## Util

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

Moen 16 [(Ole Martin Moen, Research Fellow in Philosophy at University of Oslo) “An Argument for Hedonism,” Journal of Value Inquiry (Springer), 50 (2) 2016: 267–281, <https://link.springer.com/article/10.1007/s10790-015-9506-9>] TDI

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

#### Util good – Existential threats outweigh.

**GPP 17** (Global Priorities Project, Future of Humanity Institute at the University of Oxford, Ministry for Foreign Affairs of Finland, “Existential Risk: Diplomacy and Governance,” Global Priorities Project, 2017, <https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf>

1.2. THE ETHICS OF EXISTENTIAL RISK In his book Reasons and Persons, Oxford philosopher Derek Parfit advanced an influential argument about the importance of avoiding extinction: I believe that if we destroy mankind, as we now can, this outcome will be much worse than most people think. Compare three outcomes: (1) Peace. (2) A nuclear war that kills 99% of the world’s existing population. (3) A nuclear war that kills 100%. (2) would be worse than (1), and (3) would be worse than (2). Which is the greater of these two differences? Most people believe that the greater difference is between (1) and (2). I believe that the difference between (2) and (3) is very much greater**. ...** The Earth will remain habitable for at least another billion years. Civilization began only a few thousand years ago. If we do not destroy mankind, these few thousand years may be only a tiny fraction of the whole of civilized human history. The difference between (2) and (3) may thus be the difference between this tiny fraction and all of the rest of this history. If we compare this possible history to a day, what has occurred so far is only a fraction of a second.65 In this argument, it seems that Parfit is assuming that the survivors of a nuclear war that kills 99% of the population would eventually be able to recover civilisation without long-term effect. As we have seen, this may not be a safe assumption – but for the purposes of this thought experiment, the point stands. What makes existential catastrophes especially bad is that they would “destroy the future,” as another Oxford philosopher, Nick Bostrom, puts it.66 This future could potentially be extremely long and full of flourishing, and would therefore have extremely large value. In standard risk analysis, when working out how to respond to risk, we work out the expected value of risk reduction, by weighing the probability that an action will prevent an adverse event against the severity of the event. Because the value of preventing existential catastrophe is so vast, even a tiny probability of prevention has huge expected value.67 Of course, there is persisting reasonable disagreement about ethics and there are a number of ways one might resist this conclusion.68 Therefore, it would be unjustified to be overconfident in Parfit and Bostrom’s argument. In some areas, government policy does give significant weight to future generations. For example, in assessing the risks of nuclear waste storage, governments have considered timeframes of thousands, hundreds of thousands, and even a million years.69 Justifications for this policy usually appeal to principles of intergenerational equity according to which future generations ought to get as much protection as current generations.70 Similarly, widely accepted norms of sustainable development require development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs.71 However, when it comes to existential risk, it would seem that we fail to live up to principles of intergenerational equity. Existential catastrophe would not only give future generations less than the current generations; it would give them nothing. Indeed, reducing existential risk plausibly has a quite low cost for us in comparison with the huge expected value it has for future generations. In spite of this, relatively little is done to reduce existential risk. Unless we give up on norms of intergenerational equity, they give us a strong case for significantly increasing our efforts to reduce existential risks. 1.3. WHY EXISTENTIAL RISKS MAY BE SYSTEMATICALLY UNDERINVESTED IN, AND THE ROLE OF THE INTERNATIONAL COMMUNITY In spite of the importance of existential risk reduction, it probably receives less attention than is warranted. As a result, concerted international cooperation is required if we are to receive adequate protection from existential risks. 1.3.1. Why existential risks are likely to be underinvested in There are several reasons why existential risk reduction is likely to be underinvested in.Firstly, it is a global public good. Economic theory predicts that such goods tend to be underprovided.The benefits of existential risk reduction are widely and indivisibly dispersed around the globe from the countries responsible for taking action. Consequently, a country which reduces existential risk gains only a small portion of the benefits but bears the full brunt of the costs. Countries thus have strong incentives to free ride, receiving the benefits of risk reduction without contributing. As a result, too few do what is in the common interest. Secondly, as already suggested above, existential risk reduction is an intergenerational public good: most of the benefits are enjoyed by future generations who have no say in the political process. For these goods, the problem is temporal free riding: the current generation enjoys the benefits of inaction while future generations bear the costs. Thirdly, many existential risks, such as machine superintelligence, engineered pandemics, and solar geoengineering, pose an unprecedented and uncertain future threat. Consequently, it is hard to develop a satisfactory governance regime for them: there are few existing governance instruments which can be applied to these risks, and it is unclear what shape new instruments should take. In this way, our position with regard to these emerging risks is comparable to the one we faced when nuclear weapons first became available. Cognitive biases also lead people to underestimate existential risks.Since there have not been any catastrophes of this magnitude, these risks are not salient to politicians and the public.72 This is an example of the misapplication of the availability heuristic, a mental shortcut which assumes that something is important only if it can be readily recalled. Another cognitive bias affecting perceptions of existential risk is scope neglect. In a seminal 1992 study, three groups were asked how much they would be willing to pay to save 2,000, 20,000 or 200,000 birds from drowning in uncovered oil ponds. The groups answered $80, $78, and $88, respectively.73 In this case, the size of the benefits had little effect on the scale of the preferred response. People become numbed to the effect of saving lives when the numbers get too large. **74** Scope neglect is a particularly acute problem for existential risk because the numbers at stake are so large.Due to scope neglect, decision-makers are prone to treat existential risks in a similar way to problems which are less severe by many orders of magnitude.A wide range of other cognitive biases

#### We don’t ignore structural oppression---preventing existential risk and framing it as a “we” claim is good.

Coles and Susen 18—Research Professor at the Institute for Social Justice at Australian Catholic University AND Reader in Sociology at the School of Arts and Social Sciences of City, University of London (Romand and Simon, “The Pragmatic Vision of Visionary Pragmatism: The Challenge of Radical Democracy in a Neoliberal World Order,” Contemporary Political Theory May 2018, Volume 17, Issue 2, pp 250–262)

Visionary pragmatism is driven by a political ethos that accents radical receptivity and a sense that a greater degree of wildness in our efforts is indispensable for transformative democratic movements. While some of my earlier works accented the ethical character of receptive generosity in political life, Visionary Pragmatism argues that receptivity is indispensable for generating democratic power – precisely because receptivity involves vulnerability, relationship formation, capacities to modulate, and learning in unexpected ways amidst difficult differences. Drawing on my engagements with the movement for democratic action research in Northern Arizona, I argue that receptive practices engender remarkable capacities for fostering grassroots critique and alternatives, powerful political assemblages across differences, and transformative dynamics in the face of what otherwise appear to be intractable problems. Our best and most powerful possibilities for co-creating urgent democratic change almost always advance along pathways engendered partly through relationships of careful attentiveness to what we initially took to be oblique, unintelligible – or, perhaps, even odious.

For these reasons, my political, theoretical, and pedagogical engagements move across many different configurations and a wider range of situations, ideologies, modes, and commitments than most. Eschewing a single subject position, in Visionary Pragmatism, I experiment with first-person plurals in which the ‘we’ morphs in relation to the different loci of initiative that animate my reflections. Sometimes ‘we’ refers to proponents of radical and ecological democracy very broadly, sometimes to scholars in higher education, sometimes to political theorists, sometimes to the action research movement that formed among people at Northern Arizona University and its community partners, sometimes to a specific action research team, sometimes to all people facing the possibility of planetary ecological collapse. Among the many things I find compelling about the writing of James Baldwin is how he shifts his pronouns without notice – for example, sometimes using ‘we’ to represent black people, sometimes as an uncanny member of the white-majority United States. This rhetorical shiftiness encroaches upon and pulls his readers – especially white readers – beyond the ‘innocence that constitutes the crime’ of their assumed individual and collective white subjectivities in ways that work in visceral, relational, and conceptual registers (Baldwin, 1992, p. 6). Such uncertainty has significant capacity to erode habits and defences, as one finds oneself unexpectedly drawn into perspectives, locations, energies, and tendencies that unsettle and reorient one’s own subjectivity. Much of my work has theorized ‘moving democracy’, and my rhetorical shifting of the first-person plural is a textual practice that aims to enhance this in ways that facilitate reflection.

Throughout Visionary Pragmatism, I argue that there are powerful reasons for active hope. At the same time, we do not live far from tipping points beyond which planetary ecological collapse, globalizing neoliberal fascism, and violent chaos may overwhelm our efforts. I do not think so much in terms of pessimism or optimism as I do about seizing and co-creating opportunities for catalysing dynamic changes in theory and practice that foster a powerful movement of receptive democracy, for complex democratic commonwealth and ecological flourishing. In one sense, as Walter Benjamin’s discussion of Paul Klee’s ‘Angelus Novus’ makes poignantly clear, it is always ‘too late’ for so much and so many, as catastrophic history keeps piling wreckage at our feet. At the same time, there are what Benjamin (1968) calls ‘weak messianic powers’ that emerge as the retroactive force of salvaged aspects of past struggles ignite sparks with emerging struggles to explode the continuum of progress. In this sense, up to our day, it is never altogether too late. With the language of ‘game-transformative practice’, I argue that a visionary-pragmatic movement of radical democracy must do something analogous in response to the fierce urgency of now, to avoid a sixth extinction in which this possibility could well become a casualty.

## DA

#### Private sector development is happening now and is necessary to scale up and lock in India’s status as a powerhouse in space

EdexLive, 06-25-2020, "Opening space sector will enable India to play important role in global space economy: ISRO chief," New Indian Express, https://www.edexlive.com/news/2020/jun/25/opening-space-sector-will-enable-india-to-play-important-role-in-global-space-economy-isro-chief-12874.html TDI

SRO chief K Sivan on Thursday stated that opening the space sector for private enterprises will help scale up benefits from space technology and enable Indian industry to be an important player in the global space economy. "If the space sector is opened (for private enterprises), the potential of the entire country can be utilised to scale up benefits from space technology. It will not only result in the accelerated growth of the sector but also enable Indian industry to be an important player in the global space economy," the Indian Space Research Organisation chief said. Sivan said that far-reaching reforms in space technology in India will put the country in the league of the select countries. "As part of longer socio-economic reform, space reforms will improve access to space-based services for India's development. Far-reaching reforms will put India in the league of few countries with efficient promotional and authorisation mechanism for private-sector space activities," he said. Talking about reforms that the government is planning to implement in the country's space sector, he said, "Space sector, where India is among a handful of countries with advanced space technology, can play a significant role in boosting the industrial base of India." "The government's decision is to implement reform measures to leverage ISRO's achievement by opening the space sector for private enterprises," he added. He further said that "Department of Space will promote sector space activities to enable it to provide end to end space services, including building and launching of rockets and satellites as well as providing space-based services on a commercial basis." "With this, there is an opportunity for large scale employment in the technology sector and India becoming a global technology powerhouse," ISRO chief added. Sivan also talked about the government's decision to establish an autonomous nodal agency for taking independent decisions for regulating the activities of private companies. "Government has approved the establishment of an autonomous nodal agency - Indian National Space, Promotion and Authorisation Centre - for taking independent decisions with respect to permitting and regulating the activities of private companies in the space sector," said ISRO chief. "It will act as a national nodal agency for handholding and promoting the private sector in space endeavours and for this ISRO will share its technical expertise as well as facilities," he added.

#### India private sector is key to space success – low cost operations, transparency, and accountability.

Rajagopalan ’20 [Dr Rajeswari (Raji) Pillai Rajagopalan is the Director of the Centre for Security, Strategy and Technology (CSST) at the Observer Research Foundation, New Delhi., 5-24-2020, "India’s Space Programme: A role for the private sector, finally?," ORF, <https://www.orfonline.org/research/indias-space-programme-a-role-for-the-private-sector-finally-66661/>] TDI

India’s finance minister Nirmala Sitharaman announced last week that India’s private sector will play a key role in augmenting India’s space programme, and that the government intends to share the facilities of the Indian Space Research Organisation (ISRO) with the private sector. This announcement was part of the Narendra Modi government’s call for new and bold reforms in an effort to promote its ‘self-reliant India’ mission. It is the fourth segment of the Rs 20 lakh crore Aatma Nirbhar Bharat Abhiyan special economic stimulus.

Sitharaman’s announcement entails a role for the private sector, possibly with the goal of greater investments in technology development and acquisition, capacity-building and space exploration, including planetary exploration. The minister, while announcing these reforms, appeared to understand that the private sector can help augment India’s space capability. While praising the work done by ISRO, she also pointed out that the private sector is also doing a lot of work in developing space technology. She also acknowledged that the existing regulations prevent private entities from using or even testing their products.

Therefore, to level the playing field, the government “will make a provision for the private sector to benefit from the assets which are available to ISRO and for India (in general) to benefit from.” The minister also said the new reforms would allow the private sector to play an active role in “satellites, launches and space-based services”.

But as always, implementation is key. Properly executing these reforms will require enabling policies and appropriate regulatory frameworks.

That the new reforms will allow private sector players to use ISRO facilities is a big deal. This indeed must be music to the ears of commercial players who have been seeking to get a fair share of the pie in terms of manufacturing of satellites and propellant technologies, among other areas. It should not be too difficult for India’s private space sector because there is a sizeable talent pool available outside ISRO. More importantly, the entry of the private sector, as in the telecom sector, can bring several advantages in terms of cost and access.

Following the announcement, ISRO tweeted that it will follow the government’s guidelines to allow the private sector to undertake space activities in the country. Though this did not seem particularly welcoming of the government’s initiative, ISRO’s support is critical to making it a success.

ISRO has in the last few years been opening up to the Indian private space sector in a gradual manner – mostly as a matter of compulsion because ISRO simply does not have the in-house capacity to address India’s growing requirements. Today, the Indian space programme is not just about civilian applications for remote-sensing, meteorology and communication, as in the early decades. India’s space sector and its requirements have grown enormously in the last decade to include television and broadband services, space science and exploration, space-based navigation and, of course, defence and security applications.

Among others, Ambassador Rakesh Sood has articulated the need for legislation to facilitate ISRO’s partnership with industries and entrepreneurs. Narayan Prasad and Prateep Basu, two prominent faces in the Indian space start-up segment, have argued that despite ISRO’s successes, “India’s space competitiveness has suffered from the absence of a globally reputed, private space industry.”

The private sector, especially the NewSpace industry and start-ups, have an advantage in terms of low-cost operations, which itself should be a big incentive for the government to make it an active stakeholder. A certain amount of democratisation of space technology with the participation of the private sector can ensure costs are kept low. And expanding the number of stakeholders will also ensure more transparency and better accountability and regulatory practices. This has been missing in India’s space sector. The same agency has undertaken promotion, commercialisation and regulatory functions – which is not healthy.

#### India space key to soft power.

Hickert 17 Cameron Hickert, Harvard’s Belfer Center for Science and International Affairs, Schwarzman Scholars, "Space Rivals: Power and Strategy in the China-India Space Race - Schwarzman Scholars", August 14, 2017, <https://www.schwarzmanscholars.org/events-and-news/space-rivals-power-strategy-china-india-space-race/> TDI

The regional rivalry between India and China has long simmered, and the next frontier increasingly appears to be space. Beyond the hard power dimension, this regional space race has taken on many of the soft power characteristics of the competition between the U.S. and U.S.S.R. during the Cold War. It should not be forgotten, “a major factor in the Asian space race is prestige, as rapidly developing countries there use technology to jockey for status. Space technology in particular, being flashy and complex, often captures the most cache.” Because soft power is about perception and attraction, demonstrating prowess in space capabilities is a crucial step in building this power regionally. Many of the feats that China and India are pursuing have already been achieved by the U.S., so mistakes are costlier in terms of international credibility – failures are perceived as worse when another nation has already been successful. Yet the attraction power of spaceflight achievements is more lucrative than in the past, as private entities around the world face tighter competition and shorter timelines in launching satellites, and are therefore willing to bring their business to any nation that can demonstrate the ability to launch cargo safely and cheaply. A prime example is India’s recent launch of 20 satellites on a single rocket; this mission included satellites from around the world, including the United States. The increased soft power borne out of a successful space program therefore is not only useful in the struggle for regional prestige, but also paves the way for increased economic success in a fast-growing industry.

#### India k2 taking up the climate change and alternative energy cause

GPC 17 [(Greater Pacific Capital, investing institution designed to identify and develop investing opportunities in and between India and other international economies), “Path to Power: India’s Great Opportunity in the Changing World Order,” 7/17/17, Greater Pacific Capital, <https://greaterpacificcapital.com/path-to-power-indias-great-opportunity-in-the-changing-world-order/>]TDI

Taking up the Climate Change and Alternative Energy Cause**.** The US withdrawal from the Paris Climate Accord has left a serious gap in climate change leadership that has yet to be filled.  While the rest of the world has vowed to continue without the US and China has signalled its willingness to play a greater role in the process, the size of the challenge facing the world exceeds any one country’s ability to lead alone on the matter. India, as the world’s fifth largest producer of energy has a strong position to be one of a small number of countries to lead the way in fighting climate change. India is targeting to grow renewable energy production fourfold within five years, and with its low-cost base can become a core source of mass-produced cost effective renewable solutions for the rest of the world.

## Pic

#### Counterplan: Private Companies other than Indigenous owned and operated companies should ban the appropriation of outer space by private entities

#### Solves the whole aff- cant recreate the logic of settler colonialist violence, NB of space col good

# Case

#### 1] Only evaluate the net amount violence solved by the aff Filter the debate through scope of solvency—there’s no impact to root cause if they don’t solve it. Aff cannot overcome the sum total of colonialist violence – structural barriers that are outside the scope of resolution will always exist

#### 2] Extinction outweighs it precludes the possibility for future generations and denies any possible value to life – any other metric is paternalistic resulting in involuntary death turns their offense. Framing issue alt solvency is dependent upon generating social life, which is impossible in a state of biological death. Any 1AR argument should be rejected cuz it’s paternalistic for them to justify the INVOLUNTARY death of indigenous individuals.

#### 3] The aff gives the state MORE power – 1AC specifically bans private companies from space but not public companies which leaves only the public sector for space exploration, all 1AC evidence proves how much people want to go space, however after the 1AC its done only through the state which is net worse according to the aff

#### 4] Voting aff in this round cannot solve colonialist violence – but it can rectify procedural fairness skews or an endorsement of a policy, evaluate the round by virtue of how much the ballot can solve, even if fairness isn’t the HIGHEST impact, it IS the highest impact you as a judge can impact

#### 5] Vote neg on presumption – demands for rematriation and material land return generate resentment within debate rounds where we think talking the talk is sufficient – turns the K. Think of ontology through Pascals wager **if they’re right nothing happens but if they’re wrong, they cement generations of indigenous death and alienation from life.**

Brough 17 (Taylor, BA from University of Vermont and 2016 CEDA Nationals Champion, Open letter to non-Black Native people in debate, <https://resistanceanddebate.wordpress.com/> //shree)

What is most disturbing to me about this ongoing history is that we have yet to tie virtually any debate round to actual, material land repatriation, sovereign gains, or the upholding of treaty rights. These material gains involve labor from Native people organizing at the grassroots level, not an academic labor from Settlers. Debate arguments do not facilitate sovereign benefits for Native peoples. Further, the struggle for sovereignty itself does not overcome or solve genocide. The removal of the Hunkpapa Lakota Oyate and their relatives at the Oceti Sakowin camp at Standing Rock should be proof enough of this—sovereignty as a politic is often met with, rather than resolving, genocidal violence. Non-Black Native people in debate have performed a similar land-based politic. Native debate has become so associated with words like “land,” “sovereignty,” “space,” “place,” “treaty rights,” and others, that it is almost impossible to theorize Native debate absent sovereignty as a grammar that marks our existence. So both non-Native debaters (who claim to advocate for Native peoples’ sovereignty) and Native debaters (who claim to advocate for something that usually falls into the grammar of sovereignty) are talking in essentially the same register, with incredibly limited slippage towards genocide as a vector of violence. And, for Native people, like non-Natives, debate arguments do not and cannot facilitate the material elements of decolonization that these land-based arguments frequently rely upon.[3] Sovereign gains don’t happen in debate rounds, but for some reason the (mis)recognition of Native enunciation as sovereignty persists, in that the word “land” harkens to Native debate in almost every instance, that almost every debate involving Native people reading perceptibly “Native” arguments includes a discussion of “treaties” or “sovereignty” or “land-based pedagogy” or “spatiality.” What other reason could this be than a structure of desire around recognition from the Settler/Master? If we really follow the history of how “Nativeness” has been misrepresented in debate by Settlers, it becomes clear that much of contemporary Native debate, strangely (or as I argue, not so strangely), mimics these misrepresentations.

#### 6] This is literally you—non-indigenous scholars doing academic work.

**Tuck and Yang 12** [Eve is an award-winning scholar in field of Indigenous studies and educational research [“Decolonization is not a metaphor” pg 1-40]

There is a long and bumbled history of non-Indigenous peoples making moves to alleviate the impacts of colonization. The too-easy adoption of decolonizing discourse (making decolonization a metaphor) is just one part of that history and it taps into pre-existing tropes that get in the way of more meaningful potential alliances. We think of the enactment of these tropes as a series of moves to innocence (Malwhinney, 1998), which problematically attempt to reconcile settler guilt and complicity, and rescue settler futurity. Here, to explain why decolonization is and requires more than a metaphor, we discuss some of these moves to innocence: As an Indigenous scholar and a settler/trespasser/scholar writing together, we have used forward slashes to reflect our discrepant positionings in our pronouns throughout this essay. i. Settler nativism ii. Fantasizing adoption iii. Colonial equivocation iv. Conscientization v. At risk-ing / Asterisk-ing Indigenous peoples vi. Re-occupation and urban homesteading Such moves ultimately represent settler fantasies of easier paths to reconciliation. Actually, we argue, attending to what is irreconcilable within settler colonial relations and what is incommensurable between decolonizing projects and other social justice projects will help to reduce the frustration of attempts at solidarity; but the attention won’t get anyone off the hook from the hard, unsettling work of decolonization. Thus, we also include a discussion of interruptions that unsettle innocence and recognize incommensurability.

#### 7] Alliance DA - using debate as a mode of advocacy ensures the failure of their radical project – competition means debaters ally themselves with individuals who vote for them and alienate those who are positioned with the burden of rejoinder and forced to negate – at worst you vote affirmative on presumption because they don’t use debate as a stepping stone for their advocacy outside the space and don’t have a net benefit to negating.

#### 8] State engagement is good – Contingent gains are better than the alt ---

#### Pushing native crises aside by “surrendering sovereignty” is a move to innocence – force the 2nr to explain why savanna act, not invisible act, violence against women act, shouldn’t be passed in congress – here’s a testimony from native politician deb haaland

**Segers 19** [Grace Segers, <https://www.cbsnews.com/news/congress-crisis-missing-and-murdered-native-american-women/>, JUNE 12, 2019 ]

"Right now it's almost like nobody knows how to deal with this issue, and that's one of the reasons why it's been kicked aside for so long**,**" said Rep. Deb Haaland of New Mexico, one of the first Native American women to be elected to Congress, in a conference call with reporters. "Congress has never had a voice like mine, a Native American woman who sees the blind spots that have existed for far too long. That's why I've been working on multiple bills and legislation to address this crisis." In a rare example of bipartisanship in such a divided political culture, members of Congress are working together to raise awareness about the epidemic of missing and murdered Native women and improving the federal response**.** Savanna's Act A bipartisan group of senators is sponsoring Savanna's Act, named for Savanna LaFontaine-Greywind, a young pregnant woman who was abducted and killed in Fargo, North Dakota, in 2017. The bill would increase coordination between federal and tribal agencies, improving tribal access to law enforcement databases and mandating that the attorney general and Interior secretary consult with tribes on how to further develop these databases. The bill also requires the Justice Department to create standardized guidelines for responding to cases of missing and murdered Native women, and would mandate that statistics on missing and murdered Native women are sent to Congress in a report each year. "There are all of these questions, and no data. That's the impetus behind Savanna's Act," said Sen. Catherine Cortez Masto, a Democrat from Nevada who introduced the bill with Alaska Republican Sen. Lisa Murkowski this year. "Savanna's Act is something that was important for us to highlight what is going on." The bill was first introduced by North Dakota Democratic Sen. Heidi Heitkamp and Murkowski in 2018. Although it passed the Senate unanimously, it was blocked in the House by former Rep. Bob Goodlatte, the chairman of the Judiciary Committee, who objected to how it dispersed federal funds. Heitkamp was defeated in 2018, but Goodlatte retired at the end of last year, giving the bill another opportunity to pass Congress. Murkowski and Cortez Masto reintroduced the bill in January. It is co-sponsored by four Republicans -- Sens. John Hoeven and Kevin Cramer of North Dakota, Dan Sullivan of Alaska, and Thom Tillis of North Carolina -- and six Democrats -- Sens. Maria Cantwell of Washington, Tom Udall and Martin Heinrich of New Mexico, Jon Tester of Montana, Chris Coons of Delaware, and Jeff Merkley of Oregon. Cortez Masto said that senators had made "some additional language changes" after the bill faced opposition in the House last year. A version of Savanna's Act was also introduced in the House by Democratic Rep. Norma Torres of California, Republican Rep. Dan Newhouse of Washington, and Haaland in May. Like the Senate bill, it has a raft of bipartisan co-sponsors -- including the other three Native American members of the house, Reps. Sharice Davids, Tom Cole and Markwayne Mullin. "Sometimes the record of that missing indigenous woman or person isn't documented, leaving questions unanswered for sometimes decades, leading to gaps in information, missing person cases unsolved and perpetrators roaming the streets," Haaland told reporters. "In this updated version of Savanna's Act, I worked hard to prioritize the safety of Native women, including urban areas to protect indigenous women throughout the country." Not Invisible Act Another bill addressing the crisis, the Not Invisible Act, is also under consideration in the House and Senate. The legislation was introduced in the House by Haaland, a member of the Pueblo Nation of Laguna; Davids, a member of the Ho-Chunk Nation of Wisconsin; Cole, a member of the Chickasaw Nation of Oklahoma; and Mullin, a member of the Cherokee Nation. The bill would create an advisory committee comprised of law enforcement, tribal leaders, survivors, and family members of a victim, which will make recommendations to the Departments of the Interior and of Justice for how to address the crisis. It would also designate an official within the Bureau of Indian Affairs to improve violent crime prevention efforts across federal agencies. Haaland told reporters that the Not Invisible Act could help the federal government overcome the distrust from Native communities by including Native voices on the advisory council. "There's lots of reasons and lots of ways that women go missing," Haaland said. "We do have to be sensitive and accurate in our descriptions of what happens to these women when they are taken away from their communities." Cortez Masto, Murkowski and Tester introduced the bill in the Senate in April. "It was designed to work in conjunction with Savanna's Act," Cortez Masto said about the Not Invisible Act. In the meantime, a bipartisan group of legislators in the House and Senate, including members of the Senate Committee on Indian Affairs and the House Subcommittee for Indigenous Peoples, [sent a letter](https://www.murkowski.senate.gov/imo/media/doc/2019-05-06%20Comptroller%20Dodaro_GAO_MMIW%20GAO%20Study.pdf) to the Government Accountability Office (GAO) asking Comptroller General Gene Dodaro to conduct a study on missing and murdered indigenous women on May 7. The letter said that these members of Congress had "heard from federal officials, tribal leaders, and members of families directly impacted by the [missing and murdered indigenous women] crisis," and that "all agreed that failures in cross-jurisdictional coordination, inadequate MMIW reporting protocols, and poor data collection limit the effectiveness of efforts to track, investigate, and solve MMIW cases." In a visit to Alaska in late May, Attorney General William Barr expressed his willingness to address the crisis of violence against women in tribal communities. "We have programs that are directed at violence against women, which is a major problem in some of these communities, and so there are areas we can help -- but the important thing is that we don't just dribble in grants here and there to make ourselves feel good," Barr said about tribal communities in Alaska. Violence Against Women Act Despite the bipartisanship displayed with Savanna's Act, the Not Invisible Act and the letter to the GAO, not all legislation addressing the crisis has support from members of both parties. The Violence Against Women Act (VAWA) reauthorization passed by the House this year included several amendments intended to address the crisis, including one authored by Haaland that would provide victim advocate services in state courts for Native women living in cities. Another amendment would require the GAO to submit a report on the response of law enforcement agencies on the crisis. The 2013 reauthorization of VAWA included a provision allowing tribal law enforcement to prosecute non-Native perpetrators in cases of domestic violence. The bill passed in the House this year now includes a provision that would expand the definition of domestic violence in the Indian Civil Rights Act of 1968 to include violence against children and elders. It also recognizes tribal jurisdiction over crimes other than domestic violence, such as sexual assault. However, Republicans in the Senate have taken issue to some of the provisions added by the Democratic majority in the House version of the bill, like allowing transgender individuals in women's shelters and preventing gun sales to convicted abusers and those found guilty of stalking misdemeanors. Some Republicans also oppose the extension of tribal prosecution to non-Native persons charged with violent crimes. On May 7, Democratic senators took to the Senate floor to condemn their Republican colleagues for not being willing to support VAWA. "We cannot allow this bill to be buried in the majority leader's so-called 'legislative graveyard,'" said Udall, referring to Senate Majority Leader Mitch McConnell's [vow not to take up progressive legislation](https://www.cbsnews.com/news/mitch-mcconnell-vows-to-be-the-grim-reaper-to-thwart-all-democratic-proposals/) that passed in the House. A spokesman for McConnell told CBS News that there were no announcements on the House version of VAWA, but that work has been underway on similar legislation in the Senate, which is being crafted by Republican Sen. Joni Ernst and Democratic Sen. Dianne Feinstein. He also blamed Democrats for allowing VAWA to expire in order to tack on the controversial provisions. In her interview with CBS News, Cortez Masto condemned Republican opponents of VAWA. "Unfortunately, some of my Republican colleagues want to take out any funding or support for our tribal communities," Cortez Masto said. "It shouldn't be an issue." Nonetheless, while a stalemate continues over VAWA, it's likely that Savanna's Act and the Not Invisible Act are headed for passage in Congress. "I haven't heard of any opposition so far," Haaland said about Savanna's Act. "We have a lot of bipartisan support." The states with the highest populations of Native Americans are a mix of traditionally red and blue states. Cortez Masto, who worked with tribal communities to combat sex trafficking as Nevada's attorney general, emphasized how it was important to raise national awareness about the issue. If the crisis is more widely known, obtaining data on missing and murdered women will be considered more critical. "This is an epidemic," she said.

#### 9] Epistemology focus is bad—

#### [A] You can’t engage in the aff if your tribes’ food source just got messed up by climate change. Abstraction DA to the alt

#### [B] If we prove the neg is a good idea then our epistemology is sufficiently good

## Space Col Good

#### Colonization of outer space is essential to humanity – 5 warrants

Orwig 15 [(Jessica, a senior editor at Insider. She has a Master of Science in science and technology journalism from Texas A&M University and a Bachelor of Science in astronomy and physics from The Ohio State University. Before NY she spent time as an intern at: American Physical Society in MD International Center for Theoretical Physics in Italy Fermi National Accelerator Laboratory in IL American Geophysical Union in DC), “5 undeniable reasons humans need to colonize Mars — even though it's going to cost billions,” Slate, 4/21/2015, https://www.businessinsider.com/5-undeniable-reasons-why-humans-should-go-to-mars-2015-4] MN

Establishing a permanent colony of humans on Mars is not an option. It's a necessity. At least, that's what some of the most innovative, intelligent minds of our age — Buzz Aldrin, Stephen Hawking, Elon Musk, Bill Nye, and Neil deGrasse Tyson — are saying. Of course, it's extremely difficult to foresee how manned missions to Mars that would cost hundreds of billions of dollars each, could benefit mankind. It's easier to imagine how that kind of money could immediately help in the fight against cancer or world hunger. That's because humans tend to be short-sighted. We're focused on what's happening tomorrow instead of 100 years from now. "If the human race is to continue for another million years, we will have to boldly go where no one has gone before," Hawking said in 2008 at a lecture series for NASA's 50th anniversary. That brings us to the first reason humans must colonize Mars: 1. Ensuring the survival of our species The only home humans have ever known is Earth. But history shows that surviving as a species on this tiny blue dot in the vacuum of space is tough and by no means guaranteed. The dinosaurs are a classic example: They roamed the planet for 165 million years, but the only trace of them today are their fossilized remains. A colossal asteroid wiped them out. Putting humans on more than one planet would better ensure our existence thousands if not millions of years from now. "Humans need to be a multiplanet species," Musk recently told astronomer and Slate science blogger Phil Plait. Musk founded the space transport company SpaceX to help make this happen. Mars is an ideal target because it has a day about the same length as Earth's and water ice on its surface. Moreover, it's the best available option: Venus and Mercury are too hot, and the Moon has no atmosphere to protect residents from destructive meteor impacts. 2. Discovering life on Mars Nye, the CEO of The Planetary Society, said during an episode of StarTalk Radio in March that humanity should focus on sending humans instead of robots to Mars because humans could make discoveries 10,000 times as fast as the best spacecraft explorers we have today. Though he was hesitant to say humans should live on Mars, he agreed there were many more discoveries to be made there. One monumental discovery scientists could make is determining whether life currently exists on Mars. If we're going to do that, we'll most likely have to dig much deeper than NASA's rovers can. The theory there is that life was spawned not from the swamps on adolescent Earth, but from watery chasms on Mars. The Mars life theory suggests that rocks rich with microorganisms could have been ejected off the planet's surface from a powerful impact, eventually making their way through space to Earth. It's not a stretch to imagine, because Martian rocks can be found on Earth. None of those, however, have shown signs of life. "You cannot rule out the fact that a Mars rock with life in it landing on the Earth kicked off terrestrial life, and you can only really test that by finding life on Mars," Christopher Impey, a British astronomer and author of over a dozen books in astronomy and popular science, told Business Insider. 3. Improving the quality of life on Earth "Only by pushing mankind to its limits, to the bottoms of the ocean and into space, will we make discoveries in science and technology that can be adapted to improve life on Earth." British doctor Alexander Kumar wrote that in a 2012 article for BBC News where he explored the pros and cons of sending humans to Mars. At the time, Kumar was living in the most Mars-like place on Earth, Antarctica, to test how he adapted to the extreme conditions both physiologically and psychologically. To better understand his poignant remark, let's look at an example: During its first three years in space, NASA's prized Hubble Space Telescope snapped blurry pictures because of a flaw in its engineering. The problem was fixed in 1993, but to try to make use of the blurry images during those initial years, astronomers developed a computer algorithm to better extract information from the images. It turns out the algorithm was eventually shared with a medical doctor who applied it to the X-ray images he was taking to detect breast cancer. The algorithm did a better job at detecting early stages of breast cancer than the conventional method, which at the time was the naked eye. "You can't script that. That happens all the time — this cross pollination of fields, innovation in one, stimulating revolutionary changes in another," Tyson, the StarTalk radio host, explained during an interview with Fareed Zakaria in 2012. It's impossible to predict how cutting-edge technologies used to develop manned missions to Mars and habitats on Mars will benefit other fields like medicine or agriculture. But we'll figure that out only by "pushing humankind to its limits" and boldy going where we've never been before. 4. Growing as a species Another reason we should go to Mars, according to Tyson, is to inspire the next generation of space explorers. When asked in 2013 whether we should go to Mars, he answered: "Yes, if it galvanizes an entire generation of students in the educational pipeline to want to become scientists, engineers, technologists, and mathematicians," he said. "The next generation of astronauts to land on Mars are in middle school now." Humanity's aspirations to explore space are what drive us toward more advanced technological innovations that will undoubtedly benefit mankind in one way or another. "Space is like a proxy for a lot of what else goes on in society, including your urge to innovate," Tyson said during his interview with Zakaria. He added: "There's nothing that drives ambitions the way NASA does." 5. Demonstrating political and economic leadership At a February 24 hearing, Aldrin told the US Senate's Subcommittee on Space, Science and Competitiveness that getting to Mars was a necessity not only for science, but also for policy. "In my opinion, there is no more convincing way to demonstrate American leadership for the remainder of this century than to commit to a permanent presence on Mars," he said. If Americans do not go to Mars, someone else will. And that spells political and economic benefit for whoever succeeds. "If you lose your space edge," Tyson said during his interview with Zakaria, "my deep concern is that you lose everything else about society that enables you to compete economically."

#### Space col key to innovation

West 20 Darrell M. West, 8-18-2020, "Five reasons to explore Mars," Brookings, <https://www.brookings.edu/blog/techtank/2020/08/18/five-reasons-to-explore-mars/> TDI

The recent launch of the Mars rover Perseverance is the latest U.S. space mission seeking to understand our solar system. Its [expected arrival at the Red Planet in mid-February](https://www.nytimes.com/2020/07/30/science/nasa-mars-launch.html) 2021 has a number of objectives linked to science and innovation. The rover is equipped with sophisticated instruments designed to search for the remains of ancient microbial life, take pictures and videos of rocks, drill for soil and rock samples, and use a small helicopter to fly around the [Jezero Crater landing spot](https://mars.nasa.gov/resources/22474/jezero-crater-mars-2020s-landing-site/). Mars is a valuable place for exploration because it can be reached in 6 ½ months, is a major opportunity for scientific exploration, and has been mapped and studied for several decades. The mission represents the first step in a long-term effort to bring Martian samples back to Earth, where they can be analyzed for residues of microbial life. Beyond the study of life itself, there are a number of different benefits of Mars exploration. UNDERSTAND THE ORIGINS AND UBIQUITY OF LIFE The site where Perseverance is expected to land is the place where experts believe 3.5 billion years ago held a lake filled with water and flowing rivers. It is an ideal place to search for the residues of microbial life, test new technologies, and lay the groundwork for human exploration down the road. The mission plans to investigate whether microbial life existed on Mars billions of years ago and therefore that life is not unique to Planet Earth. As noted by Chris McKay, a research scientist at NASA’s Ames Research Science Center, that would be an extraordinary discovery. “Right here in our solar system, [if life started twice](https://www.space.com/9329-earth-unique-life-common-universe.html), that tells us some amazing things about our universe,” he pointed out. “It means the universe is full of life. Life becomes a natural feature of the universe, not just a quirk of this odd little planet around this star.” The question of the origins of life and its ubiquity around the universe is central to science, religion, and philosophy. For much of our existence, humans have assumed that even primitive life was unique to Planet Earth and not present in the rest of the solar system, let alone the universe. We have constructed elaborate religious and philosophical narratives around this assumption and built our identity along the notion that life is unique to Earth. If, as many scientists expect, future space missions cast doubt on that assumption or outright disprove it by finding remnants of microbial life on other planets, it will be both invigorating and illusion-shattering. It will force humans to confront their own myths and consider alternative narratives about the universe and the place of Earth in the overall scheme of things. As noted in my Brookings book, [Megachange](https://www.brookings.edu/book/megachange-economic-disruption-political-upheaval-and-social-strife-in-the-21st-century/), given the centrality of these issues for fundamental questions about human existence and the meaning of life, it would represent a far-reaching shift in existing human paradigms. As argued by scientist McKay, discovering evidence of ancient microbial life on Mars would lead experts to conclude that life likely is ubiquitous around the universe and not limited to Planet Earth. Humans would have to construct new theories about ourselves and our place in the universe. DEVELOP NEW TECHNOLOGIES The U.S. space program has been an extraordinary [catalyst for technology innovation](https://www.jpl.nasa.gov/infographics/infographic.view.php?id=11358). Everything from Global Positioning Systems and medical diagnostic tools to wireless technology and camera phones owe at least part of their creation to the space program. Space exploration required the National Aeronautics and Space Administration to learn how to communicate across wide distances, develop precise navigational tools, store, transmit, and process large amounts of data, deal with health issues through digital imaging and telemedicine, and develop collaborative tools that link scientists around the world. The space program has pioneered the miniaturization of scientific equipment and helped engineers figure out how to land and maneuver a rover from millions of miles away. Going to Mars requires similar inventiveness. Scientists have had to figure out how to search for life in ancient rocks, drill for rock samples, take high resolution videos, develop flying machines in a place with gravity that is 40 percent lower than on Earth, send detailed information back to Earth in a timely manner, and take off from another planet. In the future, we should expect large payoffs in commercial developments from Mars exploration and advances that bring new conveniences and inventions to people. ENCOURAGE SPACE TOURISM In the not too distant future, wealthy tourists likely will take trips around the Earth, visit space stations, orbit the Moon, and perhaps even take trips around Mars. For a substantial fee, they can experience weightlessness, take in the views of the entire planet, see the stars from outside the Earth’s atmosphere, and witness the wonders of other celestial bodies. The Mars program will help with space tourism by improving engineering expertise with space docking, launches, and reentry and providing additional experience about the impact of space travel on the human body. Figuring out how weightlessness and low gravity situations alter human performance and how space radiation affects people represent just a couple areas where there are likely to be positive by-products for future travel. The advent of space tourism will [broaden human horizons](https://unitedearth.us/religion-and-spirituality/does-seeing-earth-from-space-alter-your-perspective/) in the same way international travel has exposed people to other lands and perspectives. It will show them that the Earth has a delicate ecosystem that deserves protecting and why it is important for people of differing countries to work together to solve global problems. Astronauts who have had this experience say it has altered their viewpoints and had a profound impact on their way of thinking. FACILITATE SPACE MINING Many objects around the solar system are made of similar minerals and chemical compounds that exist on Earth. That means that some asteroids, moons, and planets could be rich in minerals and rare elements. Figuring out how to [harvest those materials](https://www.sciencefocus.com/space/space-mining-the-new-goldrush/) in a safe and responsible manner and bring them back to Earth represents a possible benefit of space exploration. Elements that are rare on Earth may exist elsewhere, and that could open new avenues for manufacturing, product design, and resource distribution. This mission could help resource utilization through advances gained with its Mars Oxygen Experiment (MOXIE) equipment that converts Martian carbon dioxide into oxygen. If MOXIE works as intended, it would help humans live and work on the Red Planet. ADVANCE SCIENCE One of the most crucial features of humanity is our curiosity about the life, the universe, and how things operate. Exploring space provides a means to satisfy our thirst for knowledge and improve our understanding of ourselves and our place in the universe. Space travel already has exploded centuries-old myths and promises to continue to confront our long-held assumptions about who we are and where we come from. The next decade promises to be an exciting period as scientists mine new data from space telescopes, space travel, and robotic exploration. Ten or twenty years from now, we may have [answers to basic questions](https://www.brookings.edu/book/turning-point/) that have eluded humans for centuries, such as how ubiquitous life is outside of Earth, whether it is possible for humans to survive on other planets, and how planets evolve over time.

#### Space colonization encourages healthcare innovations- solves diseases

Donoviel 19 (Dorit Donoviel, 7-19-2019, "Space exploration is reinventing healthcare," [20+ years leadership experience as executive director of R&D overseeing diverse areas of biomedical research from basic to applied science, drug discovery, and technology development. Executing a multi-million dollar national research portfolio of grants addressing the plethora of physiological and behavioral challenges of humans in space. Executive Director, Translational Research Institute for Space Health at Baylor College of Medicine] The Hill, <https://thehill.com/opinion/technology/453853-space-exploration-is-reinventing-healthcare>) TDI

Though many do not realize it, humans have been living and working in space continuously for the past two decades. The conditions of spaceflight have accelerated our ability to study progressive degenerative diseases. This novel paradigm of understanding human physiology under the stresses of living in space holds great promise for new sources of medical breakthroughs for Earth. Although astronauts are carefully selected to be exceptionally healthy and exhibit peak physical and mental performance, after only four to six months in space, they can develop numerous medical [conditions](https://humanresearchroadmap.nasa.gov/Risks/). Without appropriate exercise, they lose bone and muscle mass. They become prone to developing kidney stones. Their hearts become deconditioned. Their blood vessels stiffen. A subset of astronauts develop a swelling of the optic nerve and possibly an increase in pressure on the brain. Even dormant viruses become activated, alongside changes to the immune system. There is a sense of urgency to solve these problems if we are to send humans to Mars and return them safely in the next decade or two. This is why NASA is investing in cutting-edge research for human health and performance including high-risk high-reward approaches funded through the [Translational Research institute for Space Health](https://www.bcm.edu/centers/space-medicine/translational-research-institute) (TRISH). Supporting potentially ground-breaking innovations requires a leap of faith in the right direction. Keeping astronauts healthy during deep space exploration missions — where there are no hospitals and no medical specialists — requires a different paradigm for healthcare. Astronauts are typically engineers and scientists, and only occasionally physicians. On the way to Mars, when communications with Earth will be limited, they could be forced to act as both patients and healthcare providers. If a medical condition is allowed to progress when they are millions of miles away from Earth, the situation could become catastrophic. Therefore, astronauts will need to detect even the most subtle changes in their own health status early enough to prevent disease. This requires a healthcare paradigm of predicting, preventing and mitigating ailments by intervening early. This means enabling monitoring, diagnostic and therapeutic medical capabilities that are simple to use, safe, robust and miniaturized. Additionally, what will work in a small spacecraft in the hands of an engineer is also likely to work in a community clinic with limited resources. Or even in our homes. This different approach to healthcare can help save lives and reduce costs — at a global level. Space demands the best in healthcare innovations, focusing on prevention and early intervention using smart, creative solutions. On a mission to Mars, blood tests will be done in a matter of minutes, by the patient, on a single [drop of blood](https://www.1dropdx.com/). A trained and adaptive computer [algorithm](https://www.visualdx.com/) will track health status based on a variety of physiological parameters and alert astronauts when important deviations from normal become evident. [Automated eye exams](https://www.healio.com/ophthalmology/retina-vitreous/news/online/%7Bb1a85e81-9e54-4976-9717-3218fd7fa175%7D/web-vision-technologies-awarded-grants-to-develop-devices-for-nasa) will be performed by the astronauts on themselves and images will be analyzed by a computer for changes. Customized [medications](http://news.mit.edu/2016/portable-pharmacy-on-demand-0331) will be tailor-made for the patient on the spot. If a minor medical procedure is required, the caregiver will learn and practice beforehand using augmented reality tools and software [simulations](https://www.level-ex.com/) adjusted for zero-gravity. Kidney stones will be found early and treated quickly and painlessly using [ultrasound](http://www.sonomotion.com/) to “push” them out of the kidney so they can be cleared naturally with urination. Sleep and mood will be improved using [sound stimulation](https://www.usa.philips.com/a-w/about/news/archive/standard/news/press/2019/20190617-philips-smartsleep-deep-sleep-headband-selected-by-nasa-funded-institute-for-studies-to-improve-sleep-and-behavioral-health.html) and health will be improved by individualized diets which will be enriched with high-nutrient [plants](https://news.ucr.edu/articles/2019/04/25/astronauts-might-soon-grow-space-tomatoes) grown efficiently within a small footprint. Most importantly, all these advances have clear and important applications on Earth. Space exploration has already yielded hundreds of inventions that filled our [arsenal](https://spinoff.nasa.gov/) for fighting diseases. To land women and men on Mars and return them healthy, we must reinvent healthcare. The positive consequences of this work will impact all of humanity. The spirit of Apollo is alive and well in space health research today. And for science, medicine and technology pioneers, our most important work is still ahead.

#### Colonies in space are sustainable and rely on planetary resources

Haynes 19, 5/17, Korey "O’Neill colonies: A decades-long dream for settling space," Astronomy, https://astronomy.com/news/2019/05/oneill-colonies-a-decades-long-dream-for-settling-space Top of Form

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Last week, Amazon founder Jeff Bezos revealed his spaceship company’s new lunar lander, dubbed Blue Moon, and he spelled out a bold and broad vision for humanity’s future in space. Faced with the limits of resources here on Earth, most fundamentally energy, he pointed to life in space as a solution. “If we move out into the solar system, for all practical purposes, we have unlimited resources,” Bezos said. “We could have a trillion people out in the solar system.” And while colonies on other planets would be plagued by low gravity, long distances to Earth (leading to communication delays), and further limits down the road, those weaknesses are avoided if the colonies remain truly in space. To that end, Bezos instead suggested people consider taking up residence in O’Neill colonies, a futuristic concept for space settlements first dreamed up decades ago. “These are very large structures, miles on end, and they hold a million people or more each.” Gerard O’Neill was a physicist from Princeton University who teamed up with NASA in the 1970s on a series of workshops that explored efficient ways for humans to live off-world. Beyond influencing Bezos, his ideas have also deeply affected how many space experts and enthusiasts think about realistic ways of living in space. “What will space colonies be like?” O’Neill once asked the Space Science Institute he founded. “First of all, there’s no point in going out into space if the future that we see there is a sterile future of living in tin cans. We have to be able to recreate, in space, habitats which are as beautiful, as Earth-like, as the loveliest parts of planet Earth — and we can do that.” Of course, neither O’Neill nor anyone since has actually made such a habitat, but in many ways, the concepts he helped developed half a century ago remain some of the most practical options for large-scale and long-term space habitation. While NASA has mostly focused on exploring the moon and Mars in recent years, O’Neill colonies offer an option untethered to any planetary body. Instead, people would live in enormous circular structures in space that would be capable of hosting many thousands of people — or even millions according to Bezos — on a permanent basis. You may have seen these kinds of colonies in science fiction, from Star Trek, to the movie Interstellar. But in real life, researchers have thought up a a few variations: either a sphere, a cylinder, or a ring-shaped torus. All of these are designed to rotate and create a centrifugal force that mimics gravity for the inhabitants. While the sizes and specifications of the colonies vary, there are a few staples. In general, O’Neill colonies were designed to be permanent, self-sustaining structures. That means they would use solar power for electrical energy and for growing crops. The outer walls of an O’Neill colony are generally pictured as a transparent material, so that mirrors can aim sunlight through its walls as needed to provide light and energy – or to allow darkness, a feature humans also need, especially while we sleep. But building these colonies is a challenge beyond any humans have accomplished so far in space, and Bezos acknowledged that. He referred to two “gates” in his announcement, which he clarified as challenges that humans need to overcome. The first, which his company Blue Origin and other space entrepreneurs have been tackling, is to reduce the cost and difficulty of getting to space at all. But the second involves using resources from space, rather than hauling them from Earth. Bezos isn’t alone in such thinking. Most of NASA’s long-term plans for the Moon and Mars involve rely on harvesting materials and manufacturing products locally, using lunar and martian regolith to build and repair structures. And in the shorter term, three of the dozen experiments NASA selected as the first to fly as part of the new lunar program — possibly even by the end of the year — are what NASA terms “resource prospecting instruments.” That pairs well with O’Neill’s vision. These colonies are meant to use resources gathered from space, whether asteroids, the Moon, or even Mars. Doing so avoids the costly effort of heaving materials and goods out of Earth’s deep gravity well. That means they would be built using materials available cheaply in space. The humans and their attendant plants and animals would need to be carried from Earth. But raw materials like oxygen, nitrogen and aluminum are plentiful in the solar system, and mining for resources in space is a common theme across space settlement discussions. Because of their size, the colonies should be able to act as fully independent ecosystems, with plants to cycle air and water and resource cycles not so dissimilar from Earth. Humans are a long way from being able to launch anything like an O’Neill colony in the near future. But it’s somewhat telling that, after 50 years of space exploration and technological achievement, one of the modern leaders in private spaceflight is still espousing an idea from the first days of space exploration.