the war economy

Prendergrast 15

(John, 8-10-15, the Founding Director of the Enough Project (EnoughProject.org) and the Co-Founder of The Sentry (TheSentry.org), a new investigative initiative to counter the financing of Africa's deadliest wars. He was formerly a Director of African Affairs at the National Security Council., How to Destroy a War Economy, <http://foreignpolicy.com/2015/08/10/how-to-destroy-a-war-economy-sentry-smugglers-africa-conflict-enough-sentry-clooney/>, JKS)

In these hijacked African states, leaders use networks of enablers and financiers for personal enrichment and as a means to stay in power. Arms dealers, ivory traffickers, gold and diamond smugglers, minerals dealers, and others collude with government officials and rebel warlords — as well as, at times, terrorist networks — to maximize profit for a narrow few. Technically savvy and skilled at exploiting legitimate systems of finance, trade, and transport — as well as money laundering, regulatory and sanctions evasion, disguised beneficial ownership, diversion of state resources and assets, security sector fraud, and offshoring assets — these networks have remained largely untouched by law enforcement, regulation, or international sanctions. The joint African Union/United Nations High Level Panel on Illicit Financial Flows from Africa, chaired by former South African President Thabo Mbeki, estimated that Africa loses [$50 billion annually](http://www.theguardian.com/global-development/2015/feb/02/africa-tax-avoidance-money-laundering-illicit-financial-flows) because of this kind of graft.¶ Instability and the absence or subversion of the rule of law allow the biggest guns to control and profit from illicit economic activity, which would in a normal state operate under a legal framework and in the formal economy. Deadly violence serves multiple interests, and the states of emergency that rulers disingenuously declare in response to war allow them to further consolidate power, repress civil society and opposition, and enhance control of the spectacularly profitable illicit economy.¶ Political power and access to wealth and opportunity are so interlinked in hijacked states that it is difficult to separate greed from grievance in assessing motivations for conflict. Root causes involve a deadly cocktail of economic opportunism combined with social cleavages. And as war economies evolve and conflicts become more protracted, armed groups can fragment, especially if states employ divide-and-conquer military strategies, as has been seen in Sudan, South Sudan, Somalia, Congo, and other deadly conflicts in Africa.

### Case – solvency

Pub sector alt cause

#### International mining regimes are inefficient, corrupt, and enable exploitation – ISA proves

Roach 11-8-21

Anna Bianca Roach (she/they, degree in conflict studies from munk school of global affairs), 11-8-2021, "The Obscure Organization Powering a Race to Mine the Bottom of the Seas," PassBlue, https://www.passblue.com/2021/11/08/the-obscure-organization-powering-a-race-to-mine-the-bottom-of-the-seas/, // HW AW

On the seafloor, anemones with eight-foot-long tentacles live alongside [blind crabs](https://www.mbari.org/discovery-of-yeti-crab/) that cultivate food in their arm hair, sharks with glow-in-the-dark bellies and [glass sponges](https://www.mpg.de/5595233/climate_archive_deep-sea_sponge#:~:text=Researchers%20at%20the%20Max%20Planck,living%20animal%20species%20existing%20today.) that have been thriving since before the invention of the wheel. “Because of the lack of light and the fact that creatures do need to see each other to eat each other, you get these amazing photoluminescent animals down there,” said Helen Rosenbaum, the coordinator of the [Deep Sea Mining Campaign,](http://www.deepseaminingoutofourdepth.org/) an association of nongovernmental organizations located in Australia, Canada, the United States and the Pacific Islands. “We’re just starting to discover them!” The emerging industry of deep-sea mining is eyeing these otherworldly creatures’ home with keen financial interest: the potato-shaped rocks that provide a foothold for many of these animals in the otherwise silty, slippery environment of the ocean floor contain myriad metals that miners say are needed for a global eco-transition. At the heart of primary decision-making on deep-sea mining ventures is the [International Seabed Authority](https://www.isa.org.jm/), an autonomous organization based in Jamaica that critics say has little public oversight. “Our journey is to drive humankind through a wonderful adventure, which is to go very deep in the ocean to extract some minerals that are necessary for human activity on earth,” says Marie Bourrel-McKinnon, a special assistant to the secretary-general of the Authority, in one of its promotional [videos](https://www.youtube.com/watch?v=tzP-WqTJR_w&t=55s). The ISA, which was established through the 1982 [United Nations Convention on the Law of the Sea](https://www.un.org/depts/los/convention_agreements/convention_overview_convention.htm#:~:text=by%20%22*%22.-,The%20United%20Nations%20Convention%20on%20the%20Law%20of%20the%20Sea,the%20oceans%20and%20their%20resources.&text=The%20Convention%20also%20provided%20the,the%20law%20of%20the%20sea.), is led by the idea of a “common heritage of mankind,” a phrase that is used to explain that the wealth of the ocean floor should belong to all of humanity. Michael Lodge, the Authority’s secretary-general, says in the same video that the ISA’s focus on equity and common resources is what makes the organization special. “This is something that has never been done before,” he says. “It’s actually a unique experiment in human civilization.” **Critics balk at the organization’s lack of transparency and worry that the humanitarian intentions behind the Law of the Sea treaty aren’t enough to ensure that the monetary benefits of the minerals on the seafloor will reach everyone**. Some critics see an inherent contradiction in the Authority’s dual mandate to promote the development of deep-sea minerals while also protecting the environment. King among the coveted metals is cobalt, a mineral used for batteries in phones, electric cars and other electronics. Other minerals include nickel, manganese and copper. On land, these minerals — particularly cobalt — are shrouded in [controversy](https://www.youtube.com/watch?v=tzP-WqTJR_w&t=55s) related to child slavery and the environmental impacts of terrestrial mining, but they’re also in high demand. Large companies like the Canadian-based Metals Company and the American-based Lockheed Martin see these metals as the key to transitioning away from fossil fuels and contend that procuring these metals from the deep sea is a cleaner, more ethical alternative to digging them on land. “We’re on a quest for a more sustainable future, and we need metals to get there,” says [Gerard Barron](https://www.linkedin.com/in/gerardbarron), chief executive of the Metals Company, in an [advertisement](https://vimeo.com/286936275) for what was then called DeepGreen. “I don’t want to see more deforestation. I don’t want to see child labor. And I want to see us access the most sustainable supply of these important metals.” But scientists warn that disturbing these slow-moving ecosystems could hurt the biological pump — a process through which the ocean sequesters a substantial amount of carbon — in ways that can’t be remedied within generations. With the COP26 climate conference underway in Glasgow, Scotland, until Nov. 12, and the UN classifying the 2020s as the “Decade of Oceans,” leaders have been turning their eyes to the health of the seas and to the human activities that damage them. Peter Thomson, a Fijian diplomat and former president of the UN General Assembly who was president of the International Seabed Authority’s decision-making body twice, wrote an [open letter](https://ocean.economist.com/governance/articles/cop26-and-the-ocean-climate-nexus) calling for COP26 to devote attention to sustainability in the blue economy. “What the ocean gives, it can take away,” Thomson writes. “While our understanding of the ocean’s properties is still limited, we know it is the planet’s largest carbon sink, so that closely protecting the special places within it has become urgent work at hand.” Thomson is also the [UN’s envoy for the ocean.](https://sdgs.un.org/topics/oceans-and-seas/SpecialEnvoy) Other diplomats and advocates have spoken to similar concerns, including Monaco’s Prince Albert II. “We still need to avoid overexploitation of the ocean’s natural resources and the ocean floor,” he says in an [interview](https://people.com/royals/prince-albert-urges-bold-action-cop26-united-nations-climate-change-conference/) right before launching the most recent [Because the Ocean initiative](https://www.fpa2.org/en/initiatives/because-the-ocean-005) at COP26. “We cannot allow countries or large corporations to jump on every opportunity they see to exploit oil, gas or precious metal nodules protruding from the seabed without strict regulation.” Some experts and scientists who have worked with the ISA warn that harvesting metals from the mostly untouched ecosystems in the seafloor holds as much potential for global ecological devastation as it does for profit. The Authority has so far sold 31 licenses for companies and governments to explore the bottom of the high seas and is being [pressured](https://news.mongabay.com/2021/07/canadian-miner-looms-large-as-nauru-expedites-key-deep-sea-mining-rules/#:~:text=Nauru%2C%20which%20sponsors%20a%20company,whether%20regulations%20have%20been%20written.) by the small Pacific island nation of Nauru to authorize the beginning of mining operations within two years. Observers, civil society members and former employees of the ISA are raising alarms about **potential conflicts of interest in the organization and a lack of transparency surrounding funding for and profits from mining**. PassBlue’s investigation into the ISA’s operations has involved interviewing eight scientists, researchers and lawyers familiar with deep-sea mining as well as four former ISA employees and scouring documents from the Authority, embassy cables, civil society reports, academic papers and from the UN Appeals Tribunal, which is hearing [disputes](https://www.un.org/en/internaljustice/files/unat/orders/order-unat-2018-328.pdf) from employees who have left the organization. **The portrait that emerges is of an organization with a vested interest in promoting the work of the underwater mining industry, a consistent habit of alienating international marine scientists whose findings favor a more cautious approach to exploiting the ocean floor and a lack of good-faith engagement with civil society.** “If you guys are the first to mine, the first to extract nodules from international waters, it’s opening oceans earthwide,” Adrian Hellman, an Australian environmental scientist, says in an [ad](https://vimeo.com/user79094991) for the Metals Company. “What happens initially is going to affect everything down the track.” Although the push to speed up the start of undersea mining has been triggered by a two-year clause initiated by Nauru, it doesn’t mean that the Authority has to finalize the necessary legislation within two years, Duncan Currie of the [Deep Sea Conservation Coalition](http://www.savethehighseas.org/) says. The group consists of more than 80 international organizations that promote the conservation of biodiversity in the high seas. “**Once regulations are adopted, the voting requirements make it extremely difficult to disapprove a mining application, so it’s likely numerous 30 year contracts will be approved,**” Currie added in an email, noting that the contracts cannot be amended or canceled without the consent of the mining contractor. “Under the two-year rule, contracts can even be approved without regulations being in place. And it is likely they cannot be cancelled or amended without the contractor’s agreement.” PassBlue [published the first of its two-part investigation](https://www.passblue.com/2021/09/29/pressure-builds-to-mine-international-waters-amid-questions-about-ecosystems-and-profit-sharing/) on the ISA on Sept. 29, focusing on the efforts by Nauru to trigger deep-sea mining licenses. A spokesperson for the ISA declined an interview on the topic after repeated requests from PassBlue. A delegate of Nauru, Margo Deiye, attending the 26th session of the ISA, Feb. 18, 2020. The small Pacific island nation has triggered a clause at the ISA giving its member states the ability to demand that the process of granting mining permits to begin soon, possibly jeopardizing the delicate ecosystems of the oceans. ISA Navigating with good intentions? “A lot of idealists go into the International Seabed Authority thinking, ‘Oh wow, this is a place where there’s actually a statement about ensuring effective protection of the marine environment from harmful effects of seabed mining, and making sure that all states can participate in these activities,'” says Kristina Gjerde, who represents the [International Union for Conservation of Nature](https://www.iucn.org/) at ISA meetings. But she says that **the Authority is led more by corporate interests** than for “the benefit of all mankind,” the Authority’s stated goal. “It’s difficult for states to put on their hats as representing the global community interests, as opposed to one particular economic sector or another,” Gjerde told PassBlue. “Now that interest in seabed minerals is rising, this gives rise to very serious concerns about potential conflicts of interest.” The members of the ISA consist of 167 countries and the European Union. Formally, the organization is made up of five bodies: the Secretariat; the Assembly, where member countries are represented; the Council, elected by the Assembly; the Finance Committee; and the Legal and Technical Committee. The latter is tasked with making recommendations to the Council about approving legislation; together with the Secretariat, this committee is the most influential of the Authority’s organs. Longtime observers say that the Legal and Technical Committee has also never turned down an application for an exploration license. Critics of the ISA, including former employees who spoke to PassBlue confidentially, point to its leadership and revenue structure as the source of many of its problems. When deep-sea mining may actually begin, the ISA plans to receive a cut of the profits from the mining operations to cover its operating expenses. Until then, the organization receives money in two ways: through sales of exploration licenses and member states’ voluntary donations or assessed contributions. The ISA collects a $500,000 application fee for each exploration license that it grants as well as a yearly administrative fee of $47,000 per contractor doing the exploring, according to a 2019 [presentation](https://isa.org.jm/files/files/documents/dec-analysis_0.pdf) on the ISA’s payment regime. A [2020 report](https://isa.org.jm/files/files/documents/ISBA_26_FC_4-2006697E.pdf) by the Finance Committee to the Authority’s Secretary-General Lodge expressed concern that many member states haven’t been paying their assessed contributions. Outstanding contributions currently total just over $1.1 million, representing more than a month of the organization’s yearly budget. According to a former finance officer, who spoke to PassBlue but asked to remain anonymous because of the sensitivity of the information, the ISA depends heavily on the exploration license fees for its roughly $10 million annual operating budget. PassBlue has been unable to verify how much of the budget comes from contractor fees, as the Authority did not share audited financial statements after repeated requests to do so. The ISA also has a track record of dismissing scientists or employees who raise concerns about the speed at which decisions surrounding deep-sea mining are being taken, several former employees and longtime observers to the organization said. “I decided to speak out about the fact that, you know, we didn’t have enough science to be making informed decisions about how to manage this activity, unless the decision was not to proceed,” says Diva Amon, a marine biologist who [received](https://www.isa.org.jm/news/isa-secretary-general-presents-inaugural-edition-award-excellence-deep-sea-research-dr-diva) the ISA’s Award for Excellence in Deep Sea Research in 2018, referring to the writing of the Authority’s regulations around deep-sea mining. “That was when the relationship [with the Authority] switched.” Amon says she no longer gets invitations to the workshops that the ISA hosts on environmental management. The workshops are one way that the ISA consults scientists to inform members of the Legal and Technical Committee on policy decision-making. But some scientists who attend the workshops question whether their advice is being heeded. [Pradeep Singh](https://de.linkedin.com/in/pradeeparjansingh), a researcher at the University of Bremen, in Germany, who specializes in the Law of the Sea treaty, said that the reports on the workshops have gotten less substantive and sometimes fail to include the recommendations made by scientists at the gatherings. “If all this scientific input is not included in the workshop report,” he told PassBlue, “it won’t come to the attention of the Legal and Technical Committee.” Singh also said the organization’s selection of scientists attending the meetings isn’t transparent. Sabine Christiansen, a senior researcher at the German-based Potsdam Institute for Advanced Sustainability Studies, agreed. She has been studying the ISA since 2001 and attending the organization’s meetings since 2009, and says that it has a tendency to invite mostly “like-minded” scientists, a sentiment that other observers have also echoed. Who’s steering the ship? The relationship between Lodge, the secretary-general of the Authority, and the Metals Company, the Canadian company that holds three of the 31 current exploration licenses, especially concerns critics of the ISA. Lodge sparked controversy when he [tweeted](https://twitter.com/mwlodge/status/984626856384221185) a photo of himself in 2018, wearing a hard-hat branded DeepGreen, the previous name of the Metals Company, on one of its exploration cruises. Lodge also represented the ISA in an [ad](https://vimeo.com/286936275) for DeepGreen, where he said that mineral resources on Earth are dwindling and becoming more expensive and environmentally damaging to mine. [Baron Divavesi Waqa,](https://en.wikipedia.org/wiki/Baron_Waqa) the president of Nauru from 2013 until 2019, is also featured in the ad as well as in Lodge’s tweeted photos of the deep-sea cruise. [Lodge](https://www.isa.org.jm/secretary-general) is a British lawyer with a background in ocean law and fisheries management and has worked extensively in the South Pacific, where he was a lead negotiator for the 1995 [Fish Stocks Agreement](https://www.un.org/depts/los/convention_agreements/convention_overview_fish_stocks.htm), part of the Law of the Sea treaty. He has been with the ISA as a legal counsel since 1996 and was elected secretary-general in 2016. He did not respond to repeated requests for an interview from PassBlue. Christiansen of the Potsdam Institute says the climate at the ISA has become “less open” since Lodge’s election, citing less-thorough public reports. The Metals Company has been the most active corporation pushing for deep-sea mining to begin. It holds an exploration contract sponsored by Nauru through a local subsidiary. Gerard Barron, chief executive of DeepGreen (and now heading its renamed Metals Company), [represented](https://enb.iisd.org/events/1st-part-25th-annual-session-international-seabed-authority-isa/highlights-and-images-main-1) Nauru at the ISA’s Assembly meeting in 2019. In March 2021, the Metals Company [released](https://metals.co/deepgreen-combines-to-form-the-metals-company/) a $2.9 billion initial public offering stating that it would begin producing metals — and mining the ocean — as soon as 2024. Today, the company appears to be struggling, however, with one major investor [suddenly pulling out](https://www.ft.com/content/6675ac1e-a9a0-48d8-b4e9-aee2ef27c7be) his capital and a [class-action lawsuit](https://www.businesswire.com/news/home/20211028005874/en/EQUITY-ALERT-Rosen-Law-Firm-Files-Securities-Class-Action-Lawsuit-Against-TMC-the-metals-company-Inc.-fka-Sustainable-Opportunities-Acquisition-Corp.-%E2%80%93-TMC-TMCWW-SOAC-SOAC.U-SOACWS) accusing the company of misleading information in documents for investors. Lodge’s public statements on mining also raise questions about his commitment to protecting the environment when that work contradicts the interests of mining companies. Scientists, including the ISA awardee Diva Amon, have for years been calling for a moratorium on deep-sea mining to give scientists and miners more time to understand its potential consequences and devise mitigation strategies. During a [June 2020 hearing](http://www.dekamer.be/media/index.html?sid=55U0739) in Belgium’s parliament, Lodge said he had not heard a “powerful” call for a moratorium and called such an initiative “anti-science, anti-knowledge, anti-development and anti-international law.” In September 2021, 81 governments, more than 500 civil society organizations and several multinational companies, including Google, [jointly called](https://www.iucncongress2020.org/motion/069) for the moratorium. They also called on the ISA to improve its transparency and accountability. A deep-sea jellyfish collected by a remotely operated vehicle from a depth of at least 4,920 feet in the Celebes Sea of the western Pacific Ocean. The red color is common among deep-sea medusas, as it is invisible in the perpetual darkness and at the same time masks any bioluminescence of prey in the jelly’s gut. NOAA-OFFICE OF OCEAN EXPLORATION AND RESEARCH Sharing the profits The ISA was established “with this amazing principle as its fundamental legal basis to act on behalf of humankind,” Gjerde of the International Union for the Conservation of Nature says. The ISA contends that it is committed to prioritizing the interests of developing nations through the financial and economic frameworks that it writes for the exploitation of the riches that lie at the ocean floor. Though the US is not a party to the Law of the Sea treaty, American organizations still have influence over the ISA. Through subsidiaries, the weapons manufacturer Lockheed Martin holds two exploration contracts. The ISA also relies heavily on research by the Massachusetts Institute of Technology for its economic predictions. A [leaked US embassy cable](https://wikileaks.org/plusd/cables/05KINGSTON2220_a.html) from 2005 describes the involvement of the US in the Authority’s meetings, noting that the choice of an “acceptable” candidate to succeed then-secretary-general Satya Nandan would be an issue that the US would “want to address in the near future.” The 31 exploration licenses that the Authority has sold so far are held by a total of 23 governments, nationally owned entities and private companies. Seven of the contracts are set aside as “reserved areas,” which are donated by wealthy countries and meant to benefit developing countries. A closer look at the complex web of the parties involved with the exploration licenses, however, raises questions as to whether the mechanism is working as intended. “Sponsoring states need to think carefully, because if they fail to exercise due diligence and the company causes environmental damage because of that, they can be held liable,” Gjerde says, paraphrasing an [advisory opinion](https://www.asil.org/insights/volume/15/issue/7/advisory-opinion-seabed-disputes-chamber-international-tribunal-law-sea-) of the International Tribunal for the Law of the Sea. Of the contracts reserved for developing countries, three are owned by the Metals Company; one is a Chinese state company; one is a joint venture among Lockheed Martin, the Singaporean conglomerate Keppel and an investment company whose ownership is unknown; one is a joint venture between the Cooks Islands government and the Belgian dredging company DEME; and one is Blue Minerals Jamaica, of which little is known except its association with Peter Henrik Jantzen, a Dane. Indeed, as pressure increases for the Authority to speed up the process of allowing the mining of the deep sea, it remains an obscure body with little public oversight. The next meetings for the ISA Council and the Assembly, postponed last year due to the Covid crisis, are planned for December. “We have all these other activities in the high seas,” Christiansen of the Potsdam institute says. “The ISA is adding new pressures on the ocean, and nobody’s looking.”

#### Space treaties get circumvented through domestic legislation and legal ambiguities will be exploited – the Outer Space Treaty proves

Stockwell 20 [Samuel Stockwell. Research Project Manager, the Annenberg Institute at Brown University. “Legal ‘Black Holes’ in Outer Space: The Regulation of Private Space Companies.” E-International Relations. July 20, 2020. <https://www.e-ir.info/2020/07/20/legal-black-holes-in-outer-space-the-regulation-of-private-space-companies/>] HW AL

Envisaging appropriation concerns that might arise from the future extraction of space assets by spacefaring nations, Article II of the UN OST declared that: “Outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means” (UN, 1967). The emphasis on claims of national sovereignty were intimately tied to the Cold War context at the time, where space activities were under the exclusive monopoly of governmental agencies and initiated for goals of military dominance or national prestige (Sachdeva, 2017: 210). However, the privatisation of the space industry that has occurred since the 1980s has meant that the legislation leaves an enormous amount of legal ambiguity and interpretation regarding the regulation of private resource mining in space. As Shaer (2016) demonstrates, the Article II provision fails to address either the exploitation of space for financial gain or the property claims of commercial enterprises (Shaer, 2016: 47). Nevertheless, Article VI of the UN OST asserts that: “States shall be responsible for national space activities whether carried out by governmental or non-governmental entities” (UN, 1967; own emphasis). Some scholars have suggested that this clause significantly restrains the activities of private space corporations by incentivising states to regulate their domestic organisations for fear of liability concerns (Abeyratne, 1998: 168). **However, the US government recently enacted a piece of legislation which exploited this clause, in order to circumvent its own restrictions** and strengthen US economic influence in space. The passage of the 2015 SPACE Act enabled US citizens to privately “possess, own, transport, use, and sell the resources” they obtain in outer space, whilst making careful consideration to deny national sovereign claims over such materials (Leon, 2018: 500). Yet, regardless of whether it is an American private company or public venture, the US is still satisfying its geopolitical interests; by exclusively siphoning off extra-terrestrial resources for American gain, the nation’s soft power is thereby extended at the expense of spacefaring adversaries such as China (Basu & Kurlekar, 2016: 65). Indeed NewSpace actors cleverly played on these strategic concerns prior to the bill’s passage, with billionaire space entrepreneur Robert Bigelow asserting that the biggest danger wasn’t private enterprises on the Moon, but that “America is asleep and does nothing, while China comes along… surveying and laying claim [to the Moon]” (Klinger, 2017: 222). The UN Outer Space Treaty and Rise of the ‘NewSpace’ Actors Although ratified into international law in 1967, the UN Outer Space Treaty (OST) is perhaps still the most relevant piece of legislation for analysing state and non-state entity activity in outer space. Designed to prevent both the militarisation of space and national appropriation of celestial bodies at the height of Cold War tensions, the UN OST holds significant influence as a form of customary international law (Hebert, 2014: 6). Ratified by over 100 nations – including major spacefaring nations such as the United States, Russia and China – the treaty is widely accepted as an authoritative document and has formed the basis for all other space treaties that have succeeded it (Kramer, 2017: 129). This is in contrast to more recent legislation such as the 1972 Moon Treaty designed to promote cooperation in Moon exploration and development, which the US and other major space superpowers have refrained from signing (Adolph, 2006: 968-969). The type of American actors becoming involved in the realm of outer space has undergone significant diversification. Despite working alongside NASA since the 1950s, commercial enterprises were largely confined to the manufacturing of parts utilised in rockets and other equipment for space activities (Lal, 2016: 63-66). However, the continuous sharp decline in NASA’s overall budget that has occurred since the Apollo 11 moon landing, and the increasing trends towards the privatisation of government functions has drastically altered both the capabilities and the outlooks of private space companies. Indeed, although the space economy is growing overall, global government spending decreased by 1.3% between 2012 and 2013 while commercial-sector growth increased by roughly 7% (Conklin, 2017: 33). Central to the impetus behind this private sector space boom has been the emergence of the so-called ‘NewSpace’ actors – “a broad range of primarily US-based entrepreneurs… who, for more than 30 years, have aimed to commercialise space” (Valentine, 2012: 1046). Driven by a libertarian outlook of economics, and critical of NASA’s historical grip on space exploration, these individuals portray themselves as the pioneers of the ‘final frontier’ who will save humanity from extinction through privately-funded extra-terrestrial missions (Kearnes & van Dooren, 2017: 182). Near-Earth Object and Lunar Resource Mining: US Private Property in Space Lunar rock samples from the Apollo missions containing rare Earth resources, such as Helium-3 which produces more power and less waste than traditional nuclear reactors on Earth, have since fuelled incentives for extra-terrestrial resource mining (Brearley, 2006: 44-46). This was further facilitated by suggestions that near-earth objects (NEOs) like the so-called ‘Anteros asteroid’ could comprise of over five trillion dollars’ worth of magnesium silicate and aluminium (Kramer, 2017: 131). On 30th April 2020, NASA – the US government’s space agency ­– awarded three private space companies a joint-contract worth $967m to complete a lunar mission by 2024, in what was celebrated as “the last piece that [America] need[s] in order to get to the moon” by NASA administrator Jim Brindestine (The Telegraph, 2020). Yet, whilst this development was widely covered in the media, less coverage has focused on the extent to which existing international legislation surrounding outer space endeavours appropriately applies to private entities. Indeed, the prospect of a corporate foothold within the extra-terrestrial domain has thrown up both a mixture of optimism and concern regarding the potential benefits of expanding capital projects into space (Adolph, 2006; Dickens & Ormrod, 2007). By adopting the 1967 UN Outer Space Treaty (OST) as an analytical framework in relation to the rise of the so-called US ‘NewSpace’ actors, this essay argues that there are significant legal ambiguities regarding the status of private space companies in orbital space. **Such loopholes allow the US government to circumvent its own obligations to the OST**, whilst simultaneously undermining the notion of space as a ‘global commons’ through a commodification process. **The lack of specificity within the OST surrounding private property rights** over extra-terrestrial resources **risks** the prospect of **reinforcing** Earth-bound **wealth inequalities and US dominance in space**, by restricting the potential economic benefits for the broader global citizenry in favour of a narrow class of wealthy American investors. Moreover, the OST’s weak clause regarding the regulation of space surveillance risks the incentivisation of a ‘global panopticon’ network of US satellites. The rise of dual-use technology is blurring the boundaries between military and civilian observations, raising serious ethical concerns over the nature of US space-based data collection. Finally, the increasing number of private satellite constellations is facilitating the possibility of cataclysmic space debris collisions which could exacerbate geopolitical tensions. Such developments are also contributing towards the contamination of the broader space environment in ways that the OST had never envisioned.