

U.S. – CHINA COOPERATION NEGATIVE

Inherency

The United States and China already have strong ties. Each government has used engagement with the other to build positive and cooperative policies as well as building webs of interdependencies that constrain hostility. Differences between the two nations continue to be worked out in private. Early warning of debris collisions is one example of space policy where the two nations are working together.

Harm/Advantages

Economic cooperation and interdependence are huge barriers to a downward spiral in our relationship. Neither side has made hostile public statements recently. Both sides see too much benefit from good relations to seriously provoke the other.

Existential threats to the planet are greatly exaggerated and far off in the future at best. Spending now on efforts to prevent extinction events may present an inefficient opportunity cost. Other survival strategies, such as developing ground-based renewable energy and new food supplies would be a better way for us to spend our resources.

Space colonies or “getting off the rock” would divert enormous attention and resources away from improving our planet directly. It’s hard to imagine that any society capable of sending billions of people successfully to live on another planet, possibly outside of our solar system, would not also be able to develop a solution to global warming hundreds of years sooner. If we start now to focus on solutions like space colonies, future resources like young scientists will be misdirected in that direction; they will ignore our short-term problems here on earth.

Aside from the enormous challenges of leaving the planet, if humanity doesn’t figure out how to work together to make its own planet habitable first, it’s unlikely we will be able to move millions of miles away to another planet and successfully work together there. We should focus our efforts here first and worry about space colonization in the future when we are more advanced technologically and have developed a workable ethic of harmony between nations. Chances are we will never reach the point of being able to colonize space if we don’t focus now exclusively on earth-bound solutions to our problems.

Solvency

China may not be eager to cooperate with the U.S. on space exploration. Their leadership has become more hard-edged in their orientation toward us and not as interested in cooperating. Younger generations of leaders hold views of Chinese ascendancy and are less interested in joining forces with any nation, including America. Even though elements of both countries realize that cooperation might have some benefits, there are powerful nationalistic forces on both sides that would prevent a deep, sustained working relationship.

Similar forces would prevent meaningful cooperation more broadly in Asia. Rivalries there are intense and involve fundamental questions like religion, border disputes and histories of war. It is unlikely that cooperation in just one policy area like space would be able to undo all of that.

Disadvantages

Cooperation with China could undermine U.S. technology leadership. We would have to share and transfer technology if we were working in a joint program with the Chinese. They would be able to analyze our products and copy or improve on them. The U.S. is so far ahead right now any sharing arrangement would benefit China.

China would use space cooperation as a way to get the United States to make concessions in other areas. Once we were working closely together on a space project, would the U.S. be as willing to criticize China's human rights policy or their currency devaluation?

China's space program has important military functions and cooperating with them would be giving away secrets they could use for military advantage. This could threaten the U.S. directly or at least our ability to lead allies. You can use the large amount of evidence in the U.S. Leadership Affirmative file to build this argument.

Extensive cooperation with China would greatly provoke the China-India rivalry, so the Rivalry DA would link.

Cooperation with China is very controversial and unpopular with conservatives so it will link to the Politics DA.

COOPERATION IS SUFFICIENT NOW

THE U.S. AND CHINA ALREADY HAVE STRONG COOPERATIVE TIES

Robert Sutter, Visiting Professor, School of Foreign Service, Georgetown Univ, 2010

[Southeast Asian Affairs, Volume 2010, p. 55]

Specialists in China and the United States have identified a pattern of dualism in U.S.-China relations that has emerged as part of the generally positive equilibrium which developed in the post Cold War period. The pattern involves constructive and cooperative engagement on the one hand and contingency planning or hedging on the other.^{^^} Chinese and U.S. contingency planning and hedging against one another sometimes involves actions like the respective Chinese and U.S. military buildups that are separate from and develop in tandem with the respective engagement policies the two leaderships pursue, with each other. At the same time, dualism shows as each government has used engagement to build positive and cooperative ties while at the same time seeking to use these ties to build interdependencies and webs of relationships that have the effect of constraining the other power from taking actions that oppose its interests. The Obama government and the Chinese administration have continued a pattern that characterized Sino-American relations during the later years of the George W. Bush administration. That is, differences between the two countries usually continue to be dealt with out of the limelight in over sixty dialogues and other high-level interaction between the two administrations. Public discourse between the two administrations tends to emphasize the positive in the relationship.

THE GROWING THREAT OF SPACE DEBRIS MAY LEAD TO SOME COOPERATION

James Clay Moltz, professor national security, Naval Postgraduate Sch., January 2011

[Journal of Contemporary China, Issue 68, pp. 69-87, vol. 20]

But the increasing crowding of space itself, the need for improved control over debris, and expanded efforts to avoid collisions are providing top-down pressures on all countries—regardless of region—to cooperate more closely in 'managing' space. While relatively autonomous policies were possible in the early decades of space activity, recent events (such as the 2007 Chinese ASAT test and the 2009 Iridium-Cosmos collision) and the resultant increase in orbital debris have forced countries and their militaries to begin thinking more collectively about space. The recent willingness of the US Air Force to expand its international data sharing on conjunction analysis regarding

space debris and satellite collisions marks a significant evolution in American thinking. China's restraint from conducting additional kinetic ASAT tests since 2007 may be part of the same learning curve. These factors suggest that increasing cooperation and transparency may yet emerge in the coming years, since states recognize that the alternative is the possible loss of safe access to low-Earth orbital space.

COOPERATION IS SUFFICIENT NOW

BOTH SIDES RECOGNIZE THE IMPORTANCE OF ECONOMIC COOPERATION

Robert Sutter, Visiting Professor, School of Foreign Service, Georgetown Univ, 2010

[Southeast Asian Affairs, Volume 2010, p. 56]

At bottom, it seems fair to conclude that the recent U.S. relationship with China rests upon a common commitment to avoid conflict, cooperate in areas of common interest, and prevent disputes from shaking the overall relationship. Against this background, the Obama government seems most likely to advance relations with China in small ways. It probably will show sufficient restraint and resolve to avoid serious conflict with China over trade, currency, environmental, security, Taiwan, Tibet, human rights, and other issues that appear counterproductive for what seem to be more important U.S. interests in preserving a collaborative relationship with China and avoiding frictions with such an important economy at a time when international economic cooperation seems of utmost importance.

BOTH U.S. AND CHINA PURSUING GOOD, COOPERATIVE RELATIONS – NO COMPETITION

Robert Sutter, Visiting Professor, School of Foreign Service, Georgetown Univ, 2010

[Southeast Asian Affairs, Volume 2010, p. 44]

On balance, the leaders of both countries remained committed to a path of constructive engagement that has marked Sino-American interchange since early in the decade. Differences over various issues, including respective efforts to improve influence and protect interests in Southeast Asia, have tended to be dealt with through various private channels or formal "dialogues", out of the public limelight. Neither side has taken steps in their respective foreign policy initiatives that would seriously jeopardize the positive stasis that has developed in relations between the American and Chinese governments.

COOPERATION IS SUFFICIENT NOW

CHINA SEES TOO MUCH BENEFIT IN THE STATUS QUO – WON'T PROVOKE THE U.S.

Robert Sutter, Visiting Professor, School of Foreign Service, Georgetown Univ, 2010

[Southeast Asian Affairs, Volume 2010, p. 51]

The Chinese administration of Hu Jintao has set a central foreign and domestic policy goal for the next decade focused on China fostering a continuation of the prevailing international situation, seen generally advantageous for China in order to allow for expeditious modernization of the country. Exploiting this period of perceived "strategic opportunity" in international affairs requires keeping U.S.- China relations moving in a positive direction. The Hu Jintao administration worked hard in fostering business-like and constructive relations with the George W. Bush administration.[^] More recently, the Chinese administration has ensured that its initiatives and probes do not seriously disrupt the advantages for China in sustaining generally positive relations with the United States. Thus, Chinese probes against U.S. military surveillance in the South China Sea have subsided. Despite public complaints and threats, Chinese investment in U.S. securities continues and Chinese reliance on the U.S. dollar remains. Chinese entrepreneurs seem determined to sustain and expand their shares of the reviving U.S. market. China has acceded to U.S. arguments on North Korea, Iran, and climate change. It resumed active military contacts cut off because of U.S. arms sales to Taiwan in 2008.

CHINA WILL SAY NO AND WON'T COOPERATE WITH THE U.S.

CHINA HAS RECENTLY BECOME MORE REALIST AND LESS INTERESTED IN COOPERATING

David Shambaugh, Director, China Policy Program, GWU, Winter, 2011

[Washington Quarterly, volume 34. number 1, Winter 2011 p. 24]

What the world has seen from China since 2009 is an increasingly realist, narrowly self-interested nation, seeking to maximize its own comprehensive power. China's rapid recovery from the global financial crisis, growing energy consumption needs, rising nationalism, a looming leadership transition, and distrust of the Obama administration following President Obama's 2010 decisions to receive the Dalai Lama in the White House and to sell a \$6 billion arms package to Taiwan have all fueled this tendency. This external behavior is mirrored in the country's domestic discourse.

THE YOUNGER GENERATION OF CHINESE LEADERSHIP ADOPTS A VIEW OF CHINESE ASCENDANCY AND WILL BE LESS LIKELY TO COOPERATE WITH THE UNITED STATES

Joseph Nye, professor Harvard University, October 2010

[The Washington Quarterly, Volume 33, Number 4, October 2010, p. 150]

The current generation of Chinese leaders, realizing that rapid economic growth is the key to domestic political stability, has focused on economic development and what they call a "harmonious" international environment that will not disrupt their growth. But generations change, power often creates hubris, and appetites sometimes grow with eating. Many observers report an intensification of nationalism in the younger generation. Reinforced by misperceptions about the power effects of the financial crisis, such attitudes could lead to policy miscalculations in both Beijing and Washington. As Kenneth Lieberthal notes, "there is an overall feeling in China that there is a narrowing of the gap in power with the United States that is belied by reality. Nevertheless, there is a sort of national hyperbole in China."²⁵ Ironically, as Chinese come to believe that the global crisis has led to American decline, they are more likely to treat U.S. efforts at compromise as signs of weakness rather than conciliation, and thus make policy accommodation more difficult.

CHINA WILL SAY NO AND WON'T COOPERATE WITH THE U.S.

COOPERATION CAN HELP BOTH COUNTRIES BUT FORCES OF NATIONALISM ON BOTH SIDES WILL THREATEN THE ABILITY TO DO THAT.

Joseph Nye, professor Harvard University, October 2010

[The Washington Quarterly, Volume 33, Number 4, October 2010, p. 151]

The fact that China is not likely to become a peer competitor to the United States on a global basis does not mean that it could not challenge the United States in Asia, and the dangers of conflict can never be completely ruled out. But Bill Clinton was basically right when he told Jiang Zemin in 1995 that the United States has more to fear from a weak China than a strong China. Given the global challenges that both China and the United States face, they have much to gain from working together. But hubris and nationalism among some Chinese, as well as unnecessary fear of decline among some Americans, make it difficult to assure this future. Extrapolating the wrong long-term projections from short-term cyclical events like the recent financial crisis can lead to costly policy miscalculations.

U.S.-CHINA SPACE COOPERATION FACES SIGNIFICANT OBSTACLES

Washington Post January 23, 2011

[www.washingtonpost.com/wpdyn/content/article/2011/01/22/AR2011012203747.html]

But as China ramps up its space initiatives, the diplomatic talk of cooperation has so far found little traction. The Chinese leadership has shown scant interest in opening up the most sensitive details of its program, much of which is controlled by the People's Liberation Army (PLA). At the same time, Chinese scientists and space officials say that Washington's wariness of China's intentions in space, as well as U.S. bans on some high-technology exports, makes cooperation problematic.

CHINA WILL SAY NO AND WON'T COOPERATE WITH THE U.S.

COOPERATION AS A CONFIDENCE BUILDING MEASURE WITH CHINA RUNS AGAINST THEIR CULTURE

Everett Dolman, prof., Comparative Military Studies, US Air Force, September 2010

[The Case for Weapons in Space: A Geopolitical Assessment, September 2010, p. 5]

The Western mind sees transparency and openness as the surest way to peace. When one state can effectively monitor another, fears of surprise attack are mitigated and the tendency to overestimate a potential opponent's capacities and intentions are minimized. With transparency, the security dilemma is obviated and cooperation is possible. But transparency as a confidence-building measure is a purely Western mode of thought. To an Eastern strategist, the idea that an opponent might know precisely one's strengths and weaknesses merely invites attack. The key to stability in this view is uncertainty—not knowing how strong or how weak an opponent is, and never, under any circumstances, revealing one's own intentions and capacities. The more sure the knowledge, the more crafty the countervailing plan, the more likely its success.

CHINA'S REALISTS ARE SUSPICIOUS OF OFFERS TO COOPERATE WITH THE U.S.

David Shambaugh, Director, China Policy Program, GWU, Winter, 2011

[Washington Quarterly, volume 34. number 1, Winter 2011 p. 13]

In these respects, Realists are pessimists about China's external environment, cross-strait relations, and the United States. Above all, they take a narrow and self-interested definition of China's national interests, rejecting concepts and policies of globalization, transnational challenges, and global governance. Advocates of Chinese realism tend to argue (like Nativists) that Western attempts to enlist greater Chinese involvement in global management and governance is a dangerous trap aimed at tying China down, burning up its resources, and retarding its growth. However, Realism is not an isolationist school it simply argues for a very hard-headed definition and defense of China's narrow national interests.

CHINA WILL SAY NO AND WON'T COOPERATE WITH THE U.S.

INSECURITIES WILL DISCOURAGE COOPERATION ON BOTH SIDES

James Clay Moltz, professor national security, Naval Postgraduate Sch., January 2011

[Journal of Contemporary China, Issue 68, pp. 69-87, vol. 20]

The security challenge, however, is that both China and Russia have invested considerable political capital in their proposed Treaty on the Prohibition of the Placement of Weapons in Outer Space. It also remains unclear whether China will agree to halt testing of its current ground-based ASAT system and rule out future developments of other weapons that might be used against US assets. Such moves would be consistent with past Chinese rhetoric and could be seen as a means of both strengthening Chinese 'soft power' and limiting US 'hard power' in regard to space, but they have not yet occurred. The United States, on its part, would likely have to accept a ban on space-based missile defenses, a key sticking point for China but one sure to elicit strong opposition among conservatives in the US Congress and the defense community.

COOPERATION WITH CHINA HURTS THE UNITED STATES

COOPERATION WITH CHINA COULD UNDERMINE U.S. TECH LEADERSHIP

Dean Cheng, research fellow Asian Studies Center, Heritage Foundation, 10.30.09

[<http://www.heritage.org/Research/Reports/2009/10/US-China-Space-Cooperation-More-Costs-Than-Benefits>]

Beyond the technical issues, however, there are more fundamental political concerns that must be addressed. The U.S. military depends on space as a strategic high ground. Space technology is also dual-use in nature: Almost any technology or information that is exchanged in a cooperative venture is likely to have military utility. Sharing such information with China, therefore, would undercut American tactical and technological military advantages.

CHINA WOULD COOPERATE ONLY IF WE MADE CONCESSIONS IN OTHER AREAS

Dean Cheng, research fellow Asian Studies Center, Heritage Foundation, 10.30.09

[<http://www.heritage.org/Research/Reports/2009/10/US-China-Space-Cooperation-More-Costs-Than-Benefits>]

Moreover, Beijing is likely to extract a price in exchange for such cooperation. The Chinese leadership has placed a consistent emphasis on developing its space capabilities indigenously. Not only does this ensure that China's space capabilities are not held hostage to foreign pressure, but it also fosters domestic economic development -- thereby promoting innovation within China's scientific and technological communities -- and underscores the political legitimacy of the Chinese Communist Party. Consequently, the PRC will require that any cooperation with the U.S. provides it with substantial benefits that would balance opportunity costs in these areas.

COOPERATION WITH CHINA HURTS THE UNITED STATES

CHINA'S SPACE PROGRAM IS OVERWHELMINGLY MILITARY IN NATURE

**Dean Cheng, research fellow Asian Studies Center, Heritage Foundation,
10.30.09**

[<http://www.heritage.org/Research/Reports/2009/10/US-China-Space-Cooperation-More-Costs-Than-Benefits>]

Indeed, China's space program is overwhelmingly military in nature. And nowhere more so than in the manned space program, the "commanders" or "directors" of which include the head of the General Armaments Department, one of the four general departments responsible for day-to-day management of the entire People's Liberation Army (PLA). The challenges presented by the Chinese space program's strong ties to the PLA are exacerbated by the generally opaque nature of China's space program on issues ranging from who the top decision-makers are to the size of their budget. Any effort at cooperation is likely to be stymied so long as the PRC views transparency as a one-way affair.

U.S. IS AHEAD NOW SO COOPERATION WOULD BENEFIT CHINA

**Dean Cheng, research fellow Asian Studies Center, Heritage Foundation,
10.30.09**

[<http://www.heritage.org/Research/Reports/2009/10/US-China-Space-Cooperation-More-Costs-Than-Benefits>]

If reciprocity in terms of basic leadership visits cannot be obtained, it is even more problematic how either side would achieve reciprocity in other areas. There is a general disparity in technology between the U.S. and the PRC. Under such circumstances, reciprocity would likely benefit the Chinese side far more than the U.S. side. And if the U.S. holds back, it only undermines the case for cooperation. Yet well-founded reticence on the part of the U.S. to share information could also jeopardize the missions and safety of the crews.

ASIAN SPACE COOPERATION IS UNLIKELY

SPACE PROGRAMS ARE HIGHLY ASSOCIATED WITH NATIONALISM

James Clay Moltz, professor national security, Naval Postgraduate Sch., January 2011

[Journal of Contemporary China, Issue 68, pp. 69-87, vol. 20]

As noted above, rival nations typically cooperate in sensitive fields involving dual-use technologies—such as space—on only a limited scale, at least until relations of trust have been solidified or security concerns in other areas have dissipated. This is particularly the case when there are asymmetries in the capabilities between states in that field and they fear that an overly generous policy could assist in the rise of potential military rivals. Moreover, because of the close relationship between space technologies and missile development, countries have typically guarded these programs very closely and viewed their neighbor's programs with mistrust. Notably, the United States and the old Soviet Union (in contrast to Russia) often opposed the development of space-launch capabilities even by respective allies in Asia, such as South Korea and North Korea, for fear of upsetting the regional balance of power, creating new military uncertainties, and setting unfavorable precedents for dealing later with potential proliferant states. Thus, space power has been, at times, a divisive force even among allies, often increasing political tensions and nationalism.

SPACE COOPERATION AMONG ASIAN NATIONS IS UNLIKELY

James Clay Moltz, professor national security, Naval Postgraduate Sch., January 2011

[Journal of Contemporary China, Issue 68, pp. 69-87, vol. 20]

The multipolar nature of space competition in Asia and the lack of regional security organizations have also played a role in impeding cooperation. There are no bodies currently—outside of the United Nations—that bring together all of the key players for space security discussions. Moreover, relatively hostile political relationships still exist between many capitals in Asia (New Delhi-Beijing, New Delhi-Islamabad, Seoul-Tokyo, Pyongyang-Seoul, and Tokyo-Beijing), which have lowered receptivity to possible cooperation in space. Finally, the relative availability of alternative partners (Russia, Ukraine, France, the United Kingdom, and, for some, the United States) with more advanced capabilities has made regional cooperation within Asia seem unnecessary and even undesirable, if a rival might thereby gain a comparative advantage.

ASIAN SPACE COOPERATION IS UNLIKELY

NATIONALISTIC FORCES LIMIT COOPERATION IN ASIA

James Clay Moltz, professor national security, Naval Postgraduate Sch., January 2011

[Journal of Contemporary China, Issue 68, pp. 69-87, vol. 20]

Timing has also played a role in inhibiting space cooperation, as countries have sought to avoid revealing weaknesses and potentially being 'locked into' inferior positions relative to rivals. Asian countries have been relative late-comers in space, and the high cost of space programs, the sophistication of the technologies involved, and the need for specially trained personnel and an expensive infrastructure have increased the role of nationalism and limited the perceived value of cooperation with neighbors, particularly those with the potential to harm them. Indeed, it is hard to underestimate how much the interplay between developmental and security needs has affected (and limited) space cooperation within Asia.

RECOGNITION OF COMMON ENVIRONMENTAL PROBLEMS AND DISASTERS MAY SPUR COOPERATION IN ASIA

James Clay Moltz, professor national security, Naval Postgraduate Sch., January 2011

[Journal of Contemporary China, Issue 68, pp. 69-87, vol. 20]

At the regional level, the increasing recognition of common interests in environmental monitoring and disaster relief has begun to shift mindsets within Asian capitals about the desirability of cooperation. The 2004 tsunami and the 2008 Chinese earthquake led to unprecedented cooperation in disaster relief and in pressure for new region-wide disaster prevention mechanisms. As Asia struggles to come to terms in the coming years with the effects of global warming on crops, sea levels, river routes, and weather patterns, there will be increasing pressure to share data and develop more effective regional strategies. Put simply, there is a growing recognition among experts that purely national approaches are not likely to work and will only delay the potential gains to be had from international cooperation. The logic of these ideas does not guarantee immediate change, but it does heighten the likelihood of the adoption of a trans-national perspective by state leaders. The potential role of space in assisting in these efforts is already obvious and has begun, including in the unprecedented cooperation between Japan and China in 2008 after the Sichuan earthquake.

ASIAN SPACE COOPERATION IS UNLIKELY

THERE ARE SMALL SIGNS OF INCREASED COOPERATION IN ASIA

James Clay Moltz, professor national security, Naval Postgraduate Sch., January 2011

[Journal of Contemporary China, Issue 68, pp. 69-87, vol. 20]

This is not to say, however, that the situation is static and unchanging. Indeed, small signs of cooperative initiatives and greater openness are beginning to be seen in the areas of space science and commerce. Japan, for example, announced in June 2009 an effort with five other space agencies (including India's ISRO and South Korea's KARI, but not China's CNSA) to cooperate on the design of small Earth observation satellites and microsatellites, but this project remains an exception to the rule, at present.

MANY FACTORS BLOCK SPACE COOPERATION IN ASIA

James Clay Moltz, professor national security, Naval Postgraduate Sch., January 2011

[Journal of Contemporary China, Issue 68, pp. 69-87, vol. 20]

Over the past decade, negative political events have also played a role in derailing potential progress in space cooperation. The prerequisites for real change, if it is to occur, are likely to be found in an array of overlapping, positive conditions, which will take strong and steady political leadership—and some degree of luck—to create. These include: (1) progress in data exchanges and functional cooperation in regional disaster warning and Earth observation; (2) gradual expansion of commercial ties and national willingness to use foreign satellite launchers within Asia; (3) the continued absence of direct US-Chinese military confrontations (along the lines of the 2001 EP-3 incident or a Taiwan independence scenario); (4) greater willingness by the Chinese government (and particularly its military) to open its space activities to foreign (especially US) representatives;⁴² (5) efforts by the United States to broaden the boundaries of acceptable space cooperation with Asian countries (especially China) by revision of its export control policies; (6) willingness by China to refrain from ASAT testing and by the United States to refrain from deployment of space-based missile defense interceptors; and (7) continued Asian progress toward nuclear arms reduction and support for nonproliferation measures. In regard to this last item, unfortunately, success or failure in dealing with the North Korean nuclear/missile threat is likely to affect Asian space cooperation. Specifically, to the extent that cooperative security

models (such as the Six-Party Talks) succeed, they are more likely to have positive spin-off effects in other areas, such as space. By contrast, if they fail and countries again begin to take sides either for or against North Korea, these divisions could spill over into hostile developments in space, as countries fall back on typical national-security responses and 'hunker down' in the face of perceived international threats.

THE BENEFITS OF SPACE ARE EXAGGERATED

THE SHUTTLE PROGRAM PROVES THE PROMISED BENEFITS OF SPACE ARE EXAGGERATED

The Economist May 19, 2011

[http://www.economist.com/node/18712369?story_id=18712369&fsrc=rss]

The shuttles never captured the public imagination in the manner of the moon programme. How could they? These were workhorses, hurled aloft by rockets but landing like aeroplanes so they could be used time and time again. They were confined to low-earth orbit, where they did the unglamorous job of launching satellites or ferrying astronauts to the International Space Station. Public opinion was shocked by the tragedies, such as the losses of *Challenger* (1986) and *Columbia* (2003), but unmoved by the workaday successes. And there was, in fact, less success than advertised. They were too cantankerous to fly as often or as inexpensively as planned, so the hope of doing things more cheaply in space evaporated. Nothing came of the dream that men would build factories in space to grow exotic crystals or spin fabulous metals that could not be made on the gravity-polluted Earth.

NO INHERENT CULTURAL BENEFIT IN SPACE EXPLORATION

EXPLORATION IS NOT INSTINCTIVE

Dr. Michael Robinson, University of Hartford, Journal of Cosmology, Oct-Nov 2010

[<http://journalofcosmology.com/Mars134.html>]

Yet there is little evidence to show that exploration is an instinct. Only a tiny percentage of people in any society can be called explorers or adventurers, thus a desire to explore could hardly be called a ubiquitous trait in humans. Indeed, the lesson from history appears to show the reverse: that humans have sought out an increasingly settled lifestyle based upon agriculture and industry, foregoing the risks of nomadic travel. The migrations of prehistoric peoples may look to us like bold expeditions into the unknown but this was almost certainly not the case. As science writer Nicolas Wade explains: In tracing the movements of the first modern humans across the globe, geneticists' maps show neat arrows stretching from eastern Africa to India, Australia, or Japan, and the arrows unavoidably give the impression that the emigrants were purposefully traveling to these distant endpoints. But of course they were not – they had no maps and no idea of what lay at the end of their journey. In fact, it's doubtful they were on a journey at all (Wade 2006). Later explorers did have maps and goals, but they were rarely driven by impulse. Christopher Columbus, Vasco da Gama, and Bartolomeu Dias, for example, all sailed in hopes of bringing back riches, glory, and knowledge of trade routes. Curiosity was low on their list.

EVEN IF EXPLORATION IS INSTINCTIVE, WHY SHOULD WE OBEY THAT INSTINCT?

Dr. Michael Robinson, University of Hartford, Journal of Cosmology, Oct-Nov 2010

[<http://journalofcosmology.com/Mars134.html>]

Yet even if we were to accept the pro-human spaceflight argument that the desire to explore is natural or instinctive, it doesn't explain why we should obey this impulse. To say that we should do something because it is natural is to fall into the classic "naturalistic fallacy." (Moore 1903). This line of reasoning has been used repeatedly in history often to ill-effect. In the 1800s, for example, Social Darwinists used nature to justify poor treatment of workers and colonial subjects on the idea that survival of the fittest was natural and therefore should be allowed to run its course. Even if one

decides, against better judgment, to label humans as "born explorers" it does not follow that we should explore. Human missions to Mars need to be justified on better grounds.

“EXTINCTION” IMPACT ANSWERS

IMPACTS THAT ARE A LONG TIME IN THE FUTURE MUST BE DISCOUNTED

Seth Baum, professor, Geography, Penn State Univ, 2009

[Cost Benefit Analysis of Space Exploration, Space Policy vol. 25, no. 2, pp. 75-80]

Discounting generally refers to the process of comparing the values of costs and benefits that occur in different points in time. The discounting concept is often weakly understood and haphazardly implemented. However, how discounting is implemented is an important part of CBAs of decisions which cause future costs and benefits. The longer-term the decision, the more important discounting becomes. As space exploration involves some very long-term decisions, discounting is very important to space exploration CBA.

SPENDING ON EFFORTS TO REDUCE EXTINCTION NOW MAY BE AN INEFFICIENT OPPORTUNITY COST

Jason Matheny, Dept of Health Policy and Management, Johns Hopkins, 2007

[http://jgmatheny.org/matheny_extinction_risk.htm, Risk Analysis, vol 27 (5)]

A last argument for intergenerational discounting is from opportunity costs: without discounting, we would always invest our money rather than spend it now on important projects. For instance, if we invest our money now in a stock market with an average 5% real annual return, in a century we will have 130 times more money to spend on extinction countermeasures (assuming we survive the century). This reasoning could be extended indefinitely (as long as we survive). This could be an argument for investing in stocks rather than extinction countermeasures if: the rate of return on capital is exogenous to the rate of social savings, the average rate of return on capital is higher than the rate of technological change in extinction countermeasures, and the marginal cost effectiveness of extinction countermeasures does not decrease at a rate equal to or greater than the return on capital.

“EXTINCTION” IMPACT TURNS

OTHER SURVIVAL OPTIONS MAY BE MORE COST-EFFECTIVE

Seth Baum, professor, Geography, Penn State Univ, 2009

[Cost Benefit Analysis of Space Exploration, Space Policy vol. 25, no. 2, pp. 75-80]

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 and materials to assist survivors, such as a how-to manual for civilization or a seed bank. Further analysis is necessary to determine the most cost-effective means of increasing the probability of long-term human survival.

SURVIVAL MEASURES ON EARTH WOULD BE LESS EXPENSIVE

Anders Sandberg, Fellow, Future of Humanity Institute, Oxford Univ. Sept 9, 2008

[www.thebulletin.org/web-edition/features/how-can-we-reduce-the-risk-of-human-extinction]

Probably cheaper than building refuges in space would be building them on Earth. Elaborate bunkers already exist for government leaders to survive nuclear war, and the Svalbard Global Seed Vault in Norway protects crop seeds from nuclear war, asteroid strikes, and climate change. Although Biosphere 2 may inspire giggles, functioning refuges that are self-sufficient, remote, and permanently occupied would help to safeguard against a range of hazards, both foreseeable and unforeseeable.

“EXTINCTION” IMPACT TURNS

WE HAVE TO CHOOSE BETWEEN INVESTING IN SPACE COLONIES OR EARTH SOLUTIONS, WE SHOULD FOCUS ON THE EARTH SOLUTIONS NOW

Hard SF, May 10, 2007

[<http://www.hardsf.org/IssuSpac.htm>]

Currently, our society is not inclined to invest that much in either stopping global warming (and other threats) or space habitats. It strikes me as improbable that we will see a heavy investment in both of them at the same time in the next period of time. My impression is the best chance for human survival is focusing as much as possible on one or the other of the two paths, and that space colonization will not solve the problem within the limited time-frame.

IF WE WORK ON SPACE COLONIES NOW, YOUNG SCIENTISTS WILL FOCUS ON THAT INSTEAD OF SOLVING EARTH’S PROBLEMS

Lynda Williams, Physics Instructor, Santa Rosa Junior College, Spring 2010

[Peace Review: A Journal of Social Justice vol 22, no. 1 p1-4]

If we direct our intellectual and technological resources toward space exploration without consideration of the environmental and political consequences, what is left behind in the wake? The hype surrounding space exploration leaves a dangerous vacuum in the collective consciousness of solving the problems on Earth. If we accept the inevitability of Earth’s destruction and its biosphere, we are left looking toward the heavens for our solutions and resolution. Young scientists, rather than working on serious environmental challenges on Earth, dream of Moon or Martian bases to save humanity, fueling the prophesy of our planetary destruction, rather than working on solutions to solve the problems on Earth.

“EXTINCTION” IMPACT TURNS

LIFE ON EARTH IS MOSTLY THREATENED BY HUMAN CAUSES – FOCUSING ON SPACE SOLUTIONS DIVERTS US FROM SOLVING THOSE THREATS

Lynda Williams, Physics Instructor, Santa Rosa Junior College, Spring 2010

[Peace Review: A Journal of Social Justice vol 22, no. 1 p1-4]

Life on Earth is more urgently threatened by the destruction of the biosphere and its life sustaining habitat due environmental catastrophes such as climate change, ocean acidification, disruption of the food chain, bio-warfare, nuclear war, nuclear winter, and myriads of other man-made doomsday prophesies. If we accept these threats as inevitabilities on par with real astronomical dangers and divert our natural, intellectual, political and technological resources from solving these problems into escaping them, will we playing into a self-fulfilling prophesy of our own planetary doom? Seeking space based solutions to our Earthly problems may indeed exacerbate the planetary threats we face. This is the core of the ethical dilemma posed by space colonization: should we put our recourses and bets on developing human colonies on other worlds to survive natural and man-made catastrophes or should we focus all of our energies on solving the problems that create these threats on Earth?

COLONIZATION BAD

SPACE EXPLORATION WOULD SPREAD OUR MISTAKES TO OTHER PLANETS

Bruce Gagnon, Global Network Against Weapons & Nuclear Power In Space, 1999

[Space Exploration and Exploitation,
<http://www.space4peace.org/articles/scandm.htm>]

We are now poised to take the bad seed of greed, environmental exploitation and war into space. Having shown such enormous disregard for our own planet Earth, the so-called "visionaries" and "explorers" are now ready to rape and pillage the heavens. Countless launches of nuclear materials, using rockets that regularly blow up on the launch pad, will seriously jeopardize life on Earth. Returning potentially bacteria-laden space materials back to Earth, without any real plans for containment and monitoring, could create new epidemics for us. The possibility of an expanding nuclear-powered arms race in space will certainly have serious ecological and political ramifications as well. The effort to deny years of consensus around international space law will create new global conflicts and confrontations.

IF HUMANITY DOESN'T FIGURE OUT SOLUTIONS TO EARTH'S PROBLEMS FIRST, WE ARE DOOMED TO REPEAT THE SAME DESTRUCTIVE BEHAVIORS ELSEWHERE

Hard SF, May 10, 2007

[<http://www.hardsf.org/IssuSpac.htm>]

For those who still believe space colonization should be the priority, I would like to suggest one piece of advice. The known threats to human survival in the next century or so are not vast earthquakes and volcanoes, asteroid impacts, supernovas or other natural disasters. Most of them are at least partly man-made. If the same problems are not to threaten survival of humans on space colonies, we either have to make humans on Earth act more responsibly to ensure survival before we colonize, or we need to know how to insure that those people who colonize are not so prone to make the same mistakes their Earthly brothers do. If space colonization ends up amounting to running away from our problems, we will not have changed the odds of human survival by much. Space colonies would need to be planned in a way to avoid this fate.

COLONIZATION WOULD FAIL

HUMANS ARE NOT WELL ADAPTED FOR SPACE COLONIZATION

Charlie Stross, science writer, June 16, 2007

[http://www.antipope.org/charlie/blogstatic/2007/06/the_high_frontier_redux.html]
We're human beings. We evolved to flourish in a very specific environment that covers perhaps 10% of our home planet's surface area. (Earth is 70% ocean, and while we can survive, with assistance, in extremely inhospitable terrain, be it arctic or desert or mountain, we aren't well-adapted to thriving there.) Space itself is a very poor environment for humans to live in. A simple pressure failure can kill a spaceship crew in minutes. And that's not the only threat. Cosmic radiation poses a serious risk to long duration interplanetary missions, and unlike solar radiation and radiation from coronal mass ejections the energies of the particles responsible make shielding astronauts extremely difficult. And finally, there's the travel time. Two and a half years to Jupiter system; six months to Mars.

THERE IS NO REASONABLE INCENTIVE FOR PEOPLE TO MOVE TO ANOTHER PLANET PERMANENTLY

Charlie Stross, science writer, June 16, 2007

[http://www.antipope.org/charlie/blogstatic/2007/06/the_high_frontier_redux.html]
But even so, when you get down to it, there's not really any economically viable activity on the horizon for people to engage in that would require them to settle on a planet or asteroid and live there for the rest of their lives. In general, when we need to extract resources from a hostile environment we tend to build infrastructure to exploit them (such as oil platforms) but we don't exactly scurry to move our families there. Rather, crews go out to work a long shift, then return home to take their leave. After all, there's no there there — just a howling wilderness of north Atlantic gales and frigid water that will kill you within five minutes of exposure. And that, I submit, is the closest metaphor we'll find for interplanetary colonization. Most of the heavy lifting more than a million kilometres from Earth will be done by robots, overseen by human supervisors who will be itching to get home and spend their hardship pay.

COLONIZATION WOULD FAIL

HUMANS HAVEN'T EVEN COLONIZED MOST OF THE EARTH, COLONIZING OTHER PLANETS IS A FANTASY

Charlie Stross, science writer, June 16, 2007

[http://www.antipope.org/charlie/blogstatic/2007/06/the_high_frontier_redux.html]

And closer to home, the commercialization of space will be incremental and slow, driven by our increasing dependence on near-earth space for communications, positioning, weather forecasting, and (still in its embryonic stages) tourism. But the domed city on Mars is going to have to wait for a magic wand or two to do something about the climate, or reinvent a kind of human being who can thrive in an airless, inhospitable environment. Colonize the Gobi desert, colonise the North Atlantic in winter — then get back to me about the rest of the solar system!

COLONIZATION WOULD FAIL

THE DISTANCES INVOLVED IN TRAVELING TO PLANETS OUTSIDE OUR SOLAR SYSTEM ARE ABSURDLY FAR

Charlie Stross, science writer, June 16, 2007

[http://www.antipope.org/charlie/blogstatic/2007/06/the_high_frontier_redux.html]
Historically, crossing oceans and setting up farmsteads on new lands conveniently stripped of indigenous inhabitants by disease has been a cost-effective proposition. But the scale factor involved in space travel is strongly counter-intuitive. Here's a handy metaphor: let's approximate one astronomical unit — the distance between the Earth and the sun, roughly 150 million kilometres, or 600 times the distance from the Earth to the Moon — to one centimetre. Got that? 1AU = 1cm. (You may want to get hold of a ruler to follow through with this one.) The solar system is conveniently small. Neptune, the outermost planet in our solar system, orbits the sun at a distance of almost exactly 30AU, or 30 centimetres — one foot (in imperial units). Giant Jupiter is 5.46 AU out from the sun, almost exactly two inches (in old money). We've sent space probes to Jupiter; they take two and a half years to get there if we send them on a straight Hohmann transfer orbit, but we can get there a bit faster using some fancy orbital mechanics. Neptune is still a stretch — only one spacecraft, Voyager 2, has made it out there so far. Its journey time was 12 years, and it wasn't stopping. (It's now on its way out into interstellar space, having passed the heliopause some years ago.) The Kuiper belt, domain of icy wandering dwarf planets like Pluto and Eris, extends perhaps another 30AU, before merging into the much more tenuous Hills cloud and Oort cloud, domain of loosely coupled long-period comets. Now for the first scale shock: using our handy metaphor the Kuiper belt is perhaps a metre in diameter. The Oort cloud, in contrast, is as much as 50,000 AU in radius — its outer edge lies half a kilometre away. Got that? Our planetary solar system is 30 centimetres, roughly a foot, in radius. But to get to the edge of the Oort cloud, you have to go half a kilometre, roughly a third of a mile. Next on our tour is Proxima Centauri, our nearest star. (There might be a brown dwarf or two lurking unseen in the icy depths beyond the Oort cloud, but if we've spotted one, I'm unaware of it.) Proxima Centauri is 4.22 light years away. A light year is 63.2×10^3 AU, or 9.46×10^{12} Km. So Proxima Centauri, at 267,000 AU, is just under two and a third kilometres, or two miles (in old money) away from us. But Proxima Centauri is a poor choice, if we're looking for habitable real estate. While exoplanets are apparently common as muck, terrestrial planets are harder to find; Gliese 581c, the first such to be detected (and it looks like a pretty weird one, at that), is roughly 20.4 light years away, or using our metaphor, about ten miles. Try to get a handle on this: it takes us 2-5 years to travel two inches. But the proponents of interstellar travel are talking about journeys of ten miles. That's the first point I want to

get across: that if the distances involved in interplanetary travel are enormous, and the travel times fit to rival the first Australian settlers, then the distances and times involved in interstellar travel are mind-numbing.

COLONIZATION WOULD FAIL

WE CAN'T EVEN GET ONE PERSON TO MARS SAFELY RIGHT NOW

Lynda Williams, Physics Instructor, Santa Rosa Junior College, Spring 2010

[Peace Review: A Journal of Social Justice vol 22, no. 1 p1-4]

A Moon base is envisioned as serving as a launch pad for Martian expeditions, so the infeasibility of a lunar base may prohibit trips to Mars, unless they are launched directly from Earth. Mars is, in its closest approach, 36 million miles from Earth and would require a nine-month journey with astronauts exposed to deadly solar cosmic rays. Providing sufficient shielding would require a spacecraft that weighs so much it becomes prohibitive to carry enough fuel for a roundtrip. Either the astronauts get exposed to lethal doses on a roundtrip, or they make a safe one-way journey and never return. Either way, no one can survive a trip to Mars and whether or not people are willing to make that sacrifice for the sake of scientific exploration, human missions to Mars do not guarantee the survival of the species, but rather, only the death of any member who attempts the journey.

SKILLED LABOR ISSUES WOULD PREVENT AN EFFECTIVE SPACE COLONIZATION PROGRAM

Hard SF, April 27, 2010

[<http://www.hardsf.org/HSFIPopu.htm>]

Regardless of whether it is an international organization, a single nation or private companies, there's the question of who, occupationally, they would choose to have emigrate. If we had an empty Earth-like planet available, it would be possible to send Earth's excess of unskilled workers with just enough tools to start 18th century-style colonial farming. But that's not an option. Until terraforming or interstellar exploration provides such an option centuries from now, the people would have to go to artificial habitats. The space colony projects will be massive enough without attempting to have them include enough Earth-like farm lands and rice paddies to feed millions of people. Even the food producing jobs will not be in the form rural people from developing nation are familiar with. And many of the jobs will be associated with maintaining an artificial habitat and the professions related to that kind of technological setting. A significant number of the emigrating population would have to be skilled professionals - people Earth will not be as willing to see leave. Today, developed nations recruit skilled professionals from developing nations to move to the developed nation. Considering that, can we expect developed nations to contribute most of the

skilled professionals to the space colonies and allow the developing nations to contribute only unskilled rural labor? Can we expect developing nations to contribute their precious supply of skilled professionals, while limiting the number of unskilled workers who go?

COLONIZATION WOULD FAIL

IT WILL TAKE A LONG TIME TO CREATE SPACE COLONIES THAT ARE INDEPENDENT OF EARTH

Hard SF, May 10, 2007

[<http://www.hardsf.org/IssuSpac.htm>]

Consider the possible habitats. Space stations in orbit around Earth or at L5 have little natural resources at their location other than solar energy. The Moon has no atmosphere, a limited amount of water at best, which part of the Moon has access to solar energy varies during the month, and it's not considered one of the solar system's better sources of minerals. Venus is extremely hot, the atmosphere is dangerous and with the cloud cover I'm not sure how practical solar energy would be at the surface. Mars has too little atmosphere and accessible water is questionable, etc. Some of the outer planet's moons may have enough ice and raw materials, but are very cold, lack usable atmospheres and get limited solar energy. And so on. We may be able to establish bases at some of these places in a realistically short amount of time, but not independent ones. Any colony that wants to get resources from post-apocalyptic Earth will need to have spaceships that can land on Earth and later achieve escape velocity from Earth while carrying cargo without help from Earth. Otherwise, the needed resources may not be available from a single astronomical body. That could require longer distance travel between bodies - whether that's between asteroids, between moons, between planets or some other combination. Significant space travel ability may be essential. A colony would need an industrial base capable of extracting and refining raw materials, and making useful things from them. Interstellar colonies and terraforming of planets in our solar system are longer range goals. Colonies in any place other than an Earth-like planet will require a substantial infrastructure to allow humans to exist in an otherwise deadly environment. The colony needs to be able to maintain and repair that infrastructure...

COLONIZATION WOULD FAIL

WE STILL DON'T HAVE SOLUTIONS TO MANY PHYSICAL ISSUES RELATED TO SPACE TRAVEL

Hard SF, May 10, 2007

[<http://www.hardsf.org/IssuSpac.htm>]

Meanwhile, we have not yet solved the physical and psychological problems that develop during months of low gravity. Most of the physical issues may not be significant for those who never intend to return to Earth-type gravities. Psychological issues remain. Some physical issues may arise when dealing with years and decades in low gravity. Even in shorter spans of time, weakening bones may have serious consequences in low gravity situations. Weakened hip bones may be a problem for women giving birth in low gravity. Other stressful activities may also be problematic. We need to find out how low gravity will effect a fetus during pregnancy and child growth afterwards. Identifying and resolving all the issues is likely to take many years.

DELAYING COLONIZATION IS GOOD

WE SHOULD FOCUS OUR EFFORTS ON SOLVING EARTH'S PROBLEMS NOW AND DO SPACE COLONIZATION LATER

Hard SF, May 10, 2007

[<http://www.hardsf.org/IssuSpac.htm>]

To consider how well space colonization is likely to solve our problems we need to ask what the timescales of sustainable, independent space colonies are. If, after disaster strikes Earth, Earth is still able to supplement the needs of space colonies, then those space colonies aren't necessarily essential to continuing the human race. We have to ask when spaces colonies would be functioning without need of any assistance from Earth. Truly independent space colonies must not simply provide bare nutrition, air, heat, and habitat repair for 100 years. They should have a non-traumatizing environment with enough people to protect against dangerous levels of inbreeding – able to last and progress indefinitely. There will also be a minimum number of people required for any space colony in order to provide needed manpower in various occupations (one person with multiple occupations doesn't help if you need two of those occupations in different places at the same time). How does that compare to the timescales of threats from climate change, environmental crisis, nuclear / bio weapons and accidents, possible nanotech weapons or accidents, overpopulation, etc.? We also have to consider threats to the global economy, since an economic collapse would presumably at least interrupt efforts towards establishing space colonies. Economic crises also increase risks of war, which could have apocalyptic consequences. Even assuming the ultimate solution of human survival is space colonization, we may need to find a way to extend the lifespan of human civilization and economy on Earth in order to have time to accomplish sustainable space colonization.

COLONIZATION DOES NOT NEED TO OCCUR NOW BECAUSE OF TECHNOLOGICAL IMPROVEMENT OVER TIME

Seth Baum, Department of Geography, Penn State Univ, 2010

[Sustainability, volume 2 www.mdpi.com/journal/sustainability p. 599]

Colonizing space will permit us to take advantage of all that the rest of the universe has to offer [39]. But this does not mean that we should focus our current efforts on space colonization. The reason for this is simple: Earth will remain habitable for another billion years or so. While a billion years is quite small compared to the universe's lifetime, it is quite large compared to the amount of time it probably takes to colonize space, especially given our current rapid rates of technological change. If we

are to colonize space before the world ends, then we have plenty of time to do it—as long as nothing really bad happens first.

DELAYING COLONIZATION IS GOOD

WE MUST FOCUS ON EXISTENTIAL RISKS NOW SO FUTURE GENERATIONS CAN COLONIZE SPACE

Seth Baum, Department of Geography, Penn State Univ, 2010

[Sustainability, volume 2 www.mdpi.com/journal/sustainability p. 600]

These “really bad” things can be any global catastrophe so large that it would permanently eliminate our capacity to colonize space before the world ends. Several phenomena may be so catastrophic, including nuclear warfare, pandemic outbreaks, ecological collapse, disruptive technology, and of course impact from a large asteroid. Risks of these events have been called *global catastrophic risks* or *existential risks* [40]. I will use the term existential risk here because it is our existence that is ultimately at stake. These risks are far more imminent than the end of the world. Therefore, if we care about long-term sustainability, then we should focus our efforts on avoiding these catastrophes, *i.e.*, on reducing existential risk, so that future generations can colonize space.

AVOIDING GLOBAL CATASTROPHE IS ESSENTIAL TO REACH THE POINT WE CAN COLONIZE SPACE

Seth Baum, Department of Geography, Penn State Univ, 2010

[Sustainability, volume 2 www.mdpi.com/journal/sustainability p. 601]

Finally, astrobiology informs us that Earth’s environment will not remain habitable forever, but that the universe just might, or at least will remain habitable for much, much longer. This suggests the importance of colonizing space before the world ends, which in turn suggests the importance of avoiding the global catastrophes that threaten our civilization’s existence today.

DELAYING COLONIZATION IS GOOD

WE NEED TO RESOLVE EARTH'S PROBLEMS BEFORE WE CAN SUCCESSFULLY GO TO SPACE

Lynda Williams, Physics Instructor, Santa Rosa Junior College, Spring 2010

[Peace Review: A Journal of Social Justice vol 22, no. 1 p1-4]

Every space faring entity, be they governmental or corporate, face the same challenges. Star Trek emboldened us all to dream of space, the final frontier. The reality is that our planet Earth is a perfect spaceship. We travel around our star the sun once every year, and the sun pull us with her gravitational force around the galaxy once every 250 million years through star systems, star clusters and all the possible exosolar planets that may host life or be habitable for us to colonize. The sun will be around for billions of years and we have ample time to explore the stars. It would be wise and prudent for us as a species to focus our intellectual and technological knowledge now into preserving our spaceship for the long voyage through the stars, so that once we have figured out how to make life on Earth work in an environmentally and politically sustainable way, we can then venture off the planet into the final frontier of our dreams.

WE DON'T HAVE THE POLITICAL CONSENSUS YET TO START SPACE COLONIZATION

Lynda Williams, Physics Instructor, Santa Rosa Junior College, Spring 2010

[Peace Review: A Journal of Social Justice vol 22, no. 1 p1-4]

The technological hurdles prohibiting practical space colonization of the Moon and Mars in the near future are stratospherically high. The environmental and political consequences of pursuing these lofty dreams are even higher. There are no international laws governing the Moon or the protection of the space environment. The Moon Treaty, created in 1979 by the United Nations, declares that the Moon shall be developed to benefit all nations and that no military bases could be placed on the moon or on any celestial body, and bans altering the environment of celestial bodies. To date, no space faring nation has ratified this treaty, meaning, the moon, and all celestial bodies, including Mars and asteroids are up for the taking. If a nation did place a military base on the moon, they could potentially control all launches from Earth. The Moon is the ultimate military high ground. How should we, as a species, control the exploration, exploitation and control of the Moon and other celestial bodies if we can not even agree on a legal regime to protect and share its resources?

DELAYING COLONIZATION IS GOOD

ASTRONOMICAL THREATS ARE SO FAR OFF WE HAVE PLENTY OF TIME TO SOLVE THEM – AND MOON OR MARS BASED COLONIES MIGHT BE JUST AS VULNERABLE

Lynda Williams, Physics Instructor, Santa Rosa Junior College, Spring 2010

[Peace Review: A Journal of Social Justice vol 22, no. 1 p1-4]

According to scientific theory, the destruction of Earth is a certainty. About five billion years from now, when our sun exhausts its nuclear fuel, it will expand in size and envelope the inner planets, including the Earth, and burn them into oblivion. So yes, we are doomed, but we have 5 billion years, plus or minus a few hundred million, to plan our extraterrestrial escape. The need to colonize the Moon or Mars to guarantee our survival based on this fact is not pressing. There are also real risks due to collisions with asteroids and comets, though none are of immediate threat and do not necessitate extraterrestrial colonization. There are many Earth-based technological strategies that can be developed in time to mediate such astronomical threats such as gravitational tugboats that drag the objects out of range. The solar system could also potentially be exposed to galactic sources of high-energy gamma ray bursts that could fry all life on Earth, but any Moon or Mars base would face a similar fate. Thus, Moon or Mars human based colonies would not protect us from any of these astronomical threats in the near future.

COLONIZATION IS NOT A SOLUTION TO RESOURCE SHORTAGES

SPACE COLONIES AREN'T A PRACTICAL SOLUTION TO POPULATION PRESSURES

Hard SF, April 27, 2010

[<http://www.hardsf.org/HSFIPopu.htm>]

Let us assume a 1% annual rate of increase in the human population (this is actually somewhat less than it currently is). At that rate, in 50 years the Earth's population would be about 10.8 billion and increasing by about 108 million people in a year. Although I seriously doubt that we will be capable of transporting tens of millions of humans off the Earth in as short a time as 50 years from now, let us assume we will. Even assuming that from 2028 to 2058 we would be able to transport 1 million per year off-planet, that would not have substantially changed the situation. So imagine we are in 2058 and we can transport off-planet just as many people as the amount by which Earth's population would have grown. Doing so will merely stabilize the world population at about 10.8 billion - not necessarily a comfortable number. It would be necessary to transport 108 million people off-planet every year. Assuming that by 2058 we are able to build and use colony ships that will hold 1000 people each, that means 108,000 such colony ships every year. That comes out to about 295 each and every day of the year - more than 12 every hour. If these ships are just ferrying people to a colony and returning to Earth to pick up another group and if the colonies average a day's journey from Earth, we would need 2 days worth of ships - that's 590 ships capable of carrying 1000 people. The number of ships must be increased if the journey time to the colonies is greater. If these are "colony ships" that will never return to Earth, that's 108,000 new ships per year. This is a mind-bogglingly large project by itself. However, it is only part of what would be required. Every ten years you would need some habitable place for another billion people. We simply don't have any planets or moons in this solar system where you can just drop people off with tents and have them live like Daniel Boone. You have to either terraform a world, manufacture artificial habitats for all those people or find habitable worlds in other star systems. Any of those are going to require significant time and resources.

COLONIZATION IS NOT A SOLUTION TO RESOURCE SHORTAGES

EARTH'S POPULATION GROWTH WILL BE UNSUSTAINABLE EVEN WITH SPACE COLONIES

Hard SF, April 27, 2010

[<http://www.hardsf.org/HSFIPopu.htm>]

Suppose, in order to accomplish all of these necessary projects it took 75 years rather than 50. At a 1% population growth rate, the Earth's population in 2083 would be 13.8 billion with 138 million more each year. Suppose, all of this took 100 years. At a 1% rate, by 2108, the population would be 17.7 billion. It would be necessary to take 177 million people off-planet every year just to maintain Earth at 17.7 billion. If we consider 17.7 billion too many and want to reduce Earth's population, it would be necessary to transport even more millions to other habitats. I do not believe our current population growth will permit us enough time for this to be a practical solution. It seems that by the time we may be able to accomplish the technological marvels that would be required, the Earth's population would already be at too great a state of crisis. Other means are needed that can help us avoid such a huge population which can be implemented in a shorter period of time.

COLONIZATION IS NOT A SOLUTION TO RESOURCE SHORTAGES

POLITICAL SUSPICIONS WOULD DOOM ANY SPACE PROGRAM DESIGNED TO RELIEVE POPULATION PRESSURES

Hard SF, April 27, 2010

[<http://www.hardsf.org/HSFIPopu.htm>]

It doesn't seem a single country could afford to pay for the entire 100 million people per year. Even if a single country could afford it, a single country won't ship out 100 million of only that one country's people each year. To send 100 million per year to space colonies means people being sent from a number of countries. The country paying the bill will either send people from countries that are reimbursing them for the cost of the project, or it might help countries with whom it has favorable relations without charging them. Either way, it would be unlikely to result in overpopulation being relieved in an optimal way where it is needed most. If a single nation were to establish a space colonization program to reduce population pressures, it would be cheaper and more immediately beneficial for that one country to only emigrate its own nation's excess population to a space colony run by that one nation. (That is, it's not sending out 100 million per year from the world, but maybe a few million just from the one nation's population.) However, if it sends out millions of its people to space colonies while the rest of the world lacks that option, the rest of the world will be jealous and suspicious of that country's plans. What single country might choose a project massive enough to even keep down its own national population? The US is not faced with the overpopulation some nations are. China has an especially large population, has shown interest in population control (the one child law) and is a major power. However, if China began a project to send millions of Chinese into space, the West would be alarmed at the potential political, military and economic implications. Such a project by India might not alarm the West as much, but India is probably not in as good a position as China to attempt it. In reality, probably any single nation taking on such a project would raise concerns among some influential nations. No developed nation would be unconcerned at the prospect that some other nation was getting a head-start colonizing space, would have an opportunity to take the most favorable locations for itself, might claim the most valuable resources in the solar system, and might gain a military advantage.

COLONIZATION IS NOT A SOLUTION TO RESOURCE SHORTAGES

THE MOON IS NOT A PANACEA FOR RESOURCES LIKE HELIUM 3

Lynda Williams, Physics Instructor, Santa Rosa Junior College, Spring 2010

[Peace Review: A Journal of Social Justice vol 22, no. 1 p1-4]

Although evidence of water has been discovered on both bodies, it exists in a form that is trapped in minerals, which would require huge amounts of energy to access. Water can be converted into fuel either as hydrogen or oxygen, which would eliminate the need to transport vast amounts of fuel from Earth. However, according to Britain's leading spaceflight expert, Professor Colin Pillinger, "You would need to heat up a lot of lunar soil to 200C to get yourself a glass of water." The promise of helium as an energy source on the moon to is mostly hype. Helium-3 could be used in the production of nuclear fusion energy, a process we have yet to prove viable or efficient on Earth. Mining helium would require digging dozens of meters into the lunar surface and processing hundreds of thousands of tons of soil to produce 1 ton of helium-3. (25 tons of helium-3 is required to power the US for 1 year.) Fusion also requires the very rare element tritium, which does not exist naturally on the Moon, Mars or on Earth in abundances needed to facilitate nuclear fusion energy production. There are no current means for generating the energy on the Moon to extract the helium-3 to produce the promised endless source of energy from helium-3 on the Moon. Similar energy problems exist for using solar power on the Moon, which has the additional problem of being sunlit two weeks a month and dark for the other two weeks.