## 1

#### Space Commercialization is key to Space Deterrence – Commercial Flexibility is key to deterrence by denial.

Klein 19, John J. Understanding space strategy: the art of war in space. Routledge, 2019. (a Senior Fellow and Strategist at Falcon Research, Inc. and Adjunct Professor at George Washington University’s Space Policy Institute)//Elmer

Recent U.S. space policy initiatives underscore the far-reaching benefits of commercial space activities. The White House revived the National Space Council to foster closer coordination, cooperation, and exchange of technology and information among the civil, national security, and commercial space sectors.1 National Space Policy Directive 2 seeks to promote economic growth by streamlining U.S. regulations on the commercial use of space.2 While the defense community generally appreciates the value of services and capabilities derived from the commercial space sector—including space launch, Earth observation, and satellite communications—it often overlooks one area of strategic importance: deterrence. To address the current shortcoming in understanding, this paper first describes the concept of deterrence, along with how space mission assurance and resilience fit into the framework. After explaining how commercial space capabilities may influence the decision calculus of potential adversaries, this study presents actionable recommendations for the U.S. Department of Defense (DoD) to address current problem areas. Ultimately, DoD—including the soon-to-be reestablished U.S. Space Command and possibly a new U.S. Space Force—should incorporate the benefits and capabilities of the commercial space sector into flexible deterrent options and applicable campaign and contingency plans. Deterrence, Mission Assurance, and Resilience Thomas Schelling, the dean of modern deterrence theory, held that deterrence refers to persuading a potential enemy that it is in its interest to avoid certain courses of activity.3 One component of deterrence theory lies in an understanding that the threat of credible and potentially overwhelming force or other retaliatory action against any would-be adversary is sufficient to deter most potential aggressors from conducting hostile actions. This idea is also referred to as deterrence by punishment.4 The second salient component of deterrence theory is denial. According to Glenn Snyder’s definition, deterrence by denial is “the capability to deny the other party any gains from the move which is to be deterred.”5 The 2018 U.S. National Defense Strategy (NDS) highlights deterrence, and specifically deterrence by denial, as a vital component of national security. The NDS notes that the primary objectives of the United States include deterring adversaries from pursuing aggression and preventing hostile actions against vital U.S. interests.6 The strategy also observes that deterring conflict necessitates preparing for war during peacetime.7 For the space domain, the peacetime preparedness needed for deterrence by denial occurs in the context of space mission assurance and resilience. Mission assurance entails “a process to protect or ensure the continued function and resilience of capabilities and assets—including personnel, equipment, facilities, networks, information and information systems, infrastructure, and supply chains—critical to the performance of DoD mission essential functions in any operating environment or condition.”8 Similar to mission assurance but with a different focus, resilience is an architecture’s ability to support mission success with higher probability; shorter periods of reduced capability; and across a wider range of scenarios, conditions, and threats, despite hostile action or adverse conditions.9 Resilience may leverage cross-domain solutions, along with commercial and international capabilities.10 Space mission assurance and resilience can prevent a potential adversary from achieving its objectives or realizing any benefit from its aggressive action. These facets of U.S. preparedness help convey the futility of conducting a hostile act. Consequently, they enhance deterrence by denial. Commercial Space Enables Deterrence The commercial space sector directly promotes mission assurance and resilience efforts. This is in part due to the distributed and diversified nature of commercial space launch and satellites services. Distribution refers to the use of a number of nodes, working together, to perform the same mission or functions as a single node; diversification describes contributing to the same mission in multiple ways, using different platforms, orbits, or systems and capabilities.11 The 2017 U.S. National Security Strategy, in noting the benefits derived from the commercial space industry, states that DoD partners with the commercial sector’s capabilities to improve the U.S. space architecture’s resilience.12 Although U.S. policy and joint doctrine frequently acknowledge the role of the commercial space sector in space mission assurance and resilience, there is little recognition that day-to-day contributions from the commercial industry assists in deterring would-be adversaries. The commercial space sector contributes to deterrence by denial through multi-domain solutions that are distributed and diversified. These can deter potential adversaries from pursuing offensive actions against space-related systems. Commercial launch providers enhance deterrence by providing options for getting payloads into orbit. These include diverse space launch capabilities such as small and responsive launch vehicles, along with larger, reusable launch vehicles; launch rideshares for secondary payloads; and government payloads on commercial satellites. Various on-orbit systems also promote deterrence. For example, if an aggressor damages a commercial remote sensing satellite during hostilities, similar commercial satellites in a different orbital regime, or those of the same constellation, may provide the needed imagery. If satellite communications are jammed or degraded, commercial service providers can reroute satellite communications through their own networks, or potentially through the networks of another company using a different portion of the frequency spectrum. Regarding deterrence by punishment efforts, the commercial space sector can play a role, albeit an indirect one, through improved space situational awareness (SSA) and space forensics (including digital forensics and multispectral imagery). The commercial industry may support the attribution process following a hostile or illegal act in space through its increasingly proliferating network of SSA ground telescopes and other terrestrial tracking systems. The DoD may also leverage the commercial space sector’s cyber expertise to support digital forensic efforts to help determine the source of an attack. By supporting a credible and transparent attribution process, commercial partners may cause a would-be adversary to act differently if it perceives that its aggressive, illegal, or otherwise nefarious actions will be disclosed. Doing so can help bolster the perceived ability to conduct a legitimate response following a hostile attack, which may improve deterrence by punishment efforts. Commercial space capabilities may also facilitate the application of force to punish a potential aggressor. In addition to traditional military space systems, commercial satellite imagery and communication capabilities may be used in cueing and targeting for punitive strikes against an aggressor. Although the commercial space sector is not expected to be involved directly in the use of retaliatory force following a hostile act, commercial partners may help in providing the information used to identify those responsible and to facilitate any consequent targeting efforts.

#### Space Deterrence Breakdowns causes War and Extinction.

Parker 17 Clifton Parker 1-24-2017 “Deterrence in space key to U.S. security” <https://cisac.fsi.stanford.edu/news/deterrence-space-key-us-security> (Policy Analyst at the Stanford Center for International Security and Cooperation)//Elmer

Space is more important than ever for the security of the United States, but it’s almost like the Wild West in terms of behavior, a top general said today. Air Force Gen. [John Hyten](http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/108115/general-john-e-hyten.aspx), commander of the U.S. Strategic Command, spoke Jan. 24 at Stanford’s [Center](http://cisac.fsi.stanford.edu/) for International Security and Cooperation. His [talk](http://cisac.fsi.stanford.edu/events/us-strategic-command-perspectives-deterrence-and-assurance) was titled, “U.S. Strategic Command Perspectives on Deterrence and Assurance.” Hyten said, “Space is fundamental to every single military operation that occurs on the planet today.” He added that “there is no such thing as a war in space,” because it would affect all realms of human existence, due to the satellite systems. Hyten advocates “strategic deterrence” and “norms of behavior” across space as well as land, water and cyberspace. Otherwise, rivals like China and Russia will only threaten U.S. interests in space and wreak havoc for humanity below, he said. Most of contemporary life depends on systems connected to space. Hyten also addressed other topics, including recent proposals by some to upgrade the country’s missile defense systems. “You just don’t snap your fingers and build a state-of-the-art anything overnight,” Hyten said, adding that he has not yet spoken to Trump administration officials about the issue. “We need a powerful military,” but a severe budget crunch makes “reasonable solutions” more likely than expensive and unrealistic ones. On the upgrade front, Hyten said he favors a long-range strike missile system to replace existing cruise missiles; a better air-to-air missile for the Air Force; and an improved missile defense ground base interceptor. ‘Critically dependent’ From satellites to global-positioning systems GPS, space has transformed human life – and the military – in the 21st century, Hyten said. In terms of defining "space," the U.S. designates people who travel above an altitude of 50 miles as astronauts. As the commander of the U.S. Strategic Command, Hyten oversees the control of U.S. strategic forces, providing options for the president and secretary of defense. In particular, this command is charged with space operations (such as military satellites), information operations (such as information warfare), missile defense, global command and control, intelligence, surveillance, and reconnaissance, global strike and strategic deterrence (the U.S. nuclear arsenal), and combating weapons of mass destruction. Hyten explained that every drone, fighter jet, bomber, ship and soldier is critically dependent on space to conduct their own operations. All cell phones use space, and the GPS command systems overall are managed at Strategic Command, he said. “No soldier has to worry about what’s over the next hill,” he said, describing GPS capabilities, which have fundamentally transformed humanity’s way of life. Space needs to be available for exploration, he said. “I watch what goes on in space, and I worry about us destroying that environment for future generations.” He said that too many drifting objects and debris exist – about 22,000 right now. A recent Chinese satellite interception created a couple thousand more debris objects that now circle about the Earth at various altitudes and pose the risk of striking satellites. “We track every object in space” now, Hyten said, urging “international norms of behavior in space.” He added, “We have to deter bad behavior on space. We have to deter war in space. It’s bad for everybody. We could trash that forever.” But now rivals like China and Russia are building weapons to deploy in the lower levels of space. “How do we prevent this? It’s bigger than a space problem,” he said. Deterring conflict in the cyber, nuclear and space realms is the strategic deterrence goal of the 21st century, Hyten said. “The best way to prevent war is to be prepared for war,” he said. Hyten believes the U.S. needs a fundamentally different debate about deterrence. And it all starts with nuclear weapons. “In my deepest heart, I wish I didn’t have to worry about nuclear weapons,” he said. Hyten described his job as “pretty sobering, it’s not easy.” But he also noted the mass violence of the world prior to 1945 when the first atomic bomb was used. Roughly 80 million people died from 1939 to 1945 during World War II. Consider that in the 10-plus years of the Vietnam War, 58,000 Americans were killed. That’s equivalent to two days of deaths in WWII, he said. In a world without nuclear weapons, a rise in conventional warfare would produce great numbers of mass casualties, Hyten said. About war, he said, “Once you see it up close, no human will ever want to experience it.” Though America has “crazy enemies” right now, in many ways the world is more safe than during WWII, Hyten said. The irony is that nuclear weapons deterrence has kept us from the type of mass killings known in events like WWII. But the U.S. must know how to use its nuclear deterrence effectively. Looking ahead, Hyten said the U.S. needs to think about space as a potential war environment. An attack in space might not mean a response in space, but on the Earth. Hyten describes space as the domain that people look up at it and still dream about. “I love to look at the stars,” but said he wants to make sure he’s not looking up at junk orbiting in the atmosphere.

## 2

#### We are a punk civilization; your pleasure is your death, violence collapses to mere representation, to mere mass consumption of spectacular snuff of your naked life. No secrets. No meaning. Pharmacoporngraphic representation screeches nothing but its own death. Extinction is only inevitable in the pharmacoporngraphic regime. It’s now a matter of how we record that death.

**Preciado 13( Paul B. Preciado, Testo Junkie: Sex, Drugs, And Biopolitics in the Pharmacoporgraphic era, The micropolitics of gender in the pharmacoporngraphic era, Snuff Politics, pg 344-347) Lynbrook SY**

snuFF pOliTiCs The fact is that we’re being fucked right off the bat: becoming a punk civilization.The sudden emergence of the punk movement in 1977 was not a simple microphenomenon, but the last lucid explosion of what seems today to be the only ideal shared by the members of what has been called the human species: the pleasure instinct as a death instinct. At the beginning of the twenty-first century, no cultural production has entailed such a punk dimension as much as snuff has—the filming of death as it happens. In popular culture, *snuff* refers to those films that show the murder of a person or animal with the unique objective of making that death visible, transforming it into public, marketable representation. ***The micropolitics of Gender in the Pharmacopornographic era* 345** Everything, in fact, begins as something sham. In 1971, Z-series directors Michael and Roberta Findlay made *The Slaughter*, a small-budget film production that combined erotic scenes with horror scenes. That same year, Ed Sand- ers interviewed Charles Manson. Manson claimed to have recorded some of the celebrity murders perpetrated by his followers under his authority. No trace of such films were found, but the myth of snuff was born. In 1972, the dis- tributor Alan Shackleton got ahold of *The Slaughter*, added a last scene in which one of the actresses is disemboweled (fictionally) in front of the camera, and rereleased this new edit under the title *Snuff*. The premiere of the film took place in 1976 and provoked an unprecedented debate over the verity of the actress’s death. Antiporn groups, pro-cen- sorship feminists, and the media took part in this debate. The film, which had no other cinematographic or narrative interest outside the evisceration scene, would garner unex- pected profits. As a questioning of representational limits, snuff has served as a pornographic paradigm for both pro-censorship feminists and antiporn Christians, and also as a formal model of realism to which the dramatization of sex in por- nography must tend: a film is that much more pornographic if the sexual scene that is filmed is real, in the same way that a representation is snuff when the crime has *actually* taken place. Radically postmodern, the notion of snuff is opposed to the dramatic or simulated and mimetic quality of all rep- resentation. On the contrary, it affirms the performative power of representation to modify reality, or a desire for the real to exist in and by representation. This brings us **346 *The micropolitics of Gender in the Pharmacopornographic era*** to the theatrical relationship between pornography, snuff, and politics. Today, some snuff film catalogs offer images filmed by Allied or Nazi soldiers in concentration camps, Zapruder’s film of the John F. Kennedy assassination, the film of the assassination of Yitzhak Rabin, videos of the executions of prisoners of war in Afghanistan and Iraq, vid- eos showing the American army destroying Iraqi villages, images of the destruction of New York’s Twin Towers and of the execution of Saddam Hussein. Politics has become snuff: extermination by and for representation. The mushroom cloud left in the sky by the atomic bomb, the photograph of the completely naked little girl running away from the Vietnam village Trang Bang in flames after a napalm attack, the sperm-filled lips of Linda Lovelace, piles of mutilated limbs in Rwanda, double penetration, the terri- fying feats performed in *Big Brother* and the surgical scenes in *Nip/Tuck*, the liters of fat suctioned from the buttocks of American housewives for the cameras of *Extreme Make- over*, murders at the maximum-security San Quentin State Prison filmed by security cameras—all of them say more about the current state of our species than any philosophy book of the twentieth century, from Husserl to Sartre. The distinctive feature of the *techno-porno-punk* moment is *snuff politics*: rip away everything from life to the point of death and film the process, record it in writing and image, distrib- ute it live over the Internet, make it permanently accessible in a virtual archive, an advertising medium on the global scale. By the beginning of the twenty-first century, our spe- cies had literally stuck good philosophical intentions up our ***The micropolitics of Gender in the Pharmacopornographic era* 347** ass, filming the thing before marketing the images from it. The philosophy of the pharmacopornographic regime has been reduced to an enormous, dripping butt-plug camera. In such circumstances, the philosophy of such high-punk modernity can only be autotheory, autoexperimentation, auto-techno-penetration, pornology. When surmising about the future of the planet, Donna J. Haraway encourages us to avoid two kinds of narrative traps of the metaphysical and semiotico-fascist kind. First, there is the messianic temptation: someone will come to save us—some unique religious or technical force, an all- powerful understanding that possesses all the answers needed to transform the human condition(systems of power, util, commi, socialism, etc). Second, there is the apocalyptic temptation: nothing can be done, and the disappearance of the species is imminent.(Fiat, just assuming someone else will do it, the usfg will do it, a system, wto will do it, we will look for them to do it, when itn reality we need to think about what WE can do. Fiat illusory; unproductive we are being other people, but that’s not what should do) Haraway tells us, “We might profitably(beneficial) learn to doubt our fears and cer- tainties of disasters as much as our dreams of progress. We might learn to live without the bracing discourses of salvation history.”11 The problem resides precisely in the fact that no one will come to save us and that we are still some distance from our inevitable disappearance. It will thus be necessary to think about doing something while we are on the way out, undergoing mutation or changing planets, even if this something consists in intentionally accelerating our own disappearance, mutation, or cosmic displacement. Let us be worthy of our own fall and imagine for the time left the components of a new pornopunk philosophy. The prinCiple OF The auTO–guinea pig The first principle of a trans-feminism movement capable of facing *porno-punk* modernity: the fact that your body, the body of the *multitude* and the pharmacopornographic networks that constitute them are political laboratories, both effects of the process of subjection and control and potential spaces for political agency and critical resistance to normalization. I am pleading here for an array of poli- tics of physical experimentation and semiotechnology that (in the face of the principle of political representation, which dominates our social life and is at the core of politi- cal mass movements, which can be as totalitarian as they are democratic) will be regulated by the principle that—in accordance with Peter Sloterdijk’s intuitions—I will call the “principle of the auto-guinea pig.”12 In China, in 213 BC, all books were burned by order of the emperor. In the fifth century, after a series of wars had ransacked and decimated the library at Alexandria, it was accused of harboring pagan teachings contrary to the Christian faith and was destroyed by the decree of Emperor Theodosius. The greatest center of research, translation, and reading disappeared. Between 1330 and 1730, thou- sands of human bodies were burned during the Inquisition, thousands of books were destroyed, and hundreds of works related to the expertise and production of subjectivity were relegated to oblivion or to the underground. In 1813, 12. In his interview with Hans-Jürgen Heinrichs, Peter Sloterdijk evokes “voluntary intoxication” and “auto-guinea pig” techniques in reference to Samuel Hahnemann; see Peter Sloterdijk, *Neither Sun Nor Death*. With Hans-Jürgen Heinrichs, trans. Steven Corcoran (New York: Semiotext(e), 2011). ***The micropolitics of Gender in the Pharmacopornographic era* 349** American soldiers took York (now Toronto) and burned the parliament and legislative library. A year later, the Library of Congress was razed. In 1933, one of the first actions of the Nazi government was the destruction of the Institut für Sexualwissenschaft (Institute for Sexual Research) in Ber- lin. Created in 1919 by Magnus Hirschfeld, this center had for years played a role in the research and dissemination of progressive ideas and practices concerning sex and sexual- ity. Twenty thousand books from the Hirschfeld Institute were burned on May 10, 1933, on Opernplatz on a gigantic pyre whose flashing flames were imprinted on the camera film of Hitler’s reporters. On the night of March 9, 1943, an air raid on a library in Aachen destroyed five hundred thou- sand books. In 1993, Croatian militia destroyed dozens of libraries (among them, those in Stolac). In 2003, Ameri- can bombs and Saddam loyalists sacked and destroyed the National Library of Baghdad13 . . . The theorico-political innovations produced during the past forty years by feminism, the black liberation move- ment, and queer and transgender theory do seem to be last- ing acquisitions. However, in the context of global war, this collection of scholarship could be destroyed also, as fast as a microchip melting under intense heat. Before all the existing fragile archives about feminism and black, queer, and trans culture have been reduced to a state of radioac- tive shades, it is indispensible to transform such minority knowledge into collective experimentation, into physical 13. On the destruction of the books, see Fernando Baez, *A Universal History of the Destruction of Books: From Ancient Sumer to Modern-day Iraq*, trans. Alfred MacAdam (New York: Atlas & Co., 2008). **350 *The micropolitics of Gender in the Pharmacopornographic era*** practice, into ways of life and forms of cohabitation. We are no longer pleading, like our predecessors in the 1970s and 1980s, for an understanding of life and history as effects of different discursive regimes. We are pleading to use dis- cursive productions as stakeholders in a wider process of the technical materialization of life that is occurring on the planet. A materialization that each day resembles more and more a total technical destruction of all animal, vegetable, and cultural forms of life and that will end, undoubtedly, in the annihilation of the planet and the self-extinction of most of its species. Alas, it will become a matter of finding ways to record a planetary suicide. Until the end of the eighteenth century, self-exper- imentation was still a part of the research protocols of pharmacology. Animal experimentation was not yet called into question, but an ethical precept dictated that the researcher take on the risk of unknown effects on his or her own body before enacting any test on the body of another human. Relying on the rhetoric of objectivity, the subject of scientific learning would progressively attempt to gen- erate knowledge outside him- or herself, to exempt his or her body from the agonies of self-experimentation. In 1790, the physician Samuel Hahnemann self-administered strong daily doses of quinine in order to observe its effects in fighting malaria. His body reacted by developing symp- toms that resembled the remittent fever characteristic of malaria. The experiment would serve as the basis for the invention of the homeopathic movement, which, based on the law of similars, maintains that it is possible to treat ill- ness using minute doses of a substance that, in much larger ***The micropolitics of Gender in the Pharmacopornographic era* 351** amounts, would provoke the same symptoms of that ill- ness in a healthy body, in the manner of a therapeutic mir- ror. Peter Sloterdijk, inspired by Hahnemann, will call the process of controlled and intentional poisoning “voluntary auto-intoxication” and will sum it up as follows: “If you intend to be a doctor, you must try to become a laboratory animal.”14 In order to transform conventional frameworks of the “cultural intelligibility”15 of human bodies, it is necessary to evolve toward practices of voluntary autointoxication. From Novalis to Ritter, the romanticism from which Sloter- dijk draws his inspiration for a counterproject to moder- nity will make autoexperimentation the central technique of the self in a dystopian society. Nevertheless, romantic autoexperimentation carries the risk of individualism and depolitization. On the other hand, two of the discourses around which the critique of modern European subjec- tivity will develop—those of Sigmund Freud and Walter Benjamin—will begin under the form of the invention of new techniques of the self and repertories of practices of voluntary intoxication. But the dominant discourse of disciplinary modernity will brush them aside; the process of institutionalization that both psychoanalysis and the Frankfurt School will experience will go hand in hand with the pathologizing of intoxication and the clinical industri- alization of experimentation. “It would be a good thing if a doctor were able to test many more drugs on himself,” declared the young doctor 14. Peter Sloterdijk, *Neither Sun Nor Death*. With Hans-Jürgen Heinrichs, trans. Steven Corcoran (New York: Semiotext(e), 2011), 8. 15. I’m reclaiming Judith Butler’s term here. See *Undoing Gender*, 35–46. **352 *The micropolitics of Gender in the Pharmacopornographic era*** Mikhail Bulgakov in 1914, in “Morphine,” a text in which the protagonist describes the effects of morphine on his own body.16 Likewise, it seems urgent today, from the perspective of a trans-feminist project, to use our living bodies as biopolitical platforms to test the pharmacopor- nopolitical effects of synthetic sex hormones in order to create and demarcate new frameworks of cultural intelli- gibility for gender and sexual subjects. In an era in which pharmaceutical laboratories and corporations and state medico-legal institutions are controlling and regulating the use of gender and sex biocodes (the active molecules of pro- gesterone, estrogen, and testosterone) as well as chemical prostheses, it seems anachronistic to speak of practices of political representation without going through performa- tive and biotechnological experiments on sexual subjectiv- ity and gender. We must reclaim the right to participate in the *construction* of biopolitical fictions. We have the right to demand collective and “common” ownership of the bio- codes of gender, sex, and race. We must wrest them from private hands, from technocrats and from the pharmaco- porn complex. Such a process of resistance and redistribu- tion could be called *technosomatic communism*. As a mode of the production of “common” knowledge and political transformation, the auto–guinea pig principle would be critical in the construction of the practices and discourses of trans-feminism and the coming liberation movements of gender, sexual, racial, and somatic-political 16. See Mikhail Bulgakov, “Morphine,” in *A Country Doctor’s Notebook* (New York: Melville House, 2013), 134. ***The micropolitics of Gender in the Pharmacopornographic era* 353** minorities. To echo Donna J. Haraway’s expression, it will consist of a positioned,

#### Private pharmaceutical entities and the state are inseparable in their presence in space, in which has created an ecosystem devoted to production of pharmaceuticals in space, allowing multinationals to expand its horizon of perfected control into space. This is the new space race, a race for money, a race towards the proliferation of the techno-body.

Howell 19(Elizabeth Howell, How Big Pharma Was Wooed To Space-Based 'Business Park, August 14 2019, https://www.forbes.com/sites/elizabethhowell1/2019/08/14/how-big-pharma-was-wooed-to-space-based-business-park/?sh=e97d10632e17)

The most exclusive business park for humankind is so remote that it takes a rocket to get there — and big pharma is among the growth industries in this difficult-to-reach location. The "weightless" lab is packed with experiments that develop drugs and 3D-print human tissue, among other things. It's called the U.S. National Laboratory and its address is on the International Space Station. Its sole manager — Florida's non-profit Center for the Advancement of Space (CASIS) — has been in charge there for eight years, working with astronauts who contend with packed schedules and a dangerous environment. While CASIS says its ecosystem is growing and thriving, NASA's Office of the Inspector General criticized the organization for its work, as late as January 2018: "The organization has underperformed on tasks important to achieving NASA's goal of building a commercial space economy in low Earth orbit," the OIG wrote in a report at that time. "After more than five years of operation, CASIS has not fully met a majority of the goals and expectations set out by NASA," it added. (At the time, NASA said it concurred or partially concurred with OIG recommendations, although OIG and NASA clashed as to how the report's performance metrics for CASIS were defined.) Yet CASIS says it has been working hard amid unique requirements for its lab. It's a tough place to work, because the principal investigators are nowhere near their experiments. Further, astronaut time is precious — so experiments ideally are somewhat autonomous, able to be controlled from Earth or to run on their own. German astronaut Alexander Gerst works on a CASIS-developed experiment called Space Algae. German astronaut Alexander Gerst works on a CASIS-developed experiment called Space Algae. Algae ... [+] NASA CASIS had a classic "blue ocean" advantage — the ability to offer experiment environments that are completely unavailable to competitors, for obvious reasons — but at the same time, it had to move quickly to gain community trust. MORE FOR YOU New Research Finds A Connection Between Domestic Violence And These Two Personality Disorders This Scientist Helps Andean Forests And Ecuador’s Women In STEM Exceptional Fossil Preservation Suggests That Discovering Dinosaur DNA May Not Be Impossible Any success so far is due to quick growth in partnerships, said Ken Shields, the laboratory's chief operating officer, in an interview. "We knew very quickly we had a limited time to get our organization and the national lab ramped up," he said, which required a good deal of forecasting. One of the potential winners CASIS identified was "big pharma", and nearly a decade later that idea is paying off in a big way, Shields said. While that industry is thriving, there are special requirements to consider. In space, experiments can take years to plan due to requirements in fire safety and astronaut safety — not to mention the usual research approvals and funding challenges that principal investigators go through at their individual institutions. How Schools Can Better Serve Hispanic And Latino Students SpaceX's Falcon 9 is one of the providers launching CASIS cargo to space. SpaceX's Falcon 9 (pictured here atop a Falcon 9 rocket during a July 25, 2019 launch from Cape ... [+] NURPHOTO VIA GETTY IMAGES Shields said his non-profit's first step was to understand who in big pharma was investing "a lot of dollars in applied development", and then make the pitch to those folks about how microgravity could simplify the production of drugs. CASIS had to rapidly demonstrate a robust supply chain of rocket launches and high-speed connections to allow results to come out quickly. While drug development takes years of work (meaning tangible financial results can often come decades down the line) what CASIS can point to is demonstrated interest of well-known industry names. Merck has studied the crystallization of antibodies in space. AstraZeneca recently launched a regenerative medicine payload. And Dover Lifesciences won a technology in space award (sponsored by Boeing) to crystallize a protein complex that is tough to make in Earth's gravity. <https://www.the-scientist.com/bio-business/pharma-looks-to-outer-space-to-boost-drug-rd--68183> On a cool December afternoon in 2018, on a viewing platform at the Kennedy Space Center at Cape Canaveral in Florida, Jordan Greco watched his research project leave planet Earth. As chief scientific officer of the Connecticut-based biotech LambdaVision, he had spent years developing a protein-based artificial retina to treat patients blinded or severely visually impaired by retinal degenerative diseases. At 1:15 PM that day, a Falcon 9 launch rocket lit up the sky as it blasted the SpaceX Dragon cargo spacecraft toward (blasted to) the International Space Station (ISS), carrying onboard the proteins that make up Greco’s artificial retina. “It didn’t really hit me until we were sitting on the balcony at the NASA complex and seeing that rocket off in the distance,” Greco recalls. “Our protein, our experiment that we’ve been working on for years, is on that thing.” Once the SpaceX capsule docked at the ISS, an astronaut in the station’s near-weightless environment was to initiate an experiment that Greco hoped would help him understand how to improve the artificial retina’s function. Back on Earth, he and his colleagues had been making progress with the retina—essentially a small film covered in hundreds of layers of the microbial light-activated protein bacteriorhodopsin—but were struggling to produce consistently high-quality retinas. The team suspected that the bacteriorhodopsin proteins should be oriented the same way with respect to one another for the artificial retina to create robust electrical signals and communicate effectively with patients’ neurons. But the team’s process of dipping the film into protein solutions seemed to generate somewhat disordered protein arrangements. Greco suspected that gravity was negatively affecting the layering process—for instance, by causing the proteins in the solution to undergo sedimentation, he explains. To test that hypothesis, he and his colleagues sent materials to the ISS to repeat part of the experiment in microgravity. Microgravity influences scientific experiments in many ways that appeal to drug developers. Scientific research in space has thrived over the past decade, but it’s only recently that the pharmaceutical and biotech sector has started getting in on the action, pursuing new ways to study drugs and other medical treatments. Pharma giants including Merck, AstraZeneca, Eli Lilly, and Sanofi, along with dozens of smaller companies, have all sent experiments to the ISS to reap the unique benefits of microgravity. Of the 150 or so life science research projects supported in the 2019-2020 fiscal year by the Center for the Advancement of Science in Space (CASIS)—a nonprofit that collaborates with NASA to manage the US National Laboratory on the ISS—more than a third have been led by pharmaceutical and biotechnology companies, says CASIS’s interim chief scientist, Mike Roberts. Such endeavors could one day help improve astronaut health and equip humanity for longer ventures into space, but their primary aim is to develop or improve drugs for people on Earth. That’s certainly the hope of Greco and his colleagues, who found out a few months after that December afternoon that, as they’d hypothesized, the proteins layered in space appeared to have more-orderly arrangements—an improvement that could benefit the artificial retina’s function. Studies such as these have yet to yield new blockbuster drugs or even significant improvements to existing ones. Research in space is slow, and the costs are sky-high. All projects are subsidized through NASA, and many rely on additional financial support through federal grants, spurring a new kind of space race—one aiming to prove that such projects are profitable enough for the private sector to fund on their own. “Overcoming that 1G gravitational pull to get rockets up to low Earth orbit or beyond is expensive still,” says Roberts. But even so, “we’ve seen a significant uptick in interest” in conducting experiments in space. The benefits of microgravity While microgravity can be achieved for a few moments on an aircraft rounding the top of a parabolic flight, or simulated imperfectly in bioreactors on Earth, the best way to conduct experiments under sustained microgravity is to go to the ISS. The station orbits approximately 400 km from the planet’s surface and is close enough to Earth to experience about 90 percent of its gravitational pull, but astronauts aboard the station feel nearly weightless because it’s in constant free fall around the planet. The resulting microgravity conditions in this setting influence scientific experiments in many ways that appeal to drug developers. There are minimal convection currents in fluids, for instance, and hardly any sedimentation—conditions advantageous not only for LambdaVision’s layering procedure but also for processes such as protein crystallization, whereby proteins form a regular array. Under near weightlessness, “you get a [higher-quality] crystal than [what you’d get through] the crystallization process on Earth,” making certain proteins easier to study and more attractive as drugs, explains Marlise dos Santos, an aerospace pharmacy specialist at InnovaSpace, a UK-based think tank that promotes life science in space, among other activities related to extreme environments. Paul Reichert, a research scientist at Schering-Plough and at Merck after their merger, was one of the first in the pharmaceutical industry to recognize the value of near weightlessness for protein crystallization. In the 1990s, before the ISS was operational, he collaborated with NASA to send interferon alfa-2b, the active ingredient in the company’s antiviral and cancer drug intron A, into low Earth orbit on the Space Shuttle to see if it would crystallize in space. Upon studying the product that was returned to Earth, Reichert noticed that the protein had turned into small crystals with perfectly uniform size—the kind that would be ideal for drug delivery. Although the crystallized interferon alfa-2b was never commercialized, Reichert has conducted similar experiments on the ISS with the monoclonal antibody pembrolizumab, the key ingredient in Merck’s popular oncology drug Keytruda. Because antibodies aren’t very soluble under standard conditions, treatments such as Keytruda tend to form viscous solutions at high concentrations and need to be delivered in burdensome, lengthy, and regular intravenous infusions. If pembrolizumab took the form of a compact crystalline suspension, however, it could be deliverable as an injection, Reichert explains. In his most recent experiment, published in npj Microgravity, he and his colleagues found that cooling pembrolizumab on the ISS yielded “a uniform population of particles [that] actually gave a better injectability profile than the heterogeneous population of crystals that we got on Earth,” Reichert says. Eli Lilly has also sent its products to the ISS to be crystallized, in this case to make them easier to study structurally using analytical techniques such as X-ray diffraction. The company has also flown mice to the ISS to test an experimental drug that boosts muscle growth. Under microgravity, the loss of physical strain on bone and muscle accelerates the natural onset of common musculo-skeletal diseases in rodents, making them ideal models of such human conditions, explains Jeremy Hinds, a senior research scientist at Lilly. In addition, Hinds is studying whether near weightlessness affects the process of freeze-drying materials, a common step in drug distribution and storage. Microgravity “could have positive outcomes on the physical properties and resulting drug product performance,” he explains in an email to The Scientist. CASIS, which selects the research projects that go to the US national lab on the ISS and provides companies with logistical support, is also working with a number of smaller companies studying everything from treatments for rare diseases to medical devices. One such company is MIT spinout MakerHealth, which has spent nearly a decade creating a device that can produce a number of personalized pharmaceuticals on demand. A mission is slated for 2021 to carry the device’s mechanical reactors to the ISS, where they’ll produce some simple compounds in space. Engineer Jose Gomez-Marquez of MIT’s Little Devices Lab who helped develop the device says the experiment could not only show that it’s possible to make drugs in space—a prerequisite for humanity’s future ventures into outer space—but also help his team understand the typical gravitational constraints on the device’s function and how they can improve it further: “It’s a fundamental physics question.” EXTRATERRESTRIAL LAB: The Destiny Lab on the International Space Station allows researchers to carry out experiments in microgravity. COURTESY OF NASA Challenges in space research While research and development in space is well underway, progress has been slow, says Reichert. “We’re still in the infancy of doing this kind of work.” Many of the challenges are logistical. Only six astronauts are stationed on the ISS; their time for experimental work is limited, and basic laboratory tasks such as pipetting and moving reagents around are challenging in microgravity. That’s in part why pharma entities and biotechs typically contract companies that specialize in automating scientific experiments and packing them into flight-ready “cube labs,” which astronauts simply need to activate to have the experiments conduct themselves. LambdaVision, for instance, worked with the microgravity research company Space Tango to turn their 2018 layering experiment and a more recent study of how bacteriorhodopsin functions under microgravity into miniature labs. The downside of such arrangements is that researchers are often limited to one experiment at a time, and results can be a long time coming, Reichert says. “The astronaut just activates the experiment that sits there for two to three weeks, and then it comes back on a Dragon SpaceX module a month later, and then we first see what the results are.” Doing research in space comes with a host of other challenges as well, such as organizing simultaneous control experiments on the ground, and adapting research methods to the nonstandard laboratory equipment on the ISS. For Paul Jaminet, founder and president of the Massachusetts-based oncology startup Angiex, which undertook an experiment on the ISS in 2018, the endeavor “turned out to be significantly more work than we thought it would be.” The company’s experiment showed that endothelial cells’ response to one of the company’s cancer drugs changed over the course of their time on the ISS, and that the cells generally grew and behaved differently in space than on Earth. In particular, the cells displayed unique characteristics that Angiex founder and head of research Shou-Ching Jaminet tells The Scientist could mimic certain features of cardiovascular conditions afflicting humans on Earth. The husband-and-wife team is interested in continuing that line of research, but due to the amount of labor, time, and money involved, it’s taken a backseat to the company’s work on drug candidates and other projects that are further along. Researchers are often limited to one experiment at a time, and results can be a long time coming. The biggest challenge is indeed the sheer cost of space experiments. Getting a single experiment to and back from the ISS can cost some $7.5 million, according to CASIS. Currently, flights to and from the ISS and astronaut time are covered by NASA, and the hardware and research costs of such experiments are sometimes partially funded through federal grants. Some smaller companies, including MakerHealth, Lambda-Vision, and Angiex, financed their endeavors with six-figure microgravity research grants awarded by a partnership between CASIS and Boeing through the Boston-based business accelerator program MassChallenge. These generous subsidies and incentives are part of a long-term effort by NASA to coax private companies to recognize the value of R&D in space. In addition to bringing benefits to people on Earth, companies ideally would ultimately pay for their own research and help the US National Laboratory on the ISS become self-supporting. However, a 2018 report by NASA’s Office of the Inspector General criticized CASIS for failing to recruit enough commercial users to the space station, and “question[ed] whether a sufficient business case exists under which private companies will be able to develop a self-sustaining and profit-making business [on the ISS].” That’s broadly in line with an analysis by Nicholas Vonortas, a microeconomist at George Washington University who received a NASA grant in 2015 to conduct a cost-benefit analysis of using protein crystallization on the ISS to get better structural information about peptides. Through economic models that considered the risk of experiments failing, among other factors, Vonortas found that the potential financial benefits of crystallizing proteins on the ISS will likely not be enough to outweigh the costs if they’re shouldered by the private sector alone. “All of this together, when you do the calculations, brings a result that is not as attractive as the scientists think,” he tells The Scientist. Space pharmacy ahead? Costs may decrease over time as travel to and from the ISS becomes more frequent, Vonortas says. Entrepreneur Elon Musk, for instance, has said he wants to establish a more regular service to the station than there is currently—an idea not without its skeptics. But a significant source of uncertainty is that the ISS, after more than 110,000 laps around the planet, may be nearing the end of its life. NASA and other participating space agencies plan to continue operations through 2024, but what happens after that is unclear. Instead, pharma research of the future may take advantage of independent initiatives developed by a growing community of companies working to make conducting experiments in sustained microgravity cheaper, faster, and more accessible for life scientists. For instance, the Israeli-Swiss company SpacePharma, founded in 2011, develops autonomous research stations that can be operated from the ground. “Until now, unless you were part of NASA or some space agency, it was very difficult to initiate and perform such experiments” in space, says Guy Samburski, SpacePharma’s director of chemical and pharmaceutical applications. The company recently launched the satellite DIDO 3, carrying four experiments by Italian and Israeli researchers on board, all packed into a milk carton–size box. The satellite won’t return to Earth, but is currently recording and transmitting research data back to scientists on the ground. SpacePharma’s next launch will involve a larger system that will eventually return home so researchers can physically collect materials and results. British spaceflight company Virgin Galactic and Jeff Bezos’s space company Blue Origin have also begun to offer such opportunities to scientists. The emergence of an entire ecosystem devoted to bringing pharmaceutical research into space has opened up new possibilities to those in the industry. “Could we have space labs in the sky that can operate autonomously and discover new lifesaving medications for us?” Gomez-Marquez asks. And while the return on investment currently isn’t ideal, many believe such research will become profitable over time. Eventually, “[it] might be financially beneficial for a company to have things produced or manufactured in space,” in the same way we outsource drug production to different countries on Earth, suggests Thais Russomano, a space medicine expert and cofounder and CEO of InnovaSpace. In fact, LambdaVision is already considering launching production of its artificial retina in space, encouraged by the potential superiority of space-made products. Whether such visions become reality, only time will tell. “If you’re asking me whether this is possible—absolutely, this is technically possible,” Vonortas says. But “the economics is a problem.”

#### Two future scenarios in the Punk-Neo-Liberal development: First, the preservation of the theological-humanist political state. Second, an abstract deterritorialized nation-state of the pharmacopornographic industry. This is the extension of the sovereignty of control not just down here but up there, reigniting the thrill of finding “new and exciting” ways to experiment and perfect the molecular-control of bodies. The Kritik is an interrogation of power, in attempt to reformulate the meaning of experimentation towards the Queer sovereign.

**Preciado 13( Paul B. Preciado, Testo Junkie: Sex, Drugs, And Biopolitics in the Pharmacoporgraphic era, The micropolitics of gender in the pharmacoporngraphic era, Traps of Neo-liberalism, pg 389-394) Lynbrook SY**

Traps of pharmacopornographic neoliberalism Contemporary biodrag activism is confronted, fifty years after Agnes, with a new set of violent neoliberal economic and politic strategies, including the privatization of the **390 *The micropolitics of Gender in the Pharmacopornographic era*** health system, government deregulation, deep cuts in social spending, and the militarization of social life. In the present context, it’s possible to imagine (at least) two tracks of development for the pharmacopornographic economy in the face of which different modes of activism could be articulated. The first is the preservation of theological-humanist political states that regulate the action of the neoliberal (meaning free trade, either democratic or totalitarian in the context of globalization) pharmacopornographic econ- omy. Current pharmacopornographic corporations would function as free market tentacles inside contemporary nation-states (which would continue to see themselves as sovereign and patriarchal)) and would negotiate with them to determine the directives for the production, use, and consumption of chemical prostheses and semiotic gender and sex codes. The second transformation is one into an abstract deterritorialized nation-state of the pharmacoporno- graphic industry. We could also be witnessing a process of privatization of contemporary nation-states, which would be progressively absorbed by the pharmacoporno- graphic industry. This would be the strategy employed by the pharmacopornographic companies to escape pre-1970s regulations imposed by states (to avoid the gradual trans- formation of pharmaceutical patents into generics, the more or less severe regulation of the production and distri- bution of pornographic audiovisual material, and attempts to abolish prostitution), as these companies engage in the political direction of new national entities (via the FDA; the ***The micropolitics of Gender in the Pharmacopornographic era* 391** International Monetary Fund; the European Union; and the governments of the United States, China, or India) and purchase state institutions (for example, the Department of Health or Department of Justice or the prison-industrial complex) and put them to work to their benefit, refilling such archaic institutions with new content whose only objective would be increasing consumption and pharmaco- pornographic profits. In fact, the pharmacopornographic industries are already in competition with the domestic affairs of the old nation-states . . . The war to come isn’t a war between states (Israel vs. Palestine or the United States vs. the oil-produc- ing countries) but more probably a war of pharmacoporno- graphic multinationals against the multitude of vulnerable bodies, a war of the pharmaceutical multinationals that hold the copyright for active principles against the traditional gatherers of plants and their specific forms of knowledge, a war of the military-prison-industrial complexes against the racialized and pauperized populations, a war of mafia states against the users of “illegal” drugs, a war of the multinational conglomerates that coordinate the management of medical and legal institutions and free market consumption against bodies deprived of nationality, a war of the systems of control that construct docile sexual subjects to achieve the total and limitless exploitation of their *potentia gaudendi*. The history of the transformations of production, dis- tribution, and consumption of heroin offers several leads about the probable evolution of the legal and political man- agement of sex hormones. Although their common origins **392 *The micropolitics of Gender in the Pharmacopornographic era*** don’t seem obvious, heroin and aspirin were synthesized in the same year, 1897, and in the same laboratory, by Hoff- man and Eichengrun, by means of the same process. It involved the simple acetylation of morphine (in the case of heroin) and salicylic acid (in the case of aspirin). Heroin and aspirin were legally marketed by Bayer the following year for the treatment of various pulmonary affections, because of their analgesic properties. Although restrictions on the production and distribution of heroin went into force in the 1920s, it was still possible to find heroin-based pills in an English pharmacological catalog in 1949.59 After fifty years of the repression and criminalization of the marketing of heroin, which resulted in the deterioration of fields, which weren’t being tilled, the adulteration of the substance, and the corruption of its trafficking networks, medical special- ists today are developing a gradual reintegration of heroin into the legal pharmaceutical market. For example, Macfar- lan Smith Limited in Edinburgh is making yearly advances in the experimental and therapeutic use of this substance.60 The changes in the legal status of a substance and the description of a consumer as criminal or mentally ill (addicted in the case of heroin, and gender dysphoric in the case of sex hormones) facilitate the establishment of a political relationship between illegal drugs and biocodes of the production of gender. Sex hormones, whose consump- tion is strongly regulated by the state, are drugs whose use is, if not illegal, at least politically controlled; and their use, considering their potential for transforming gender and 59. Carnwath and Smith, *Heroin Century*, 31. 60. Ibid., 30–31. ***The micropolitics of Gender in the Pharmacopornographic era* 393** sex, is subject to specific restrictions that espouse adminis- trative criteria and channels of distribution comparable to those of narcotic substances. How to react in the face of states’ resistance to legal- izing the sale of pharmaceutical heroin or removing the consumption of sex hormones from psychiatric protocols? If we consider the close relationships maintained by the neoliberal nation-states, the pharmaceutical corporations, and the networks of drug trafficking, it appears urgent that those dismissed as junkies (the users of illegal drugs) and those diagnosed with gender dysphoria (the potential users of sex hormones) must organize into associations of copyleft drug consumers and force the state-industry- pharmaceutical-drug-trafficking networks to facilitate free access without restrictions to these biocodes of the produc- tion of subjectivity.)Just as the users of Agreal prosecuted Sanofi-Aventis laboratories for the serious side effects61 of this medication (origin ally intended to disguise the symp- toms of menopause by blocking the action of the dopamine neurotransmitters), the users of heroin could prosecute the state in instances of withdrawal or overdose for that state’s having prevented the production, distribution, and consumption of that substance for users in a trustwor- thy and legal manner. This political pressure would lead gradually to the production and distribution of heroin (or cocaine, MDA, etc.) as generics that could be first bought freely on the pharmaceutical market and, in the long run, be produced and managed collectively as *chemical prostheses* 61. Some side effects include Parkinsonian syndromes, symptoms of anxiety, and depression. **394 *The micropolitics of Gender in the Pharmacopornographic era*** *commons*. This would ultimately entail a process of a mul- titude-in-the-making, not only of a lobby of consumers of gender and sex biocodes but also a network of trans-junkie experts, a monster-multitude-in-the-making. gender and sex hackers The cis-males and cis-females (indiscriminately hetero- sexual or homosexual), as well as transsexuals, who have access to surgical, endocrinological, or legal techniques of the production of identity, are not simple economic classes in the Marxist sense of the term, but genuine “pharmaco- pornographic factories”—existing simultaneously as raw materials, producers (but rarely proprietors) of biocodes of gender, and pharmacopornographic consumers. Porn actors; whores; the transgender; genderqueers; and producers, traffickers, and consumers of illegal drugs inhabit different cultures, but all are used as living phar- macoporn laboratories. All of them sell, buy, or get access to their biocodes as pharmacopornographic property. The sudden emergence of new gender statuses is creating a novel type of conflict between owners and managers of the patents of the microtechnologies of subjectification (sex hormones, psychotropic molecules, audiovisual codes, etc.) and the producers and traffickers of these techno-bio- codes. The pharmacopornographic entrepreneurs, who are among the contemporary leaders of global capitalism, are trying to restrict and privatize the biocodes of gender and convert them into rare and naturalized objects by means of legal and market techniques. Computer hackers use the web and copyleft programs as ***The micropolitics of Gender in the Pharmacopornographic era* 395** tools of free and horizontal distribution of information and claim that they should be in reach of everyone. The pharma- copornographic *gendercopyleft* movement has a technoliv- ing platform that is a lot easier to gain access to than the Internet: the body, the *somathèque*. Not the naked body, or the body as unchanging nature, but the technoliving body as a biopolitical archive and cultural prosthesis. Your mem- ory, your desire, your sensibility, your skin, your cock, your dildo, your blood, your sperm, your vulva, your ova . . . are the tools of a potential gendercopyleft revolutionThe various producers of sexual biocodes are very differ- ent from one another. Some get off on economic and social privileges, such as the models through whose bodies the dominant codes of male and female beauty are produced. Others, such as porn actors or sex workers, suffer from the lack of regulations for the open market of their biocodes. But all of them depend on the pharmacopornographic industry and its local alliances with the police forces of the nation-states. One day, they will all become hackers. Agnes, mother of all the techno-lambs: Del LaGrace Volcano, Kate Bornstein, Jacob Hale, Dean Spade, Mauro Cabral, Susan Stryker, Sandy Stone, King Erik, Moises Mar- tínez—all are master hackers of gender, genuine traffickers of semiotico-technological flux, producers and *tinkers* of copyleft biocodes. Gender copyleft strategies must be minor but decisive: the survival of life on the planet is at stake. For this move- ment, there will be no single name that can be transformed into a brand. It will be our responsibility to shift the code to open the political practice to multiple possibilities. We could **396 *The micropolitics of Gender in the Pharmacopornographic era*** call this movement, which has already begun, Postporn, Free Fuckware, BodyPunk, OpenGender, FuckYourFather, PentratedState, TotalDrugs, PornTerror, AnalInflation, UnitedUniversalTechnoPriapism . . . This book, a legacy of Agnes’s self-experimentation poli- tics, is a protocol for self-tests carried out with testosterone in gel form, exercises of controlled poisoning on my own body. I am infecting myself with a chemical signifier cul- turally branded as masculine. Vaccinating yourself with tes- tosterone can be a technique of resistance for bodies that have been assigned the status of cis-females. To acquire a certain political immunity of gender, to get roaring drunk on masculinity, to know that it is possible to look like the hegemonic gender. Little by little, the administration of testosterone has ceased to be a simple political test and has molted into a discipline, an asceticism, a way of restoring my spirit by means of the down growing on my arms, **an addiction, a form of gratification, an escape, a prison, a paradise**. Hormones are chemical prostheses. Political drugs. In this case, the substance not only modifies the filter through which we decode and recodify the world; it also radically modifies the body and, as a result, **the mode under which we are decoded by others**. Six months of testosterone, and any cis-female at all, not a should-have-been-boy or a les- bian, but any girl, any neighborhood kid, a Jennifer Lopez or a Rihanna, can become a member of the male species who cannot be told apart from any other member of the hegemonic class. ***The micropolitics of Gender in the Pharmacopornographic era* 397** I refuse the medico-political dose, its regime, its regu- larity, its direction. I demand a virtuosity of gender; to each one, its dose; for each context, its exact requirement. Here, there is no norm, merely a diversity of viable monstrosi- ties. I take testosterone like Walter Benjamin took hashish, Freud cocaine, or Michaux mescaline. And that is not an autobiographical excuse but a radicalization (in the chemi- cal sense of the term) of my theoretical writing. My gen- der does not belong to my family or to the state or to the pharmaceutical industry. My gender does not belong to feminism or to the lesbian community or to queer theory. Gender must be torn from the macrodiscourse and diluted with a good dose of micropolitic[s]al hedonist psychedelics. I don’t recognize myself. Not when I’m on T, or when I’m not on T. I’m neither more nor less myself. Contrary to the Lacanian theory of the mirror state, according to which the child’s subjectivity is formed when it recognizes itself for the first time in its specular image, political sub- jectivity emerges precisely when the subject does not rec- ognize itself in its representation. It is fundamental not to recognize oneself. Derecognition, disidentification is a condition for the emergence of the political as the possibil- ity of transforming reality. The question posed by Deleuze and Guattari in 1972 in *Anti-Oedipus* remains stuck in our throat: “Why do the masses desire fascism?” It’s not a ques- tion here of opposing a politics of representation to a poli- tics of experimentation, but of becoming aware of the fact that the techniques of political representation always entail programs of the somatic production of subjectivity. I’m not **398 *The micropolitics of Gender in the Pharmacopornographic era*** opting for any direct action against representation, but for a micropolitics of disidentification, a kind of experimenta- tion that doesn’t have faith in representation as an exteri- ority that will bring truth or happiness. In order to accomplish the work of therapy for the mul- titudes that I have begun with these doses of testosterone and with writing, I now need only to convince you, all of you, that you are like me, and not the opposite. I am not going to claim that I’m like you, your equal, or ask you to allow me to participate in your laws or to admit me as a part of your social normality. My ambition is to convince you that you are like me. Tempted by the same chemical abuse. You have it in you: you think that you’re cis-females, but you take the Pill; or you think you’re cis-males, but you take Viagra; you’re normal, and you take Prozac or Paxil in the hope that something will free you from your problems of decreased vitality, and you’ve shot cortisone and cocaine, taken alcohol and Ritalin and codeine . . . You, you as well, you are the monster that testosterone is awakening in me

## 3

#### The US commercial space industry is booming – private space companies are driving innovation

**Lindzon 2/23** [(Jared Lindzon, A FREELANCE JOURNALIST AND PUBLIC SPEAKER BORN, RAISED AND BASED IN TORONTO, CANADA. LINDZON'S WRITING FOCUSES ON THE FUTURE OF WORK AND TALENT AS IT RELATES TO TECHNOLOGICAL INNOVATION) "How Jeff Bezos and Elon Musk are ushering in a new era of space startups," Fast Company, 2/23/21, https://www.fastcompany.com/90606811/jeff-bezos-blue-origin-elon-musk-spaces-space] TDI

In early February, Jeff Bezos, the founder of Amazon and one of the planet’s wealthiest entrepreneurs, dropped the bombshell announcement that he would be stepping down as CEO to free up more time for his other passions. Though Bezos listed a few targets for his creativity and energy—The Washington Post and philanthropy through the Bezos Earth Fund and Bezos Day One Fund—one of the highest-potential areas is his renewed commitment and focus on his suborbital spaceflight project, Blue Origin. Before space became a frontier for innovation and development for privately held companies, opportunities were limited to nation states and the private defense contractors who supported them. In recent years, however, billionaires such as Bezos, Elon Musk, and Richard Branson have lowered the barrier to entry. Since the launch of its first rocket, Falcon 1, in September of 2008, Musk’s commercial space transportation company SpaceX has gradually but significantly reduced the cost and complexity of innovation beyond the Earth’s atmosphere. With Bezos’s announcement, many in the space sector are excited by the prospect of those barriers being lowered even further, creating a new wave of innovation in its wake. “What I want to achieve with Blue Origin is to build the heavy-lifting infrastructure that allows for the kind of dynamic, entrepreneurial explosion of thousands of companies in space that I have witnessed over the last 21 years on the internet,” Bezos said during the Vanity Fair New Establishment Summit in 2016. During the event, Bezos explained how the creation of Amazon was only possible thanks to the billions of dollars spent on critical infrastructure—such as the postal service, electronic payment systems, and the internet itself—in the decades prior. “On the internet today, two kids in their dorm room can reinvent an industry, because the heavy-lifting infrastructure is in place for that,” he continued. “Two kids in their dorm room can’t do anything interesting in space. . . . I’m using my Amazon winnings to do a new piece of heavy-lifting infrastructure, which is low-cost access to space.” In the less than 20 years since the launch of SpaceX’s first rocket, space has gone from a domain reserved for nation states and the world’s wealthiest individuals to everyday innovators and entrepreneurs. Today, building a space startup isn’t rocket science. THE NEXT FRONTIER FOR ENTREPRENEURSHIP According to the latest Space Investment Quarterly report published by Space Capital, the fourth quarter of 2020 saw a record $5.7 billion invested into 80 space-related companies, bringing the year’s total capital investments in space innovation to more than $25 billion. Overall, more than $177 billion of equity investments have been made in 1,343 individual companies in the space economy over the past 10 years. “It’s kind of crazy how quickly things have picked up; 10 years ago when SpaceX launched their first customer they removed the barriers to entry, and we’ve seen all this innovation and capital flood in,” says Chad Anderson, the managing partner of Space Capital. “We’re on an exponential curve here. Every week that goes by we’re picking up the pace.”

#### The aff creates a restriction that encourages companies to move their operations to states with lower standards

Albert 14 [(Caley Albert, J.D. Loyola Marymount University) “Liability in International Law and the Ramifications on Commercial Space Launches and Space Tourism,” Loyola of Los Angeles International and Comparative Law Review, 11/1/14, <https://digitalcommons.lmu.edu/cgi/viewcontent.cgi?article=1708&context=ilr>] TDI

A parallel can be drawn here between the commercial space industry and the maritime law concept of the Flag of Convenience. The term has evolved over time, but in this day and age, it is commonly used to mean the owner of a vessel does not want to create an obligation with a country with stricter standards for registry; hence, the owner will register strictly for economic reasons with a country that has a more convenient registry.133 By flying a Flag of Convenience, ship owners are able to avoid taxation on earnings of ships registered under these flags, and in some cases, they can also receive relief from stricter crew standards and corresponding operating costs.134 A Flag of Convenience is flown by a vessel that is registered in one state, which the vessel has little if any connection to, when in reality the vessel is owned and operated from another state.135 This way the vessel avoids any unfavorable economic requirements from its true home state.136 In this sense, “flag shopping” is similar to “launch forum shopping,” similar in that Flags of Convenience are utilized for economic reasons, such as to avoid high taxes and compliance with certain restrictive international conventions, commercial space companies will forum shop when choosing which country to launch from. As of today, there has yet to be a catastrophic commercial launch incident, so for now commercial space companies do not have an incentive to forum shop, but if there is, the indemnification policies described above may lead companies to seek out countries that provide more coverage so they pay less in the event something goes wrong. This comparison to Flags of Convenience brings up two separate yet equally important issues. First, launch companies may try to follow the Flags of Convenience model and soon catch on to the wisdom of their maritime predecessors by “registering” in countries with more favorable conditions. Of course, in this case the concern is not with registration so much as launching. If launch companies follow the Flags of Convenience model, they will seek out the most convenient state for launch, most likely the state that provides the most liability coverage and has the least safety precautions. Launching from states with low safety standards increases the potential for catastrophic launch events. This, in turn, will place states that are potentially incapable of paying for damages from launch disasters in a position they would not normally assume if these commercial companies had not been drawn to their shores with the promise of more favorable regulations. Second, launch customers may also seek out companies located in states with lower cost liability regimes (lower insurance policy limits) since those companies will presumably charge less to launch their payloads. In this scenario, instead of the launch companies seeking out states with lower liability caps and softer regulations, the launch customers themselves will seek companies located in states with lowcost liability regimes. Here, the effect will be the same as above. Under the Liability Convention, the launching state will be liable for any damage caused by a vehicle launched from within its borders; hence, if customers start engaging in “launch forum shopping,” states will be incentivized to put in place low-cost liability regimes, which in turn will increase the states’ potential payout in the event of a catastrophic launch incident. Looking at the indemnification program the United States has in place in comparison to other countries, it is possible to see how either launch companies or launch customers could engage in “launch forum shopping” when a catastrophic launch incident ever occur. It is also important to keep in mind that various factors go into where a company or customer decides to launch from. A state’s indemnification program is just one factor in this decision. With this in mind, it is clear that if a launch incident did occur in the United States, the commercial launch company would be liable for much more than it would in another country. For instance, why would a commercial space company launch in the United States, where it would be liable up to $500 million and the additional costs that the government would not cover? The argument can be made that a catastrophic space incident has yet to occur, and even if it did, it is unlikely to cost above the $2.7 billion covered by the United States government. Other states like Russia or France, which has the two-tier liability system, would simply cover all claims above the initial insurance, which is much lower than the $500 million mark required by the United States. In that case, the commercial company would never have to pay more than the initial liability insurance. If there ever is a catastrophic commercial space incident in the future, it is easy to see why commercial companies or launch customers might be drawn to “launch forum shop” outside the United States.

#### Maintaining US space dominance requires a homegrown commercial space industry – private companies offshoring gives China the advantage they need

**Cahan and Sadat 1/6** [(Bruce Cahan, J.D) (Dr. Mir Sadat, ) "US Space Policies for the New Space Age: Competing on the Final Economic Frontier," based on Proceedings from State of the Space Industrial Base 2020 Sponsored by United States Space Force, Defense Innovation Unit, United States Air Force Research Laboratory, 1/6/21, https://www.politico.com/f/?id=00000177-9349-d713-a777-d7cfce4b0000] TDI

\*USSF = United States Space Force

Today, China’s commercial space sector is in its infancy but is set to grow with continued national and provincial support, which have been rapidly increasing over the past three years.64 Since 2004, the United States and China accounted for 74% of the $135.2 billion venture capital (VC) invested in commercial space. 65 The early 2020s are pivotal, as it would be far cheaper for China and Chinese commercial space firms to acquire space technologies from the United States or allied nation companies seeking revenues or facing cashflow constraints, than to build the companies and their teams and technologies from scratch in China. The tight coupling of Chinese military goals and an economy organized to achieve those goals magnifies the economic threats and market disruptions that the United States must immediately address, in order for DoD and national security operations to rely on US commercial space capabilities. 3. ISSUES AND CHALLENGES Peaceful Uses of Space and Space Exploration Space has been primarily a shared, not a warfighting, domain.67 With each passing second of Planck time,68 space enables a modern way of life, provides instantaneous global imagery, assures telecommunications, and captures humanity’s imagination for civil space exploration. As a result, space is a burgeoning marketplace and territory for commercial ventures and investors. Strengthening the US commercial space industrial base is vital to and beyond US national security. Civil space activities are a source of US “soft power” in global commerce, cooperation, and investment. 69 The civil space sector, led by NASA, is fundamental to America’s national security. 70 NASA is on an ambitious critical path to return to the Moon by 2024,71 along with developing the capabilities and infrastructure for a sustained lunar presence. NASA’s lunar plans provide a lunar staging area for missions to Mars and beyond. They offer a strategic and economic presence for the United States on the Moon. Congress, the White House, DoD, and NASA must recognize that economic and strategic dominance in service of national security requires catalyzing and accelerating growth of a vibrant, private US industrial and cultural expansion into the Solar System. Human visitation and eventual settlement beyond the Earth require sustaining visionary leaders, aided by, and aiding, US national security. A recurring theme in US policy is “maintaining and advancing United States dominance and strategic leadership in space” because US global competitors and adversaries are competent and capable of outpacing American space capabilities. 72 The stakes are high: At this historic moment, there is a real race for dominance over cislunar access and resources. Regulations Should Foster US Commercial Space as a National Asset Leveraging the reimagination and disruption of terrestrial industries, the US commercial space industry is pushing the frontiers of the United States and global space economics and capabilities. A pre-COVID19 assessment by the US Chamber of Commerce projected that the US space market will increase from approximately $385 billion in 2020, to at least $1.5 trillion by 2040. 73 This projection represents a seven percent (7%) annual compound average growth rate (CAGR), driven largely by expanded business opportunities in Low Earth Orbit (LEO). Total addressable market (TAM) for US commercial space companies could be far larger were they to have federal and financial support for initiating cislunar space operations and opportunities. Recent advancements in commercial space technologies and business models have driven down costs and unlocked new areas of economic growth and space capabilities that outpace and de-risk acquiring capabilities through traditional US government economic development, research and development (R&D), procurement and regulatory policies and processes. US regulations must ensure that US companies lead in commercial space. In specific, technological advances that lower access costs and expand space mission capabilities, content, continuity, and redundancies must be fully supported by or incorporated into US government programs, budgets, requirements, and acquisition processes. Until commercial space offerings are fully incorporated, and federal acquisition policies and personnel commit to innovation, US government fiscal buying power, intelligence and program support will lag and remain inadequate in comparison to US private sector companies and the nation’s global competitors and adversaries in space. Addressing COVID-19’s Impact on US Commercial Space The COVID-19 pandemic damaged and still challenges the US space industrial base. US domestic investors’ funding of space R&D remains inconsistent across the lifecycle of New Space companies and the spectrum of technologies necessary to grow the space economy. To date, public R&D, government procurements and visionary space entrepreneurs have played a major role in establishing and funding the New Space industrial base. In the last five years, $11 billion of private capital has been invested.74 Traditional private investors may become reluctant to fund space technologies due to perceptions of higher risk over longer time horizons before receiving profitable returns on their capital. Institutional and long-horizon investors who manage patient capital have an appetite for illiquid, but higher yielding, terrestrial alternative asset investments such as commodities, private equity limited partnerships and real estate.75 The COVID-19 pandemic has created economic uncertainties making the New Space’s funding model unreliable. COVID-19 significantly impacted venture capital (VC)-backed companies: the pace of VC space investments fell 85% between April - June, as compared to January – March, in 2020. 76 Pre-COVID-19, the New Space industrial base confronted multiple challenges in raising later stages of venture capital such as (1) the lag between having an early-stage startup with an idea and commercializing a viable revenue-generating product, (2) the lack of market liquidity for founder and private equity space investments to attract and retain talented teams, and (3) the lack of a market to re-sell contracts for space goods and services when customers buy more capacity than needed. Even prior to the COVID-19 pandemic, federal financing of US R&D was at a historically minor level, as compared to businesses and universities.77 US government support for basic research has steadily declined as a percent of GDP. The federal government will experience near- to medium-term budget constraints.78 The vibrant venture community in the United States has taken up a portion of this slack by increasing R&D investment in later-stage and applied research. However, founding teams and VC financing rely on government to fund earlier R&D for basic science and engineering. Therefore, government must resume the sustainable and impactful past levels of support for basic research, an essential role in the space economy’s public-private partnership that ensures US leadership in space. Space as Existential Terrain for National Security In this Digital Era, space integrates and drives all elements of US national security. The Cold War may be over, but since the early 2010s, a renewed era of great power competition has emerged across terrestrial land, air, sea, and cyber domains. This competition extends into space, where a great game ensues.79 Space is no longer an uncontested or sanctuary domain. Competent and capable global competitors and peer adversaries are challenging US military, commercial, and civil space interests. The United States, along with its allies and partners, has had to accept and anticipate that space may be a warfighting domain, as suggested primarily by Russian and Chinese counter-space capabilities, military operations, and declarative statements. On December 20, 2019, the bipartisan National Defense Authorization Act (NDAA) for Fiscal Year 202080 authorized the creation of the US Space Force, under the Department of the Air Force, to secure US national interests in an increasingly contested domain.81 Back in October 1775, the Continental Congress established the US Navy to ensure that commercial and government fleets could freely navigate the Atlantic coastline - today, that includes the South China Sea. Likewise, the USSF’s mission is to ensure unfettered access to and the freedom to operate in space. The 2017 National Security Strategy considers space to be a “priority domain.”82 Freedom of navigation is a sovereign right that nations have fought to achieve and defend. 83 The USSF’s main role is to organize, train and equip, as well as to protecting US space interests and supporting terrestrial and joint warfighters (e.g., US Space Command). Thus, USSF must secure US national interests in space, whether military, commercial, scientific, civil, or enhancing US competitiveness for cislunar leadership.

#### US space dominance prevents global war

**Zubrin 15** [(Robert Zubrin, president of Pioneer Energy, a senior fellow with the Center for Security Policy) “US Space Supremacy is Now Critical,” Space News, 1/22/15, <https://spacenews.com/op-ed-u-s-space-supremacy-now-critical/>] TDI

The United States needs a new national security policy. For the first time in more than 60 years, we face the real possibility of a large-scale conventional war, and we are woefully unprepared. Eastern and Central Europe is now so weakly defended as to virtually invite invasion. The United States is not about to go to nuclear war to defend any foreign country. So deterrence is dead, and, with the German army cut from 12 divisions to three, the British gone from the continent, and American forces down to a 30,000-troop tankless remnant, the only serious and committed ground force that stands between Russia and the Rhine is the Polish army. It’s not enough. Meanwhile, in Asia, the powerful growth of the Chinese economy promises that nation eventual overwhelming numerical force superiority in the region. How can we restore the balance, creating a sufficiently powerful conventional force to deter aggression? It won’t be by matching potential adversaries tank for tank, division for division, replacement for replacement. Rather, the United States must seek to totally outgun them by obtaining a radical technological advantage. This can be done by achieving space supremacy. To grasp the importance of space power, some historical perspective is required. Wars are fought for control of territory. Yet for thousands of years, victory on land has frequently been determined by dominance at sea. In the 20th century, victory on both land and sea almost invariably went to the power that controlled the air. In the 21st century, victory on land, sea or in the air will go to the power that controls space. The critical military importance of space has been obscured by the fact that in the period since the United States has had space assets, all of our wars have been fought against minor powers that we could have defeated without them. Desert Storm has been called the first space war, because the allied forces made extensive use of GPS navigation satellites. However, if they had no such technology at their disposal, the end result would have been just the same. This has given some the impression that space forces are just a frill to real military power — a useful and convenient frill perhaps, but a frill nevertheless. But consider how history might have changed had the Axis of World War II possessed reconnaissance satellites — merely one of many of today’s space-based assets — without the Allies having a matching capability. In that case, the Battle of the Atlantic would have gone to the U-boats, as they would have had infallible intelligence on the location of every convoy. Cut off from oil and other supplies, Britain would have fallen. On the Eastern front, every Soviet tank concentration would have been spotted in advance and wiped out by German air power, as would any surviving British ships or tanks in the Mediterranean and North Africa. In the Pacific, the battle of Midway would have gone very much the other way, as the Japanese would not have wasted their first deadly airstrike on the unsinkable island, but sunk the American carriers instead. With these gone, the remaining cruisers and destroyers in Adm. Frank Jack Fletcher’s fleet would have lacked air cover, and every one of them would have been hunted down and sunk by unopposed and omniscient Japanese air power. With the same certain fate awaiting any American ships that dared venture forth from the West Coast, Hawaii, Australia and New Zealand would then have fallen, and eventually China and India as well. With a monopoly of just one element of space power, the Axis would have won the war. But modern space power involves far more than just reconnaissance satellites. The use of space-based GPS can endow munitions with 100 times greater accuracy, while space-based communications provide an unmatched capability of command and control of forces. Knock out the enemy’s reconnaissance satellites and he is effectively blind. Knock out his comsats and he is deaf. Knock out his navsats and he loses his aim. In any serious future conventional conflict, even between opponents as mismatched as Japan was against the United States — or Poland (with 1,000 tanks) is currently against Russia (with 12,000) — it is space power that will prove decisive. Not only Europe, but the defense of the entire free world hangs upon this matter. For the past 70 years, U.S. Navy carrier task forces have controlled the world’s oceans, first making and then keeping the Pax Americana, which has done so much to secure and advance the human condition over the postwar period. But should there ever be another major conflict, an adversary possessing the ability to locate and target those carriers from space would be able to wipe them out with the push of a button. For this reason, it is imperative that the United States possess space capabilities that are so robust as to not only assure our own ability to operate in and through space, but also be able to comprehensively deny it to others. Space superiority means having better space assets than an opponent. Space supremacy means being able to assert a complete monopoly of such capabilities. The latter is what we must have. If the United States can gain space supremacy, then the capability of any American ally can be multiplied by orders of magnitude, and with the support of the similarly multiplied striking power of our own land- and sea-based air and missile forces be made so formidable as to render any conventional attack unthinkable. On the other hand, should we fail to do so, we will remain so vulnerable as to increasingly invite aggression by ever-more-emboldened revanchist powers. This battle for space supremacy is one we can win. Neither Russia nor China, nor any other potential adversary, can match us in this area if we put our minds to it. We can and must develop ever-more-advanced satellite systems, anti-satellite systems and truly robust space launch and logistics capabilities. Then the next time an aggressor commits an act of war against the United States or a country we are pledged to defend, instead of impotently threatening to limit his tourist visas, we can respond by taking out his satellites, effectively informing him in advance the certainty of defeat should he persist. If we desire peace on Earth, we need to prepare for war in space.

## 4:

#### Interpretation: “appropriation of outer space” as a term of art by private entities refers to the exercise of exclusive and permanent control of space.

TIMOTHY JUSTIN TRAPP, JD Candidate @ UIUC Law, ’13, TAKING UP SPACE BY ANY OTHER MEANS: COMING TO TERMS WITH THE NONAPPROPRIATION ARTICLE OF THE OUTER SPACE TREATY UNIVERSITY OF ILLINOIS LAW REVIEW [Vol. 2013 No. 4]

The issues presented in relation to the nonappropriation article of the Outer Space Treaty should be clear.214 The ITU has, quite blatantly, created something akin to “property interests in outer space.”215 It allows nations to exclude others from their orbital slots, even when the nation is not currently using that slot.216 This is directly in line with at least one definition of outer-space appropriation.217 [\*\*Start Footnote 217\*\*Id. at 236 (“Appropriation of outer space, therefore, is ‘the exercise of exclusive control or exclusive use’ with a sense of permanence, which limits other nations’ access to it.”) (quoting Milton L. Smith, The Role of the ITU in the Development of Space Law, 17 ANNALS AIR & SPACE L. 157, 165 (1992)). \*\*End Footnote 217\*\*]The ITU even allows nations with unused slots to devise them to other entities, creating a market for the property rights set up by this regulation.218 In some aspects, this seems to effect exactly what those signatory nations of the Bogotá Declaration were trying to accomplish, albeit through different means.219

#### Violation ­–

#### i.e. the aff bans commercial tourism by private entities, which both fails to establish sovereign possession over regions that are toured and fails to establish permanent appropriation since tours enter and leave regions in outer space

#### Vote neg:

#### Limits – their interp explodes the topic to include affs about using space for any single purpose, like space-based solar power, helium and REMs on the Moon, military deployments, and climate adaptation satellites – this is unpredictable because topic lit is concerned with sovereignty over space and space colonization broadly, privileges the aff by stretching pre-tournament neg prep too thin and precludes nuanced case negs that rigorously test the aff

#### Precision first – Justifies the aff arbitrarily doing away with words in the resolution which gives way to affs about anything from public appropriation affs to air space affs and many more which obliterates negative prep.

#### Ground – allowing debates about extracting any space resource denies the neg links to core generics like space col good, which only answers affs that broadly prohibit states from using space – this kills testing and forces negatives to the fringes of argumentation like generic Ks that are stale and vulnerable to aff prep-outs

#### Fairness and education are voters – debate’s a game that needs rules to evaluate it and education gives us portable skills for life like research and thinking.

#### No RVIs – a) illogical – you shouldn’t win for being fair – it’s a litmus test for engaging in substance, b) norming – I can’t concede the counterinterp if I realize I’m wrong which forces me to argue for bad norms, c) baiting – incentivizes good debaters to be abusive, bait theory, then collapse to the 1AR RVI, d) topic ed – prevents 1AR blipstorm scripts and allows us to get back to substance after resolving theory