### Colonization NC

#### My value is life and my criteria is utilitarianism. Saving lives is the most important function of a government who must represent all of its people, and evaluating costs and benefits emphasizes critical comparative decision making skills

#### Contention One - Links

#### 1. Private investment is our only chance for Colonization- Government can’t solve

Dinkin, 2004 – CEO of SpaceShot [Sam July 26, Space Review “Space privatization: road to freedom” http://www.thespacereview.com/article/193/1]

In “Space Privatization: Road to Conflict”, Bruce Gagnon makes the case for defending the legal status quo. He first argues that privatization of space will lead to “more debris” and worries that, “Very soon we will reach the point of no return, where space pollution will be so great that an orbiting minefield will have been created that hinders all access to space.” Space law and achievement as embodied in the 1967 Outer Space Treaty are stuck in the 1960s. Without amendment, the treaty is stuck without property rights for the Moon and the planets. Our achievement is stuck with an ISS that really does not improve much on Skylab or Mir. Our lift capability is backsliding. Our capability to get to the Moon has disappeared maybe to be reclaimed some day. So it may not be such a big deal to have to give up the ISS due to orbital debris because the public benefit from the station is so low. Of course, there are many useful devices in space with GPS and telecom satellites providing excellent service to the global economy. Since these rarely fail due to orbital debris, it might be too soon to declare an emergency. But if there is an orbital debris problem, it is self limiting. The more debris there is, the less useful launches there will be so the less addition there will be to the debris problem. There are also several ways to solve the debris problem. Satellite launchers can be taxed for cleanup, kind of like a bottle deposit. If the deposit money were sufficient to de-orbit a satellite, then private industry would be very keen on de-orbiting satellites after their useful life in order to get the money back. Another way to solve the debris problem is to begin to ablate or collect the orbiting debris. In any case, there are two reasons that privatization will not substantially change the space debris situation. First, this debris problem will continue if space remains the preserve of big government even with business as usual. Second, regulations, such as the new FCC regulations for a minimum amount of propellant to continue broadcasting, allow the government to keep the debris situation under control. Gagnon states, “As the privateers move into space...they hope to mine the sky. Gold has been discovered on asteroids, helium-3 on the moon, and magnesium, cobalt and uranium on Mars.” If only this were viable, I would have a much easier time arguing for colonization. There are not too many things worth $10,000/pound in propellant to get something back from the Moon or more from Mars. Gold weighs in at $6,250/pound. Even Helium-3 (3He) does not fit the bill. Let’s wait for someone to have a commercially viable reactor before we invest in going to the Moon to extract the 3He on a large scale. Some things may be worth that transportation cost. Colonization in order to assure that our species outlasts the dinosaurs is priceless. Opening Mars to colonization will also create new opportunities for religious freedom and personal freedoms as the Pilgrims found when they immigrated to the New World. Space entertainment might pay its own way, as might suborbital tourism. Orbital hotels may be viable. Space science might be able to tag along, but science would have to be heavily subsidized. Maybe astronomical observing frequencies could be sold off on Earth to pay for a site on the far side of the Moon, but that would require much lower transport prices and higher spectrum prices than we’ve seen since the 3G crash. Suborbital point-to-point service from New York to Tokyo with a flight time less than the Concorde’s New York-to-London time may emerge some time. There are some valuable military uses to space being explored by the Pentagon with its FALCON and RASCAL programs in addition to earth observing satellites. Further weaponization of space will probably be required to defend the US in the most economical manner and to defend the new civilian space assets. If no weaponization occurs by the US, we can definitely expect terrorists or other states to do so and for space to be stunted by lack of defensive protection. With no privatization and no military protection, there will not be much colonization. Antarctica may be free of the intellectual pollution brought by property rights, but there are also no citizens, no development and very little in the way of commercial exports. Alaska, in contrast, hands out checks to its citizens rather than charging them taxes. Antarctica is also more inaccessible, so there may be another explanation for the disparity. Texarkana offers a starker side-by-side comparison of different law leading to different levels of commerce. The city has a street running down the center of town where one side is governed by Arkansas law and the other is governed by Texas law. The main difference between the two jurisdictions is the ability to collect a high rate of interest (Arkansas caps their interest rate at 5% above the federal funds rate). This minor limitation on commerce means that there are many more stores on the Texas side of the street. But suppose for a moment that we do have the opportunity to create a viable space economy. Gagnon continues, “Thus, after the taxpayers have paid all the R&D, private industry now intends to gorge itself on profits. Taxpayers won’t see any return on our ‘collective investment.’” They are seeing little return now on their collective investment. Public returns will be great indeed if space development is successful. If privatization results in profits, those profits can be taxed. If private suborbital, orbital, point-to-point, lunar and planetary development lowers the price of access for public science, exploration and commerce, then that is a benefit. If colonization is successful, the public will have an insurance policy against extinction. Successful colonization will also energize the spirit of humanity. Colonizing Mars will double the amount of land available to the species and potentially more than double solar system GDP as a commerce of ideas and builds up between the growing Mars population and Earth. Compare that to taxpayer return on public projects. What has the taxpayer return been on Social Security? It is as if the government mandated that everyone in the nation hold thousands of dollars in government bonds. Worse, the bonds pay below the market interest rate for federal savings bonds. While this is a boon to taxpayers because US borrowing is cheaper as a result, the elderly are getting a negative real return on their money. A privately-administered system with similar terms would surely have resulted in arrests and prosecutions. I love listening to NPR and watching PBS. GPS is cool. I don’t like the Post Office. The Channel Tunnel was an excellent public-private partnership, but the private partner seems to be getting no return in that case. Central planning by the USSR failed dismally with their investment in collectives. Socialism is leaving many European countries with a money standard of living comparable to the poorest US states although their quality of life is quite high. To be charitable, I would say that the case for public returns from public management is mixed. In any case, there are few returns to give up in space’s public sphere to let private industry have a go. Gagnon worries that, “Ultimately the taxpayers will be asked to pay the enormous cost incurred by creating a military space infrastructure that would control the ‘shipping lanes’ on and off the planet Earth.” I think the taxpayers should assess the costs and the benefits. If the shippers are going to be paying enough extra taxes with the extra commerce in safe and protected space to warrant the protection, pay for the protection from taxpayers. If not, I will be in the vanguard of those asking for corporations to arm themselves against would-be space pirates. Gagnon implies that privatization of off-Earth development will prepare the way for the next “war system.” This is not a disadvantage of privatization even if true. First, terrorists and rogue states will take war to the heavens whether there is public or private management of space so at best public management postpones the new war system. Second, energizing the human spirit with new challenges in space may actually result in a solar system with less conflict. Third, the next war system may provide security for Earth more economically than the existing Earth-based military. Gagnon finishes with, “Privatization also means that existing international space legal structures will be destroyed in order to bend the law toward private profit. Serious moral and ethical questions must be raised before another new “frontier” of conflict is created.” If space attracts no investment and no colonists, I say “Down with the legal structures!” As for the serious moral and ethical questions, I say, “Bring ’em on!”

#### 2. Property rights are key to developing a strong space infrastructure that can support space colonization

O’Connell, 2021 - Director, Office of Space Commerce [Kevin – introduction to “US Space Policies for the New Space Age: Competing on the Final Economic Frontier” by Bruce Cahan, J.D. and Dr. Mir Sadat January 6, 2021 (supersedes prior versions) https://newspacenm.org/space-policies-for-the-new-space-age-competing-on-the-final-economic-frontier]

The ability to maintain competitive advantage in the global space economy requires all of the tools available to government and industry in a free-market system. Government activities - whether as a first adopter, a predictable customer or a regulator - will remain important, but private sector innovations, both technical and nontechnical are the primary drivers of competitive advantage in our properly ambitious pursuit of space exploration and space commerce. Like recent U.S. government policies, Bruce Cahan and Mir Sadat have recognized the even greater strategic dimensions of the new space race. While space has always been a key national security venue, the race is now shifted predominantly to an economic race with immensely important political and international consequences. The American ecosystem that is driving space exploration and space commerce must be encouraged and protected in a variety of ways: investment, advocacy, regulatory reform, and an improved, rigorous understanding of developments in the space economy. Further, beyond the natural roles of NASA, the Department of State, the Department of Defense, the Department of Transportation, and increasingly, the Department of Commerce, continuing emphasis should be placed on the roles that can be played by other U.S. economic, financial, and development organizations such as the Export-Import Bank, the Development Finance Corporation, Small Business Administration, and other entities from across the federal government. Financial and insurance innovations must occur at the same exponential rate as the technical and business model developments that drive the space industry. As important risk-shifting mechanisms for a very broad and diverse American entrepreneurial base, new tools will be required to support the infrastructure and other longer-term support activities identified in this chapter. Innovative ideas for creating a space bank, use of tax credits, space bonds, and even a space commodities exchange, among others, merit careful consideration for inclusion into the U.S. toolkit for creating and sustaining advantage. International space partnerships are an essential part of this strategic competition. While all countries are inspired by the idea and pursuit of space exploration, many are as a practical matter interested mostly in how to participate in the forthcoming trillion-dollar space economy from a workforce, industrial development, and economic growth perspective. Our long-standing space partnerships with Europe and Japan must now naturally begin to include a new slate of space partnerships with countries in Asia, Africa, and Latin America. The unique American advantage here, contrary to Chinese behavior, is genuine interest in helping with partner capacity and economic growth, and ensuring internationally accepted norms, rights, and values are upheld. The Artemis Accords, for example, reflect this collective interest in safe, responsible, and transparent exploration of the Moon. So does the growing international interest in private property rights in space. 4 The race for the 2060 space economy is on, and competition is not a detriment because it stimulates inventions and innovations that often benefit all of humanity. This is possible when it is fueled by adaptive U.S. government policies, strong private sector entrepreneurship, a strong finance and insurance ecosystem, an inspired and growing workforce, and effective partnerships. As the global partner of choice, the United States and its allies stand to prevail and maintain the lion’s share in the economy. However, this race is much less about market share than it is about the norms, values, and behaviors that will carry us into the heavens to explore the Moon and other planets, and will create breath-taking new capabilities to improve our lives back on Earth for all of humanity.

#### 3. Property rights for private entities are essential to create the incentive for the transportation infrastructure necessary for space settlements

Jobes, 2005 - president of the Space Settlement Institute[Douglas, “Lunar Land Claims Recognition: Designing the Ultimate Incentive for Space Infrastructure Development”, May/June Space Times <http://www.space-settlement-institute.org/Articles/LCRSpaceTimesMay2005.pdf>]

U.S. recognition of land claims would be an open proposition, equally, to consortia from any nation, and, in fact, it is very likely that some lunar bases would be established by multi-national consortia and launched from non-American spaceports. Without something like the land claims recognition law, it may be a very long time before the space infrastructure that space businesses will need is financed and constructed. On February 10, Congressman Ken Calvert, the newly appointed chairman of the Space and Aeronautics Subcommittee of the House Science Committee, spoke before the Federal Aviation Administration's annual commercial space transportation conference. Calvert stated, "In 2010, the shuttle will be retired, so there is right now a need to move people into space quickly, safely, and reliably, I believe that need could be met in large part by the private sector.... The job of Congress is to pass legislation and exercise its oversight functions in such a way that will enable this industry to succeed." In June 2004, the President's Commission on Implementation of United States Space Exploration Policy (also known as the Aldridge Commission) specifically recommended prizes, tax incentives, regulatory relief, and the assurance of "appropriate property rights for those who seek to develop space resources and infrastructure." It's hard to imagine a more effective way to help the private space industry succeed than by passing legislation creating a financial incentive worth billions of dollars to research, design, develop, and build vital components of the infrastructure in space. And what would motivate Congress to pass a lunar land claims recognition law? Unlocking billions of dollars in private investment for the development of the space industry and space infrastructure would create an economic boom for this country in the aerospace and technology sectors. Untold new technology jobs would be created. More young people in this country would become interested in pursuing science as a career, inspired by a private industry race to the Moon in which they could possibly participate, just as the young generation was inspired during the Apollo era. An intensive effort on the part of the private sector to develop space infrastructure will have many economic and societal benefits. A catalyst like that which a lunar land claims recognition law would provide is needed now to jumpstart the development of space infrastructure. As Anita Gale points out, "The effect of adding space infrastructure will be like building a freeway in Southern California. After the first elements of infrastructure are in place, gas stations and restaurants are built at the exits, then hotels, and finally entire towns. After the first big spaceport or settlement is established, there will be a space construction boom." We can only close our eyes and imagine - and then open them and get to work to make it happen. •

#### 4. Property rights are key to establishing peaceful norms and frameworks for expanding commercial interests in space.

Cahan and Sadat, 2021 – prof of Management Science and Engineering, and former Policy Director on the U.S. National Security Council [Bruce and Mir “US Space Policies for the New Space Age: Competing on the Final Economic Frontier” January 6, 2021 (supersedes prior versions) https://newspacenm.org/space-policies-for-the-new-space-age-competing-on-the-final-economic-frontier]

Create a Framework for Like-Minded Allies and Partners In order to leverage US soft power, the US must shape the future-operating environment in Space by promoting international norms and standards, property rights in space, and develop a framework for maintaining peace, generating wealth, and securing allies and partners. The United States needs to permanently level the playing field for allies and partners to build their companies and abide by shared norms and rules so that the space economy reflects US market principles. In doing so, foreign markets will be made accessible and foreign demand for, US space companies’ products and services will ensure US companies longevity and supply chains through innovative economic policymaking and financial tools. Great power competition is as much about economics as it is about geopolitics. The United States is undermined by global competitors and foreign adversaries that target American allies and partners through offers of joint participation in platforms such as China’s Belt and Road Initiative that build and finance economies, infrastructure, wealth, and now space endeavors. In response to this challenge, the United States must provide meaningful alternatives for US-sympathetic nations that move beyond space exploration or military cooperation and provide a path toward shared prosperity from an expanded space economy. (OPRs: NSC, NEC, NSpC, State, DoD, Treasury, DoC, NASA, EXIM) Establish Private Property Rights in Space. Private sector ownership rights for space-based assets, as well as the legal means to create, transfer, license, and hypothecate them are essential if US market principles are to apply and be enforceable for space entrepreneurs and their investors, lenders, and customers. The inefficiencies or ambiguities of law and regulation today put the United States at risk, ignore opportunities to collaborate with America’s allies and partners, hamstring US corporations with outdated technology transfer restrictions, and starve the most nimble, efficient, and innovative new American companies of the capital they need to create revolutionary new technologies and business models.

#### Contention Two - Impacts

#### 1. Human extinction is inevitable on Earth – multiple cascading catastrophes threaten human survival eventually

Austen, 2011 – Popular Science feature author [Ben March, Popular Science “AFTER EARTH: Why? Where? How? When?” 5/24/1 https://www.popsci.com/science/article/2011-02/after-earth-why-where-how-and-when-we-might-leave-our-home-planet/#:~:text=Earth%20won't%20always%20be,course%20with%20our%20Milky%20Way.]

Earth won't always be fit for occupation. We know that in two billion years or so, an expanding sun will boil away our oceans, leaving our home in the universe uninhabitable-unless, that is, we haven't already been wiped out by the Andromeda galaxy, which is on a multibillion-year collision course with our Milky Way. Moreover, at least a third of the thousand mile-wide asteroids that hurtle across our orbital path will eventually crash into us, at a rate of about one every 300,000 years. Indeed, in 1989 a far smaller asteroid, the impact of which would still have been equivalent in force to 1,000 nuclear bombs, crossed our orbit just six hours after Earth had passed. A recent report by the Lifeboat Foundation, whose hundreds of researchers track a dozen different existential risks to humanity, likens that onein- 300,000 chance of a catastrophic strike to a game of Russian roulette: "If we keep pulling the trigger long enough we'll blow our head off, and there's no guarantee it won't be the next pull." Many of the threats that might lead us to consider off-Earth living arrangements are actually manmade, and not necessarily in the distant future. The amount we consume each year already far outstrips what our planet can sustain, and the World Wildlife Fund estimates that by 2030 we will be consuming two planets' worth of natural resources annually. The Center for Research on the Epidemiology of Disasters, an international humanitarian organization, reports that the onslaught of droughts, earthquakes, epic rains and floods over the past decade is triple the number from the 1980s and nearly 54 times that of 1901, when this data was first collected. Some scenarios have climate change leading to severe water shortages, the submersion of coastal areas, and widespread famine. Additionally, the world could end by way of deadly pathogen, nuclear war or, as the Lifeboat Foundation warns, the "misuse of increasingly powerful technologies." Given the risks humans pose to the planet, we might also someday leave Earth simply to conserve it, with our planet becoming a kind of nature sanctuary that we visit now and again, as we might Yosemite. None of the threats we face are especially far-fetched. Climate change is already a major factor in human affairs, for instance, and our planet has undergone at least one previous mass extinction as a result of asteroid impact. "The dinosaurs died out because they were too stupid to build an adequate spacefaring civilization," says Tihamer Toth-Fejel, a research engineer at the Advanced Information Systems division of defense contractor General Dynamics and one of 85 members of the Lifeboat Foundation's space-settlement board. "So far, the difference between us and them is barely measurable." The Alliance to Rescue Civilization, a project started by New York University chemist Robert Shapiro, contends that the inevitability of any of several cataclysmic events means that we must prepare a copy of our civilization and move it into outer space and out of harm's way-a backup of our cultural achievements and traditions. In 2005, then-NASA administrator Michael Griffin described the aims of the national space program in similar terms. "If we humans want to survive for hundreds of thousands or millions of years, we must ultimately populate other planets," he said. "One day, I don't know when that day is, but there will be more human beings who live off the Earth than on it."

#### 2. Space colonies are essential for human survival – they are our Plan(et)-B

Baum 2010 - scholar at Columbia University's Center for Research on Environmental Decisions [Seth “Cost–Benefit Analysis Of Space Exploration: Some Ethical Considerations”, Space Policy Volume 25, Issue 2, May, pg 75-80, http://www.sciencedirect.com/science/article/pii/S0265964609000198]

Another non-market benefit of space exploration is reduction in the risk of the extinction of humanity and other Earth-originating life. Without space colonization, the survival of humanity and other Earth-originating life will become extremely difficult – perhaps impossible – over the very long term. This is because the Sun, like all stars, changes in its composition and radiative output over time. The Sun is gradually converting hydrogen into helium, thereby getting warmer. In some 500 million to one billion years, this warming is projected to render Earth uninhabitable to life as we know it [25] and [26]. Humanity, if it still exists on Earth then, could conceivably have developed technology to survive on Earth despite these radical conditions. Such technology may descend from present proposals to “geoengineer” the planet in response to anthropogenic climate change [27] and [28].2 However, later – around seven billion years later – the Sun will lose mass that spreads into Earth's orbit, causing Earth to slow, be pulled into the Sun, and evaporate. The only way life could survive on Earth would be if, by sheer coincidence (the odds are on the order of one in 105 to one in 106 [29]), the planet happened to be pulled out of the Solar System by a star system that was passing by. This process might enable life to survive on Earth much longer, although the chances of this are quite remote. While space colonization would provide a hedge against these very long-term astronomical threats, it would also provide a hedge against the more immediate threats that face humanity and other species. Such threats include nuclear warfare, pandemics, anthropogenic climate change, and disruptive technology [30]. Because these threats would generally only affect life on Earth and not life elsewhere, self-sufficient space colonies would survive these catastrophes, enabling life to persist in the universe. For this reason, space colonization has been advocated as a means of ensuring long-term human survival [32] and [33]. Space exploration projects can help increase the probability of long-term human survival in other ways as well: technology developed for space exploration is central to proposals to avoid threats from large comet and asteroid impacts [34] and [35]. However, given the goal of increasing the probability of long-term human survival by a certain amount, there may be more cost-effective options than space colonization (with costs defined in terms of money, effort, or related measures). More cost-effective options may include isolated refuges on Earth to help humans survive a catastrophe [36] and materials to assist survivors, such as a how-to manual for civilization [37] or a seed bank [38]. Further analysis is necessary to determine the most cost-effective means of increasing the probability of long-term human survival.

#### 3. The failure to colonize space threatens an Enormous number of lives potentially – the largest utilitarian impact possible.

Bostrom, 2003 – Gannon Award winning author at Oxford University [Nicholas “Astronomical Waste: The Opportunity Cost of Delayed Technological Development Utilitas Vol. 15, No. 3 (2003): pp. 308-314 https://www.nickbostrom.com/astronomical/waste.html]

ABSTRACT. With very advanced technology, a very large population of people living happy lives could be sustained in the accessible region of the universe. For every year that development of such technologies and colonization of the universe is delayed, there is therefore an opportunity cost: a potential good, lives worth living, is not being realized. Given some plausible assumptions, this cost is extremely large. However, the lesson for utilitarians is not that we ought to maximize the pace of technological development, but rather that we ought to maximize its safety, i.e. the probability that colonization will eventually occur. I. THE RATE OF LOSS OF POTENTIAL LIVES As I write these words, suns are illuminating and heating empty rooms, unused energy is being flushed down black holes, and our great common endowment of negentropy is being irreversibly degraded into entropy on a cosmic scale. These are resources that an advanced civilization could have used to create value-structures, such as sentient beings living worthwhile lives. The rate of this loss boggles the mind. One recent paper speculates, using loose theoretical considerations based on the rate of increase of entropy, that the loss of potential human lives in our own galactic supercluster is at least ~10^46 per century of delayed colonization.[1] This estimate assumes that all the lost entropy could have been used for productive purposes, although no currently known technological mechanisms are even remotely capable of doing that. Since the estimate is meant to be a lower bound, this radically unconservative assumption is undesirable. We can, however, get a lower bound more straightforwardly by simply counting the number or stars in our galactic supercluster and multiplying this number with the amount of computing power that the resources of each star could be used to generate using technologies for whose feasibility a strong case has already been made. We can then divide this total with the estimated amount of computing power needed to simulate one human life. As a rough approximation, let us say the Virgo Supercluster contains 10^13 stars. One estimate of the computing power extractable from a star and with an associated planet-sized computational structure, using advanced molecular nanotechnology[2], is 10^42 operations per second.[3] A typical estimate of the human brain’s processing power is roughly 10^17 operations per second or less.[4] Not much more seems to be needed to simulate the relevant parts of the environment in sufficient detail to enable the simulated minds to have experiences indistinguishable from typical current human experiences.[5] Given these estimates, it follows that the potential for approximately 10^38 human lives is lost every century that colonization of our local supercluster is delayed; or equivalently, about 10^29 potential human lives per second. While this estimate is conservative in that it assumes only computational mechanisms whose implementation has been at least outlined in the literature, it is useful to have an even more conservative estimate that does not assume a non-biological instantiation of the potential persons. Suppose that about 10^10 biological humans could be sustained around an average star. Then the Virgo Supercluster could contain 10^23 biological humans. This corresponds to a loss of potential equal to about 10^14 potential human lives per second of delayed colonization. What matters for present purposes is not the exact numbers but the fact that they are huge. Even with the most conservative estimate, assuming a biological implementation of all persons, the potential for one hundred trillion potential human beings is lost for every second of postponement of colonization of our supercluster.[6] II. THE OPPORTUNITY COST OF DELAYED COLONIZATION From a utilitarian perspective, this huge loss of potential human lives constitutes a correspondingly huge loss of potential value. I am assuming here that the human lives that could have been created would have been worthwhile ones. Since it is commonly supposed that even current human lives are typically worthwhile, this is a weak assumption. Any civilization advanced enough to colonize the local supercluster would likely also have the ability to establish at least the minimally favorable conditions required for future lives to be worth living. The effect on total value, then, seems greater for actions that accelerate technological development than for practically any other possible action. Advancing technology (or its enabling factors, such as economic productivity) even by such a tiny amount that it leads to colonization of the local supercluster just one second earlier than would otherwise have happened amounts to bringing about more than 10^29 human lives (or 10^14 human lives if we use the most conservative lower bound) that would not otherwise have existed. Few other philanthropic causes could hope to match that level of utilitarian payoff.

#### 4. A Hilarious “space colonies good” card.

Savage, 1994 - First Millennial Foundation [Marshall T. The Millennial Project: Colonizing the Galaxy in Eight Easy Steps, 1994. , pp. 7–8, 230]

Now is the watershed of Cosmic history. We stand at the threshold of the New Millennium. Behind us yawn the chasms of the primordial past, when this universe was a dead and silent place; before us rise the broad sunlit uplands of a living cosmos. In the next few galactic seconds, the fate of the universe will be decided. Life — the ultimate experiment — will either explode into space and engulf the star-clouds in a fire storm of children, trees, and butterfly wings; or Life will fail, fizzle, and gutter out, leaving the universe shrouded forever in impenetrable blankness, devoid of hope. Teetering here on the fulcrum of destiny stands our own bemused species. The future of the universe hinges on what we do next. If we take up the sacred fire, and stride forth into space as the torchbearers of Life, this universe will be aborning. If we carry the green fire-brand from star to star, and ignite around each a conflagration of vitality, we can trigger a Universal metamorphosis. Because of us, the barren dusts of a million billion worlds will coil up into the pulsing magic forms of animate matter. Because of us, landscapes of radiation blasted waste, will be miraculously transmuted: Slag will become soil, grass will sprout, flowers will bloom, and forests will spring up in once sterile places. Ice, hard as iron, will melt and trickle into pools where starfish, anemones, and seashells dwell — a whole frozen universe will thaw and transmogrify, from howling desolation to blossoming paradise. Dust into Life; the very alchemy of God. If we deny our awesome challenge; turn our backs on the living universe, and forsake our cosmic destiny, we will commit a crime of unutterable magnitude. Mankind alone has the power to carry out this fundamental change in the universe. Our failure would lead to consequences unthinkable. This is perhaps the first and only chance the universe will ever have to awaken from its long night and live. We are the caretakers of this delicate spark of Life. To let it flicker and die through ignorance, neglect, or lack of imagination is a horror too great to contemplate.