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# \*\*\*Multilateral/Cooperative Regime CP\*\*\*

## Cooperative Regime CP---1NC---Solves the Case

### Lunar Resource Regime Good – The clock is ticking for the US to move forward and push for the development of an LRR to produce an environment conducive to public and private international investment for the development of a reliable energy source.

Bilder 10 - Richard B. Bilder, Foley & Lardner-Bascom Professor of Law at the University of Wisconsin-Madison , January 2010, “A Legal Regime For The Mining Of Helium-3 On The Moon: U.S. Policy Options,” Fordham International Law Journal, Volume 33, Number 2, [SSRN:](http://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1611202_code546503.pdf?abstractid=1486273&mirid=2) pg. 277-280

**The need for affordable, safe, and non-polluting energy to serve the Earth's growing population is increasingly evident and urgent. The development of lunar He-3-based fusion energy, while still uncertain of achievement, offers humanity a credible prospect of meeting that need for centuries to come**. Thus, it is not surprising that the United Stales and other nations proposing the eventual establishment of lunar bases have expressed interest in the possible mining and exploitation of lunar He-3.

**However, neither nations nor private commercial enterprises are likely to be willing to commit resources to an He-3-bascd fusion energy program absent a stable and predictable legal regime governing lunar resources that provides reasonable assurance that any** such effort and **investment will be rewarded and can be carried on without controversy** or disruption. Yet, **at present, international space law fails to establish any detailed rules governing the mining, ownership, and exploitation of He-3** and other lunar resources or to provide such assurance.

Consequently, **if the U**nited **S**tates seriously **contemplates the possible development of He-3-based fusion energy, it is in** its **national interest to take steps to establish** what it would consider as **an acceptable and agreed-upon international lunar resource regime**—**and to do so relatively soon**.>

## Cooperative Regime CP---Say Yes---2NC

### Lunar Resource Regime Good – While a LRR may seem unneeded now, conducive conditions including long lead time, a favorable international climate, declining bargaining power, and the lack of competing space programs are reasons for the US to act now.

Bilder 10 - Richard B. Bilder, Foley & Lardner-Bascom Professor of Law at the University of Wisconsin-Madison , January 2010, “A Legal Regime For The Mining Of Helium-3 On The Moon: U.S. Policy Options,” Fordham International Law Journal, Volume 33, Number 2, [SSRN:](http://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1611202_code546503.pdf?abstractid=1486273&mirid=2) pg. 277-280

A. Should the United States Try to Establish an Acceptable International Regime Even Before Lunar Mining and He-3-Bascd Fusion Power Are Feasible?

**There are clearly arguments that, given the current uncertainty as to the feasibility of** both **establishing a permanent U.S. lunar base capable of carrying on He-3 mining activities and developing fusion reactors that economically warrant investment** in the creation of a major He-3-based fusion power program, **it would be premature** at this time **for the U**nited **S**tates **to negotiate a lunar mining regime with other countries**.125 Other **countries are unlikely to see a need for such negotiations** at this time and, in any event, it is certainly arguable that the countries concerned simply do not now know enough to do a sensible job in this respect. Indeed, it was for this reason dial COPUOS, in drafting article 11 of the Moon Agreement, expressly deferred the negotiation of such a regime to such time "as such exploitation is about to become feasible."1'6

**There are, however, several reasons suggesting that the U.S. should seek to reach international agreement on such a regime** quite soon and **even before the possibility and practicality of a permanent moon base and an He-3-based fusion power program arc clearly established**. First, as discussed**, states and enterprises are unlikely to be willing to undertake the substantial effort and investment involved in developing lunar He-3 mining and** He-3-based **fusion power without the assurance of political and legal stability that only a broadly accepted international agreement can provide.**'27**Given the long lead time which will be required if the U**nited **S**tates **wishes to achieve a viable He-3-based fusion power program in the relatively near future**—perhaps within die next half-century or so—it **seems sensible** for it **to begin to take steps to put the necessary legal infrastructure in place fairly soon**.

**Second, the international climate is arguably now relatively favorable to achieving international agreement on the kind of**

**international lunar resource regime the U**nited **S**tates **hopes to achieve**. Other **major players, such as China, the E**uropean **U**nion, **India, Japan, and Russia**, which currently appear to have the capability to participate in the potential exploitation of lunar resources, **may well now share an interest with the U**nited **S**tates **in a more open-access regime and market-based mechanisms**.128 The U.N. General Assembly's adoption of the 1994 implementation agreement nullifying the provisions of part XI of the LOSC to which the United States objected clearly reflects a broader international acceptance of a U.S.-favored approach to the exploitation of deep seabed "common heritage" resources more favorable to the participation of free enterprise, which serves as persuasive precedent for the similar treatment of lunar resources.129 Indeed, there is now growing support in the United States for U.S. ratification of the LOSC and accession currently seems increasingly likely.130 In addition, **international**

**cooperation among the major technologically-advanced countries in both space and fusion power development is already ongoing under the International Space Station and ITER agreements**'31 and the Obama administration appears to look favorably on cooperative multilateral rather than unilateral approaches to dealing with broad international issues.152 Moreover, the recent spike in oil prices135 and **heightened international concern about global warming134 reinforce the pressing need of the global economy to find ways to meet the world's growing appetite for energy** while still decreasing greenhouse gas emissions, **and** thus to **renew**ed **international interest in the development of alternative energy sources such as nuclear fission and fusion**.

**Third**, for a variety of reasons, **the current** influence and **"bargaining power" of the U**nited **S**tates both **as a leader in space and nuclear technology**, and more generally as an actor on the world stage, **is arguably declining relative to that of China, the European Union, India, Russia, and other countries**.135**If this is so, the ability of the U**nited **S**tates **to negotiate the** kind of **lunar resource regime** it wants **may well be greater now than later**.

**Finally**, it may be easier **to establish the** type of **lunar resource regime** that the United States would prefer **while the feasibility of He-3 exploitation and fusion power**—and, indeed, the possibility that we may eventually find valuable resources elsewhere in the solar system—**is** still uncertain **and before potentially concerned states have developed important stakes in particular outcomes.>**

### International Community Says Yes – A space regime is of global interest and prevents conflict over the use of space or in space.

Tannenwald 03 - Nina Tannenwald, Director of the International Relations Program and Joukowsky Family Research Assistant Professor at the Watson Institute for International Studies at Brown University, April, 2003, “Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space,” Online: <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj&sei-redir=1#search=%22mining+moon+legal+regime%22>

Such a competition will place at risk existing military, commercial, and scientific activities in space. With events of September 11, 2001, and the war against Iraq dominating the headlines, the issue of national missile defense, and with it the larger issue of the control and weaponization of space, have receded from the front pages. However, the problem is imminent as the United States moves forward with Pentagon plans to develop “space control” and “global engagement” capabilities, which imply the deployment of weapons in space. If conflict over the use of space, or even actual conflict in space, is to be prevented or at least significantly constrained by general agreement, the international community will need to agree on permitted activity in space and more refined arrangements for distributing the benefits of that activity. Such a regime would be in the strong interest of commercial, scientific and military support constituencies worldwide. Without such agreement, space will largely be shaped by the short-term interests of power rather than the long-term interests of law.

### US Says Yes – American users of space, including NASA, prefer the rule of law produced by an international regime.

Tannenwald 03 - Nina Tannenwald, Director of the International Relations Program and Joukowsky Family Research Assistant Professor at the Watson Institute for International Studies at Brown University, April, 2003, “Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space,” Online: <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj&sei-redir=1#search=%22mining+moon+legal+regime%22>

Finally, a military competition in space would largely extinguish the role of law in space in favor of a regime of power. Despite the narrow organizational appeal of the latter to SPACECOM, the much broader interests of the United States in space lie in the promotion of the rule of law. The United States has long been a strong advocate of the rule of law both at home and in global affairs, in the latter case seeing it as the best way to promote its interests in an interdependent world. When presented with the choice, it is likely that most users of space--- including the satellite communications industry, those involved in military support operations, and the scientific community, including NASA---would prefer the more stable protection provided by the rule of law rather than the more uncertain and potentially disruptive protection of untested and complex weapons systems. In sum, the United States and the international community have a strong interest in preventing a destabilizing military competition in space through the timely negotiation of a more elaborated legal regime for space.

### China Says Yes – China will support a space regime which prevents space weaponization and militarization.

Martel And Yoshihara 3 – William C. Martel, Professor Of National Security Affairs At Naval War College, Toshi Yoshihara, Doctoral Candidate At Fletcher School Of Law And Diplomacy And Research Fellow At The Institute For Foreign Policy Analysis, 2003, “Averting A Sino-US Space Race,” The Washington Quarterly, 26:4, pg. 19-35, Online: http://www.twq.com/03autumn/docs/03autumn\_martel.pdf

The PRC’s official policy is to support the exploitation of space for economic, scientific, and cultural benefits while firmly opposing any militarization of space.9 China has consistently warned that any testing, deployment, and use of space-based weapons will undermine global security and lead to a destabilizing arms race in space.10 These public pronouncements have been primarily directed at the United States, especially after President George W. Bush declared in December 2001 that the United States was officially withdrawing from the Anti-Ballistic Missile Treaty and accelerating U.S. efforts to develop a missile defense system. Some Chinese observers point to U.S. efforts to militarize space as evidence of the U.S. ambition to establish unilateral hegemony. For example, in 2001, Ye Zhenzhen, a correspondent for a major daily newspaper of the Chinese Communist Party, stated that, “[a]fter the Cold War, even though the United States already possessed the sole strategic advantage over the entire planet, and held most advanced space technology and the most satellites, they still want to bring outer space totally under their own armed control to facilitate their smooth ascension as the world hegemon of the 21st century.” 11 Diplomatically, China has urged the use of multilateral and bilateral legal instruments to regulate space activities, and Beijing and Moscow jointly oppose the development of space weapons or the militarization of space.12 The Chinese leadership’s opposition to weaponizing space provides evidence of China’s growing concern that the United States will dominate space. The United States’ avowed intention to ensure unrivaled superiority in space, as exemplified by the Rumsfeld Commission report, increasingly defines China’s interests in space. Chinese anxieties about U.S. space power began with the 1991 Gulf War, when the PRC leadership watched with awe and dismay as the United States defeated Iraq with astonishing speed. Beijing recognized that the lopsided U.S. victory was based on superior command and control, intelligence, and communications systems, which relied heavily on satellite networks. Demonstrations of the United States’ undisputed conventional military power in Bosnia; Kosovo; Afghanistan; and, most recently, Iraq further highlighted for Chinese officials the value of information superiority and space dominance in modern warfare.

## Cooperative Regime CP---Net-Benefit Uniqueness---No Coop Now

### No Cooperation Now – There remains no commonly agreed-to definition of CHM principle. Even basic preconditions are in flux and producing international problems.

Shackelford 9 – Scott J. Shackelford, Third Year Law Student Stanford Law School And Ph.D. Candidate IR University of Cambridge, February, 2009, “The Tragedy Of The Common Heritage Of Mankind,” 28 Stanford Environmental Law Journal 109, Lexis

[\*110] I. Introduction. Territorial sovereignty has in large part defined both international relations and international law since the 1648 Treaty of Westphalia. n1 The primary exception to this principle is the international commons. In these areas, which include the deep international seabed, the Arctic, Antarctica, and outer space, concerns over free passage outweighed the great Western powers' territorial ambitions and Grotius's mare liberum triumphed. n2 As a result, these regions were gradually regulated to a greater or lesser extent by the Common Heritage of Mankind (CHM) principle, in which theoretically all of humanity became the sovereign over the international commons. n3 Yet there remains no commonly agreed-to definition of the CHM amongst legal scholars or policymakers. Developing and developed nations disagree over the extent of international regulation required to equitably manage commons resources. These disagreements have played out in the diverse legal regimes [\*111] of the Antarctic, deep seabed, Arctic, and outer space, each with its own version of the CHM principle. Although no universal definition exists, most conceptions of the CHM share five primary points. First, there can be no private or public appropriation of the commons. n4 Second, representatives from all nations must manage resources since a commons area is considered to belong to everyone. Third, all nations must actively share in the benefits acquired from exploitation of the resources from the common heritage region. n5 Fourth, there can be no weaponry or military installations established in commons areas. Fifth, the commons should be preserved for the benefit of future generations. n6 But now even these basic preconditions are in flux, with states claiming large tracts of the Arctic; the United States, Russia, and China pursuing space weaponry; and oil companies drilling further out into the deep seabed.

### No Cooperation Now – Space law is breaking down and nations are seeking bilateral and even unilateral approaches. Multilateral regime K2 success.

Shackelford 9 – Scott J. Shackelford, Third Year Law Student Stanford Law School And Ph.D. Candidate IR University of Cambridge, February, 2009, “The Tragedy Of The Common Heritage Of Mankind,” 28 Stanford Environmental Law Journal 109, Lexis

Recently, with the announcement of the NASA Vision for Space Exploration (VSE), space law has once again become a pressing topic. This time, however, the focus is not on United Nations rulemaking, but on bilateral agreements between sovereign nations. n159 This lack of multilateral cooperation is now threatening core principles of space law as technology leapfrogs existing governance regimes. In a world organized by and for sovereign states, negotiation for a body of legal rules to govern space activities should take place in the principal intergovernmental organization, the United Nations. But this is only possible so long as a multilateral political consensus on the future of outer space is maintained. With the fall of communism, the failure of the Moon Treaty as a result of a renewed free market orientation among the world's principle space powers, and technological development, states have taken it upon themselves to negotiate bilateral accords and bypass the UN consensus-driven system altogether in favor of bilateral agreements. Certain states, such as the United Kingdom, officially maintain that COPUOS is not the place to regulate commercial activity. "It is as telling what is as what is not on the COPUOS agenda," stated Richard J. Tremayne-Smith of the British National [\*145] Space Center. "The position of the UK, and the West, is to shorten negotiations, not prolong them. The space treaties aren't perfect, but they're not supposed to be." n160 Taken to its logical conclusion, this sentiment implies that efforts to regulate space in the future are on the way to fragmenting to the bilateral and even national levels. Similar outcomes in the Arctic, deep seabed, and Antarctica would ultimately result in tragedy of the commons scenarios as individual nations or small regional groupings occupy formerly commons territories to maximize gains. A new multilateral regime guaranteeing limited property rights to entrepreneurs as well as providing for international environmental protection and some degree of benefit-sharing is essential if the tragedy of the international commons is to be avoided.

## Cooperative Regime CP---Net-Benefit---Resource Conflicts

### Effective multilateral cooperation is key in the context of resource competition to prevent international conflicts.

Shackelford 9 – Scott J. Shackelford, Third Year Law Student Stanford Law School And Ph.D. Candidate IR University of Cambridge, February, 2009, “The Tragedy Of The Common Heritage Of Mankind,” 28 Stanford Environmental Law Journal 109, Lexis

As law in most societies has clearly defined private ownership of most national territories, the international and domestic commons have been shrinking. This is evident in the global commons, both with regard to the transition from UNCLOS to the more capitalist 1994 New York Agreement, and more controversially, the emerging property regime in space. As global resource shortfalls increase, it is natural to look towards commons zones for solutions - to Antarctica, the deep seabed, and skyward. Without effective multilateral cooperation, resource competition and technological progression could result in instability and potentially international conflicts over resources.

### Establishing a peaceful framework for lunar governance will be important to prevent international conflicts and peacefully allocating the moon’s resources in a mutually beneficial manner.

Moltz 9 – James Clay Moltz, Associate Professor; Department of National Security Studies at the Naval Postgraduate School, Monterey, California, 2009, “Toward Cooperation Or Conflict On The Moon: Considering Lunar Governance In Historical Perspective,” Online: http://www.au.af.mil/au/ssq/2009/Fall/moltz.pdf

The question of how the moon will be governed once humans return in about a decade and begin to establish permanent bases matters greatly to the future of international security. Already, a range of major powers have plans to participate in the moon’s further scientiic exploration, commercial exploitation, and possible permanent settlement. If we count both manned and robotic activities, this list currently includes the United States, China, Russia, India, Germany, the United Kingdom, the European Space Agency, Japan, and South Korea. Other countries are likely to join this list in the coming years. Establishing a peaceful framework for lunar governance will be im­ portant, because hostile international relations on the moon are likely to lead to conlicts elsewhere in space and, possibly, on Earth. Such patterns regarding new frontiers have plagued the history of international rela­ tions for centuries. Indeed, despite frequent hopes for cooperation, most unclaimed territories historically have become sources of international conlict rather than serving as peaceful lebensraum. Typically, and consis­ tent with realist predictions about international politics, states have had a built-in penchant to pursue relative gains over their rivals and therefore have sought to seize and defend new resources to their own advantage. On the other hand, successful formation of a stable, transnational governance system—a mechanism for sharing or otherwise peacefully allocating the moon’s resources—could open the possibility for mutually beneicial and self-sustaining lunar commerce and settlement, consistent with neo-liberal institutionalist predictions. Such a model could have positive spin-of effects on Earth and set a cooperative pattern for further human explo­ ration and development of the rest of the solar system, spurring states to pool resources and engage in joint approaches to space’s many challenges. In such scenarios, hopes for “humankind” eforts in space—rather than state-driven rivalries—might be realized, something for which astronauts and cosmonauts who have visited space have often called.

## Cooperative Regime CP---Solves the Case---General

### Cooperation in space generally is good-multiple reasons

Zelino 05-Ryan Zelnio,Worked for 6 years in the space industry in various roles with increased responsibility and then decided to leave the private sector to pursue a passion for the policy impacts on Science and Technology innovation on the global world by pursuing a PhD in Public Policy at George Mason University, Dec. 5, 05, “A model for the international development of the Moon” http://www.thespacereview.com/article/510/1

Observers have concluded that as per-partner costs decrease, the per-partner utility of international cooperation increases.15 Cooperation reduces exposure by spreading the risk of failure and allows a spacefaring state to draw in outside resources. This is especially compelling for nations whose resources are insufficient to attain any substantial space operational and technical goals. Even the well-endowed ESA has engaged the USA and Japan to join what were previously traditional European science missions as a way to rescue its mission portfolio from increased cost-growth.16 Similarly, Chandraayan, India’s first satellite to the Moon, was launched in 2008 carrying two primary instruments to help locate water and other resources. The USA contributed these to the mission. They cost more than the amount India spent building and integrating the balance of the spacecraft and the launch vehicle. International cooperation offers the opportunity to improve the efficacy of the expenditures. Resources can be rationalized, standardized, and made interoperable to bring about the best and most efficient use of research, development, procurement, support, and production resources. This fosters effective operations. So if a hypothetical space partnership involves two nations, one with sophisticated remote sensing engineering capabilities, and the other, spacelift, a rational approach would allocate program activities in accord with these strengths. International cooperation can provide a strong and essential benefit by providing programmatic redundancy, as happened when Russian Soyuz craft were able to provide transportation to the ISS following the loss of the Shuttle Challenger. Standardization of hardware, software, procedures, and the like helps to achieve a closer practical cooperation among partners. It does this through an efficient use of resources and reduction of operational, logistic, communications, technical, and procedural obstacles. It is telling that international partnerships usually begin their efforts by standardizing administrative, logistic, and operational procedures. Originators of standardizing systems and procedures often become the de facto leaders of collaborative efforts. Finally and closely related to standardization, interoperability is essential. “Designing for programmatic redundancy provides a strong argument for interoperability between nations’ space exploration assets, as this would allow nations to substitute each other’s critical capabilities with relative ease.”17 Nations whose space systems are interoperable can operate together more effectively. Designing for interoperability enables them to substitute each other’s critical capabilities with relative ease,18 and provides much needed redundancy in the event one nation cannot supply a key service or component for any number of reasons. Space programs can use the important capabilities provided by rationalization, standardization and interoperability to: communicate; efficiently integrate and synchronize operations; enable data and information exchanges; share consumables and resources; enhance effectiveness by optimizing individual and combined capabilities of equipment; increase efficiency through common or compatible support and systems; and assure technical compatibility by developing standards for equipment design, employment, maintenance, and updating them. With rationalization standardization, and interoperability, nations that are likely to join a partnership can properly prepare to perform their responsibilities

## Cooperative Regime CP---Solves the Case---Resource Development

### The shape of the legal regime for space development determines how quickly and effectively resources can be developed---means only the CP solves the case

Shackelford 9 – Scott J. Shackelford, Third Year Law Student Stanford Law School And Ph.D. Candidate IR University of Cambridge, February, 2009, “The Tragedy Of The Common Heritage Of Mankind,” 28 Stanford Environmental Law Journal 109, Lexis

B. Property Rights and Resource Competition. The world is in dire need of the resources found in international commons. By 2050 the world's population may exceed nine billion while industrial output will quadruple. Developing countries with over three quarters of the global population will see the most dramatic population increases, yet they account for just twenty-five percent of energy consumption and contribute less than sixteen percent of global Gross Domestic Product (GDP). n197 By 2030, energy consumption in developing countries such as China and India could double or even triple. n198 In the developed world, energy demand will likewise soar to unprecedented heights, straining existing energy infrastructure and spurring demand for new nonrenewable and renewable energy sources. Current resources are inadequate to meet this surging demand. n199 [\*156] Between one to three trillion barrels of oil remain on Earth. Current estimates suggest production will peak within 35 to 100 years. n200 Other resources, such as silver, tin and copper, could conceivably be exhausted within twenty to forty years depending on demand. Technological advances could alter these predictions, but the salient point remains: the Earth's resources are finite and running out. Even if it takes centuries, at some point it will no longer be economically feasible to acquire needed resources from traditional sources. When the marginal cost is sufficiently high, private and public entities will look to new resource areas - to the poles, the deep seabed, and eventually the inexhaustible resources of outer space. For example, Halley's Comet contains hydrocarbons comparable in quantity to the Earth's entire reserves. n201 Developing space industry would also help alleviate ongoing concerns regarding climate change. n202 The legal regime that the international community puts in place now will govern the manner and rate at which the commons develops. The question then becomes whether the current lack of property rights in the commons fundamentally impedes development.

### Complete privatization without cooperation would lead to resource exhaustion by defection as nations seek to fulfill only national interests.

Shackelford 9 – Scott J. Shackelford, Third Year Law Student Stanford Law School And Ph.D. Candidate IR University of Cambridge, February, 2009, “The Tragedy Of The Common Heritage Of Mankind,” 28 Stanford Environmental Law Journal 109, Lexis

But formalized property rights are also the starting point for sustained economic growth, as argued by de Soto. n236 And that growth is best driven by the Lockean labor principle. Classic solutions involve the enforcement of conservation measures or privatization. The idea of dividing the commons into private parcels is often advocated by libertarians, who argue that this division should be performed according to the Lockean principle of homesteading. This consists of allowing individuals to acquire property on a "first come first served" basis, providing incentives for efficiency by internalizing social costs and benefits. The market would better promote economic growth, achieve optimal levels of pollution, reduce inefficiency, and modify the legal regime by responding to societal needs. n237 Advocates of a res nullis approach to commons areas similarly favor privatization. The tragedy of the commons though may be no worse than the directly unproductive rent-seeking activities that can result from private property establishment as groups lobby for the right to exploit the commons. n238 Just as this argument applies to public policy formation in national legislatures, it is also relevant on the global stage as nations petition for the right to exploit commons resources on behalf of all humanity. This underscores the necessity of having a simple auction, or awarding a leasehold to the first entity to arrive at a region in the international commons. Such procedures will assist in avoiding directly unproductive rent-seeking activities and other conflict. Without the type of multilateral cooperation described in this proposal, the tragedy of the international commons could easily turn into a collective prisoner's dilemma in which each government acts in its own best interest without coordination. This is already arguably occurring in outer space. There are two options: cooperate with the group or defect. n239 It is this latter outcome of resources being prematurely exhausted through [\*166] defection that developing countries fear most. Game theory n240 demonstrates that defection is individually beneficial even though everyone would be best off through cooperation. Far-sighted groups impose sanctions on members that over-exploit a resource to limit defection. An international regime would require punitive power to promote cooperation while preserving common resources.

### Unilateral or bilateral actions will not help nations garner necessary resources in space commons. Multilateral initiative is necessary to reap economic benefit, prevent environmental harm, and protect the commons.

Shackelford 9 – Scott J. Shackelford, Third Year Law Student Stanford Law School And Ph.D. Candidate IR University of Cambridge, February, 2009, “The Tragedy Of The Common Heritage Of Mankind,” 28 Stanford Environmental Law Journal 109, Lexis

Without collective action, security and environmental concerns will proliferate as sovereigns develop the commons. Regional multilateral agreements, such as the ATS, should be propounded in both the Arctic (through an expanded AEPS or an "Arctic Council") and in space to limit environmental harm, ensure the protection of limited property rights, and promote multilateral cooperation over nationalism, thereby enhancing sustainable economic development. The commons will likely be developed to garner necessary resources in the not too distant future. But it should be done responsibly, while respecting the principles of the international commons and avoiding a slide backwards in popular conceptions of sovereignty. Unilateral or bilateral action by nations will not serve this purpose. Multilateral initiative is necessary to reap economic benefits in the short-term, and to ensure that our common heritage is preserved for posterity.

### International cooperation needed for moon-no one can carry budgetary burden

Avnet, Gallo, and Broniatowski 04-Mark Avnet is a candidate for an M.A. in International Science and Technology Policy with a focus in space policy at The George Washington University, Mindy Gallo is a Principal Systems Engineer in the Advanced Programs Group at Orbital Sciences Corporation and is currently the Requirements Lead for NASA’s Concept Exploration and Refinement study, David André Broniatowski is a candidate for Master’s degrees in Aeronautical & Astronautical Engineering and Technology and Policy at the Massachusetts Institute, 2004, “An International Approach to Lunar Exploration in Preparation for Mars,” http://web.mit.edu/adamross/www/BRONIATOWSKI\_IEEE05.pdf

Suggested Cooperative Framework The most important lesson learned from the ISS partnering framework is that partners should be flexible in developing a future exploration framework to allow for adjustments to changing political situations and countries’ priorities [15]. Because no one country can currently afford to carry the full budgetary burden of human exploration of the Moon and Mars, it may be advantageous to structure a partnering framework in which major responsibilities, such as budget and program leadership, are shared among partners. The positive aspects and the lessons learned from the ISS partnerships should be incorporated into an exploration program framework. An integrated international organization is needed for effective management. The Working Group on “International Cooperation in the Context of a Space Exploration Vision” at the Seventh AIAA Workshop on International Space Cooperation held May 3-6, 2004 suggested the concept of “A Virtual Program of Programs” for structuring international cooperation in the exploration program. This Virtual Program, “rather than trying to develop a cooperative concept for exploration as a whole, would be comprised of a coordinated set of individual activities, each activity employing the most sensible international arrangement as determined by the specific parties involved” [10]. Not all partners would be involved in all activities, and not all activities would necessarily be cooperative. Rather, a spirit of collaboration would be upheld. This framework would incorporate the lessons learned from the ISS experience. This paper suggests implementing a loose coordinating body called the Space Exploration Forum (SEF).

### Best option is cooperation, U.S. not able to exploit lunar resources by themselves-financially and technologically difficult

Lele 10-Ajey Lele, Research Fellow, Institute for Defence Studies and Analyses (IDSA), New Delhi, India, Oct. 2, 2010, “An Asian Moon Race?” http://www.sciencedirect.com/science/article/pii/S0265964610000846#bbib43

On 28 June 2010 President Obama announced the latest national space policy for the USA, which contains no specific mention of US interest in the Moon. However, the document does state that by 2025 the USA should began crewed missions beyond the Moon and, by mid-2030, send humans to orbit Mars and return them safely to Earth [47]. The same policy also states that a goal should be expanding international cooperation on mutually beneficial space activities. Looking at US relations particularly with Japan and India, it seems likely that the USA could engage these two nations in an ambitious human deep space programme. For the USA the days of a ‘contest’ for space supremacy are over and it is unlikely to mix its military requirements with a deep space mission. Financially and technologically, in the current climate, it would be extremely difficult for the USA to undertake a ‘solo’ programme. Just as happened with the ISS it is likely to prefer to have an international programme for this purpose and India and Japan could be the obvious choices. Since Obama’s space policy also promises to “pursue bilateral and multilateral transparency and confidence-building measures to encourage responsible actions in, and the peaceful use of, space”, it may also attempt to engage China. Doing so (and, if possible, isolating/containing Russia—which has issues with the missile defence programme) is very important to start the process of the development of a 21st century space regime. The deep space arena could be the best arena in which to start such cooperation, because it will take a minimum of two to three decades to judge exactly how mankind stands to reap benefits from these planets and develop human colonies on them.

## Cooperative Regime CP---Solves the Case---Private Investment

### Cooperation Key – Private Investment - A regime which provides a clear definition of CHM can promote private investment in space while upholding the CHM.

Zell 6 – Jeremy L. Zell, J.D. Candidate, 2007, University of Minnesota Law School; B.A., 2004, University of South Dakota, Summer, 2006, “Putting A Mine On The Moon: Creating AN International Authority To Regulate Mining Rights In Outer Space,” 15 Minnesota Journal of International Law 489, Lexis

A successful SRA must promote independent investment in outer space while upholding the core of the Common Heritage Concept. This is an onerous balance to strike and few, if any, international agreements have been able to do so. n226 The proposed SRA would adequately promote private investment in outer space in at least four ways. First, giving meaning to the Common Heritage Principle provides a stable legal framework, which in turn allows firms and nations a stable footwork from which to judge the feasibility of mining outer space. Mining, almost more than any other industry, is an endeavor which requires a tremendous amount of initial capital. n227 One does not know where to find resources to mine without first prospecting. n228 Prospecting can encompass several sites, millions of dollars, and countless hours and still [\*515] yield little. n229 The money and energy spent prospecting is justified by the belief that sooner or later the prospector will find success and the prospector will receive an adequate return on his or her investment. n230 This process has been described as "buying a lottery ticket" because the payoffs are randomly awarded. n231 It is nearly impossible for a firm or nation to calculate potential returns on investment for mining outer space if the legal status of its claim is unknown. Currently, the debate over the Common Heritage Concept leaves many debating whether it is possible to make claims on materials in space and who receives the benefits of the extracted material and in what proportions. n232 The SRA would resolve this confusion by adapting the Common Heritage Concept to space and outlining a regime that will regulate and appropriate property in space. With an SRA in place, nations and firms would be able to include property rights in their cost/benefit analyses. In addition, the current uncertainty leaves many potential actors hesitant to spend even modest resources exploring the feasibility of space mining. n233 The SRA would eliminate that uncertainty and foster an increase in the research and development of space mining programs. Second, the SRA's Council should reserve seats for the world's largest mineral producers and consumers. n234 In this way the nations and firms with the largest investment in outer space mining will have a substantial voice in creating the rules that will regulate outer space mining. This provides an added amount of stability to the legal framework because it gives industrialized nations and their firms a hand in their own destiny. Regulations governing space mining will be promulgated by nations containing the firms with the greatest to gain and lose in the space mining industry. Third, the SRA provides methods through which firms or nations who invest in developing nations can maximize their return on investment. In the ACME illustration, it is possible for ACME to receive complete forgiveness of its fee and royalty obligations with a large enough investment in developing nations. ACME would then be entitled to the entirety of the return on its [\*516] mining operations. Firms with the resources and willingness to invest in the developing world stand to make a great deal of profit under the SRA. This is a strong incentive for private investment in outer space mining. Fourth, granting exploitation easements would provide greater incentive to outer space miners than the contract-based system of the ISA. Under the contract system, a firm or nation's control over its operation can only last as long as the contract allows. As such, those who wish to mine outer space are unable to know the amount of benefit they may receive from a mine before the contract expires and they are forced to negotiate new terms or walk away from their investment. Clearly, the international authority regulating the mining has the upper hand in subsequent contract negotiations. Under an easement system, the firm or nation would be guaranteed use of the surface and subsurface for as long as it mined at that location. This guarantee creates stability in judging the feasibility of outer space mining by increasing the amount of return an investor can plan to receive from a mine.

## Cooperative Regime CP---Solves the Case---Global Mining Benefits

### Cooperation Key – Developing Nations – Only a space regime which sufficiently adheres to CHM can produce benefits for developing nations.

Zell 6 – Jeremy L. Zell, J.D. Candidate, 2007, University of Minnesota Law School; B.A., 2004, University of South Dakota, Summer, 2006, “Putting A Mine On The Moon: Creating AN International Authority To Regulate Mining Rights In Outer Space,” 15 Minnesota Journal of International Law 489, Lexis

E. Benefiting Non-Spacefaring Developing Nations While sufficiently promoting private investment in space mining activities, the SRA would also sufficiently adhere to the Common Heritage Concept. Operating under the notion that the Common Heritage Concept vests ownership of all outer space territories in the international community, it becomes clear that all nations, whether industrialized or developing, are entitled to benefit from the joint tenancy. However, developing nations, by definition, lack significant economic capital. The capital-intensive nature of space travel in general and space mining in particular renders it highly improbable that a developing nation would be able to enter outer space, let alone harvest its resources. Therefore, adhering to the Common Heritage Concept requires that developing nations receive some benefit from the mining activities in outer space. The SRA would contain two provisions which specifically seek to share the wealth of outer space with developing nations. First, the fee and royalty forgiveness program would not only maximize the return on investment for those who mine outer space but would also create strong incentives for firms or nations with the ability to mine outer space to invest in the developing world. More importantly, the investment would come in the form of moderate-to high-technology jobs. A firm or nation [\*517] cannot establish any enterprise in a developing nation and expect to reduce fees and royalties owed to the SRA, but instead must establish an enterprise directly related to their outer space mining operations. Without this requirement, a multinational corporation could invest in any type of activity in a developing nation and then apply for a reduction in fees or royalties. An example of this would be a multinational mining operation that mines in both space and on Earth. If that operation began mining in a developing country while simultaneously mining on the Moon, it would qualify for a reduction in fees and royalties. The multinational company would receive a higher return from its outer space mining while contributing little to the infrastructure or general well-being of the developing nation in which it began mining. However, the SRA would require that investment be tied directly to the firm or nation's mining activities. Like similar national space programs, the building and launching of outer space mining technology and the firm or nation's mission control would require a large amount of high-tech infrastructure n235 and skilled laborers. n236 Therefore, investment in developing countries would bring with it a level of infrastructure and labor that could help drive growth in other sectors of that nation's economy. n237 The firm or nation taking advantage of the forgiveness program benefits from a higher rate of return while developing countries benefit from a higher degree of investment. Second, the SRA's Enterprise will benefit developing nations by providing a source of income to developing nations and promoting the development of space-related enterprises in developing nations. In addition, the Enterprise will provide developing nations with something they rarely posses: economic leverage that can be used in negotiations with industrialized firms and nations.

## Unilateral Strategy does not solve-general

### A unilateral strategy is counterproductive and unrealistic

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A key point that this essay develops is the notion that, given emerging international trends in space, adopting a purely national strategy will become increasingly difficult and counterproductive. Specifically, with the growing importance of international cooperation in space for reducing costs and dealing with shared problems in this highly interdependent environment, alliances, networks, and transnational ties may become the true test of a state's “power” in space, rather than, as in the past, only its own national assets. In this sense, effective leadership in space coalition building and compatibility with other countries' goals may become critical to the success of any future national strategy. Finally, serious thinking about cause-and-effect relationships and action-reaction dynamics cannot be ignored. Too often, purported strategists make the mistake of adopting simplistic assumptions of “decisive” U.S. moves and static foreign reactions. Such thinking is unrealistic, and it will cause us to fail in anticipating the actual future of space activity. Indeed, given the global spread of space technology, the complex dynamics of international interactions are likely to become even more important as we move further from the bipolar U.S.-Russian context and into a new multipolar space structure, influenced by additional actors, such as China, the European Space Agency and European Union, Japan, India, and others.

With these caveats in mind, the first task herein is to review briefly what the concept of strategy means. Next, this paper undertakes a comparative review of some of the “lessons” we might draw from nuclear strategy during the Cold War (1945-1991), where we have relatively greater experience, and the benefit of declassified information about the thinking of both sides. The third section of this study reviews the practice of space policy and attempts at strategy since 1958 to the present, as well as more recent suggestions regarding space strategy from the academic literature. As will be shown, the period of the Moon race from 1961 to 1969 is arguably as close as the United States has ever come to a space strategy, however, our eventual success revealed this strategy's ultimate limitations. Finally, the article considers how we might formulate a space strategy in the future, and what pitfalls we should seek to avoid in doing so. The main point is that forward-leaning approaches that recognize the unique characteristics of space dynamics and the increasing influence of economic globalization are likely to be more successful than backward-looking strategies attempting to mimic or adapt military principles that worked in other environments in other times. In addition, contrary to much current thinking, a successful strategy in space may have more to do with mustering the funding and organizational skills that it took to build the inter-state highway system than in organizing the military forces needed to storm the beaches of Normandy during World War II.

## Unilateral Strategy does not solve-resources

### Cooperation may be difficult but is critical for exploiting lunar resources

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The tremendous work involved in bringing to completion the Obama Administration's space policy after 17 months in office—amid the welter of bureaucratic in-fighting involved—highlights the even greater challenges of developing a workable U.S. space strategy. For strategy development, there would have to be a serious study of the challenges we face in space, the range of resources we possess—national, allied, and friendly—and the likely reaction of potential adversaries. It must also offer a vision capable of rallying national and international support behind a set of practical priorities, such as settlement of the Moon or Mars, developing energy sources from space, or creating a shared response plan for dangerous near Earth objects, as well as more general philosophical goals, like freedom of access, service to Earth as a priority, or creation of an ever-expanding league of cooperating spacefaring countries. Given the extra-territorial nature of space itself and the increasingly international complexion of space activity, with the exception of the military sector, an old-style national strategy seems to be an overly limited approach. It is also not likely to succeed. Crafting an international strategy, however, requires agreeing to certain constraints on national sovereignty with the assumption of greater individual and collective gains. To date, such agreements have been difficult—but not impossible—to establish. The next set of robotic and manned lunar mission might offer test cases of such comparative strategies. Whether the problems of tomorrow in space might actually require such cooperation is a question worth asking. In the military sector, the growth of international responses to disasters, and of at least, coalition-based responses to security threats suggest that multilateral approaches may become more acceptable and desirable in the future. Such trends and the underlying reasons for supporting them (if such a decision is made) would need to be incorporated into a future space strategy.

The prospect that such a unified strategy might eventually include all nations in a common approach to space is not realistic today. In the meantime, we need to start by developing new mechanisms to prevent space conflicts among ourselves, and particularly the kind of kinetic conflicts that might render Earth orbital space unusable. The costs of failure in this mission are very high. Unfortunately, developing cooperative mechanisms for mutual restraint in space is not going to be easy. Even without a space strategy, the United States managed to survive the Cold War in space with the Soviet Union intact, and derived great benefit from it through participation in mutual military restraint mechanisms, both tacit and explicit. Perhaps, such past, bilateral cooperation could become a model of sorts for the future in space. Yet creating such mechanisms in a multilateral context may be more difficult, particularly if the space strategies developed by individual countries are fundamentally competitive. Fortunately, the status of relations among major states today does not mirror U.S.-Soviet hostility of the Cold War, and the forces of globalization, transparency, and information sharing may help us overcome obstacles to cooperation. In the end, understanding and acting upon our common interests as human beings in space may be the most difficult and most important element of any future attempt at space strategy.

## Unilateral Strategy=Conflicts

### Going to moon unilaterally will cause conflicts

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The question of how the moon will be governed once humans return in about a decade and begin to establish permanent bases matters greatly to the future of international security. Already, a range of major powers have plans to participate in the moon’s further scientific exploration, commercial exploitation, and possible permanent settlement. If we count both manned and robotic activities, this list currently includes the United States, China, Russia, India, Germany, the United Kingdom, the European Space Agency, Japan, and South Korea. Other countries are likely to join this list in the coming years.

Establishing a peaceful framework for lunar governance will be important, because hostile international relations on the moon are likely to lead to conflicts elsewhere in space and, possibly, on Earth. Such patterns regarding new frontiers have plagued the history of international relations for centuries. Indeed, despite frequent hopes for cooperation, most unclaimed territories historically have become sources of international conflict rather than serving as peaceful lebensraum. Typically, and consistent with realist predictions about international politics, states have had a built-in penchant to pursue relative gains over their rivals and therefore have sought to seize and defend new resources to their own advantage. On the other hand, successful formation of a stable, transnational governance system—a mechanism for sharing or otherwise peacefully allocating the moon’s resources—could open the possibility for mutually beneficial and self-sustaining lunar commerce and settlement, consistent with neo-liberal institutionalist predictions. Such a model could have positive spin-off effects on Earth and set a cooperative pattern for further human exploration and development of the rest of the solar system, spurring states to pool resources and engage in joint approaches to space’s many challenges. In such scenarios, hopes for “humankind” efforts in space—rather than state-driven rivalries—might be realized, something for which astronauts and cosmonauts who have visited space have often called. As Per Magnus Wijkman wrote on these issues in 1982, the “interdependence” of all actors in space provides “strong incentives” for the emergence of cooperative solutions.1

Yet predictions from the literature on collective goods suggest that governing the “global commons” of space and the moon is likely to become increasingly difficult when finite resources face claims by multiple, self-interested actors. Such trends historically have led to processes of “enclosure” rather than successful collective management.2 Thus, the question facing lunar settlement is: Can such conflicts be avoided and, if so, how?

In seeking to weigh possible alternative scenarios on the moon, this article analyzes historical cases of human settlement of remote regions and attempts to chart and categorize similarities and differences that might provide useful guidance for forecasting lunar governance—and, specifically, with the aim of avoiding international conflict. This study begins by comparing space to the international experience in three prior regions: settling the Americas in the 1500s, establishing permanent bases on the Antarctic continent in the late twentieth century, and managing the deep seabed since the 1980s. It then turns to the moon, starting with a historical survey of predictions about its settlement since the 1950s and relevant developments in the realm of international treaties affecting lunar activity. The article concludes by applying lessons drawn from the historical cases—and differences—to forecast likely directions on the moon. It argues that the current restraints imposed by moon-related treaties and the nonmilitary nature of the likely participants are likely to favor cooperation. But it cautions that such forces will have to be balanced against the likely presence of highly competitive national motivations. This mixed set of influences suggests a less cooperative outcome than on the Antarctic continent but a far more cooperative result than emerged in the struggle over governance and sovereignty issues in the New World of the Americas.

### Unilateral and hostile actions to exploit the moon’s resources will harm countries through military means

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The debate on the issue of commercial development of the moon’s resources is an important and still unresolved one. As Brearley notes, it would be highly desirable for states to settle these issues before the next humans set foot on the moon. Once humans begin landing and staying on the moon, complex issues will quickly arise. Key variables in the process of international discussion and possible negotiation include (1) the nature of the leading space actors and their interrelations at the time of the moon’s settlement, ( 2) the status of existing space-related treaties and restraint-based norms, (3) the prospects for lucrative contracts (which could promote either competition or cooperation), (4) the extent of the resources and locations available (more likely to promote competition), and (5) the availability of cost-effective technology for their exploitation.

Of all these factors, the first two—the status of international relations among participants and their willingness to comply with existing space treaties and norms—may be the most important, even above resource scarcity or the availability of technology. It almost goes without saying that friendly relations and cooperative exploratory projects on the moon and in the solar system will greatly increase the chances of successful management of moon conflicts. This suggests that realist factors alone are not likely to dictate a break-up of the OST or the existing consensus on cooperative restraint on the exercise of military power. Of course, hostile relations (such as between the United States and China) cannot be ruled out and could lead to unilateral efforts to seize locations and establish nationally oriented keep-out and governance regimes, whether or not resources are scarce. However, violation of the OST in this manner could have other repercussions on space security and would have to be considered carefully by any state undertaking such policies. Hostile or self-serving actions on the moon could harm a country’s interests in other areas of space or on Earth, leading to rival coalitions against it and efforts to undercut its attempted unilateral gains—possibly through military means.

### Great conflicts will occur in Space and on Earth if U.S. unilaterally acts upon exploiting the Moon’s resources

Hatch 10-Benjamin D. Hatch, Executive Notes and Comments Editor, Emory International Law, “DIVIDING THE PIE IN THE SKY: THE NEED FOR A NEW LUNAR RESOURCES REGIME,” http://www.law.emory.edu/fileadmin/journals/eilr/24/24.1/Hatch.pdf

Today, unowned areas cannot be acquired through discovery or first use,199 primarily because “developing nations became concerned that richer countries would dominate the resources that lay as yet unclaimed by any sovereign. . . . By the time the developing world gained the wherewithal to reach the resources of the ocean beds, outer space, and Antarctica, those resources would already be claimed.”200 By rejecting res nullius and its corresponding mode of acquisition through discovery, the alternative position of res communes became accepted in the law of international common spaces. Res communes is characterized by the notion that the real estate or object was “common to all men . . . such things could not be owned . . . .”201 This notion gave rise to the Common Heritage Doctrine described above. Yet, regardless of whether the language is res nullius or res communes, the existence of a vast, unowned, but claimable area of resource-rich land will inevitably spawn political conflict.202 At first glance, this might appear to be counter-intuitive: the logic of res communes would seem to suggest that when a proprietary claim is disallowed, states would have no reason to have conflicts over an unownable entity.203 One example of the success of res communes with respect to conflict resolution is in Antarctica. Prior to the Antarctic Treaty of 1959, the continent was the subject of a series of territorial claims, some dating back as far as the 1840s.204 By the early part of the twentieth century, eight different countries had launched “scientific expeditions,” some of which were as much about annexation as exploration.205 By 1950, eight claims had been made on the continent,206 and these eight would be the claims that would be locked in place during the 1959 Antarctica Treaty.207 This treaty, along with supplementary agreements (altogether comprising the “Antarctic Treaty System”) have managed to “avoid[] conflicts over sovereignty . . . prevent[] the militarization of the continent . . . [and] prevent[] an unregulated gold rush in Antarctica.”208 This success has, at least in part, been attributed to the application of the res communes doctrine to the Antarctic Treaty System.209 There are two crucial points, however, that differentiate Antarctica from the Moon and that predict the failure of the OST regime once the Moon becomes a resource base that is readily accessible. First, Antarctica is not a true res communes. The Antarctic Treaty did not require states parties to disavow their territorial claims.210 Rather, it only barred the modification of the claims that were in existence in 1959.211 States not only still maintain their claims on Antarctic territory,212 but some have gone as far as to issue postage stamps in the name of their Antarctic territories to reassert the vitality of those claims.213 The impact of this perpetuation of territorial claims has been mitigated by other arrangements in the Antarctic Treaty System that severely limit the profitability of states exploiting their claims, such as the Protocol on Environmental Protection to the Antarctic Treaty,214 which has barred extraction of Antarctic resources until 2048.215 Additionally, Antarctica does not have the mineral or resource wealth of the Moon.216 For these reasons, Antarctica has not been worth developing, much less fighting over. Contrast this with the current dispute over the resource-rich Arctic—where states are trying to maintain assertions of territorial control to horde the energy resources beneath the seabed217—and it is clear that where resources and profits are accessible, conflict surely follows. The historical conflicts over imperialist regimes and colonialism tend to suggest that when powerful states have an interest in amassing something that exists in large, previously un-owned quantities in one location, they will inevitably come into conflict with one another. States have a limited economic interest in the Antarctic,218 and so they are unlikely to invest military assets and the necessary financing to vindicate or broaden their claim to something that is not generating them any wealth. In contrast, states seem to believe that they have potentially great economic interests in the Moon and, accordingly may have a correspondingly large motivation to have conflicts over it.219 Exploration of the Moon will benefit humanity—on Earth, new technologies will be have to be developed to aid states in the new space race— and on the Moon, providing new opportunities for human growth and expansion.220 Whatever name a regime wants to give to the Moon—res nullius or res communes—the Moon represents an unparalleled opportunity. Imagine a situation where one state was able to not only find large quantities of Helium-3 or some other valuable resource on the Moon but also succeeded in denying access to other states. That state would enjoy a tremendous economic advantage by cornering the market in some ultra-rare, useful commodity. Resources by their nature breed conflict.221 As demonstrated above, states will soon be converging on the Moon to reap the benefits that it may provide. Given the recent actions by the United States and China, and the spirit of conquest and competition that seems to be informing the current Moon rush, the vague and generic OST will not be able to sufficiently stop state conflict over the greatest economic opportunity in history.

### Unilateral action with He-3 based fusion will result in political instability and controversies between countries-international cooperation is best

Bilder 09-Richard B. Bilder, Richard B. Foley & Lardner-Bascom Emeritus Professor of Law, University of Wisconsin Law School., 2009, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options.” *Fordham International Law Journal*. Volume 33, Issue 2. Article 1. <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj>

However, even if the United States could "go it alone" in this way, there are reasons why it may not wish to do so. First, neither the U.S. government nor U.S. private enterprise is likely to be willing to risk the very substantial investment and long-term effort necessarily involved in seeking to develop He-3-based fusion energy without some assurance that-assuming the very difficult technical and engineering obstacles to developing efficient fusion reactors and establishing permanent moon bases can be overcome-the requisite supply of lunar He-3 can continue to be obtained without encountering significant legal or political difficulties. Whatever may be the most legally persuasive interpretation of existing international law, other nations or people on Earth may challenge the unilateral appropriation of lunar resources by the United States, especially of a potentially uniquely valuable resource such as He-3. This, certainly, was the international experience in the 1960's when developing nations vigorously protested the prospect that a few technologicallyadvanced countries and their private enterprises might alone appropriate what was at the time assumed to be the mineral riches of the deep seabed. That perception ultimately led to the enunciation of the "common heritage" doctrine, the convening of UNCLOS-3, and the adoption of part XI of the 1982 LOSC."18 Only a broadly accepted international agreement is likely to offer the continued legal and political predictability that is essential if a long-term He-3-based fusion energy program is to be undertaken and sustained.11 9 Second, current commitments already obligate the United States to a certain level of international cooperation in space activities. While the Outer Space Treaty and present international law do not expressly bar the unilateral appropriation of lunar resources, they nevertheless impose an obligation on nations to cooperate in outer space activities and to avoid conduct that might give rise to disputes. 120 The United States is also committed to international cooperation in outer space activities under the Outer Space Treaty, the multinational framework for coordination in space exploration entitled "The Global Exploration Strategy,"' 21 and other agreements, such as the International Space Station Agreement,122 and has similarly committed itself to international cooperation in developing fusion energy through its participation in the recently concluded ITER agreement. 123 U.S. insistence on a right to unilaterally appropriate lunar He-3, without further international agreement, could be controversial and regarded as inconsistent with these precedents. Finally, if countries other than the United States also engage in activities on the Moon, as now appears highly likely, it will be in the interest of each of them to have at least some understandings to provide for cooperation on common problems and keep them from interfering with each other's activities. As the Moon Agreement anticipates,12 4 if some kind of lunar agreement is in their common interests, it will be difficult for such an agreement to not address the salient and thus far unresolved issue of lunar resources exploitation. Consequently, if the United States determines that it is serious about seeking to develop an He-3-based fusion energy program, it would seem sensible for it to also seek international agreement on a lunar resource regime designed to provide the long-term legal and political stability that such a program will most likely require.

### U.S. should seek international agreement-international climate is favorable and there will be decreased conflicts

Bilder 09-Richard B. Bilder, Richard B. Foley & Lardner-Bascom Emeritus Professor of Law, University of Wisconsin Law School., 2009, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options.” *Fordham International Law Journal*. Volume 33, Issue 2. Article 1. <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj>

There are, however, several reasons suggesting that the U.S. should seek to reach international agreement on such a regime quite soon and even before the possibility and practicality of a permanent moon base and an He-3-based fusion power program are clearly established. First, as discussed, states and enterprises are unlikely to be willing to undertake the substantial effort and investment involved in developing lunar He-3 mining and He-3- based fusion power without the assurance of political and legal stability that only a broadly accepted international agreement can provide. 127 Given the long lead time which will be required if the United States wishes to achieve a viable He-3-based fusion power program in the relatively near future-perhaps within the next half-century or so-it seems sensible for it to begin to take steps to put the necessary legal infrastructure in place fairly soon. Second, the international climate is arguably now relatively favorable to achieving international agreement on the kind of international lunar resource regime the United States hopes to achieve. Other major players, such as China, the European Union, India, Japan, and Russia, which currently appear to have the capability to participate in the potential exploitation of lunar resources, may well now share an interest with the United States in a more open-access regime and market-based mechanisms. 128 The U.N. General Assembly's adoption of the 1994 implementation agreement nullifying the provisions of part XI of the LOSC to which the United States objected clearly reflects a broader international acceptance of a U.S.-favored approach to the exploitation of deep seabed "common heritage" resources more favorable to the participation of free enterprise, which serves as persuasive precedent for the similar treatment of lunar resources. 129 Indeed, there is now growing support in the United States for U.S. ratification of the LOSC and accession currently seems increasingly likely.130 In addition, international cooperation among the major technologically-advanced countries in both space and fusion power development is already ongoing under the International Space Station and ITER agreements1 ' and the Obama administration appears to look favorably on cooperative multilateral rather than unilateral approaches to dealing with broad international issues.13 2 Moreover, the recent spike in oil prices133 and heightened international concern about global warming134 reinforce the pressing need of the global economy to find ways to meet the world's growing appetite for energy while still decreasing greenhouse gas emissions, and thus to renewed international interest in the development of alternative energy sources such as nuclear fission and fusion. Third, for a variety of reasons, the current influence and "bargaining power" of the United States both as a leader in space and nuclear technology, and more generally as an actor on the world stage, is arguably declining relative to that of China, the European Union, India, Russia, and other countries.13 5 If this is so, the ability of the United States to negotiate the kind of lunar resource regime it wants may well be greater now than later. Finally, it may be easier to establish the type of lunar resource regime that the United States would prefer while the feasibility of He-3 exploitation and fusion power-and, indeed, the possibility that we may eventually find valuable resources elsewhere in the solar system-is still uncertain and before potentially concerned states

### **Absent a international framework, unilateral mining of the moon will cause conflicts**

Bilder 09-Richard B. Bilder, Richard B. Foley & Lardner-Bascom Emeritus Professor of Law, University of Wisconsin Law School., 2009, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options.” *Fordham International Law Journal*. Volume 33, Issue 2. Article 1. <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj>

However, the growing interest in lunar He-3 poses its own problems. As yet, there is no international consensus on whether, or how, any nation or private entity can exploit or acquire title to lunar resources. The U.N.-developed 1967 Outer Space Treaty n7 does not specifically address this question. The related U.N.-sponsored 1979 Moon Agreement n8 purports to lay the groundwork for the eventual establishment of a regime for the exploitation of lunar resources, but that agreement has thus far been ratified by only a very few countries - not including the United States and none of which are currently leading space [\*248] powers. n9 Absent an agreed international legal framework, attempts by the United States or any other nation or private entity to acquire and bring to Earth significant quantities of He-3 could give rise to controversy and conflict. Indeed, without the security of an established legal regime, nations or private entities might well be reluctant to commit the very substantial money, effort, and resources necessary to mine, process, and transport back to Earth the amounts of lunar He-3 sufficient to support the broad-scale terrestrial use of He-3-based fusion energy.

### Mining unilaterally will cause conflicts among nations-readopting a different moon policy will help

Johnson 01-Dana J. Johnson, Dr. Johnson is a Senior Analyst at the Northrop Grumman Corporation's Analysis Center, where she is responsible for assessing space- and missile-defense-related policies and trends, “Political Barriers to Space Settlement,” Jan-Feb 01, http://www.nss.org/settlement/roadmap/political.html

The Future

While the Moon Treaty would no doubt be bad for space development if it were in force as to the major space powers, its absence is not a sufficient condition for space development. As the economic problems following the demise of the former Soviet Union illustrate, the mere absence of regulation is not enough to encourage investment: there must be positive legal protection for property rights. It thus seems clear that lunar development requires protection of property rights. Such protection is difficult to achieve in the absence of some sort of legal regime. And although it is conceivable that an appropriate regime might be provided via a unilateral approach employing only the municipal (domestic) law of individual nations, that is very much a second-best solution.

Rewriting the Moon Treaty is not out of the question. It is pretty generally considered a failure, even by its supporters. And by its own terms, it comes up for periodic review by the United Nations General Assembly. The first such review was scheduled to take place ten years after its entry into force. Although there was then no great interest among UN members in revisiting the Moon Treaty, a strong proposal for substantial reform might generate such interest. Space capability is no longer a superpower monopoly. In fact, several "Third World" opinion leaders, such as India and China, now have credible space programs. So there may be a market for new ideas in this area.

An entirely new treaty, negotiated among the major space powers, is another possibility. This avoids any political difficulties associated with drastic modification of a treaty that is already in force, and allows the nations that actually have something at stake to take the lead. Such a limitation would probably allow for faster negotiations, and would substantially reduce "free rider" and "holdout" problems that often plague negotiations in the United Nations Committee on the Peaceful Uses of Outer Space, where many nations with little direct stake are involved in a consensus-based system.

Finally, of course, it is possible that a unilateral regime, based on the municipal law of individual spacefaring nations, could provide the necessary protection, at least in the early days of lunar resource development. But such an approach has several drawbacks. First, it carries with it increased potential for conflict among nations. Second, it might seem to lack political legitimacy in the world community. And third, the fear of hostile diplomatic, economic, or military action by other nations might undermine the very confidence and stability that a resource regime is designed to create. These problems are not insuperable, and there is some precedent for such an approach, but the problems with unilateralism are sufficiently great that it should be regarded as a last resort.

Regardless of which approach is taken, some thought needs to be given to the question of how any regime should be structured. The National Space Society has taken the position that early development of space resources is vital to the future of humanity for economic, environmental, and spiritual reasons. This produces a strong bias in favor of a system that produces early development.

Thus, a "claims" regime, in which private parties are rewarded for discovering and exploiting lunar resources, would make more sense than a regime based on allocation by a centralized authority. Though such an argument might have been radical in the 1970s, it is founded on economic principles that are now unexceptionable. The precise details for implementing such a system are beyond the scope of this article, although the principles set out above provide substantial guidance.

Conclusion

Just as various technological hurdles must be overcome first, it is certain that we will not see development of lunar resources without an appropriate legal regime. The Moon Treaty's "common heritage" regime has proven thoroughly unsatisfactory, and so will any regime based on similar principles. Fortunately, it seems clear that the most desirable regime for developing lunar resources, one based on private property rights with minimal governance, is also the approach that is likely to prove most acceptable to spacefaring nations.

It is my hope that the spacefaring nations will seize the opportunity to work out such a regime in the next few years. We are already beginning to see the very first stirrings of interest in commercial exploitation of the Moon, and by the early part of the next decade we are likely to see more. As interests become more concrete, negotiation will become more difficult. Today's situation makes agreement on general principles easier. As the parties are able to make out their future interests with greater clarity and specificity, the task of negotiation is likely to become more difficult.

### No international cooperation over lunar mining could lead to a WWIII and massive conflict

Hatch 10-Benjamin D. Hatch, Executive Notes and Comments Editor, Emory International Law, “DIVIDING THE PIE IN THE SKY: THE NEED FOR A NEW LUNAR RESOURCES REGIME,” http://www.law.emory.edu/fileadmin/journals/eilr/24/24.1/Hatch.pdf

DO-NOTHING systems impose no restrictions on commons users. n248 Rather, they permit free use (and abuse)

of the system. A DO-NOTHING [\*267] system would effectively be imposed on the Moon if the OST and

Moon Agreement were repealed with no substituted agreement in their place. In combination with the natural

KEEPOUT system governing the Moon, n249 the only factor preventing the Moon from being subjected to a

tragedy of the commons would be the small number of actors dividing the vast expanse of the lunar surface. n250

On the other hand, with no legal regime for the Moon at all, the tragedy of the commons should be the least

of humanity's worries. The total repeal of the OST and Moon Agreements would cause the Moon to cease being

an object of international law, leaving it utterly free and open for the uses of the first claimants. Rather than

create a regime to govern state interests over the Moon, this policy would cause the Moon to become the

international equivalent of the Wild West. Rights to the Moon would be defined only to the degree that those

rights could be protected.

The total repeal of the OST would almost certainly solve the Moon's economic problems generated by the

tragedy of the commons. With no regulation or convoluted proprietary schemes and no legal mandate to provide

for free riders, the disincentives that have suppressed lunar development would vanish. However, this total lack

of lunar law would likely heighten the comparison to the Wild West - with no regulation, states would have an

incentive to militarize the Moon and to engage in prolonged conflicts with other would-be users to gain

monopolies and exclusive uses over valuable lunar resources. While a scheme rejecting all lunar regulation

might lead to an era of free and open use of the Moon, it also may lead to World War III.

### Exploiting lunar resources unilaterally will lead to more problems-international cooperation and open dialogue is necessary

Hatch 10-Benjamin D. Hatch, Executive Notes and Comments Editor, Emory International Law, “DIVIDING THE PIE IN THE SKY: THE NEED FOR A NEW LUNAR RESOURCES REGIME,” http://www.law.emory.edu/fileadmin/journals/eilr/24/24.1/Hatch.pdf

A return of humans to the Moon and a harnessing of lunar resources is becoming a reality. The current legal

framework is both economically inefficient and insufficiently clear to guide spacefaring states in their

interactions on the Moon. New institutions are needed, and given the timetable [\*294] that the spacefaring

states have provided for their return to the Moon, the world should turn its attention to this issue now. By

proactively creating a new legal framework for the Moon, and outer space generally, potential economic

opponents will be forced to reevaluate their own interests and to listen to the concerns of other states. Regardless

of whether the solution created resembles the Lunar Forum, the Madrid Protocol, or some middle ground, it is of

paramount importance that states begin and participate in a dialogue about the future of the Moon and its

resources. This dialogue will lead to greater mutual understanding and reduce the chance of international conflict

on the Moon. Even if Helium-3 fusion ultimately does not become a solution to the world's energy problems,

states will be none-the-worse for having come together, discussed energy economics, and worked out a mutually

agreeable solution. If, on the other hand, it does prove to be a successful energy source, the risks of allowing the

OST and Moon Agreement to remain the official international law of lunar resources are too great. It is better to

be safe and wind up with another common-space regime that exists only on paper than to be sorry and see the

world reduced to conflict over Helium-3. Creating a new treaty through open dialogue will lead not only to a

new trend in more efficient commons-resource management but also to greater respect for international law and

other states as the world faces the challenges of the next century.

### US Unilateralism Bad – US abandonment of supporting an international regime results in an arena of military competition and conflict.

Tannenwald 03 - Nina Tannenwald, Director of the International Relations Program and Joukowsky Family Research Assistant Professor at the Watson Institute for International Studies at Brown University, April, 2003, “Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space,” Online: <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj&sei-redir=1#search=%22mining+moon+legal+regime%22>

Conclusion The challenge the international community faces in space today is the imminent collapse of a 45-year tradition of restraint in regard to military activities in space. U.S. plans for “global engagement” represent the abandonment of any concept of restraint in favor of a regime of unilateral assertion of power, largely in disregard of the interests of others. If pursued, such a strategy will undermine the fragile existing legal order in space widely supported by the rest of the world. This will place in jeopardy not only the interests of other nations in space, but the multiple interests there of the United States itself. Because of the threat posed by this development, it is clear that, one way or another, a new regime for space will emerge. The existing regime cannot survive in its current form in the face of the new challenges. Either it will be transformed by agreement into a more elaborated operating regime that balances the various interests in space on the basis of new guiding principles and norms, or it will be transformed by default into a regime of power and an arena of military competition dominated by the United States.

### Unilateral Action Bad – Unilateral US space exploitation catalyzed by resource scarcity leads to space weaponization.

Huntley, Bock, And Weingartner 10 – Wade L. Huntley, US Naval Postgraduate School, Joseph G. Bock, Kroc Institute For International Peace Studies, Miranda Weingartner, Weingartner Consulting, February 2010, “Planning The Unplannable: Scenarios On The Future Of Space,” Space Policy, Vol. 26 Issue 1, pg. 25-28, Online: <http://www.sciencedirect.com/science/article/pii/S026596460900126X>

4.5. Scenario B: “Sisyphus” (or “The Never Ending Story”) Sisyphus describes a future challenged by a scarcity of resources but enjoying a high degree of technological breakthrough. In 2010 oil prices reach $350 per barrel, resulting in massive investment in new energy technology by the USA, India, China and Russia. These investments lead to a leap in computing capacity. The high price of oil causes global food shortages. These in turn cause disruptions in the political order of many nations and massive displacement of populations towards Northern regions. Canada closes its borders and calls for the UN to assist its management of US “economic” refugees. Severe water shortages send shockwaves in the Western world. Famine breaks out in the Russian Far East. By 2015 10 million people have perished worldwide from hunger. The global order reorganizes itself in two opposing blocs. The Union of Democracies (UD) includes the USA, EU and allies. China signs an armistice with Russia and Japan, thereby building the opposing block to the UD. Under civilian pressure, nations scramble to find a solution to the energy crisis and increase their cooperation over energy. Turkey and Iran agree to a water pipeline to the Middle East, increasing tensions between Israel and surrounding nations. In 2020 a researcher in Zurich discovers a new element (Fidelium) which leads to nuclear fusion. The US Air Force tests its first hypersonic spaceplane. Meanwhile, thanks to increased computing efficiency, artificial intelligence makes its appearance on the scene. The USA and allies begin the construction of a space elevator. By 2025 interest increases in mining for water on Mars. Artificial nutrient capsules are now mass-produced and help mitigate the effects of hunger, but only for those who can afford it leading to an increasing gap between haves and have-nots. Tensions increase in the Middle East water-war peace process and Turkey storms out of talks. AI computers are handed management of the US nuclear forces. By 2030, thanks to small fusion, bringing resources from space is now feasible and economical. Fidelium is confirmed abundant in space, thanks to asteroid sampling missions. Russia and China condemn Western refusal to share the fusion formula and threaten to destroy both the space elevator and the nascent mining colony in the asteroid belt with a laser weapon installed in LEO. Space is now, unequivocally, weaponized.

### Unilateral action with He-3 based fusion will result in political instability and controversies between countries

Bilder 09-Richard B. Bilder, Richard B. Foley & Lardner-Bascom Emeritus Professor of Law, University of Wisconsin Law School., 2009, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options.” *Fordham International Law Journal*. Volume 33, Issue 2. Article 1. <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj>

However, even if the United States could "go it alone" in this way, there are reasons why it may not wish to do so. First, neither the U.S. government nor U.S. private enterprise is likely to be willing to risk the very substantial investment and long-term effort necessarily involved in seeking to develop He-3-based fusion energy without some assurance that-assuming the very difficult technical and engineering obstacles to developing efficient fusion reactors and establishing permanent moon bases can be overcome-the requisite supply of lunar He-3 can continue to be obtained without encountering significant legal or political difficulties. Whatever may be the most legally persuasive interpretation of existing international law, other nations or people on Earth may challenge the unilateral appropriation of lunar resources by the United States, especially of a potentially uniquely valuable resource such as He-3. This, certainly, was the international experience in the 1960's when developing nations vigorously protested the prospect that a few technologicallyadvanced countries and their private enterprises might alone appropriate what was at the time assumed to be the mineral riches of the deep seabed. That perception ultimately led to the enunciation of the "common heritage" doctrine, the convening of UNCLOS-3, and the adoption of part XI of the 1982 LOSC."18 Only a broadly accepted international agreement is likely to offer the continued legal and political predictability that is essential if a long-term He-3-based fusion energy program is to be undertaken and sustained.11 9 Second, current commitments already obligate the United States to a certain level of international cooperation in space activities. While the Outer Space Treaty and present international law do not expressly bar the unilateral appropriation of lunar resources, they nevertheless impose an obligation on nations to cooperate in outer space activities and to avoid conduct that might give rise to disputes. 120 The United States is also committed to international cooperation in outer space activities under the Outer Space Treaty, the multinational framework for coordination in space exploration entitled "The Global Exploration Strategy,"' 21 and other agreements, such as the International Space Station Agreement,122 and has similarly committed itself to international cooperation in developing fusion energy through its participation in the recently concluded ITER agreement. 123 U.S. insistence on a right to unilaterally appropriate lunar He-3, without further international agreement, could be controversial and regarded as inconsistent with these precedents. Finally, if countries other than the United States also engage in activities on the Moon, as now appears highly likely, it will be in the interest of each of them to have at least some understandings to provide for cooperation on common problems and keep them from interfering with each other's activities. As the Moon Agreement anticipates,12 4 if some kind of lunar agreement is in their common interests, it will be difficult for such an agreement to not address the salient and thus far unresolved issue of lunar resources exploitation. Consequently, if the United States determines that it is serious about seeking to develop an He-3-based fusion energy program, it would seem sensible for it to also seek international agreement on a lunar resource regime designed to provide the long-term legal and political stability that such a program will most likely require.

## Unilateral Strategy=China U.S. Conflict

### U.S. China conflict will occur if U.S. goes to moon unilaterally

### **Brearley 6**-Andrew Brearley, University of Southampton research student, Sept. 22, 2006, “Mining the Moon: Owning the Night Sky?” http://tandfprod.literatumonline.com/doi/full/10.1080/14777620600762790

The treaties that comprise international space law are simply not designed to answer detailed questions, they only establish principles upon which the human exploration of space occurs. This is highlighted by the differing approaches to the CHM within the Moon Agreement and UNCLOS III; the Moon Agreement simply defines the Moon as the CHM, while UNCLOS III provides all the information necessary for the establishment of the ISA.

Given the relative power that the US can exercise in space in comparison to other states, it is conceivable that it could make the decision to simply ignore legal questions concerning the rights to use lunar resources. As the US has not signed nor ratified the Moon Agreement, there is no legal restraint preventing it from ignoring that particular treaty. Given the preponderance of power that the US possesses, it could choose as well not to be bound by the provisions of the OST. Alternatively, if the Chinese program proceeds rapidly, China could attempt to utilize the Moon without reference to other states. Clearly, these scenarios lead to a conflict in space, which the space treaties intended to avoid. If it is assumed that the space powers continue in their wish to avoid the potential of such conflict, then resolving the legal uncertainties becomes an important policy objective.

## Solvency Mechanism-New OST

Adopting a new OST and creating a federation solves (Not really specific to the moon….)

Gagnon 09-Jim Gagnon, A software entrepreneur and space enthusiast who’s fond of delving into the assumptions behind the prevailing wisdom to search for innovation. From his homestead in Northern California he feels a pull towards the stars as strong as the Earth, and wonders how we’re finally going to live out there, “A good old-fashioned space rush,” Nov. 23, 09, http://www.thespacereview.com/article/1512/1,

The international community must recognize that the OST did its job: it prevented the United States and the Soviet Union from turning space into another battleground. It’s time to continue that work while taking into account today’s realities. Such an effort to selectively relax this treaty is a major undertaking, and most of the world will point out that it will, at least initially, serve the interests of perhaps half a dozen countries. If the door is opened on a new OST, the effort will have to similarly all encompassing so that all nations will have a reason to throw their support behind it.

The power of the untamed frontier is immense in the human psyche; so great that even though most of the first pioneers who came the New World died even more kept coming.

The 1960s was a magic era for space exploration, and the best explanation for why it occurred is that President Kennedy, in proposing to land a man on the Moon, really plucked a decade from the 21st century and dropped it into the now. Mankind can do the same thing again. A grand stroke that would excite and unite people would be to take a page from Star Trek and create the Federation of Space Faring Nations, a united federation devoted to the peaceful exploration and colonization of space.

Any member of the Federation would have to offer to sell their space technology to any other member. Member nations would have to agree to strict nonproliferation terms and other nonaggression clauses. Part of the creation of this Federation would be a legal mechanism to selectively and progressively allow private ownership of land outside of Earth. The Federation would choose where to allow private ownership in stages, starting with the Moon and Phobos. First person there gets their forty acres, you bring your own mule. Of course, the plot would have to be continuously manned for some length of time, say five years, and every member nation would have to establish at least one outpost.

Politically, it works on several levels for the Obama Administration. It allows the US to use its space technology as a lure to pull other nations into its designs for nonproliferation and technology transfer, while providing cover for Congress to financially support America’s space effort. Governments and corporations would give space serious consideration, as certain parts of the solar system could be worth quite a lot in the future and they wouldn’t want to be left out. America’s corporate aerospace industry would benefit handsomely as it begins to build machines that allow anyone to claim their parcel in space.

Finally, the profit motive would function fully in space, and we would be in awe of how quickly humanity would spread in the bodies opened up by the Federation. Hope would be handed to a new generation because a powerful new mechanism will be built to prevent global conflict while opening up a new frontier—not only in their imaginations but in reality as well.

### OST Revisions Key – Article I of the OST is in accordance with the CHM principle of the Moon Agreement. OST is uniquely beneficial because exploitation is not prevented, even in the context of lunar mining.

Brearly 6 – Andrew Brearly, Space Analyst; Division Of Politics And International Relations, University of Southampton, 2006, “Mining The Moon: Owning The Night Sky?” ASTROPOLITICS: The International Journal Of Space Politics And Policies, Vol. 4 Issue No. 1, pg. 43-67, Online: <http://tandfprod.literatumonline.com/doi/full/10.1080/14777620600762790>

Although the OST does not classify the Moon as the property of mankind, it is not in contradiction to the Moon Agreement; rather, the principles of the later treaty are founded upon those of the OST. The similarities to the CHM can be found in the first Article of the OST, which states that the exploration and use of space and the Moon ‘shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.’ ‘Province’ classifies the subject as res communis, as it is available for all to use, but not subject to individual, national appropriation. Even though the OST prevents states from owning the Moon, it does not prevent them from exploiting it. Article I requires that the use of space and celestial bodies are for the benefit of all states, yet this commitment does not provide a great deal of clarity as to what form such benefit takes. To illustrate, the construction of a global communications system through the use of geostationary orbit is for the benefit of all states, as the OST requires, even though this use of space is more beneficial to some as they own the infrastructure and gain significant financial benefits. Alternatively, considering the Moon, a basic interpretation of this Article could simply assert that scientific investigation by one state is to the communal benefit of all humanity, leaving the state with no other obligation than carrying out such research. Nevertheless, a broad question remains unanswered, to what extent does exploitation of a common resource, such as the Moon, result in appropriation? Under the terms of the OST this remains an ambiguous area. A further limitation, applied to lunar mining, is found in Article IX of the OST, which commits states to act ‘with due regard to the corresponding interests of all other States Parties to the Treaty.’ The Article also contains the weak requirement that should a state be planning an activity, which may affect others, then it should enter into a process of consultation. 66 Thus, in order to be compliant with this Article, a lunar mining activity only needs to avoid inconveniencing other states, and be open to consultation as to the nature of the activities. In short, the OST provides nearly no indication regarding the legal implications of mining the Moon. The treaty was designed to manage the early exploration of space, specifically the imminent initial lunar landings, and it does not address itself to the possibilities of economic exploitation, like mining. As with the Moon Agreement, the OST provides broad principles under which activities on the Moon can be conducted, but it does not provide legal clarity or details.

### OST Revisions Key – Spacefaring nations intend to adhere to the OST which all have ratified. However, a clear legal framework is desireable to govern future exploitation of the Moon’s resources.

Brearly 6 – Andrew Brearly, Space Analyst; Division Of Politics And International Relations, University of Southampton, 2006, “Mining The Moon: Owning The Night Sky?” ASTROPOLITICS: The International Journal Of Space Politics And Policies, Vol. 4 Issue No. 1, pg. 43-67, Online: <http://tandfprod.literatumonline.com/doi/full/10.1080/14777620600762790>

Conclusions

The fact that no space powers ratified the Moon Agreement can be seen evidence that it has no relevance to their lunar intentions. Indeed, as the CHM has yet to have a large role in international politics, there is a strong argument that it is of more philosophical rather than practical importance, a proposition which is further emphasized by the US not ratifying UNCLOS III. Concomitantly, spacefaring states have made statements to the existence, and validity, of the principles expressed within the Moon Agreement, and the manner in which it conceptualizes lunar resources. For example, when discussing the issue of utilizing the Moon, China specifically referred to using its resources for the benefit of all humanity. While discussing the discovery of ice on the Moon, NASA's website specifically addresses the issue of ownership, 67 and it affirms the principles of the OST that the Moon is not subject to ownership; although the US may have discovered lunar ice, it cannot claim to own it.

These examples demonstrate that spacefaring states, by and large, intend to adhere to the spirit of space law, specifically the OST, which all spacefaring states ratified. This does not resolve the outstanding legal questions. All states may be willing to adhere to the principle that none of them can appropriate the Moon, yet this merely emphasizes the deficiency in addressing the legal means by which lunar resources can be exploited.

Just as the OST was required to define the status of the Moon before the first lunar landings, a clear legal framework is now desirable to govern the future exploitation of the Moon's resources. Since space activities today are largely conducted in a cooperative manner, far removed from the space race of the Cold War, a clear legal structure is needed to lessen the possibilities of conflict concerning access to non-terrestrial resources. One minimum requirement in such a clarification is a definition of the difference between exploitation and appropriation.

### OST Revisions Key – The CHM commitments of the Moon Agreement are so complex that the OST will most likely become obsolete without political support from the spacefaring powers.

Brearly 6 – Andrew Brearly, Space Analyst; Division Of Politics And International Relations, University of Southampton, 2006, “Mining The Moon: Owning The Night Sky?” ASTROPOLITICS: The International Journal Of Space Politics And Policies, Vol. 4 Issue No. 1, pg. 43-67, Online: <http://tandfprod.literatumonline.com/doi/full/10.1080/14777620600762790>

At present, the legal status of the Moon is open to debate and various interpretations. The principal issue in need of resolution is which treaty defines the legal status of the Moon, Moon Agreement or the OST? The answer to this question resolves the legal status of the Moon, either it is the CHM or a commons. If the Moon Agreement comes to be the accepted international view, then the meaning of the CHM needs to be resolved. However, precisely because of the CHM commitments of the treaty it is very unlikely that it will be able to draw support from the spacefaring powers. It is more probable that the Moon Agreement will become obsolete, yet this does not resolve the Moon's legal status. The OST does not provide sufficient detail, in its own right, to form a regime, and through its ban upon national appropriation it creates a legal problem. The Moon Agreement, through the notion of the CHM, presents a possible means of resolving this difficulty. There is a clear continuity between the two treaties; the OST creates complexity through its ban upon territorial sovereignty, and the Moon Agreement responds by presenting a model of common sovereignty.

The treaties that comprise international space law are simply not designed to answer detailed questions, they only establish principles upon which the human exploration of space occurs. This is highlighted by the differing approaches to the CHM within the Moon Agreement and UNCLOS III; the Moon Agreement simply defines the Moon as the CHM, while UNCLOS III provides all the information necessary for the establishment of the ISA.

## Solvency Mechanisms-Random

### Solvency mechanism

Bilder 09-Richard B. Bilder, Richard B. Foley & Lardner-Bascom Emeritus Professor of Law, University of Wisconsin Law School., 2009, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options.” *Fordham International Law Journal*. Volume 33, Issue 2. Article 1. <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj>

B. What Kind of Lunar Resource Regime Should the United States Try to Obtain?

Consistent with its past positions regarding the mineral resource provisions of both the Moon Agreement n136 and the LOSC, n137 the United States will presumably wish to seek a lunar resource regime having at least the following characteristics:

Provisions permitting and facilitating the exploration and development of lunar resources by the United States or its private companies. To begin, the regime should permit the United States or its private companies to conduct, without burdensome regulation or interference, any and all of the activities reasonably necessary to prospect for, explore, mine, process, and either use or transport to Earth lunar resources, in particular He-3. The regime must clearly provide for acquiring property rights in minerals or other substances removed from the Moon's surface or subsoil, the effective operation of and control over necessary stations or facilities, jurisdiction over necessary personnel, some measure of exclusivity over areas subject to resource activities, and some measure of privacy over proprietary information. The regime should also provide or permit a national or international management structure for He-3 production, marketing, and sales that permits timely decisions, within general guidelines, on all aspects of operational management. In particular, the regime should ensure the retention by the United States or its private companies of reasonable proceeds or profits commensurate with the effort involved and sufficient to encourage and warrant the level of investment involved.

A role for private enterprise. The regime should expressly allow and encourage private enterprise to play a significant role in the [\*281] exploration and use of lunar resources, subject to appropriate and reasonable regulation. This means that private enterprise must have assurance of security of tenure during the life of mining operations and the right to earn and retain reasonable profits. Environmental regulations should be designed and used solely to minimize the impact of mining operations on the environment, to a degree consistent with economic viability of the operations. Any permitting process should be simple, direct, and prompt.

Consistency with international law. The regime should be consistent with existing U.S. obligations under the Outer Space Treaty, U.N. Charter, other international instruments, and customary international law. This recognition would include the obligations not to claim title to territory on the Moon, n138 to respect the right of other states to conduct activities there, n139 and to conduct any activities with due respect for environmental concerns. n140

Recognition of broader international community concerns. The regime should recognize that the international community as a whole has legitimate interests in the exploration and use of the Moon and its resources. All states should have the right to conduct activities on the Moon without discrimination. n141 The regime should recognize that the international community is entitled to share the benefits of lunar exploitation. n142 However, any form of benefit sharing must be consistent with the right of the states and private enterprises primarily involved and in mineral or other resource activities to a principal role in decisions relating to the conduct of such activities and to a fair profit and return for their investment and effort. The regime should also require that all states conducting activities on the Moon must meet their obligations to the broader international community and to future generations by ensuring that their activities do not cause significant environmental or other damage. n143

[\*282] Encouragement of international cooperation. The regime should encourage cooperation rather than competition among states conducting activities on the Moon, such as open access and reasonable exchanges of information, mutual assistance in situations of need, and joint activities where appropriate.

Dispute-avoidance and settlement procedures. The regime should contain provisions for the avoidance and peaceful resolution of disputes, including obligations requiring prior notification of actions likely to affect other states and consultation if problems, difficulties, or controversies arise.

Flexibility. The regime should include provisions permitting and facilitating its prompt revision and development as lunar activities proceed and the need for additional or different regulatory measures or arrangements becomes apparent. Again, the regime should recognize the right of states and enterprises primarily involved, and actually planning or engaged in resource activities to a prominent role in decisions relating to changes in or development of the regime.

### Solvency mechanism-INTELSAT

Bilder 09-Richard B. Bilder, Richard B. Foley & Lardner-Bascom Emeritus Professor of Law, University of Wisconsin Law School., 2009, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options.” *Fordham International Law Journal*. Volume 33, Issue 2. Article 1. <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj>

3. Should the United States Seek to Establish an International Organization or Enterprise for the Cooperative Development of Lunar He-3 Mining and Perhaps, More Broadly, of Terrestrial He-3-Based Fusion Energy?

The United States could take the initiative in seeking to establish a user-based international organization or enterprise designed to cooperatively develop and manage the mining and distribution of lunar He-3 along with other lunar resources and, perhaps more broadly, at least certain aspects of the development, production, and distribution of He-3-based fusion energy on Earth. n165 The organization could be comprised of, first, the principal space powers and other nations willing to actively participate in creating the necessary capabilities; second, other nations and entities who are users or beneficiaries of such capabilities; and, perhaps, third, private companies, consortia, or investors interested and capable of investing and participation in the enterprise as a whole. n166 The organization could be based on a recognition that the Moon and its resources constitute a common heritage of humankind, that the enormous potential of He-3-based fusion energy deserves to be shared by all of the Earth's nations and peoples, and that this promise might best be [\*294] achieved by a cooperative, rather than individualistic or confrontational, approach to the development and management of such a complex, challenging, costly, and potentially history-changing source of energy. The world's leading technologically advanced nations have already taken significant steps in this direction in their cooperative approach to the development and operation of the International Space Station n167 and the formation of ITER. n168 The potential inclusion of private companies and consortia in such an organization would recognize the growing interest and the important and exciting possibilities of participation by private enterprise in the commercial development of spaceflight and space resources. n169

Such a cooperative international organization could take a variety of forms. As several commentators have suggested, n170 it might, for example, be modeled on the International Telecommunications Satellite Organization ("INTELSAT"), the innovative user-based intergovernmental commercial consortium which, pursuant to a U.S. initiative, was established by a number of government and operating entities, initially on an interim basis in 1964 and then by permanent agreement in 1973, to own and manage a constellation of communications satellites providing international broadcast services to all areas of the [\*295] world. n171 Membership in INTELSAT was open to any state that was a member of the International Telecommunications Union ("ITU"), but access to the system was available to every nation. n172 Under the INTELSAT agreement, shares and votes in INTELSAT were reallocated periodically in proportion to each member's contribution to and use of the system. n173 That is, members that contributed more investment through substantial use, such as the United States, had more shares and voting weight in substantive decisions of the organization. The organization's primary source of revenue was from satellite usage fees, which, after deducting operating costs, were redistributed to INTELSAT members in proportion to their shares. n174 As indicated, satellite services were available to any nation, whether or not a member of INTELSAT and all users paid the same rates. n175 This nondiscriminatory pricing structure in effect subsidized lesser use by developing countries with heavier use by more developed nations, thus providing some sharing of the benefits of space communications technology. INTELSAT was tied to the U.N. through its recognition of the regulatory functions of the ITU. n176

In 2001, INTELSAT, which by that time had over one-hundred members, was privatized and renamed Intelsat, Ltd. n177 It is now the world's largest provider of satellite services, operating [\*296] a fleet of over fifty communication satellites and providing service to over 600 Earth stations in more than 149 countries and territories. n178 INTELSAT offers not only a successful example of international cooperation with respect to the profitable commercial development of a common space resource but also suggests the possibility of transitioning an initially intergovernmental commercial consortium to participation or management by private enterprise.

Whatever form such a cooperative international institutional arrangement took, it would be designed and serve to provide access and influence to all nations, participants, investors, and customers in the development and use of He-3-based fusion power, alleviate conflict and discontent over which nation or nations should control lunar resources or resource-related operations on the Moon, and assure that the benefits of He-3-based fusion energy would be widely shared by all nations and peoples. Among the more important objectives of such an organization or enterprise would be: (1) raising the necessary capital to sustain the development of a technologically and economically viable He-3-based fusion energy system; (2) developing the necessary fusion and lunar He-3 recovery technology; (3) assuring effective and environmentally-sound operation of terrestrial and lunar fusion-energy related facilities and services; (4) assuring reliable supplies of He-3 and other resources to terrestrial customers; (5) maintaining reasonable and uniform rate structures to all users; (6) assuring access to proprietary technologies, and resources and profits related to a fair valuation of members' participation and contribution; and (7) resolving disputes among members concerning their participation in such an enterprise.

Such an organization or enterprise might conceivably be established independent of any separate international agreement regarding a lunar mining regime. Presumably, if this organization embraced a sufficiently broad and significant membership, including all of the leading space powers, it could in itself constitute such a regime, although it would, of course, have to conform to the broad principles set forth in the Outer [\*297] Space Treaty and those provisions of the Moon Agreement which can be considered to now reflect customary international law. n179 Alternatively, such an organization or enterprise could be designed to supplement and be compatible with the Moon Agreement or other international agreement which might be negotiated to deal with lunar resources. Indeed, article 16 of the Moon Agreement specifically provides that an international organization whose membership is comprised of a majority of state parties may conduct activities under the agreement if it accepts the agreement's obligations. n180 Finally, such an organization or enterprise could be established under the Moon Agreement by the parties to that agreement as, in itself, a part of the "international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon" that the parties undertake to establish under article 11(5) and 18 of that agreement. n181

### Solvency mechanism-establish new treaty with property rights that all nations can endorse

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Read more: Who Owns the Moon? The Case for Lunar Property Rights - Popular Mechanics

So property rights on the moon are still the subject of international discussion. But would anyone buy lunar land? And what would it take to establish good title?

The answer to the first question is clearly "yes." Lots of people would buy lunar land--and, in fact, lots of people have, sort of. Dennis Hope, owner of Lunar Embassy, says he's sold 500 million acres as "novelties." Each parcel is about the size of a football field and costs $16 to $20. Buyers choose the location--except for the Sea of Tranquility and the Apollo landing sites, which Hope has placed off-limits.

To convey good title, Hope essentially wrote the U.N. to say he was going to begin selling lunar property. When the U.N. didn't respond with an objection, he asserted that this allowed him to proceed. Although I regard his claim to good title as dubious, his customers have created a constituency to recognize his position. If he sells enough lunar property, it may become a self-fulfilling prophecy.

So there's demand, even for iffy titles. But what would it take to establish title, rather than Dennis Hope's approximation? That's not so clear. In maritime salvage law, which also deals with property rights beyond national territory, actually being there is key: Those who reach a wreck first and secure the property are generally entitled to a percentage of what they recover. There's even some case law allowing that presence to be robotic rather than human. Traditionally, claims to unclaimed property require long-term presence, effective control and some degree of improvement. Those aren't bad rules for lunar property, either. But who would recognize such titles?

Individual nations might. In the 1980 Deep Seabed Hard Mineral Resources Act, the United States recognized deep-sea mining rights outside its own territory without claiming sovereignty over the seabed. There's nothing to stop Congress from passing a similar law relating to the moon. For that matter, there's nothing to stop other nations from doing the same.

Ideally, title would be recognized by an international agreement that all nations would endorse. The 1979 Moon Treaty was a flop, but there's no reason the space powers couldn't agree on a new treaty that recognizes property rights and encourages investment. After all, the international climate has warmed to property rights and capitalism over the past 30 years.

I'd like to see something along these lines. Property rights attract private capital and, with government space programs stagnating, a lunar land rush may be just what we need to get things going again. I'll take a nice parcel near one of the lunar poles, please, with a peak high enough to get year-round sunlight and some crater bottoms deep enough to hold ice. Come visit me sometime!

## Solvency Mechanism-ISSIA

### ISSIA Key – Even if an international agreement were created now, the mechanisms for enforcement would not be in place quick enough. Amendments to the ISSIA are preferable.

Shackelford 9 – Scott J. Shackelford, Third Year Law Student Stanford Law School And Ph.D. Candidate IR University of Cambridge, February, 2009, “The Tragedy Of The Common Heritage Of Mankind,” 28 Stanford Environmental Law Journal 109, Lexis

When a space-based economy begins to emerge, it will become necessary to devise a method of utilizing resources in space through the Moon Treaty, or another accord. n230 It remains prudent to consider such options today. n231 As the convoluted history of UNCLOS demonstrates, establishing an effective international regime over the international commons takes years. Even if an international treaty were created to deal with natural resources in space today, it seems unlikely that it would be in place by the time humanity returns to the Moon during the next decade. Short-term stopgap measures should therefore be considered, such as the International Space Station Intergovernmental Agreement that governs the International Space Station. This would include the option of creating EEZs in space reminiscent of UNCLOS III, n232 but would not completely solve contemporary or future abuses of space law. n233 Yet, it is still preferable to the utter abandonment of the CHM principle and free for all that would ensue in the absence of multilateral cooperation. If the CHM is not only to survive, but thrive, it must be modified by marrying it to limited property rights of the kinds described above in Part IV(C). Lessons learned from this case study regarding what property rights can exist in a CHM and how to economically distribute them can support a policy proposal detailing how to govern the international commons. [\*164] V. Proposal: Property Rights and Conserving the International Commons

## Solvency Mechanism-Modified Leashold

### Modified Leasehold Key – Producing exclusive rights for set periods will help prevent the worst outcomes of international conflict, environmental harm, and lack of development.

Shackelford 9 – Scott J. Shackelford, Third Year Law Student Stanford Law School And Ph.D. Candidate IR University of Cambridge, February, 2009, “The Tragedy Of The Common Heritage Of Mankind,” 28 Stanford Environmental Law Journal 109, Lexis

The case study of the Moon Treaty in space law demonstrates that property rights over vehicles, installations, in situ and returned resources, and even zones around habitats and craft may be accorded property rights in the commons. In order to efficiently distribute these property rights, a modified version of the ITU could be established. Property rights could be auctioned off in a free market to the first investor(s) to arrive at a new resource area, occupy the territory, improve it, and equitably share some of the benefits. This arrangement is reminiscent of the Homestead Act. It would award adverse possession in line with the labor theory of value, n234 and would have the effect of not only efficiently allocating property rights to those entities most capable of using them, but also would raise capital that could be used to develop new infrastructure, fund multilateral enforcement efforts, and scientific studies to ensure minimal environmental impact. This would benefit developing nations and developed nations alike. A degree of technology transfer or direct investments like those assented to in the New York Agreement to UNCLOS III could also be instituted to ensure that all nations benefit from commons resources. Instead of ownership, a modified leasehold could also be adopted, giving tradable, exclusive rights for a set period. This would mean that the commons would not actually be privatized, but instead would be developed for the benefit of all mankind which is still ultimately vested with sovereignty. n235 Such a system would not maintain all of the pillars of the classic CHM, but it would help avoid the worst outcomes of international conflict, environmental harm, and a lack of development that could occur if no agreement is reached. Solutions such as the one described above are essential to avoid a tragedy of the commons. Environmental concerns such as pollution and climate change affect the global commons without respect for political borders. Articulating solutions to these global forces is one of the main problems of political philosophy. An economic analysis of property rights in special sovereignty areas [\*165] then is helpful given one of the purposes of property is to solve scarcity.

## Solvency-Reject Moon Treaty

### Rejecting Moon Treaty Key – There are 4 scenarios for lunar exploitation. 3 involves working within the Moon Treaty whereas 1 involves abandoning the Moon Treaty in favor of the OST. This option is the most legally workable and desireable.

Brearly 6 – Andrew Brearly, Space Analyst; Division Of Politics And International Relations, University of Southampton, 2006, “Mining The Moon: Owning The Night Sky?” ASTROPOLITICS: The International Journal Of Space Politics And Policies, Vol. 4 Issue No. 1, pg. 43-67, Online: <http://tandfprod.literatumonline.com/doi/full/10.1080/14777620600762790>

Legal Scenarios for Lunar Exploitation. When Gerard O'Neill presented his vision in The High Frontier, for the exploitation of space resources, he projected a novel legal framework, detached from normal terrestrial economic and legal structures. O'Neill conceived of economic orbital activity under the jurisdiction of the ‘Energy Satellites Corporation (ENSAT)’, a profit-making corporation regulated by UN treaties. 62 Despite the many developments concerning the practical and scientific aspects of space resources, since then, the imperative to establish a legal framework or regime is not yet considered pressing. When considering the utilization and governance of a commons area like space, the need for a clear and explicit regime is vitally important. The provisions of UNCLOS III create stability, and exploitation of the seabed can be conducted with the security that investment made in prospecting a certain location will be not wasted due to others encroaching upon the area. 63 The future utilization of the Moon's resources creates a similar need for stability. The current status of space law presents four possible means by which lunar resources could be exploited. The first two derive from the scenario stated earlier, whereby the Moon Agreement is ratified by space powers and then further codified with regard to the international regime idea. The Moon being considered CHM leads to the establishment of a Lunar Resource Authority (LRA). The Moon remains the property of humanity as a whole, and the LRA governs and undertakes exploitation of resources in accordance with the CHM principle. The utilization of lunar resources is conducted entirely by the LRA, as the ISA conducts all activities on the seabed; therefore, state agencies and private enterprise are excluded from directly using the Moon's resources. The second possibility within this scenario is built upon a different form of LRA with a mandate to govern the resources of the Moon by allowing other agencies to exploit lunar resources under license. This creates pseudo property rights, with the LRA distributing those rights. Although not a government for the Moon, the LRA is regulatory, being empowered to make the final decision concerning the exploitation of lunar resources. The revenues generated through the sale of rights to lunar resources allow the LRA to realize the CHM principle of financial benefits to be distributed among all states, and in terms of UNCLOS III and OST with particular consideration towards developing states. A third possibility within which the resources of the Moon may be exploited, is also within the provisions of the Moon Agreement; however, the resources utilized would be for scientific purposes and no further revisions or codifications to the Moon Agreement takes place. Article 6 of the treaty permits such activity, stating that there ‘shall be freedom of scientific investigation,’ and further, ‘States Parties shall have the right to collect on and remove from the moon samples of its minerals and other substances.’ The Moon Agreement, in Article 9, also permits states to construct bases on the Moon, the only limitations applied being that the Secretary General of the UN should be informed of the location and purposes of the station, that only the area required shall be used, and that in constructing bases states should not interfere with the actions of others. Legally, the CHM applies to the area upon which the base is constructed, as ‘the placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the moon …shall not create a right of ownership’ (Article 11). Freedom of scientific investigation and construction of lunar bases suggest that states have the right to use lunar resources. As discussed above, the cost of transporting materials from the Earth to the Moon is such that utilizing lunar resources is of paramount economic importance for a long-term human presence on the Moon. The provisions of the CHM, within the Moon Agreement, discuss ‘natural resources’ which may be found on the Moon. The reference to an ‘equitable sharing by all State Parties in the benefits derived from those resources’ conceptualizes them in similar economic terms to the mineral deposits on the deep seabed that the CHM provisions in UNCLOS III seek to regulate, that is, resources that could be returned to the Earth and sold. Such an interpretation of this treaty's provisions does not have direct applicability to the resources of the Moon being used in situ as the construction materials for a lunar base, or the means of supporting a permanent human presence. Paragraph 4 of Article 11 reads, ‘State Parties have the right to exploration and use of the Moon without discrimination of any kind.’ This provides weight to the perspective that a state retains the right to use lunar resources to construct a base, and to use polar ice to support human life, on the grounds that the base is a means of conducting further scientific exploration of the Moon. The prohibition upon appropriation within the Moon Agreement is qualified by a certain vagueness concerning some lunar resources. Article 11, paragraph 3 prevents resources from becoming the ‘property of any State’, but it limits this protection to ‘natural resources in place.’ This is not complemented by an explanation of what the term ‘in place’ is actually intended to mean. Further, resources ‘out-of-place’, those that are removed from the lunar surface, have, in effect, been appropriated by both the US and Russia in relation to the lunar samples that each state brought back to Earth. Appropriation of lunar resources is reinforced by the fact that the permission to collect lunar samples for scientific purposes effectively makes these samples the property of states. 64 A further difficulty in the scientific approach is the lack of a clear distinction between what is exclusively scientific and what is commercial. Existing space technologies are dual-use with terrestrial commercial ‘spinoffs’, it is thus reasonable to expect that processes developed on the Moon, and using lunar resources, will have industrial applications on the Earth. In the near-term, following humanity's return to the Moon, it is probable that it will be in this form that economic rewards are to be found. Because there is no clear linkage between scientific use of lunar resources and terrestrial economic benefits, it is probable that such activity will not be considered sufficient to initiate the creation of a legal regime, and even if an attempt were made to organize such a regime it would probably prove to be impossible, due to the lack of technological and legal clarity. As it is currently constituted, space law, including the Moon Agreement, permits states to exploit the Moon for scientific purposes; as such this activity does not require any further agreement. One problem with this is that the notion of scientific usage is not defined. It remains unclear who is responsible for the classification of scientific research, and ensuring that it is for this reason alone that the Moon is being exploited. Additionally, there is no limitation as to use of lunar resources for scientific purposes, other than such use by one state should not interfere with the activities of other states. Therefore, should one state be the first with the technical ability to exploit the Moon, does it, by default, have the right to use vast amounts of lunar resources in the present, at the expense of leaving a sufficient quantity for other states to conduct future investigations? This issue of scarcity is improbable in the foreseeable future, given the size of the Moon; however, it is a serious issue if one state were to effectively monopolize and use the suspected limited ice deposits located at the lunar poles. The option of research for scientific reasons does resolve the immediate question of regulation of lunar activities, but without providing legal clarity. For although scientific research is permitted, it is not defined, nor is there a legal instrument or regime to provide such definition. The fourth and final possibility identified herein involves the utilization of lunar resources based on the OST with the negation of the Moon Agreement. This, in essence, conceptualizes the Moon as res communis. Since spacefaring states have not ratified the Moon Agreement, this approach is the most legally valid under the current conditions. Disregarding one of the treaties, which comprise international space law, does not make the Moon a lawless place, as the spacefaring powers ratified all the other treaties of international space law. Further, travelling into space does not remove a state from ‘terrestrial’ treaties, as states move into space so they take international law with them. 65

## Solvency-Legal Issues

### Legal Uncertainty Now – Legal issues which have prevented commercial development must be solved before humans set foot on the moon once more. Friendly relations will improve the chances of successful management of moon conflicts.

Moltz 9 – James Clay Moltz, Associate Professor; Department of National Security Studies at the Naval Postgraduate School, Monterey, California, 2009, “Toward Cooperation Or Conflict On The Moon: Considering Lunar Governance In Historical Perspective,” Online: http://www.au.af.mil/au/ssq/2009/Fall/moltz.pdf

Overall, Sattler outlines a system based on “combining and reining elements” of existing international law while emphasizing the importance of gaining “support from the industrialized nations.” 43 The debate on the issue of commercial development of the moon’s resources is an important and still unresolved one. As Brearley notes, it would be highly desirable for states to settle these issues before the next humans set foot on the moon. Once humans begin landing and stay­ ing on the moon, complex issues will quickly arise. Key variables in the process of international discussion and possible negotiation include (1) the nature of the leading space actors and their interrelations at the time of the moon’s settlement, ( 2) the status of existing space-related treaties and restraint-based norms, (3) the prospects for lucrative contracts (which could promote either competition or cooperation), (4) the extent of the resources and locations available (more likely to promote competition), and (5) the availability of cost-efective technology for their exploitation. Of all these factors, the irst two—the status of international relations among participants and their willingness to comply with existing space treaties and norms—may be the most important, even above resource scar­ city or the availability of technology. It almost goes without saying that friendly relations and cooperative exploratory projects on the moon and in the solar system will greatly increase the chances of successful management of moon conflicts. This suggests that realist factors alone are not likely to dictate a break-up of the OST or the existing consensus on cooperative restraint on the exercise of military power. Of course, hostile relations (such as between the United States and China) cannot be ruled out and could lead to unilateral eforts to seize locations and establish nationally oriented keep-out and governance regimes, whether or not resources are scarce. However, violation of the OST in this manner could have other repercussions on space security and would have to be considered carefully by any state undertaking such policies. Hostile or self-serving actions on the moon could harm a country’s interests in other areas of space or on Earth, leading to rival coalitions against it and efforts to undercut its attempted unilateral gains—possibly through military means.

## Solvency-Discussions

### Discussions Now Key – If conflict is to be avoided, nations with the capabilities to go to the moon should begin discussions well in advance of actual missions and clarify existing ambiguities in the OST regime.

Moltz 9 – James Clay Moltz, Associate Professor; Department of National Security Studies at the Naval Postgraduate School, Monterey, California, 2009, “Toward Cooperation Or Conflict On The Moon: Considering Lunar Governance In Historical Perspective,” Online: http://www.au.af.mil/au/ssq/2009/Fall/moltz.pdf

In reviewing the indings of this study, we can observe that there is no predetermined outcome in regard to the moon. At the same time, there are certain tendencies that will afect lunar governance and shape the factors likely to play an important role in determining the speciic regime formed. In terms of policy recommendations for avoiding hostile outcomes on the moon, several specific measures should be considered by states—and, preferably, soon. First, if conflict is to be avoided, countries planning to go to the moon would be well advised to begin discussions in advance of the actual mis­ sions to develop protocols for peaceful interaction. Fortunately, some of these measures are tentatively being developed in the context of the Inter­ national Lunar Network, a collective efort by national space agencies and universities to develop a common set of scientiic standards and communi­ cative mechanisms to ensure international ability to cooperate and beneit from one another’s data in upcoming lunar missions. Second, national governments would be wise to clarify existing am­ biguities in the OST regime. This might require a formal review of the treaty to discuss definitions and develop an implementing agreement for multilateral understandings on how to interpret the OST in regard to specific lunar activities (particularly, regarding permitted and prohibited settlement practices).

### Discussions Now – Privatization pressures will increase in the future. Broader international adoption of rule-based behavior can only be forged with willingness on the part of current leaders.

Moltz 9 – James Clay Moltz, Associate Professor; Department of National Security Studies at the Naval Postgraduate School, Monterey, California, 2009, “Toward Cooperation Or Conflict On The Moon: Considering Lunar Governance In Historical Perspective,” Online: http://www.au.af.mil/au/ssq/2009/Fall/moltz.pdf

While pressures for “enclosure” of the moon and the privatization of its resources are likely to increase in the coming decades—at least until more speciic management structures are developed and implemented—there are reasonable grounds for believing that cooperative efforts may eventually succeed. The combined effects of economic globalization, modern communications, increasing lunar mission transparency, and the recent internationalization of large space activities (such as the International Space Station), should help facilitate these trends. Broader international trends toward the adoption of rule-based behavior (such as in the World Trade Organization) and negotiated approaches to conflict resolution sup­ port institutionally based outcomes on the moon. hus, while history’s “lessons” in regard to international cooperation on the moon may be pes­ simistic, speciic diferences in the factors surrounding lunar settlement ofer reasons to believe that the negative experience on certain past fron­ tiers may be avoided. The remaining question seems to be the willingness of current and future leaders to recognize the remaining risks and chal­ lenges that exist regarding successful lunar governance and to begin talks to address possible disputes through preventive diplomacy and existing international agreements and organizational structures. These develop­ ments are far from inevitable, but such possibilities—in the context of the relevant history of similar environments and the implications of direct military conlict today—seem to have the force of mutual self-interest behind them.

### Discussions Now Key – The US has such vast space capacity and could simply ignore legal questions concerning lunar resources. Were China to do the same, conflicts for international war would be foreseeable. Resolving legal uncertainties is an important policy objective.

Brearly 6 – Andrew Brearly, Space Analyst; Division Of Politics And International Relations, University of Southampton, 2006, “Mining The Moon: Owning The Night Sky?” ASTROPOLITICS: The International Journal Of Space Politics And Policies, Vol. 4 Issue No. 1, pg. 43-67, Online: <http://tandfprod.literatumonline.com/doi/full/10.1080/14777620600762790>

Given the relative power that the US can exercise in space in comparison to other states, it is conceivable that it could make the decision to simply ignore legal questions concerning the rights to use lunar resources. As the US has not signed nor ratified the Moon Agreement, there is no legal restraint preventing it from ignoring that particular treaty. Given the preponderance of power that the US possesses, it could choose as well not to be bound by the provisions of the OST. Alternatively, if the Chinese program proceeds rapidly, China could attempt to utilize the Moon without reference to other states. Clearly, these scenarios lead to a conflict in space, which the space treaties intended to avoid. If it is assumed that the space powers continue in their wish to avoid the potential of such conflict, then resolving the legal uncertainties becomes an important policy objective.

Ultimately, the principal restriction upon any state, with a large technical and military capacity, acting as it wishes in space, or elsewhere, is the reaction of other states. In order to preserve the principles upon which the space treaties are founded, there is a requirement from all spacefaring states to act in a manner compliant with those principles. An additional difficulty with the Moon Agreement, and any other attempt at resolving questions concerning ownership of non-terrestrial resources, is the response of those states that are not spacefaring. It is possible to conceptualize a situation wherein those states that have access to space divide the resources available between themselves, in a similar fashion to the colonial Europeans forming empires. Contrary to such a notion, the precedent of UNCLOS III suggests that in the pursuit of a common international agreement, powerful states are willing to make concessions to the developing world.

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Ultimately, the principal restriction upon any state, with a large technical and military capacity, acting as it wishes in space, or elsewhere, is the reaction of other states. In order to preserve the principles upon which the space treaties are founded, there is a requirement from all spacefaring states to act in a manner compliant with those principles. An additional difficulty with the Moon Agreement, and any other attempt at resolving questions concerning ownership of non-terrestrial resources, is the response of those states that are not spacefaring. It is possible to conceptualize a situation wherein those states that have access to space divide the resources available between themselves, in a similar fashion to the colonial Europeans forming empires. Contrary to such a notion, the precedent of UNCLOS III suggests that in the pursuit of a common international agreement, powerful states are willing to make concessions to the developing world.

### Discussions Now Key – As activities in the Moon will increasingly have commercial components, we should preferably address the legal questions surrounding space resource exploitation before humanity returns to the Moon.

Brearly 6 – Andrew Brearly, Space Analyst; Division Of Politics And International Relations, University of Southampton, 2006, “Mining The Moon: Owning The Night Sky?” ASTROPOLITICS: The International Journal Of Space Politics And Policies, Vol. 4 Issue No. 1, pg. 43-67, Online: <http://tandfprod.literatumonline.com/doi/full/10.1080/14777620600762790>

In the near-term, most activity on the Moon will probably be conducted for scientific purposes as is permitted by current international space law, both the OST and the Moon Agreement. In the long-term, activities on the Moon will have commercial aspects, or one state will be using a sufficiently large amount of lunar resources that others will question whether this will diminish their rights of access. It is of mutual benefit for the legal status of lunar resources to be resolved proactively, before vested interests in lunar activities become more developed. The preferential time period to address the legal questions is before humanity returns to the Moon, just as it was deemed necessary for the OST to be completed before the first crewed lunar landing.

## CHM Bad

### CHM Bad – The CHM doctrine incentivizes the overuse of resources, profit hoarding, and lack of economic growth which results in the failure of the commons.

Fountain 3 – Lynn M. Fountain, B.A., University of Rochester, 1987; M.L.S., San Jose State University, 1992; J.D. Candidate, University of Connecticut School of Law, 2004, Summer, 2003, “Creating Momentum In Space: Ending The Paralysis Produced By The "Common Heritage Of Mankind" Doctrine, 35 Connecticut Law Review 1753, Lexis

Under the Common Heritage doctrine, property "belongs to all people or peoples of all states." n41 There are five elements generally considered central to the modern Common Heritage doctrine: 1) the area is not subject to national appropriation; 2) all states share in the management of the area; 3) the benefits derived from exploitation of resources in the area must be shared with all regardless of the level of participation; 4) the area must be dedicated to peaceful purposes; and 5) the area must be preserved for future generations. n42

A problem inherent within this doctrine is the notion of the "tragedy of the commons." n43 In a communal property system, each individual enjoys the benefit of exploiting the resources to their maximum, while the cost of this increased use is spread out over all users. n44 The result is over-exploitation of resources. n45 According to Garrett Hardin, "each man is locked into a system that compels him to increase his herd without limit--in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons." n46

Although the doctrine purports to encourage preservation of the commons for future generations, Erin Clancy argues that the Common Heritage doctrine actually encourages overuse, profit hoarding, effectively stunts the economic growth of developing states, and fails to protect the commons as promised. n47 Indeed, the intention of the commons is not to protect the area for the common good, but rather to extract the greatest profit over the longest [\*1760] period of time. n48

While this is currently a non-issue in regard to outer space, since the problem we face is one of under-use, the argument still deserves attention. Eventually humanity will expand beyond Earth's orbit, either under the current legal rubric, a free-market system, or some combination of both. We do not want to create a system of property rights in outer space that will, ultimately, mirror the over-exploitation of resources and environmental havoc we have wreaked on Earth. We have the opportunity to avoid repeating past mistakes.

If the Common Heritage doctrine does not effectively prevent over-exploitation of resources, then it seems its only "benefit" is to create a socialistic means for redistributing wealth. Although this doctrine may have been in favor in the political climate of the late 1950s and early 60s, it is clearly at odds with the free-market mentality that now pervades the global economy. The Common Heritage doctrine, as originally conceived, fails to provide economic return on one's investment. n49 Specifically, mandatory benefit sharing functions as a tax on the successful exploitation of resources, diminishes profits, and discourages development in the "commons" area. n50 The adoption of this doctrine in the primary space treaties and the resulting vagueness in property rights has slowed the exploration and development of outer space. n51

# \*\*\*DA Links\*\*\*

## NASA Tradeoff DA Link

### Neg-no funding-must shift from isolation

Cremins and Spudis 07-**Thomas Cremins and paul D. Spudis, National Aeronautics and Space Administration/John Hopkins University Applied Physics Laboratory, Aug. 6, 2007, “Viewpoint: The strategic context of the moon echoes of the past, symphony of the future,”http://www.spudislunarresources.com/Papers/Cremins%20and%20Spudis%202007%20Astropolitics.pdf**

**One constraining feature of the current U.S. framework for space exploration is that NASA is expected to lead this new approach without a commensurate increase in annual funding.7 In effect, the Agency is being tasked with revolutionizing the spaceflight paradigm within the boundaries of its current levels of funding. Such a task would be a challenging goal even in an Apollo-like era of copious funding. The agency will have to transform its capabilities, become more innovative and reinvigorated by the vast array of current and potential private sector and global investment in space. Furthermore, existing elements of the U.S. space program, and our national space strategy must shift from relative isolation to being connected, coordinated, and built around a shared and expanding framework.**

### Spending link-helium 3 would cost 15 billion dollars

Schmitt 04-Harrison H Schmitt.; Former NASA Astronaut, “Mining the Moon,” Popular Mechanics, Oct. 2004, http://www.popularmechanics.com/science/space/moon-mars/1283056

Lunar Mining

Samples collected in 1969 by Neil Armstrong during the first lunar landing showed that helium-3 concentrations in lunar soil are at least 13 parts per billion (ppb) by weight. Levels may range from 20 to 30 ppb in undisturbed soils. Quantities as small as 20 ppb may seem too trivial to consider. But at a projected value of $40,000 per ounce, 220 pounds of helium-3 would be worth about $141 million.

Because the concentration of helium-3 is extremely low, it would be necessary to process large amounts of rock and soil to isolate the material. Digging a patch of lunar surface roughly three-quarters of a square mile to a depth of about 9 ft. should yield about 220 pounds of helium-3--enough to power a city the size of Dallas or Detroit for a year.

Although considerable lunar soil would have to be processed, the mining costs would not be high by terrestrial standards. Automated machines might perform the work. Extracting the isotope would not be particularly difficult. Heating and agitation release gases trapped in the soil. As the vapors are cooled to absolute zero, the various gases present sequentially separate out of the mix. In the final step, special membranes would separate helium-3 from ordinary helium.

The total estimated cost for fusion development, rocket development and starting lunar operations would be about $15 billion. The International Thermonuclear Reactor Project, with a current estimated cost of $10 billion for a proof-of-concept reactor, is just a small part of the necessary development of tritium-based fusion and does not include the problems of commercialization and waste disposal.

### Mining helium 3 requires infrastructure and a lot of capital

Gerlach 05-Charles L. Gerlach is founder and CEO of Gerlach Space Systems LLC, a privatelyfunded, early-stage start-up focused on designing, building, and operating highly automated systems to cost-effectively locate, extract, process, refine, and deliver near- Earth object resources to Earth/Earth orbit for commercial use. He is a graduate of Harvard College and Harvard Law School., Profitably Exploiting Near-Earth Object Resources,” May 19-22, 2005, http://abundantplanet.org/files/Space-Ast-Profitably-Exploiting-NEO-Gerlach-2005.pdf

When exploring the potential commercial viability of various space resources opportunities, the ideal candidates are those where an actual market exists today for the product. Obviously, to make money a product and a market are required. Markets are based on need. There is no market if no one wants to buy the product. Would-be space entrepreneurs have identified many products over the years, but most of the markets are non-existent, hypothetical or government dependent. No independent commercial demand exists today for space habitats and astrocrete or orbital water, oxygen, and metals or helium-3 on Earth except to supply government-sponsored activities. This requirement for existing markets is the reason space tourism is attracting so much attention in general discussions of commercial space development. Several market studies32 suggest that there is a readily identifiable group of customers who are willing to spend a specific amount of money today for the opportunity to travel into space. Most space resources development schemes, such as proposals to mine lunar helium-3 and return it to Earth for use in fusion power plants,33 are dependent not only on investment in the infrastructure to mine and return lunar helium-3 but also on the massive investment in time and capital required to actually build a working helium-3 fusion reactor (if that is possible at all in the foreseeable future).

## Unilateral Action Bad

### Unilateral action with He-3 based fusion will result in political instability and controversies between countries

Bilder 09-Richard B. Bilder, Richard B. Foley & Lardner-Bascom Emeritus Professor of Law, University of Wisconsin Law School., 2009, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options.” *Fordham International Law Journal*. Volume 33, Issue 2. Article 1. <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2180&context=ilj>

**However, even if the United States could "go it alone" in this way, there are reasons why it may not wish to do so. First, neither the U.S. government nor U.S. private enterprise is likely to be willing to risk the very substantial investment and long-term effort necessarily involved in seeking to develop He-3-based fusion energy without some assurance that-assuming the very difficult technical and engineering obstacles to developing efficient fusion reactors and establishing permanent moon bases can be overcome-the requisite supply of lunar He-3 can continue to be obtained without encountering significant legal or political difficulties. Whatever may be the most legally persuasive interpretation of existing international law, other nations or people on Earth may challenge the unilateral appropriation of lunar resources by the United States, especially of a potentially uniquely valuable resource such as He-3. This, certainly, was the international experience in the 1960's when developing nations vigorously protested the prospect that a few technologicallyadvanced countries and their private enterprises might alone appropriate what was at the time assumed to be the mineral riches of the deep seabed. That perception ultimately led to the enunciation of the "common heritage" doctrine, the convening of UNCLOS-3, and the adoption of part XI of the 1982 LOSC."18 Only a broadly accepted international agreement is likely to offer the continued legal and political predictability that is essential if a long-term He-3-based fusion energy program is to be undertaken and sustained.11 9 Second, current commitments already obligate the United States to a certain level of international cooperation in space activities. While the Outer Space Treaty and present international law do not expressly bar the unilateral appropriation of lunar resources, they nevertheless impose an obligation on nations to cooperate in outer space activities and to avoid conduct that might give rise to disputes. 120 The United States is also committed to international cooperation in outer space activities under the Outer Space Treaty, the multinational framework for coordination in space exploration entitled "The Global Exploration Strategy,"' 21 and other agreements, such as the International Space Station Agreement,122 and has similarly committed itself to international cooperation in developing fusion energy through its participation in the recently concluded ITER agreement. 123 U.S. insistence on a right to unilaterally appropriate lunar He-3, without further international agreement, could be controversial and regarded as inconsistent with these precedents. Finally, if countries other than the United States also engage in activities on the Moon, as now appears highly likely, it will be in the interest of each of them to have at least some understandings to provide for cooperation on common problems and keep them from interfering with each other's activities. As the Moon Agreement anticipates,12 4 if some kind of lunar agreement is in their common interests, it will be difficult for such an agreement to not address the salient and thus far unresolved issue of lunar resources exploitation. Consequently, if the United States determines that it is serious about seeking to develop an He-3-based fusion energy program, it would seem sensible for it to also seek international agreement on a lunar resource regime designed to provide the long-term legal and political stability that such a program will most likely require.**

## Spending Links

### Spending link- Helium-3 mining will cost $15 billion, after the fusion reactors are invented

Dillow 11- Clay Dillow, contributor and researcher at Popular Science Magazine, 05-05-11, “Former Apollo Astronaut and Senator Says Mining Helium on the Moon Could Solve The Global Energy Crisis,” http://www.popsci.com/science/article/2011-05/former-apollo-astronaut-says-moon-mining-could-solve-global-energy-crisis

Former astronaut, Apollo moonwalker, geologist and former Senator Harrison Schmitt has a modest plan to solve the world’s energy problems. All we need is $15 billion over 15 years and some fusion reactors that have yet to be invented. And we’ll need a moon base. Schmitt’s idea isn’t novel--he thinks the U.S. should go back to the moon, this time to mine the surface for helium-3, an isotope of helium that is rare on earth but relatively bountiful on the moon. The Russians have been talking about mining helium-3 from the moon for years, but they’ve never put forth a viable plan. Schmitt thinks his, all things considered, is pretty realistic. So how does Schmitt’s plan break down? We’ll need $5 billion for a helium-3 fusion demonstration plant, because as of right now no such thing exists. We’ll also need to invest $5 billion more in a heavy-lift rocket capable of launching regular moon missions, something akin to the Apollo-era Saturn V. A moon base for mining the stuff would cost another $2.5 billion, and though Schmitt didn’t really specify in his recent presentation to a petroleum conference, the other $2.5 billion could easily be chalked up to operating costs in an endeavor of this magnitude.

### Spending link- building a the lunar base for mining will cost $230 billion by 2025

CNN 06- Dean Irvine, a contributor for CNN, December 18, 2006, “Mining the moon for a nuclear future,” http://edition.cnn.com/2006/TECH/space/12/18/fs.moonmining/

It is the high costs involved that will be the main reason for cooperation rather than competition. Building and running a permanently manned lunar base alone will be incredibly expensive.The Government Accountability Office, the independent auditing arm of U.S. Congress, puts the price of NASA's lunar program to 2025 at $230 billion. "Typically a habitat is less than the cost of large rocketry," Michael Griffin of NASA told AP, and successfully utilizing the native materials on the moon will be a crucial to creating a viable base there. Research at the Fusion Technology Institute at the University of Wisconsin has also suggested that the process of mining helium-3 would produce other minerals to support space settlements. Nitrogen, methane, helium, water, carbon-oxygen compounds and hydrogen produced from mining, could permit food growth and development of a water supply for lunar inhabitants. Professor Manuel Grande of University of Aberystwyth led the British involvement of the European Space Agency's Smart-1 mission to observe the moon. He believes that focusing on mining self-sustaining minerals would be more beneficial than trying to harvest and then transport helium-3. "It is dubious whether it will ever be economically viable even if nuclear fusion works commercially or if helium-3 is a better option than other elements available on earth," he told CNN. "There are plenty of other minerals on the moon that would be easier to get at and help provide resources for a self-sustaining base. Oxygen could be derived from ilmanite reserves there and water could be extracted to make rocket fuel or sustain life on a base. "Put it this way, I wouldn't buy shares in the moon for the economic return. Lunar tourism will be the first money maker there," Manuel Grande told CNN.

## Politics Links

### Politics link- lunar mining is unpopular and entails high political risk

Gass 11- Henry Gass, contributor for The Ecologist, July 7, 2011, “Plans to Strip Mine the Moon May Soon be More Than Just Science-Fiction,” http://globalresearch.ca/index.php?context=va&aid=25542

‘This will not be funded by any government or any federal agency like NASA. This is all going to be – if it ever happens – it will all be private investment,’ continues Tietz. In a June 2009 article in the Institute of Electrical and Electronics Engineers magazine Spectrum, Shackleton founder Bill Stone wrote that lunar prospecting could cost as much as $20 billion over a decade. ‘At the moment, no country seems eager to foot the bill,’ writes Stone. ‘Where governments fail to act on a vitally important opportunity, the private sector can and should step in.’ Stone outlined that, to save $1 billion during the initial staging of the lunar mining base, the first human team would only take enough fuel to land and establish the base—not enough for a return trip to Earth. ‘This may sound radical, but the human crew who will undertake this mission will do so knowing that their success and survival depend on in situ fuel generation for the return. Should they fail, theirs will be a one-way trip; the risk is theirs to take,’ writes Stone. ‘For government-sponsored space agencies, such a concept is unthinkable; they cannot tolerate the political risk of failure. Yet it is the only viable business choice. Centuries of explorers made the same hard choice in pushing the limits on land, sea, and air. It’s time to carry it forward into space.’ According to Tietz, governments are at present neither politically inclined nor financially able to carry out prospecting missions in space. Tietz says governments have different priorities – most research-oriented – they have to fund with limited budgets.

### Politics link- Green tech widely unpopular with American consumers and businesses

The Paris Post Intelligencer – 7/18/11, “Market, not politics, must establish rules” http://www.parispi.net/articles/2011/07/18/opinion/editorials/doc4e2456e394cc7146727590.txt

The adage that you can lead a horse to water, but you can’t make it drink, applies to the government’s push for green technology.Electric cars and fluorescent light bulbs, for example, would make for a better tomorrow. We know that. But we don’t like to be pushed into buying them. Americans are less than enthusiastic, for now, about making the switch.There’s a huge buildup of curiosity about electric cars, but most potential buyers are waiting for someone else to go first. The difficulty, for now, centers around battery technology.Most consumers seem to feel that autos initially coming into the market take too long to recharge and don’t travel enough miles on a single charge. Obviously, an engineering breakthrough on that front would make interest skyrocket.In the meantime, federal and state tax rebates sweeten the pot, but don’t tip the balance. Governments have a lot invested in promoting vehicles that don’t pollute (unless you consider the coal-burning byproducts of generating the electricity these vehicles need). The nation remains in a wait-and-see mode.The case for green light bulbs is clearer. Fluorescents last much longer and cost less in the long run. Incandescents turn more energy into heat than light.Still, a lot of people shy at spending more than six bucks on a light bulb, never mind how green it is. Some object to the mercury content and made-in-China label. The good old 100-watt bulb is to many as American as apple pie.Now the U.S. House of Representatives has passed a measure to block enforcement of new Energy Department standards for light bulbs. The Senate is likely to differ, and the issue has become a political football. For both autos and light bulbs, the simplest solution is to let the market rule. The people will vote with their pocketbooks.

### Green Tech won’t pass unless it gains universal support from businesses and consumers

Daily Star – 11, 2/08/11, “National Agenda Needed to Advance Green Technology” http://thedailystar.com/columns/x984921219/National-agenda-needed-to-advance-green-technology

In his State of the Union address, President Obama issued a call to action for Americans to "out-innovate" the rest of the world and build on our history of doing "big things." Green technology is the next big thing, and it's our best hope to reinvent ourselves as competitors in the global economy. But we won't get there without a comprehensive national agenda supported by all parties -- political, yes, but also businesses, consumers, educators and students.

### Voter opinions shape congressional votes- Cap and trade proves

Salam – 11, Reihan Salam, Research Associate at the Council on Foregin relations, and writer for The New York Times, Forbes, and Stale, 4/26/11, “Political Parties Choose Policies That Are Popular” http://www.nationalreview.com/agenda/265673/political-parties-choose-policies-are-popular-reihan-salam

And politicians tend to polarize around issues that are highly salient to voters. Otherwise, “expertise” tends to reign. The problem is that the consensus among experts isn’t always sound, as suggested by the economic policy debates of the stagflation era. And so political entrepreneurs will on occasion draw upon “fringe” ideas to politicize the terrain of expertise, to demonstrate that there are credible (and sometimes not-so-credible) alternative points of view.[…] If we post that the normal reason a party abandons its policy ideas is that those ideas become unpopular, it becomes easy to see why conservative politicians abandoned cap-and-trade and the individual mandate. These ideas, devised by right-of-center policy thinkers who weren’t thinking very deeply about the political implications of their proposals, didn’t gain much traction with the public. Cap-and-trade in particular was always going to be a tough sell in a country with a carbon-intensive economy, where marginal states and [congressional](http://www.nationalreview.com/agenda/265673/political-parties-choose-policies-are-popular-reihan-salam) districts are particularly carbon-intensive. […] One could say that Republicans move “to the right” to oppose Democratic proposals. But one could just as easily said that “Republicans moved to a more popular position to oppose Democratic proposals.” During the [health](http://www.nationalreview.com/agenda/265673/political-parties-choose-policies-are-popular-reihan-salam) reform debate, for example, many congressional Republicans condemned efforts to constrain the growth of Medicare expenditures, a position that had traditionally been associated with the left. Was this a move to the right or to the left? Many conservatives, like Keith Hennessey, argued that it was important to oppose Medicare cuts designed to finance a new health entitlement, but not Medicare cuts per se. That subtlety was lost.

### No political support for lunar mining and REE-do not perceive any benefits

Thompson 11-Loren Thompson, Chief Financial Officer – Lexington Institute, “Human Spaceflight”, April 2011, http://www.lexingtoninstitute.org/library/resources/documents/Defense/HumanSpaceflight-Mars.pdf

This all makes sense from a budgetary and scientific perspective. What’s missing is a grasp of the

rationale required to sustain political support across multiple administrations. While exploration of the

Moon’s far side or nearby asteroids may have major scientific benefits, those benefits are unlikely to be

appreciated by politicians struggling to reconcile record deficits. NASA’s current research plans do not

connect well with the policy agendas of either major political party, and the flexible path will not change

that. To justify investments of hundreds of billions of dollars in human spaceflight over the next 20

years while entitlements are being pared and taxes are increasing, NASA must offer a justification for its

efforts commensurate with the sacrifices required. Mars is the only objective of sufficient interest or importance

that can fill that role. Thus, the framework of missions undertaken pursuant to the flexible-path

approach must always be linked to the ultimate goal of putting human beings on the Martian surface,

and the investments made must be justified mainly on that basis. The American public can be convinced

to support a costly series of steps leading to a worthwhile objective, but trips to the Moon and near-Earth

objects aren’t likely to generate sustained political support during a period of severe fiscal stress.

### Moon funding unpopular with politicians

Timmer 4/20-John Timmer, John got a Bachelor of Arts in Biochemistry (yes, that's possible) from Columbia University, and a Ph.D. in Molecular and Cell Biology from the University of California, Berkeley. He's done over a decade's worth of research in genetics and developmental biology at places like Cornell Medical College and the Memorial Sloan-Kettering Cancer Center, “Bill introduced directing NASA to establish a moon base,” 4/20/2011, http://arstechnica.com/science/news/2011/04/bill-introduced-directing-nasa-to-establish-a-moon-base.ars

Throughout the Bush administration, NASA had been given the goal of preparing for long-duration missions in space, first to the Moon and then eventually Mars. Upon reaching office, the Obama administration performed a detailed analysis of NASA's priorities and budget, which revealed some ugly truths: NASA didn't have the money to build the systems needed to accomplish any of this, and even if it were to get a budget infusion, the schedule was unworkable. The report recommended we give up on Mars, skip the Moon, and focus on developing the technology to enable long-duration space travel.

The cancellations that accompanied this change of direction have not gone over well with either space enthusiasts or those who represent the districts in which some of the hardware would be built. But the plan does have a significant risk, in that NASA would be ordered to do technology development without having a clear goal that it would use that technology to reach. A group of US House members now aims to rectify that by, in part, reversing a portion of Obama's directive: they want NASA to build a permanent Moon base.

Even assuming that the bill could clear the full House and Senate (and survive an Obama veto), the impact may be much less than its supporters hope. As its text notes, a return to the Moon has been a Congressional priority several times before; that didn't stop Obama from dismissing it with "We've been there." And, more significantly, it clearly didn't ensure that the NASA budget was sufficient to actually accomplish that goal. Simply stating that NASA's budget will be "consistent" with achieving it by 2020 leaves open a lot of room for different definitions of consistent, and allows the current Congress to shift the burden of finding money onto future ones, which may not be inclined to do so.

Thus, on its own, the bill would accomplish nearly nothing and is sufficiently vague that it probably won't even be viewed as providing direction to NASA, at least within NASA. And, given how contentious budget issues have been in the current Congress, any attempt to turn it into something concrete would probably make it a non-starter.

# \*\*\*Asteroid Mining\*\*\*

## No Solvency

### Neg card- Scientific Consensus that Moon and Mars both preferable to Asteroids- physically impossible to bring mining equipment to and from the asteroid

Space institute studies – 11, 3/21/11, “Space Studies Institute Update Winter 2011” http://ssi.org/2011/03/ssi-update-winter-2011/#more-768

The panel discussion “Moon, Mars or Asteroids: Where Do We Go First For Resources?” was enlightening. The consensus was that the Moon would be the first body to be used for non-terrestrial resources. The advantage the Moon has over asteroids is logistical. **Travel times to asteroids are long and mission opportunities are few**, **and the longer physical distance makes teleoperation of mining equipment impossible.A successful asteroid mining expedition would involve a human crew** with a mission duration of years. **Resupply would be difficult with current technology.** The Moon, on the other hand, is only three days away and has multiple flight windows per month. Teleoperation with a lunar time delay is known to be possible, and spare parts or a human repair crew could be sent with comparative ease.

# \*\*\*Lunar Mining\*\*\*

## No Solvency

### No solvency for lunar mining- transportation laws, no human settlement, and no property rights

**Whittington 11**– Mark R. Whittington, writer for the Washington Post, USA Today, the LA Times, and the Houston Chronicle, 4/11/2011, “Moon Express Proposes Lunar Mining Operations,”http://news.yahoo.com/s/ac/20110411/sc\_ac/8271305\_moon\_express\_proposes\_lunar\_mining\_operations, bs

One of the impediments to large scale mining of the moon's resources is the high cost of returning them to Earth. If practical fusion energy were to become a reality, helium 3, a substance that does not occur naturally on Earth, might be worth it at current transportation costs. But even rare earths may not achieve a cost/benefit ratio that would make mining it on the Moon profitable. Another impediment is the lack of law governing property rights on other celestial bodies such as the moon. There is nothing in international law that forbids a private company from extracting resources from the moon. But the law is silent, so far, on rights to hold property, including land and mineral rights, on the moon. There is no mechanism to resolve disputes between private companies, such as overmining claims. For large-scale lunar mining to take place, these questions need to be resolved by international agreement. It would also be useful to have a human presence on the moon, in the form of a lunar settlement, to be a core market for lunar mining entrepreneurs. If that settlement is to be American, a change of policy and likely a change of administration would be required.

### Lunar mining- no solvency- extreme conditions are barriers to mining

Beauford 11 – Robert Beauford, background in archaeology, geology, and business, 2/13/11, “Mining the Moon for Rare Earth Elements - Is It Really Possible?” http://rareearthelements.us/lunar\_kreep

For some, all of this attention on the rare earths has brought to mind the moon and its famous rare earth rich KREEP basalts. Recent articles exploring the possibility of mining the moon have been abundant both in print and on the web, but few, if any have looked at any real numbers. So what are the facts? The moon is a very different place form the earth in a lot of ways. The moons gravity is about 1/6th of earth, the temperature can reach below negative 200° Celsius during the two week lunar night, there is no significant available water, the surface atmospheric pressure approaches that of the near absolute vacuum of space, the radiation environment is extreme due to the suns direct intense rays, and could be lethal in a solar storm, and micrometeorites bombard the surface at 15 kilometers per second or more at unpredictable intervals. The moon is not a hospitable place.

### If they haven’t successfully mined the moon by late 2011, their impacts will have happened already

Lieberman and Collins – 10, Joe Lieberman and Susan Collins, United States Senators, 10/30/10 “Nuclear Terrorism: Strengthening Our Domestic Defenses, Part 1”

Similarly, in our view, had a strategic plan to complete the global nuclear detection architecture been in place, DHS may have been less likely to expend time and resources on ASPs when a radiation detection system was already in place at ports of entry but not at other potential pathways into the United States. A recent development that complicates the future deployments of radiation detection equipment isthat both PVTs and ASPs require helium-3, which was recently found to be in short supply.According to DHS officials, if an alternative to helium-3 is not found by late 2011, further deployments of PVTs planned for the southern land border and at seaports may be delayed.We are currently conducting work on the helium-3 shortage—describing the federal government’s current priority for how the limited supply of helium-3 will be allocated and assessing, among other things, what alternative

# \*\*\*REE\*\*\*

## Nuclear Primacy

### Nuclear Primacy is a fallacy- Liber and Press’ study is flawed, and our author indicts every possible defense of the idea of nuclear primacy, which doesn’t exist now, and won’t in the future- flow the warrants carefully, cause this card is BOSS

Yarynich and Starr – 7, Valery Yarynich and Steven Starr, Former Soviet Colonel and [Associate member of the Nuclear Age Peace Foundation](http://www.wagingpeace.org/menu/about/people/index.php)[Senior Scientist for PSR](http://www.psr.org/about/experts-speakers/steven-starr.html), ““Nuclear Primacy” is a Fallacy” <http://www.globalresearch.ca/index.php>?context=va&aid=4991

The conclusions reached by Lieber and Press about a U.S. “Nuclear Primacy” over Russia and the corresponding results of their calculations in tables are erroneous. Although their set of initial data is sufficiently full and correct (Russian nuclear forces and American offensive means), both their model and method of assessing final results are incorrect. We share their concern about the (potential) danger of such a phenomenon as U.S.   “Nuclear Primacy” over Russia , but nevertheless we believe that it is absent today and cannot exist in the future.Our arguments are as follows.One should not estimate the strategic military results of a massive nuclear strike without first conducting a preliminary assessment of the ecological consequences of such an attack, because these consequences can be clearly unacceptable for both an attacker and the world as a whole. Lieber and Press ignored this consideration.An ecological examination must include an assessment of all possible aspects of this attack, including the consequences of: hundreds of American nuclear warheads detonating on Russian soil; the destruction of thousands of Russian nuclear warheads and the corresponding secondary effects; the interception of Russian retaliation warheads by U.S. Ballistic Missile Defenses (BMD); and the explosions of Russian warheads on American territory, if U.S. BMD failed. In any case, the results of this examination must be made public, because the final decision about their admissibility must belong to the people rather than to a handful of politicians and high-ranking military officers.Lieber and Press examine only one scenario: a Surprise Attack at Peacetime Alert levels (SAPTA). Although they concede that this event is not “likely”, they use this variant as the basis for all their serious conclusions. We will not talk about the moral and ethical reasons, but rather focus upon the political and military-technical issues which render this approach unworkable.First, to implement SAPTA the National Command Authority (NCA) must have in place a set of legislatively approved special conditions authorizing this action. No such set now exists.Secondly, the NCA is obliged to inform the nation about this critical decision before a first strike is launched. This must be done if only to provide a time-buffer in which its citizens could implement some measures of protection against the possible negative consequences of the attack.Third, in order to conduct a first strike it is necessary to implement a number of organizational and technical procedures within the strategic nuclear forces. This is because in peacetime there are numerous procedural and technological blocks in place which are designed to protect nuclear weapons against human error, accidents and sabotage. In order to remove such barriers as a preliminary step towards launching a nuclear first strike, it would require the participation of a significant number of crews on duty working at different operational levels.The implementation of all the above mentioned circumstances as preparations for a “surprise” first strike would be technically impossible to hide.Therefore, the opposite side would have a certain amount of time to raise the combat readiness of its strategic nuclear forces.If Russia did that, then, as Lieber and Press recognize themselves, nuclear retaliation is inevitable. Lieber and Press also assume that the Russian Early Warning System will be completely unable to reveal a massed American attack capable of destroying all Russian nuclear forces. “A critical issue for the outcome of a U.S. attack [they say] is the ability of Russia to launch on warning (i.e., quickly launch a retaliatory strike before its forces are destroyed). It is unlikely that Russia could do this.” We believe this important conclusion demands more serious calculations than the mere statement that “it is unlikely”.  It's necessary to prove that the Russian EWS will be completely incapable of revealing such massed American attack which is capable of destroying all Russian nuclear forces.Admittedly, the Russian EWS is now weakened. However, if it is able to detect even a small part of the American attack, then it is impossible to rule out the possibility that Russia will react by utilizing the policy of Launch on Warning (LoW), i.e., launching its missiles before the attack is confirmed by nuclear detonations. The number of nuclear warheads in a Russian LoW strike will be far more than in case of a pure LuA (Launch under Attack) variant.Thus, the implied ecological admissibility of a nuclear strike, the procedural and technical complexities of ordering and executing a surprise attack, and the assumed full inability of Russian EWS together constitute too many assumptions to be built into such a definitive definition of “Nuclear Primacy”.A more detailed and technical version of the Foreign Affairs article can be found in the spring 2006 edition of International Security (see  “The End of MAD? The Nuclear Dimension of U.S. Nuclear Primacy”). Yet even in this longer version of their article, a language of assumptions remains the characteristic feature of the methodology of Lieber and Press.For example, they write, “The Russian early warning system would PROBABLY not give Russia 's leaders the time they need to retaliate; in fact it is questionable WHETHER it would give them any warning at all. Stealthy B-2 bombers COULD LIKELY penetrate Russian air defenses without detection. Furthermore, low-flying B-52 bombers COULD fire stealthy nuclear-armed cruise missiles from outside Russian airspace; these missiles — small, radar-absorbing, and flying at very low altitude — would LIKELY provide no warning before detonation.” We think this isn't the language of serious proofs, especially on such an important theme.Lieber and Press state that, “Our model does not prove that a U.S. disarming attack against Russia would necessarily succeed. Nor does the model assume that the United States is likely to launch a nuclear first strike. Even if U.S. leaders were highly confident of success, a counterforce strike would entail enormous risks and costs.” We must ask: if this is so, then how can they predict that “a surprise attack at peacetime alert levels would have a reasonable chance of success”?As for our own assessment of the model, which is described in detail in International Security, it is as follows:The authors have used an analytical type of model, in which a studied process is imitated with the help of formulas. However, it is well known among experts that creating a more or less correct description of a nuclear war through an analytical model is a hopeless task.It is necessary to take into account an enormous number of different factors. Even if someone is able to offer a formula (or set of formulas) for each of these factors, it will be impossible to combine them as a whole within the framework of such a complex process.In any case, such an “analytical conglomeration” will be incredibly difficult to accurately evaluate. We believe a statistical imitation model (SIM) is the preferable medium for such studies. Apparently, Lieber and Press understood this difficulty very well, for there are only two simple formulas in their calculations: one formula to determine a “lethal range” against a given Russian target, and a second formula to calculate a  “single-shot probability of kill” for the selected American warhead. They model only an immediate process of destroying Russian targets, and only for concrete types of  “warhead-target” pairs. The authors offer an artificial picture such as the following: American warheads “lie” near Russian targets, and at “X” moment all of them are detonated simultaneously. It isn't clear from their explanations how individual assessments are combined to tables of results for all Russian nuclear forces. Therefore, one can say that the authors tried to imitate only the small, final part of the huge process of a nuclear war. Many other serious elements also remained beyond the scope of their research. One should not assume that there will be a 100% probability of such events as:

## Green Tech

### The overarching truth claims of global warming are premised on entirely flawed and dishonestly conducted scientific studies- variables omitted, large historical periods ignored, and more

Haapala – 7/17, Ken Haapala, Executive Vice President of the [Science and Environmental Policy Project](http://www.sepp.org/), 7/17/11 “Why Global Warming Alarmism isn’t Science” http://www.powerlineblog.com/archives/2011/07/why-global-warming-alarmism-isnt-science.php

In an interesting opinion piece in The New York Times entitled “On Experts and Global Warming,” Gary Gutting, Professor of Philosophy at the University of Notre Dame, argues that the non-experts must accept the findings of the expert authorities in climate science. Though not named, no doubt the expert climate authorities are the members of the UN Intergovernmental Panel on Climate Change (IPCC), particularly as expressed in the Summary for Policymakers (SPM) of the Fourth Assessment Report (AR4).Unfortunately, the good professor fails to recognize the tremendous change in thinking that came about through the development of natural philosophy – scientific philosophy. Under scientific philosophy, the pronouncements of climate authorities are not as important as how and why they acquired their claimed knowledge. Did they adhere to the principles of acquiring scientific knowledge? If the climate authorities did not, then anyone familiar with scientific principles is perfectly capable of challenging these experts, even though the challenger is not, necessarily, an expert in climate science.There are many glaring scientific defects in AR4, particularly in the SPM. Among these defects are the following:\* Ignoring scientific data that is contrary to the central conclusions.\* Failure to rigorously test hypotheses using physical observations.\* Assuming results are evidence of cause.\* Assuming a poor correlation is evidence of cause.\* Assuming a thorough knowledge of the climate system.\* Assuming that calculations involving variables with a low level of understanding can produce results embodying a high level of understanding.\* Assuming projections from unverified models are scientific knowledge.The SPM focuses only on the past fifty years – not carefully defined. Thus, it ignores a vast body of scientific evidence that prior warm periods equal to or greater than the current period existed and that the historical warm periods are unrelated to atmospheric carbon dioxide (CO2). The main body of the AR4 explains these omissions by claiming the past warm periods were not global.Yet, according to the most comprehensive, reliable data available, satellite data, the current warm period is not global. It is concentrated in the northern part of the Northern Hemisphere, above 35 deg N.CO2 is a greenhouse gas, and laboratory experiments show that a doubling of CO2, absent of feedbacks, will increase temperatures by about 1.2 deg C. The SPM assumes positive feedbacks amplify this small warming. Yet, nowhere in AR4 are these positive feedbacks tested against physical observations as required by the critical step of hypothesis testing. Tests by others demonstrate that the assumptions fail when tested against the proper alternative hypothesis – the null hypothesis. Such testing is the foundation of scientific knowledge.There is little question warming occurred in the 20th century and the results of warming can be observed. However, these results do not establish cause.During the 20th century, both CO2 and temperatures increased, but not necessarily together.The correlation is poor. For several multi-decadal periods during the 20th century temperatures fell while CO2 increased.In the SPM, only one natural variation is considered – solar irradiation. Other influences of the sun and the influence of ocean oscillations are ignored.An appendix to the main body of the AR4 gives the levels of understanding for sixteen variables considered to influence temperatures (many important variables are not considered). The levels of understanding for five of these influences are rated as very low. The levels of understanding for ten for the remaining eleven are rated as low to medium. Yet the SPM states a high level of confidence in results of its work. One cannot have high confidence in the results, when starting with a poor understanding of critical variables. The models have never been verified, thus are interesting artifacts, not knowledge.Contrary to the statements of Professor Gutting, anyone understanding the principles establishing physical sciences has a solid philosophical basis for challenging the work of the experts of the IPCC.

### No warming- stopped in 1998

Delingpole – 7/11, James Delingpole, Charles Douglas-Home Memorial Trust Award winning journalist and author, 7/11/11,“So, Climatologists—Whatever Happened To Global Warming?” <http://www.businessinsider.com/what-ever-happened-to-global-warming-2011-7>

One of the many great pleasures for those of us on the "Realist"side of the debate over man-made global warming has been watching the contortions of the "Warmists" as they try to explain away a very inconvenient truth: There has been no statistically significant global warming in more than a decade.Yes, you read that right: "global warming" stopped in around 1998.This, as you can imagine, has proved somewhat of an embarrassment for all those various interest groups—grant-hungry scientists, rent-seeking businesses, publicity-grabbing environmental NGOs—whose livelihood depends on the public's continued belief that a) the world is getting hotter and b) it's all our fault.Among the first to notice the problem was the climatologist and IPCC lead author Kevin Trenberth,who notoriously expressed his concerns in a 2009 "Climategate" email to fellow Warmist Michael Mann: "The fact is that we can’t account for the lack of warming at the moment and it is a travesty that we can’t."

### Green technology isn’t green, does nothing for the environment, and will never become popular enough to solve the aff’s impacts

Roger – 10, Chuck Roger, degree in Physics and solid state physics, LSU, and former INTEL executive, 10/29/10, “The Green Technology Fallacy” <http://www.chuckroger.com/2010/10/29/the-green-technology-fallacy/>

Green zealots, backed by government force, destroy consumer choice and warp the concept of entrepreneurship. The simple reality is that green technology cannot compete head-to-head in the marketplace.If not for basic physics and economics, greenies might have a chance. But any technology that claims to extract gold from lead and turn economic devastation into utopian elixir is destined to do the big face-plant, take the eternal dirt-nap, sleep with the fishes, whatever we choose to call fail–and fail big.Eliminate subsidies. Rescind punitive overregulation on non-green competitors. Let “green” producers try to compete in the free market using flat-out, bloodthirsty, entrepreneurial innovation. Then we might see viable “green” technology. Meaning that we might actually get “cleaner” technology that consumers can afford, not faux-clean technology that consumers are forced to buy at the point of a gun. And if green technology cannot compete and really isn’t any “cleaner” than conventional technology, then the green entrepreneurs should fail just as most entrepreneurs with flawed plans and shaky products fail.There is absolutely no proof that the save-the-planet mission behind most green technology has any rational basis whatsoever. Let them get real, and let them compete. Then we’ll see.

### New Tech solves REE shortages- future of green tech is based on Ferrite Iron, not REEs

Burns – 11, Stuart Burns, Science degree from Kingston University, and metal distributor, 1/20/11, “We May Not Need Rare Earth Metals After All, Japanese Research Suggests” http://agmetalminer.com/2011/01/20/we-may-not-need-rare-earth-metals-after-all-japanese-research-suggests/

You may have seen some recent press regarding reports that a Toyota supplier is developing an electric motor for use in the Prius and similar hybrids that does not need Rare Earth Elements (REE) in the magnets. A Toyota Prius electric motor currently uses 1 kg (2.2 lb) of neodymium plus dysporium, and yet supplies are increasing in price and decreasing in availability after China (the source of 95 percent of the world’s REE according to an [autoevolution](http://www.autoevolution.com/news/toyota-to-bypass-china-s-rare-earths-29764.html) blog) capped supplies this year to 4,500 tons. A[Bloomberg](http://www.bloomberg.com/news/2011-01-19/toyota-affiliate-aisin-seiki-developing-rare-earth-less-motor.html) article adds further detail: “China’s government cut export quotas for the first half of 2011 by 35 percent last month which in turn followed a 72% reduction in the second half of 2010,” the paper said.The Toyota supplier, Aisen Seiko Co., is Japan’s biggest manufacturer of transmissions, with 65 percent of their output going to Toyota or their subsidiaries, and so understands the demands of the automotive industry intimately. The firm is apparently drawing on research done by New Energy and Industrial Technology Development Organization (NEDO), which, jointly with Hokkaido University, is reported to have developed a ferrite iron-based motor that by careful positioning of the magnets avoids the performance-enhancing rare earth elements in the alloy. However, no comparable performance figures are quoted in the reports and it seems doubtful from the previous work if a ferrite motor is going to be pound-for-pound as effective or efficient as a rare earth-enhanced motor.[…] If electric motors can be made without REE, what about other applications?For some there may really be no alternative to REE, but this research suggests that wemay not be as totally reliant on REE as we thought and good old R&D may yet reduce our dependence on China’s dwindling rare earth supply

## Status Quo Solves

### No more China monopoly- Japan literally just found a billion tons of rare earth minerals in the Pacific

Meryn – 11, Richard Meryn, Associate Editor Industry Leaders Magazine, 6/6/11, “Rare Earth Minerals Discovered By Japan Threat to China?” http://www.industryleadersmagazine.com/will-japan%E2%80%99s-find-of-rare-earth-minerals-threaten-china%E2%80%99s-monopoly/

According to the US Geological Survey, **global reserves of rare earth minerals**, **found primarily in the U**nited **S**tates, **China, Russia and some other parts of the former Soviet Bloc, amount to only around 110 million tonnes**. **A clear monopoly**, even within these countries, where the mining and supply of these extremely valuable commodities is concerned, **belongs to China**, **which is responsible for producing 97% of the world’s supply of rare earth metals.** However, **this could be set to change, with Japan’s recent discovery of vast deposits, likely to amount to around 100 billion tonnes, of rare earth minerals in the Pacific seabed**. The viability of mining these recently found mineral deposits, however, still needs to be examined, but if logistics do work out, **it** would basically **mean an end to China’s monopoly** within this particular industry sector.

Global demand for rare earth minerals, especially the metal yttrium, has been growing quite rapidly, given the crucial role played by these in applications related to green-energy technologies and manufacturing hi-tech electronics such as TV sets, air conditioners, digital cameras, etc, which all use a lot of rare earths.

While rare earths are actually not that rare, their extraction and processing methods are quite elaborate and messy and most countries seem to have left this up to China. As a result, China has, over time, established a near monopoly on the global supply of rare earths.

It was on the basis of this apparent monopoly that China was able to restrain the supply of rare earths last year during a territorial dispute with Japan. With Japan’s economic growth being closely associated with the manufacturing and supply of high-tech products, following the supply shortage created by China’s reported embargo, Japan sought new sources of rare earth minerals.

The recent find, declared by a team of scientists led by Yasuhiro Kato, an associate professor of earth science at the University of Tokyo, which estimates that the Pacific seabed, in international waters east and west of Hawaii, and east of Tahiti in French Polynesia, contains around 100 billion tonnes of rare earths, could prove to be of extreme value to Japan, if mining these minerals proves viable.

And though Japan isn’t being specific about which materials they’ve found there, reports say that the find is likely to contain gold and copper.

Found at depths of 3,500 to 6,000 metres (11,500-20,000 ft) below the ocean surface, the deposits, according to associate professor Yasuhiro Kato, “have a heavy concentration of rare earths. Just one square kilometre (0.4 square mile) of deposits will be able to provide one-fifth of the current global annual consumption.”

The minerals have been found in sea mud at 78 locations within the specified stretch of the Pacific seabed.

Environmental Concerns

Given the rapid growth in green technology and hi-tech electronics sectors, the need and use of rare earth metals in only increasing.

On the other hand, processes related to deep sea mining for precious metals, and the damage these could cause to marine ecosystems are becoming an increasing concern for environmentalists. Radioactive waste that could be produced as a result of some of these mining processes is also a strong concern.

### China’s monopoly was already shattered last year- Mojave desert reserves made the US a significant player in rare earths

Guardian – 10, 12/26/10 “Rare earth metals mine is key to US control over hi-tech future” http://www.guardian.co.uk/environment/2010/dec/26/rare-earth-metals-us

It's **adeep pit in the Mojave desert**. But **it could hold the key to America challenging China's technological domination of the 21st century**. **At the bottom of the vast site**, beneath 6 metres (20ft) of bright emerald-green water, **runs a rich seam of ores that** are hardly household names but **are rapidly emerging as the building blocks of the hi-tech future.The mine is the largest known deposit of rare earth elements outside China**. Eight years ago, it was shut down in a tacit admission that the US was ceding the market to China. Now, **the owners have secured final approval to restart operations, and hope to begin production soon**. "**We will probably never be the largest [mine] in the world again. It will be hard to overcome China's status in that regard, but we do think we will be a very significant supplier**," Mark Smith, chief executive of Molycorp Minerals which owns the mine, told reporters during a tour of the site.

### Neg- Inherency- US is starting new mining operations now

The Guardian 10- Suzanne Goldenberg, the US environment correspondent of the Guardian, 26 December 2010, “Rare earth metals mine is key to US control over hi-tech future,” http://www.guardian.co.uk/environment/2010/dec/26/rare-earth-metals-us

**It's a deep pit in the Mojave desert. But it could hold the key to America challenging China's technological domination of the 21st century. At the bottom of the vast site**, beneath 6 metres (20ft) of bright emerald-green water, **runs a rich seam of ores that** are hardly household names but **are rapidly emerging as the building blocks of the hi-tech future**. **The mine is the largest known deposit of rare earth elements outside China. Eight years ago, it was shut down in a tacit admission that the US was ceding the market to China. Now, the owners have secured final approval to restart operations, and hope to begin production soon.** "We will probably never be the largest [mine] in the world again. It will be hard to overcome China's status in that regard, but we do think we will be a very significant supplier," Mark Smith, chief executive of Molycorp Minerals which owns the mine, told reporters during a tour of the site.

### We don’t need to go to space to procure REEs- recycling them solves the aff

UPI - 6/29/11, “Study: Rare earth elements can be recycled” http://www.spacemart.com/reports/Study\_Rare\_earth\_elements\_can\_be\_recycled\_999.html

Recycling of so-called rare earth elements could ease global concerns about a reliable supply of the substances now mined mostly in China, researchers say.Writing in the journal Environment [Science](http://www.spacemart.com/reports/Study_Rare_earth_elements_can_be_recycled_999.html) & Technology, scientists say the dozen or so rare earth elements, or REEs, have unique physical and chemical properties making them essential for defense applications, computers, cellphones, electric vehicles, batteries, appliances, fertilizers, liquid crystal displays and other products.But having only one major source supply, China, is a worry, they say."Since 1990, China has played a dominant role in REE [mining](http://www.spacemart.com/reports/Study_Rare_earth_elements_can_be_recycled_999.html)production; other countries are almost completely dependent on imports from China with respect to rare earth resources," the researchers wrote.Researchers say a "recycle and reuse" strategy could lessen that dependence.They say they've done the first-ever analysis of the amount of REEs available in in-use products in the United States, Japan and China, the major users of the materials.They found nearly 99,000 tons REEs were included in products manufactured in 2007.This "invisible" stock, equivalent to more than 10 years of mining production, "suggests that REE recycling may have the potential to offset a significant part of REE virgin extraction in the future ... and minimize the[environmental](http://www.spacemart.com/reports/Study_Rare_earth_elements_can_be_recycled_999.html) challenges present in REE mining and processing," the researchers said.

### The necessity of REEs is overblown at best- alternatives such as Induction motors, which are rapidly rising in prevalence and will only continue to grow

Plugin Cars – 11, 5/17/11, “Rare Earth Elements Aren't as Vital to Hybrids and EVs as You Might Think” http://www.plugincars.com/rare-earth-elements-arent-actually-necessary-evs-or-hybrids-107194.html

But lost in the hype surrounding REEs tends to be a simple fact that should bring some peace of mind to electric-drive fans: though most hybrids and EVs use [rather large quantities](http://www.nytimes.com/2011/05/03/business/03rare.html) of the rare earths in their motors or batteries, they don't necessarily have to.Rethinking Electric MotorsRare earths are most vital to two alternative fuel components: the electric motors used to drive a hybrid or EV's wheels, and the nickel-metal hydride batteries found in most mainstream gas-electrics.The rare element neodymium is the most oft-mentioned threat to the electric-drive vehicle market. It's the magnet in so-called fixed-magnet motors, which make up the majority of motors used in modern battery-powered applications, including hybrids and EVs.But a [competing technology](http://www.economist.com/blogs/babbage/2011/04/induction_motors?page=1) that was originally developed by Nicola Tesla (among others) has existed since the late 19th century, and has since been used in a number of electric vehicles including the EV1, [Tesla Roadster](http://www.plugincars.com/tesla-roadster), MINI E, Ford Ranger EV, and [Think City](http://www.plugincars.com/think-city).Induction motors are distinct from fixed magnet motors in that they use aluminum or copper conductors to create electromagnetic fields—without magnets. This in turn allows them to be manufactured sans rare earths.The drawback to induction motors used to be that they were difficult to control, but thanks to modern semiconductors, that's no longer the case. Variable frequency drives can now smoothly regulate the electromagnetic fields necessary to convert stored electrical energy into mechanical energy and power a car forward.Developing such a system for a hybrid or electric vehicle can be a complex and expensive process, but that hasn't kept Tesla and Toyota from employing one in their forthcoming [RAV4 EV](http://www.plugincars.com/toyota-rav4-ev-new) collaboration. Tesla has [always](http://www.teslamotors.com/blog/induction-versus-dc-brushless-motors) favored rare-earth-free induction motors because of their ability to provide big boosts of power when called upon, and because they work more efficiently with other components in the carmaker's powertrain design. Toyota, fearing rising Chinese neodymium costs that threaten to impede several of Japan's biggest industries, has [also been experimenting with induction motors](http://www.plugincars.com/http%3A//www.lacarguy.com/green/article/toyota-is-developing-electric-motors-that-don%E2%80%99t-need-rare-earth-metals)—potentially for use in some of its more mainstream future hybrid and electric vehicles.The Toyota Prius and [Prius Plug-in](http://www.plugincars.com/toyota-prius-plugin-hybrid) currently employ a combination of both induction and fixed magnet technology. But thanks to rising rare earth prices, the neodymium that once cost the carmaker less than $50 per vehicle to use, now tops out at more than five times that amount—giving Toyota engineers ample reason to at least reconsider the design. (It should be noted Toyota and most other major vehicle battery manufacturers currently have fixed-price agreements in place with REE suppliers that should, for the time being, mediate the effect of rising prices on the sticker price of hybrids.)

## No Solvency

### Neg- no solvency, CP- the US needs processing/alloying capabilities to be dependent from China

Humphries 10- Marc Humphries, Analyst in Energy Policy for the Congressional Research Service, September 30, 2010, “Rare Earth Elements: The Global Supply Chain,” http://www.fas.org/sgp/crs/natsec/R41347.pdf

A Government Accountability Office (GAO) report illustrates the lack of U.S. presence in the REE global supply chain at each of the five stages of mining, separation, refining oxides into metal, fabrication of alloys and the manufacturing of magnets and other components.26 China produces 97% of the REE raw materials, about 97% of rare earth oxides, and is the only exporter of commercial quantities of rare earth metals (Japan produces some metal for its own use for alloys and magnet production). About 90% of the metal alloys are produced in China (small production in the United States) and China manufactures 75% of the neodymium magnets and 60% of the samarium magnets. A small amount of samarium magnets are produced in the United States. Thus, even if rare earth production ramps up, much of the processing/alloying and metal fabrication would occur in China. According to investor analyst Jack Lifton, the rare earth metals are imported from China, then manufactured into military components in the United States or by an allied country. Lifton states that many investors believe that for financing purposes, it is not enough to develop REE mining operations alone without building the value-added refining, metal production, and alloying capacity that would be needed to manufacture component parts for end-use products. According to Lifton, vertically integrated companies may be more desirable.It may be the only way to secure investor financing for REE production projects.27 Joint ventures and consortiums could be formed to support production at various stages of the supply chain at optimal locations around the world. Each investor or producer could have equity and offtake commitments. Where U.S. firms and its allies invest is important in meeting the goal of providing a secure and stable supply of REEs, intermediate products, and component parts needed for the assembly of end-use products.

### Neg- no solvency- even if we mine REEs, production will be outsourced to China

Kennedy 10- James Kennedy, president of Wings Enterprises, Inc and mining engineer, 2010, “Critical and Strategic Failure of Rare Earth Resources,” http://www.phenix.bnl.gov/WWW/publish/ondrejch/misc/JimKennedyRE/NMAB-paperTMS.pdf

The greatest gain of any achievement in materials science or technology is in its production . Commercial production generates jobs, tax revenues and profits. That commercial activity generates supporting jobs, more tax revenues and builds communities. After the U.S. pays for all of the basic science, research & development and the cost of converting that knowledge into a commercial product, a very expensive process, the production is done elsewhere. Without a change in the macro-economic direction of the U.S. manufacturing base in leading technologies the future prospects for U.S. living standards will continue to fall, possibly for decades.

### Neg- the US needs processing capabilities to solve- even then, development will take to long to solve

Johnson 10– R. Colin Johnson, Technology Editor at EE Times (Electronic Engineering Times), October 24, 2010, “Rare earth supply chain: Industry’s common cause,” online: http://www.eetimes.com/General/DisplayPrintViewContent?contentItemId=4210064

Mines outside China will start mining ore in earnest in 2011. But **since the 1990s, when the only U.S. mine closed, China has also had to do the processing of rare earth ore into the metals, oxides and alloys used by industry**. **As a consequence, it has almost exclusive patent ownership of those processes, which have been much improved in the intervening 20 years**. In fact, Molycorp is currently shipping its ore to China for processing. **Until mines in other countries develop their own processes, they will either have to ship their ore to China for processing or pay license fees for using the Chinese techniques in their own processing plants. It thus may take up to a decade to develop a supply chain that is independent of China.**

## No Lunar Mining

### Lunar mining- no solvency- extreme conditions are barriers to mining

Beauford 11 – Robert Beauford, background in archaeology, geology, and business, 2/13/11, “Mining the Moon for Rare Earth Elements - Is It Really Possible?” http://rareearthelements.us/lunar\_kreep

For some, all of this attention on the rare earths has brought to mind the moon and its famous rare earth rich KREEP basalts. Recent articles exploring the possibility of mining the moon have been abundant both in print and on the web, but few, if any have looked at any real numbers. So what are the facts? The moon is a very different place form the earth in a lot of ways. The moons gravity is about 1/6th of earth, the temperature can reach below negative 200° Celsius during the two week lunar night, there is no significant available water, the surface atmospheric pressure approaches that of the near absolute vacuum of space, the radiation environment is extreme due to the suns direct intense rays, and could be lethal in a solar storm, and micrometeorites bombard the surface at 15 kilometers per second or more at unpredictable intervals. The moon is not a hospitable place.

### Lunar REE mining- no solvency- the concentrations of REEs present are not enough to mine

Beauford 11 – Robert Beauford, background in archaeology, geology, and business, 2/13/11, “Mining the Moon for Rare Earth Elements - Is It Really Possible?” http://rareearthelements.us/lunar\_kreep

In addition to the extreme physical differences in potential mining environments on the moon’s surface compared to the surface of earth, there are also important geological differences to consider. Ores are concentrations of minerals that contain profitably mineable quantities of desirable elements. Whether on Earth or on the Moon, ores form by the sorting of elements through geological processes. These typically include surface weathering, the action of hot (hydrothermal) subsurface water, or sorting by igneous processes called partial melting and fractional crystallization. ‘Igneous processes’ means any natural process that results from the melting and cooling of rocks. On the moon, the first two of these mechanisms can be eliminated. There is no water and no atmosphere, so there is no weathering. The only significant ongoing processes that are currently affecting the Moon’s surface are irradiation by the sun and bombardment by meteorites. And though there may have been small scale changes in the Moon’s rocks due to the action of subsurface water in the Moon’s early history, such action was never appreciable, due to the lack of surface water and of any continents or continental motion. Without going into too much detail, this means that any ores found on the moon must be formed by only one of the three primary mechanisms: igneous sorting processes. The moon is about 4.5 billion years old, and for much of that time, it has been a relatively static and unchanging environment. Its igneous history is brief and limited. We thought, until very recently, that the moon’s outer layers had been frozen in a solid state for almost 4 billion years. We now suspect that limited volcanism continued on the moon until about two billion years ago. This is a brief time when compared against the geological environment of the earth, which still has pervasive volcanism and constant ongoing motion within the crust, mantle and core of the planet.

### Alt sources for REEs- there are higher concentrations on earth than on the moon/ No solvency- not economically viable

Beauford 11 – Robert Beauford, background in archaeology, geology, and business, 2/13/11, “Mining the Moon for Rare Earth Elements - Is It Really Possible?” http://rareearthelements.us/lunar\_kreep

Lunar KREEP Rare Earth ElementsSo, in answer to the question: Can we profitably mine the moon for REEs and ship them back to the earth to sell? No. Rare earth oxide concentrations in known lunar ores do not support it, even at the level of conjecture, and our current understanding of lunar geology does not predict the existence of substantially more enriched ore deposits. Lack of sufficiently enriched ore, however, is not the only challenge to lunar mining for export to earth. (This is an understatement of epic proportions.) Keeping the analysis, for the moment, focused on basic mining issues rather than on the challenges facing planetary colonization, it must also be observed that competitively economical transport of marketable quantities of either ore or refined metals across planetary distances is neither available with current technology, nor on the mid-term technological horizon. Imagine transporting thousands of tons of ore output from a remote mine in Canada to a processing facility in Brazil in the small passenger seat of a fighter jet, one of the least fuel efficient aircraft ever invented, while trying to maintain profitability in the mine. Now multiply that by a factor of 100,000. Lunar KREEP vs Terrestrial Rare Earth Element Concentrations Figure 3: Lunar KREEP basalts are enriched by the standards of moon rocks, but the geological processes are very different. Compared to terrestrial concentrations of rare earths sorted and emplaced by multiple phases of geological sorting and weathering in earth’s continental crust, there is just no comparison. The above graph compares the presence of rare earth elements in typical Lunar KREEP basalts and Lunar ultra-KREEP basalts with the average presence of these elements, expressed in parts per million, in two rare earth element mines located on Earth. The first mine is Mountain Pass, owned by Molycorp, in California. The second is Mount Weld, which is being developed by Lynas Corporation, in Australia. These are, admittedly, two of the best rare earth mines on the planet, but they represent only two of many very good mines with which a hypothetical Lunar export process would have to compete. The Mount Weld Mine, in particular, stands beside the South African Steenkampskraal Mine, which is owned by the Canadian company Great Western Minerals Group, as one of the highest quality ore bodies ever discovered on earth. But, that’s not the end of the story. In space science, the first answer is almost never the only answer.

# \*\*\*He-3\*\*\*

## Fusion Bad/Fails

### Helium-3 Bad – Nuclear fusion is not as convenient as expected with the use of uneconomical He-3-T and He-3-He-3 reactions which are slower and require unusually high reaction temperatures making them unworkable.

Close 7 – Frank Close, Particle Physicist and Chair of a Working Group of British National Space Center, August 2007, “Fears Over Factoids,” Physics World, Online: <http://cdsweb.cern.ch/record/1055767/files/CM-PRS00002036.pdf>, pg. 2

<Helium errors

Let me now turn to the helium-3 factoid. **At** most **fusion experiments**, such as the Joint European Torus (JET) in the UK, **a fuel of deuterium and tritium nuclei is converted in a tokomak into helium-4 and a neutron**, thereby **releasing energy in the process. No helium-3 is involved**, so where does the myth come from? **Enter "helium-3 fusion" into Google and you will find numerous websites pointing out that the neutron produced** in deuterium-tritium fusion **makes the walls of the tokomak radioactive, but that fusion could be "clean" if only we reacted deu­terium with helium-3 to produce hclium-4 and a proton.**

Given that the amount of helium-3 avail­able on Earth is trifling, it has been proposed that we should go to the Moon to mine the isotope, which is produced in the Sun and might be blown onto the lunar surface via the solar wind. **Apart from not even knowing for certain if there is any helium-3 on the Moon, there are two main problems with this idea** - one obvious and one intriguingly subtle. The first problem is that, **in a tokomak, deu­terium reacts up to 100 times more slowly with helium-3 than** it does **with tritium**. This is because **fusion has to overcome the elec­trical repulsion between the protons in the fuel, which is much higher for deuterium-helium-3 reactions** (the nuclei have one and two protons, respectively) **than** it is **for deu­terium-tritium reactions** (one proton each).

**Clearly, deuterium-helium-3 is a poor fusion process**, but the irony is much greater as I shall now reveal. **A tokomak is not like a particle accelerator where counter-rotating beams of deuterium and helium-3 collide and fuse. Instead, all of the nuclei in the fuel mingle together, which means that two deuterium nuclei can rapidly fuse to give a tritium nucleus and proton. The tritium can now fuse with the deuterium - again much faster than the deuterium can with helium-3 - to yield helium-4 and a neutron.**

So by bringing helium-3 from the Moon, all we will end up doing is create a deuterium-tritium fusion machine, which is the very thing the helium aficionados wanted to avoid! Undeterred, **some** of these **people** even **suggest that two helium-3 nuclei could be made to fuse with each other to produce deuterium, an alpha particle and energy. Unfortunately, this reaction occurs even more slowly than deuterium-tritium fusion and the fuel would have to be heated to impractically high temperatures** that would be beyond the reach of a tokomak. And as not even the upcoming International Thermonuclear Experimental Reactor (ITER) will be able to generate electricity from the latter reaction, **the lunar-helium-3 story** -like the LHC as an Armageddon machine -**is**, to my mind, **moonshine**.>

### He-3 energy no solvency- the fusion reaction is too slow and create a deuterium– tritium reaction

Close 07- Frank Close is a theoretical physicist at the University of Oxford, Aug 3, 2007, “Fears over factoids,” http://physicsworld.com/cws/article/indepth/30679

Given that the amount of helium-3 available on Earth is trifling, it has been proposed that we should go to the Moon to mine the isotope, which is produced in the Sun and might be blown onto the lunar surface via the solar wind. Apart from not even knowing for certain if there is any helium-3 on the Moon, there are two main problems with this idea – one obvious and one intriguingly subtle. The first problem is that, in a tokomak, deuterium reacts up to 100 times more slowly with helium-3 than it does with tritium. This is because fusion has to overcome the electrical repulsion between the protons in the fuel, which is much higher for deuterium– helium-3 reactions (the nuclei have one and two protons, respectively) than it is for deuterium– tritium reactions (one proton each). Clearly, deuterium–helium-3 is a poor fusion process, but the irony is much greater as I shall now reveal. A tokomak is not like a particle accelerator where counter-rotating beams of deuterium and helium-3 collide and fuse. Instead, all of the nuclei in the fuel mingle together, which means that two deuterium nuclei can rapidly fuse to give a tritium nucleus and proton. The tritium can now fuse with the deuterium – again much faster than the deuterium can with helium-3 – to yield helium-4 and a neutron. So by bringing helium-3 from the Moon, all we will end up doing is create a deuterium– tritium fusion machine, which is the very thing the helium aficionados wanted to avoid! Undeterred, some of these people even suggest that two helium-3 nuclei could be made to fuse with each other to produce deuterium, an alpha particle and energy. Unfortunately, this reaction occurs even more slowly than deuterium–tritium fusion and the fuel would have to be heated to impractically high temperatures that would be beyond the reach of a tokomak. And as not even the upcoming International Thermonuclear Experimental Reactor (ITER) will be able to generate electricity from the latter reaction, the lunar-helium-3 story – like the LHC as an Armageddon machine – is, to my mind, moonshine.

### Neg: Fusion budget cuts prove that claims of U.S. being able to use helium-3 are outlandish

Day 07**-Dwyane A. Day works for the Space Studies Board of the National Research Council/National Academy of Sciences, where he has served as a study director on studies concerning NASA's planetary exploration program, the threat of asteroids striking Earth, NASA workforce skills, radiation hazards to astronauts on long duration spaceflights, and other projects, Nov. 12, 07, “Exploding Moon myths: or why there’s no race to our nearest neighbor,” The Space Review, http://www.thespacereview.com/article/999/1**

Another common myth, popular among more left-leaning non-American publications, is that all these missions are part of a “lunar gold rush.” Some of this stems from a conspiratorial suspicion about American government motivations—journalists **who believe that the United States invaded Iraq to seize oil** are just as likely to suspect that the United States is going to send people to the Moon to grab resources there. They then spin off conspiracy theories about Halliburton or lunar property claims. The most commonly cited lunar resource is the isotope helium-3, which Americans supposedly want to burn in their numerous fusion reactors. This theory is sometimes fueled by the statements of Chinese and Russian and even Indian officials, who claim that they are sending robots to the Moon to look for the helium-3 that the Americans supposedly covet so much**. (Proof that dubious claims supporting space exploration are universal.)**

**It’s no secret that delusions are more satisfying than reality, but these** theories are outlandish. **Nobody who pushes them has bothered to check even basic facts or ask simple questions. For starters**, if the United States is truly interested in helium-3 for fusion power, how come the American government is spending so little money on fusion research? Fusion research budgets were slashed after the Cold War, and have been anemic ever since, in effect demonstrating what little faith the US government has in the potential of fusion power. **(This raises a corollary for space enthusiasts: if you really believe that the Moon has potential as a source of fusion power, you should support dramatic increases in the Department of Energy’s budget for fusion research, possibly even taking the money from space exploration to fund it.)**

**If you really believe that the Moon has potential as a source of fusion power, you should support dramatic increases in the Department of Energy’s budget for fusion research, possibly even taking the money from space exploration to fund it.**

## A2 Nuclear Forensics

### Radiation Detection Bad – The Barot and Padilla cases in which each individual made poor choices when constructing a nuclear weapon brings into question the idea of establishing an expensing radiation-sensing system which will always have difficulty in sensing highly enriched uranium even when more common materials for constructing weaponry can be detected.

Coll 7 – Steve Coll, Pulitzer-Prize Winning President Of New America, March 12, 2007, “The Unthinkable: Can The United States Be Made Safe From Nuclear Terrorism?” The New Yorker, Fact Section, A Reporter At Large, Vol. VV No. 000issue, Lexis: pg. 48

Charles Ferguson is a former nuclear submarine officer trained in physics; he left the Navy for a career in security studies and is currently a senior fellow at the Council on Foreign Relations. In 2003, he co-wrote an unclassified report titled "Commercial Radioactive Sources: Surveying the Security Risks." About two years later, F.B.I. agents working on an international terrorism case asked to meet with him. They brought a document showing that some of his report had been downloaded onto the computer of a British citizen named **Dhiren Barot, a Hindu who had converted to Islam**. Barot, it turned out, **had been communicating with Al Qaeda about a plan to detonate a dirty bomb in Britain**, and he had used a highlighting pen on a printout of Ferguson's study while conducting his research. The report described how large amounts of certain commercial radioactive materials might pose a danger to a terrorist who tried to handle them. "This seems to have worried him," Ferguson told me, referring to Barot, "so he decided to look at smoke detectors." Some detectors contain slivers of americium-241; the isotope's constant emission of radiation creates a chemical process that screens for smoke. **Barot informed his Al Qaeda handlers that he was thinking about buying ten thousand smoke detectors to make his bomb**. In fact, to make a device that would be even remotely effective, Ferguson said, he would have had to buy more than a million. "Either his reading comprehension was poor or he was evading the assignment," Ferguson told me. In Britain, last October, Barot pleaded guilty to terrorism-related charges. Barot appears to have been only marginally more competent than **Jose Padilla, the hapless American convert to Islam who travelled to Pakistan, met with Al Qaeda leaders, and then flew to the United States, where he was arrested** amid great fanfare, in June 2002. John Ashcroft, then the Attorney General, held a press conference in which he accused Padilla of "exploring a plan" to build a dirty bomb, charges that were later omitted from an indictment against him. **The Barot and Padilla cases raise a strategic question-whether it is worth setting up an expensive, imperfect system whose effectiveness would be greatest against slow-witted terrorists. The Bush Administration is now spending about four hundred million dollars annually on radiation-detector research, but nuclear physicists who have studied the technology disagree about how discriminating these sensors might become**. One point on which everyone agrees, however, is that, **of all the potentially dangerous radioactive isotopes, it will always be most difficult to detect highly enriched uranium-235**, one of the two materials, along with plutonium, **used to make fission weapons.** Unless it is being compressed to explode, highly enriched **uranium is** a low-energy isotope that does not emit much radioactivity-it is "dull," in the lexicon employed by scientists in the field. This makes it **relatively easy to shield inside lead casing, or to mask by surrounding it with brighter isotopes. Plutonium, by comparison, is fairly bright, and many of the most dangerous isotopes that could be used in dirty bombs, such as cesium** 137 **and cobalt** 60, **are brighter** still. **Radiation sensors, then, will always be more effective against a** Dhiren **Barot** than against, say, the Pakistani nuclear scientist Abdul Qadeer Khan, a metallurgist who has spent many years studying fission weapons and highly enriched uranium, as well as the challenges of international smuggling.

### Radiation Detection Bad – Heavy spending on new radiation-sensing technology will not produce worthy results in preventing the creation of a dirty bomb or refined bomb. Unless the US begins to dispose of dangerous nuclear components, intelligence and not border security will have to save the day.

Coll 7 – Steve Coll, Pulitzer-Prize Winning President Of New America, March 12, 2007, “The Unthinkable: Can The United States Be Made Safe From Nuclear Terrorism?” The New Yorker, Fact Section, A Reporter At Large, Vol. VV No. 000issue, Lexis: pg. 48

**<Critics of Wagner's ideas say that he is over optimistic about the long-term potential of sensor technology, and that heavy spending on detectors will divert resources from the more important work of securing or eliminating dangerous nuclear materials-plutonium, highly enriched uranium, and dirty-bomb components**. There are, for example, **roughly a hundred and thirty-five civilian research reactors worldwide**, including a number in the United States, that **continue to use highly enriched uranium; some of these facilities have worrisome security. Sensors will never be effective enough against smuggled highly enriched uranium to justify the cost,** Thomas Cochran, the director of the nuclear program at the Natural Resources Defense Council, argues. **And while detectors might be more effective against dirty-bomb isotopes,** Cochran says, **the risks don't justify the expenditures. "That's not to say you should do nothing, but most** of these things **are going to be caught by good intelligence and not by the borders**," Cochran said. He believes that the country would be much safer much faster if the federal government would concentrate on the painstaking challenge of reducing the number of nuclear weapons and materials at home and abroad.>

### Radiation Detector Bad – Even with the new and expensive next generation wave of ASP, the detection of highly enriched uranium will remain a difficult challenge making the solution seem much less economical.

Coll 7 – Steve Coll, Pulitzer-Prize Winning President Of New America, March 12, 2007, “The Unthinkable: Can The United States Be Made Safe From Nuclear Terrorism?” The New Yorker, Fact Section, A Reporter At Large, Vol. VV No. 000issue, Lexis: pg. 48

**<To confront the threat of a dirty-bomb attack, Oxford favors an improved system for real-time tracking of all commercial nuclear materials in the United States**, perhaps using tags that can be monitored by satellite. His office is urging manufacturers of large commercial sources to fortify their machines against attack, and he would like to see some materials replaced with less risky alternatives. Such campaigning has added a new degree of urgency to the Bush Administration's assessment of the threat. Later this year, the federal government will hold its annual, classified exercise involving top officials (known as TOP-OFF), in which these officials rehearse responses to a major disaster scenario. This year's scenario, an official familiar with the planning told me, will posit three simultaneous dirty-bomb explosions. **Radiation detectors paid for by the Domestic Nuclear Detection Office currently screen about ninety percent of cargo entering the United States from Canada and Mexico**, as well as a similar percentage of private cars and trucks; they are also used to check about ninety per cent of incoming shipping containers. Oxford said that he plans to oversee the installation of enough detectors to screen ninety-eight per cent of imported maritime cargo by the end of the year. Creative terrorists, like drug smugglers, might then try to enter with small boats, or sneak across the land border, he said. Therefore, he is also trying to develop a more mobile system of radiation sensors on Coast Guard vessels, and at interior locations such as weigh stations, bridges, and tunnels. **Oxford is promoting the next generation of sensor, called the Advanced Spectroscopic Portal**, which has been undergoing tests in New York and at the Nevada Test Site. **This machine** can distinguish bananas from cesium, but it **will be no more sensitive than current detectors in its ability to locate highly enriched uranium, a Department of Energy official involved with the detection program said.** Fin**ding highly enriched uranium is "a really hard problem," Oxford conceded. Customs inspectors already use imaging equipment to scan for unusual shielding inside some shipping containers, but his office is supporting research to investigate more mobile and effective systems. "We agree that solving this through passive systems alone is not sufficient**," Oxford said.>

### Radiation Detection Bad – America’s radiation-sensing system is an inefficient use of resources with hundreds of false alarms on a daily basis for a concept which has yet to demonstrate economic feasibility.

Coll 7 – Steve Coll, Pulitzer-Prize Winning President Of New America, March 12, 2007, “The Unthinkable: Can The United States Be Made Safe From Nuclear Terrorism?” The New Yorker, Fact Section, A Reporter At Large, Vol. VV No. 000issue, Lexis: pg. 48

**<In the meantime, America's radiation-sensing system is, at least for now, detecting radioactive briefcase clasps, manhole covers, and chafing dishes**. These are among the contaminated products caught by detectors recently at border crossings; in New York's seaports alone, there have been twenty such cases. On a recent morning when I visited a sensor outpost at the Port of Newark, four young Customs officers with pistols strapped to their belts huddled in a booth filled with computers as trucks rumbled through a line of radiation portals, which are shaped like metallic archways. The officers had joined Customs thinking that they would mainly battle narcotics traffickers; now they spend most of their time on terrorism issues, and they know more about isotopes than some high-school physics teachers do. **Each time an alert** in their booth **sounds, a polite, calm computer voice speaks to them,** as it did when I stopped by: "Gamma alert, lane six." **This happens more than two hundred times per day at the Port of New York and New Jersey**. The officers checked the driver's papers, scanned the truck's sides with a handheld isotope identifier, consulted their computer screens, and within minutes announced their conclusion: denture cleaners, potassium-40. They spoke in the bored, slightly sardonic tone common among police officers, as if they were reviewing a burglar's jimmying techniques. **At some point, perhaps after the expenditure of a great amount of money, it will probably be cops like these, and not scientists or defense theorists, who decide where radiation detection should rank on the long and diverse list of counterterrorism techniques**. The Department of Homeland Security recently announced an initiative to experiment with the installation of radiation detection at some bridges, tunnels, roadways, and waterways leading into Manhattan; later, the department hopes to surround other cities. The N.Y.P.D. fears that the sensors might prove to be too costly and would generate too many false alarms. Nearly three hundred thousand cars and trucks cross the George Washington Bridge in both directions on an average day; without an efficient way to process radiation alerts, a single convoy of banana trucks could jam up traffic for hours. "There are a lot of possible concerns that could surface with it," Raymond Kelly, the N.Y.P.D.'s commissioner, told me. Yet, he said, "we see this as something certainly worth trying." Kelly wants to deploy rings of sensors fifty miles or more from New York, so there would be a better chance of spotting an incoming device. In February, he held talks with his counterparts in Connecticut and New Jersey. Still, Kelly said, **the entire project remains "very conceptual in nature." >**

## A2 Shale Mining

### Shale mining advantage- Shale mining predictions are a hype, shale is difficult to mine and is low in energy

Udall and Andrews 05- Randy Udall, directs the Community Office for Resource Efficiency, a nonprofit energy office in Carbondale, Steve Andrews, a Denver-based energy expert, Dec 17 2005 by Denver Post, “Oil shale may be fool's gold,” http://www.energybulletin.net/node/11779

Buried underground in western Colorado are a trillion tons of oil shale. For a century, men have tried and tried again to unlock this energy source. But the rocks have proved stubborn, promising much, delivering little. Recently, the U.S. Department of Energy published a new report on oil shale. It claimed that the nation could wring "200,000 barrels a day from oil shale by 2011, 2 million barrels a day by 2020, and ultimately 10 million barrels a day" from fields in Colorado, Utah and Wyoming. These predictions - both the production targets and their timing - are preposterous, as some industry experts admit. But hyping oil shale is nothing new. As geologist Walter Youngquist once wrote, "Bankers won't invest a dime in 'organic marlstone,' the shale's proper name, but 'oil shale' is another matter." California Rep. Richard Pombo and Utah Sen. Orrin Hatch are spearheading efforts to jumpstart the industry. "I find it disturbing that Utah imports oil from Canadian tar sands, even though our oil shale resource remains undeveloped," says Hatch. In truth, oil shale presents a paradox. If these rocks are, as some claim, the richest fossil fuel resource on Earth, why has it been so difficult to unlock them? The primary explanation is that oil shale is a lousy fuel. Compared to the coal that launched the Industrial Revolution or the oil that sustains the world today, oil shale is the dregs. Coal seams a few feet thick are worth mining because coal contains lots of energy. If coal is good, oil is even better. And oil shale? Per pound, it contains one-tenth the energy of crude oil, one-sixth that of coal.

### Shale mining advantage- shale mining in the US would be uneconomic and produce large amounts of greenhouse gasses

Udall and Andrews 05- Randy Udall, directs the Community Office for Resource Efficiency, a nonprofit energy office in Carbondale, Steve Andrews, a Denver-based energy expert, Dec 17 2005 by Denver Post, “Oil shale may be fool's gold,” http://www.energybulletin.net/node/11779

The plan is audacious. Shell proposes to heat a 1,000-foot-thick section of shale to 700 degrees, then keep it that hot for three years. Beam me up, Scotty, but first share some details. Imagine a 100-acre production plot. Inside that area, the company would drill as many as 1,000 wells. Next, long electric heaters would be inserted in preparation for a multi-year bake. It's a high-stakes gamble, but if it works, a 6-mile-by- 6-mile area could, over the coming century, produce 20 billion barrels, roughly equal to remaining reserves in the lower 48 states. Although Shell's method avoids the need to mine shale, it requires a mind-boggling amount of electricity. To produce 100,000 barrels per day, the company would need to construct the largest power plant in Colorado history. Costing about $3 billion, it would consume 5 million tons of coal each year, producing 10 million tons of greenhouse gases. (The company's annual electric bill would be about $500 million.) To double production, you'd need two power plants. One million barrels a day would require 10 new power plants, five new coal mines. And 10 million barrels a day, as proposed by some, would necessitate 100 power plants. How soon will we know whether Shell's technology is economic? The company plans to do more experiments, before making a final decision by 2010. If it pulls the trigger, it would be at least three or four years before the first oil would flow, perhaps at a rate of 10,000 barrels a day. That's less than one-tenth of 1 percent of current U.S. consumption. But if it turns out that Shell needs more energy to produce a barrel of oil than a barrel contains, bets are off. That's the equivalent of burning the furniture to keep the house warm. Energy is the original currency; electricity its most valuable form. Using coal-fired electricity to wring oil out of rocks is like feeding steak to the dog and eating his Alpo.

### Shale mining advantage- shale mining is unrealistic and will not meet America’s energy needs

Udall and Andrews 05- Randy Udall, directs the Community Office for Resource Efficiency, a nonprofit energy office in Carbondale, Steve Andrews, a Denver-based energy expert, Dec 17 2005 by Denver Post, “Oil shale may be fool's gold,” http://www.energybulletin.net/node/11779

In a ham-and-egg breakfast, the chicken is involved but the pig is committed. With half the world's oil shale resources located here, our region is committed. Another recent report by the RAND Corp. warned that if oil shale developers "overstress the environmental carrying capacity of the area, we may never see more than a few hundred thousand barrels per day of production." Amen. Large-scale development of the kind proposed by the U.S. Department of Energy and Pombo would be a disaster. The DOE casually dedicates all of western Colorado's surplus water to oil shale, proposes enormous open-pit mines 2,000 feet deep, and advocates retorting up to 6 billion tons of shale each year. That's twice the tonnage of all coal mined in the U.S. and China. This is not a vision, it is a nightmare. Americans love panaceas. We want thinner thighs in 30 days, a pill to cure baldness, an ultrasonic carburetor that will double our mileage. A magic wand would be nice, because the nation faces serious energy challenges. Since domestic oil production peaked 30 years ago, the need for energy efficiency, conservation and renewable energy has been obvious. Instead, like an addict on a binge, we continue to pursue a policy of "strength through exhaustion." Drilling the Arctic National Wildlife Refuge before improving our woeful vehicle efficiency is one example of this brain-dead approach. What contribution can oil shale make to energy security? Producing 100,000 barrels per day of shale oil does not violate the laws of physics. But the nation currently consumes that much oil every seven minutes. Improving the efficiency of our automobiles by 2 miles per gallon would save 10 times as much fuel, saving consumers $100 billion at the pump. The National Academy of Sciences has stated that cars, trucks and SUVs that get 30, 40 or 50 miles per gallon are doable. An aggressive national commitment to fuel efficiency is not optional, it's inevitable. In time, a more efficient fleet could save 20 times as much petroleum as oil shale is likely to ever provide. All hype aside, oil shale is the poorest of the fossil fuels, containing far less energy than crude oil, much less even than hog manure, peat moss or Cap'n Crunch. A meager amount of energy, tightly bound up in an enormous volume of rock, oil shale seems destined to remain an elusive bonanza, the petroleum equivalent of fool's gold.

### Shale mining bad- hurts the environment by destroying ecosystems, using large amounts of water, and increasing carbon emissions- 13 environmental groups agree

Thegoodhuman.com 09- June 28th, 2009, “Why Oil Shale Extraction Is A Very Bad Idea,” http://www.thegoodhuman.com/2009/06/28/why-oil-shale-extraction-is-a-very-bad-idea/

For their part, environmental groups are unequivocally against oil shale extraction. For one, extracting operations destroy affected landscapes, forcing plants and animals out, with regeneration unlikely for decades. Another big issue with oil shale extraction is water usage. The process requires as much as five barrels of water—for dust control, cooling and other purposes—for every barrel of shale oil produced. Oil shale extraction is also very energy-intensive, and as such is no solution to our global warming woes. Researchers have found that a gallon of shale oil can emit as much as 50 percent more carbon dioxide than a gallon of conventional oil would over its given lifecycle from extraction to tailpipe. Due to these concerns and others, 13 environmental groups, including the Wilderness Society, Sierra Club and Natural Resources Defense Council, teamed up in January 2009 to file suit against the federal government for opening up all that western U.S. land to oil shale development. The suit contends that the BLM failed to properly consider air quality and endangered species impacts in the region. The groups also contend that the development would require the construction of 10 new coal-fired power plants in order to get at and process the oil shale, significantly upping the carbon footprint of the entire region.

## Non Unique

### He-3 impacts no unique/mitigated- The US already experienced an He-3 shortage last year- new technologies have been developed to detect nuclear material

Reed 11- Christina Reed, an author, freelance science writer, and a contributor for Discovery News, Feb 19, 2011, “The Fallout of a Helium-3 Crisis,” http://news.discovery.com/earth/the-outfall-of-a-helium-3-crisis.html

The United States is currently recovering from a helium isotope crisis that last year sent low-temperature physicists scrambling, sky-rocketed the cost of hospital MRIs, and threw national security staff out on a search mission for alternate ways to detect dirty bombs. “Everybody was freaking out, going into closets and digging out what you could,” said low-temperature physicist Marcius Extavour, who is currently serving as a science policy fellow at the U.S. Senate Committee on Energy. While it’s a different kind of helium than what’s used for party balloons, the gas inflated an amazing rate of discoveries that led to four Nobel prizes in physics, a see-through method of looking at lungs and a backpack of equipment that border security patrols can wear to check whether cargo coming into the country carries nuclear material.

### He-3 advantage- all impacts are non unique because there’s already a shortage- it is no longer necessary for nuclear detectors or medicine- lunar mining is expensive and far away

Gitlin 11- Jonathan M. Gitlin, PhD in Pharmacology from Imperial College London, taught International Science and Technology Policy at the Patterson School of Diplomacy and International Relations, contributor for Ars Technica, March 2011, “National security driving a Helium-3 shortage, hurting physics,” http://arstechnica.com/science/news/2011/02/national-security-driving-a-helium-3-shortage-hurting-physics.ars

So what can be done about the problem? Luckily, quite a few efforts are underway. Although the national security applications account for 95 percent of US 3He use, there are other ways to achieve the same end. Joe Glaser, from the National Nuclear Security Agency (NNSA), spoke about how this shortage has led to new science. NNSA has a number of different requirements for neutron detectors, from large portal monitors that are being installed in border crossings, seaports, and airports as part of the Second Line of Defense Program, to rugged portable units that can be used in the field. For the static radiation portal monitors, like the one pictured at right, a number of solutions present themselves. Instead of 3He-filled tubes, BF3 can be used, if the boron has been enriched to around 90 percent 10B. These tubes are less sensitive than 3He; you need three tubes of BF3 to do the same work as a single 3He tube, and BF3 is a rather nasty gas, but it's readily available. Lining the detector tubes with a thin film of 10B allows you to avoid working with BF3, again relatively cheaply, although again these detectors are less sensitive than 3He. Moving away from 10B, glass fibers doped with 6Li have a number of cool features. When neutrons meet the 6Li atoms, the resulting energy gets transferred into the fibers, which we can detect as light (just like the optical fibers that pipe sound between your hi-fi components). They detect both neutrons and gamma rays, and can be made in a range of shapes and sizes, including backpack systems. Other interesting technologies that are further away from the market include new organic materials that can detect high-energy neutrons. Additionally, NNSA has caught the recycling bug, and believe that it can meet up to 20 percent of its needs by recycling old 3He tubes. Sadly, unlike neutron detection, the nonsecurity applications of 3He don't have any replacements as Jason Woods of Washington University mentioned as he discussed the impact of the shortage on both low-temperature physics and MRI work. When the supplies of 3He ran out, it essentially put a stop to new science in some areas of low-temperature physics. The US government is rationing out its supplies of 3He, and groups with existing refrigerators are ahead of the threat detection people in the line, but work in this area will be slow going for a while. For the medical imaging uses, alternatives like 129Xe have been tried with unsatisfactory results. But, happily, it turns out that exhaled 3He is quite easy to recover and recycle. Exhaled 3He is temporarily stored in a He-proof bag—the atoms are so small you can't use just any storage—and then purified cryogenically at 77K. As for solving the shortage, a number of options exist, but almost none are economically viable.The nearest, most abundant source of 3He is our very own moon, but we'll have more than a little wait before regular shipments start flowing

## No Solvency

### Lunar Exploration Good – While many say lunar mining remains unprofitable, lunar mining is only a technological stepping stone for accessing He-3 deposits from rich sources like Saturn and Uranus.

Wakefield 00 – Julie Wakefield, SPACE Author Of “One Small Step for Space Tourists,” June 30, 2000, “Researchers And Space Enthusiasts See Helium-3 As The Perfect Fuel Source,” SPACE, Online: http://www.space.com/scienceastronomy/helium3\_000630.html.

<Size of a basketball The chamber, which is roughly the size of a basketball, relies on the electrostatic focusing of ions into a dense core by using a spherical grid, explained Wisconsin colleague John Santarius,a study co-author. With some refinement, such Inertial Electrostatic Confinement(IEC) fusion systems could produce high-energy neutrons and protons useful in industry and medicine. For example, the technology could generate short-lived PET (positron emission tomography) isotopes on site at hospitals, enabling safe brain scans of young children and even pregnant women. Portable IECdevices could bridge the gap between today's science-based research and the ultimate goal of generating electricity, Santarius said. **This fall, the University of Wisconsin** team **hopes to demonstrate a** third-generation **fusion reaction between helium3 and helium 3 particles in the lab. The reaction would be completely void of radiation.** "**Although helium 3 would be very exciting,"says Bryan Palaszewski, leader of advanced fuels at NASA Glenn Research Center at Lewis Field, "first we have to go back to the moon and be capable of doing significant operations** there." Economically unfeasible **Indeed for now, the economics of extracting and transporting helium 3 from the moon are** also **problematic. Even if scientists solved the physics of helium 3 fusion, "it would be economically unfeasible," asserted Jim Benson, chairman of SpaceDev** in Poway, California, which strives to be one of the first commercial space-exploration companies. "**Unless I'm mistaken, you'd have to strip-mine large surfaces of the moon."While** it's true that **to produce roughly 70 tons of helium 3, for example, a million tons of lunar soil would need to be heated to 1,470 degrees Fahrenheit** (800 degrees Celsius) to liberate the gas, **proponents say lunar strip mining is not the goal. "There's enough in the Mare Tranquillitatis alone to last for several hundred years,"** Schmidt's. **The moon would be a stepping stone to other helium 3-rich sources, such as the atmospheres of Saturn and Uranus**. Benson agreed that finding fuel sources in space is the way to go. But for him, H2O and not helium 3 is the ideal fuel source. His personal goal is to create gas stations in space by mining asteroids for water. The water can be electrolyzed into hydrogen or oxygen fuel or used straight as a propellant by superheating with solar arrays. "Water is more practical and believable in the short run," he said. But proponents believe only helium3 can pay its own way. "Water just isn't that valuable," Schmitt said. Besides the helium, a mining process would produce water and oxygen as by-products, he says.>

### Helium-3 Bad – No single policy approach, including mining lunar helium-3, will likely solve the national crises concerning He-3. A complex set of actions is needed to prioritize agencies, increase supply, and reduce demand.

Shea And Morgan 10 – Dana A. Shea, Specialist In Space And Technology Policy, Daniel Morgan, Specialist In Space And Technology Policy, December 22, 2010, “The Helium-3 Shortage: Supply, Demand, And Options For Congress,” Congressional Research Service, Online: http://assets.opencrs.com/rpts/R41419\_20101222.pdf

**<No single policy approach will likely yield sufficient additional supply, reduce predicted demand, or successfully allocate helium-3 to all who wish to have it.** Policymakers may have to use a combination of supply- and demand-based approaches to address the helium-3 shortage. **Policymakers now face a number of challenging decisions**. Currently, these decisions are mainly **about how to allocate a scarce resource in the face of competing priorities: science versus security, the private sector versus the public sector, and national needs versus international obligations. Applications with unique needs may pose particular challenges.** For example, some types of cryogenic research can only be accomplished using helium-3, whereas in medical imaging and neutron detection, helium-3 has advantages but also alternatives. **To address future helium-3 concerns, policymakers** also **face choices about how or whether to increase helium-3 supply or reduce helium-3 demand and about possible alternative processes for allocating the supply**.>

### Mining moon for helium 3 not practical-cost billions in rocket fuel and don’t have the need for it

Lasker 06, **John Lasker, freelance journalist, Dec. 23, 2006, “Race to the moon for nuclear fuel,” http://www.wired.com/science/space/news/2006/12/72276?currentPage=2;**

**For years Kulcinski tried to convince NASA and the U.S. Department of Energy that they should take lunar helium-3 seriously and invest in its research, but was rebuffed, he said.**

**But NASA's "Global Exploration Strategy" (.xls) for the moon now states that among the 200 potential goals for future missions includes the study of lunar helium-3 for "fusion reactors on Earth" to "reduce Earth's reliance on fossil fuels."**

**However, there are those who doubt helium-3 could become the next super fuel.**

**Jim Benson, founder of space contractor SpaceDev, which helped build SpaceShipOne's engine and is a subcontractor of the Missile Defense Agency, said mining the moon for helium-3 doesn't pass the "net energy analysis" test. It would require more energy to retrieve helium-3 and bring it back than it would yield.**

**Just, sending mining equipment to the moon, and then returning processed helium-3 back to earth, would cost billions in rocket fuel, said Benson.**

**"We just don't have a need for helium-3," he said. "It's not practical."**

### Solvency takeout: We don’t even have the tech to mine Helium 3 on earth yet, and their author concedes that the plan isn’t sufficient to solve

Shea And Morgan 10 – Dana A. Shea, Specialist In Space And Technology Policy, Daniel Morgan, Specialist In Space And Technology Policy, December 22, 2010, “The Helium-3 Shortage: Supply, Demand, And Options For Congress,” Congressional Research Service, Online: http://assets.opencrs.com/rpts/R41419\_20101222.pdf

Other sources of helium-3 exist, both domestically and internationally. Drawing on these sourcesmight require the development of new technologies and approaches, as well as addressingpotential international export control concerns. The magnitude of the alternative sources and theease with which helium-3 could be extracted is unclear. Similarly, demand for helium-3 might bereduced through rationing or the development of alternative technologies, but these alternativesare not yet readily available.No single policy approach will likely yield sufficient additional supply, reduce predicted demand, or successfully allocate helium-3 to all who wish to have it.Policymakers may have to use a combination of supply- and demand-based approaches to address the helium-3 shortage.

## Alternate Sources

### Lunar Helium-3 Nonunique – Several sources of helium-3 exist on Earth for extraction including from light-water nuclear reactors, particle accelerators, and naturally occurring helium-3 from natural gas or the atmosphere.

Shea And Morgan 10 – Dana A. Shea, Specialist In Space And Technology Policy, Daniel Morgan, Specialist In Space And Technology Policy, December 22, 2010, “The Helium-3 Shortage: Supply, Demand, And Options For Congress,” Congressional Research Service, Online: http://assets.opencrs.com/rpts/R41419\_20101222.pdf

<Potential Additional Sources **Potential additional sources of helium-3 include increased production of tritium in light-water nuclear reactors** (beyond the amount already produced for the weapons program); **extraction of tritium produced as a byproduct in commercial heavy-water nuclear reactors; production of either tritium or helium-3 using particle accelerators; and extraction of naturally occurring helium-3 from natural gas or the atmosphere. Until recently, the ready supply of helium-3 from the nuclear weapons program meant that these alternative sources were not considered economical**ly attractive. **With the current shortage, this consideration may change.>**

### Lunar Helium-3 Nonunique – Natural gas producers which represent the primary commercial source of helium can provide He-3. Much of the equipment such as cooling systems are already used in the process to acquire He-4 meaning separating out helium-3 can cost as low as $300.

Shea And Morgan 10 – Dana A. Shea, Specialist In Space And Technology Policy, Daniel Morgan, Specialist In Space And Technology Policy, December 22, 2010, “The Helium-3 Shortage: Supply, Demand, And Options For Congress,” Congressional Research Service, Online: http://assets.opencrs.com/rpts/R41419\_20101222.pdf

<Helium-3 from Natural Gas. **Natural gas reservoirs typically contain impurities** as well as the primary component of natural gas, methane. **In some cases**, these **impurities include significant amounts of helium** (up to several percent). **Suppliers of natural gas often extract this helium in order to increase the energy content of their natural gas and improve its combustion. When a reservoir is relatively helium-rich, it can be economic to purify the extracted helium and sell it as a commodity**. In fact, natural gas is the primary commercial source of helium. **Domestic natural gas producers extract approximately 80 billion liters of helium each year**.32 Since 1960, the federal government has maintained a stockpile of raw (unpurified) helium at a facility near Amarillo, Texas.33 The original purpose of the stockpile was to ensure the availability of helium for national security uses. In the Helium Privatization Act of 1996 (P.L. 104-273), Congress mandated the sale of all but a small portion of the stockpile by 2015. At the end of FY2009, however, more than 500 billion liters of helium remained in the stockpile.34 **Helium extracted from natural gas, including helium stored in the national helium stockpile, consists mostly of helium-4 but also includes a small proportion of helium-3**. **The natural gas industry has not historically separated the helium-3 from the helium-4 because, until recently, the federal supply of helium-3 was perceived to be already greater than the likely demand.** An important cost consideration is that **some of the processes required to extract helium-3 from natural gas are already undertaken in the production of natural gas and commodity helium**. Helium-containing natural gas is purified by liquefaction—cooling it to a temperature at which the natural gas becomes liquid but the helium remains a gas. **The helium is separated and then purified by further liquefaction**—cooling to a still lower temperature at which the impurities become liquid. The most likely processes for separating helium-3 from helium-4 take place at even lower temperatures, so **the fact that helium produced from natural gas is already very cold becomes an important cost advantage. If separation of helium-3 from natural gas took place in conjunction with other natural gas processing, much of the energy required for cooling, and much of the cost of infrastructure and equipment for liquefaction and separation, would already be built into the cost of processing the natural gas**. **Separation of helium-3 from helium-4 has been demonstrated on a laboratory scale**.35 Public or private investment in process engineering and development would likely be needed before moving to full-scale production. **The amount of helium-3 that could be extracted on a large scale would depend on several factors: access to helium supplies, the proportion of helium-3 in the source helium, the capacity of the processing equipment, and the efficiency of the extraction process.** The U.S. Geological Survey estimates total U.S. helium reserves and resources to be 20.6 trillion liters.36 Natural gas reservoirs vary in the proportion of helium-3 they contain. A study conducted in 1990 by the Department of the Interior found ratios of helium-3 to helium-4 that ranged from 70 to 242 parts per billion.37 These figures imply U.S. helium-3 reserves and resources of between 1 and 5 million liters.38 **Because of the factors discussed above, any cost estimate for helium-3 extraction from natural gas is inexact. According to one estimate, the energy cost, not including the cost of infrastructure and equipment, might be about $12,000 per liter**.39 Most of this cost, however, would be to separate the commodity helium from the natural gas. **Starting with cooled commodity helium, in conjunction with regular natural gas processing, the incremental energy cost of separating out the helium-3 might be $300 per liter.>**

### Alt sources for He-3- tritium decay

AAAS 10- American Association for the Advancement of Science, 4/23/10, “AAAS Workshop Explores How to Meet Demand for Helium-3 in Medicine, Industry, and Security,”<http://www.aaas.org/news/releases/2010/0423helium3.shtml>

While manufacturing tritium just to obtain helium-3 also is prohibitively expensive, it is a reliable byproduct of the U.S. nuclear weapons program. Tritium—which has a 12.4 year half-life and decays to helium-3—is used to boost the yield of nuclear weapons. Tritium doesn’t contribute much to the explosion, Fetter said, but rather serves as a source of neutrons. The helium-3 produced from the decay of tritium can be recovered and repurposed. After the Cold War, the United States had tens of thousands of nuclear weapons. U.S. tritium production ended in 1988 and the number of warheads was subsequently reduced. Throughout the 1990s, the supply of helium-3 exceeded demand. By 2000, the United States had accumulated over 200,000 liters of helium-3.

### New technologies will decrease demand and free up He-3 supplies within the next 12-18 months

AAAS 10- American Association for the Advancement of Science, 4/23/10, “AAAS Workshop Explores How to Meet Demand for Helium-3 in Medicine, Industry, and Security,”<http://www.aaas.org/news/releases/2010/0423helium3.shtml>

Across all helilum-3 uses, AAAS workshop participants said that they could be more efficient at recovering existing and unused systems containing helium-3. Some industries, such as neutron detection systems for national security, have already made strides in developing alternatives that could be put into use soon while other industries have some ideas for alternatives. “While the demand for helium-3 from the post-9/11 homeland security sector is pretty large, we’ve seen dramatic growth in the uses of helium-3 in several different industries,” said Tannenbaum, the workshop organizer. “It’s unfortunate that all of these demands came online at about the same time, and all well after we stopped making the tritium that decays to helium-3. “In the short-term, things may look bleak for the sectors that rely on helium-3. However, several exciting new non-helium-3 technologies are coming on line in the next 12-18 months that will significantly decrease demand, and we should soon see some new helium-3 supplies come on to the market.”

### Successful alternatives to He-3 are being used now and demand is decreasing

Jones 10- Richard M. Jones, works for the Media and Government Relations Division of the American Institute of Physics, May 12, 2010, “Science Committee Hearing Spotlights Shortage in Critical Isotope,” http://www.aip.org/fyi/2010/053.html

William Brinkman, Director of the Office of Science, told the subcommittee “we have reached a critical shortage”in the global supply of helium-3. He described how White House staff formed an Interagency Policy Committee in mid-2009 to lower demand and increase available supplies of helium-3, and to “optimally allocate” its supply. “The allocation process gives priority to scientific uses dependent on unique physical properties of helium-3 and to maintaining continuity of activities with significant sunk costs. It also provides some supply for non-government sponsored uses, principally oil and gas exploration,” Brinkman told the subcommittee. Efforts to reduce projected demand in the United States have been successful, dropping from an initial FY 2010 projection of 76,330 liters to 14,557 liters. Although no new allocations will be made for radiation portal monitors, past allotments of helium-3 will support the program through “early FY 2011.” Brinkman estimated new neutron detection technologies for portal monitors will require two to three additional years of development. Scientific users of helium-3 are pursuing alternative strategies. Brinkman testified that current allocations will support experiments by the U.S. neutron scattering research community through the end of September 2014. Through the end of this decade, new international facilities will require 120,000 liters of new helium-3. “The U.S. has insisted that international partners take responsibility for securing new sources of helium-3, that the U.S. can no longer be the major supplier satisfying these needs,” Brinkman told the subcommittee. Helium-3 is required for ultra-low-temperature coolers used in fields such as nanoscience and quantum computing research. The full FY 2010 U.S. cryogenics request was approved. Looking ahead, Brinkman told the subcommittee that “the true impacts to both R&D and operational programs will be better quantified in the upcoming months, as users with small volume requirements place orders for their projects.” Brinkman also discussed developing alternative sources of helium-3. In the next three years, reuse and recycling will be encouraged, with efforts to date resulting in a 10 percent overall reduction in demand for new helium-3. Laboratories and plants have been directed to inventory unused or excess supplies. The Savannah River National Laboratory is working on a process to extract helium-3 from retired equipment, which may yield as much as 10,000 liters. DOE and the National Nuclear Security Administration are negotiating with countries having heavy-water-moderated reactors such as Canada and Argentina to determine the feasibility of recovering helium-3 from permanent storage containers used to store tritium. Technical feasibility and cost studies are scheduled to be complete in early FY 2011, which starts on October 1 of this year. It may be possible to recover 100,000 liters of helium-3 through this method over the course of seven years. Also being studied is extracting helium-3 from natural gas, and what Brinkman described as “reactor-based irradiations to produce tritium for the primary purpose of subsequent helium-3 harvesting.” Both of these longer-term measures will “likely involve a substantial increase in the cost” of the isotope.

# \*\*\*Water Advantage\*\*\*

## No Water Wars

### No Water Wars- even if they are brought to the brink the past 4,500 years prove they settle disputes with peace

Doyle – 6, Alister Doyle, Environmental correspondent, Reuters, 9/17/06, “Water Wars” loom? But none in past 4,500 years” <http://harowo.com/2006/09/17/water-wars-loom-but-none-in-past-4500-years/>

With a steady stream of bleak predictions that "water wars" will be fought over dwindling supplies in the 21st century, battles between two Sumerian city-states 4,500 years ago seem to set a worrying precedent. But the good news, many experts say, is that the conflict between Lagash and Umma over irrigation rights in what is now Iraq was the last time two states went to war over water.Down the centuries since then, international rivals sharing waters such as the Jordan River, the Nile, the Ganges or the Parana have generally favoured cooperation over conflict. So if history can be trusted, things may stay that way. "The simple explanation is that water is simply too important to fight over," said Aaron Wolf, a professor at Oregon State University. "Nations often go to the brink of war over water and then resolve their differences."

### 3,600 years of waterless justification for war in the world proves that war is unlikely- even if the potential for conflict rises, it won’t actually lead to war anyway

Doyle – 6, Alister Doyle, Environmental correspondent, Reuters, 9/17/06, “Water Wars” loom? But none in past 4,500 years” <http://harowo.com/2006/09/17/water-wars-loom-but-none-in-past-4500-years/>

Since the war between Lagash and Umma, recorded on a stone carving showing vultures flying off with the heads of defeated Umma warriors, no wars have been fought and 3,600 international water treaties have been signed, he said. Yet politicians regularly warn that water shortages caused by surging populations and climate change could trigger conflicts this century in a world where a billion people in developing countries lack access to clean drinking water."Fierce competition for fresh water may well become a source of conflict and wars in the future," U.N. Secretary-General Kofi Annan said in 2001. The English word "rival" even comes from the Latin "rivalis" meaning "someone sharing a river". Other experts say international "water wars" are unlikely."I don’t really expect wars over water because … the benefits of collaboration are so great," said Frank Rijsberman, head of the International Water Management Institute (IWMI). And still others say water might be one factor in future conflicts. Achim Steiner, executive director of the U.N. Environment Programme (UNEP), says this is particularly true in border regions where countries share rivers."I am not somebody who believes that our third world war will be over water, but I think the potential for conflict will grow as we are faced with water scarcity," he told Reuters.

### Minute risk of water war- their evidence is blown up by career-concerned journalists

Doyle – 6, Alister Doyle, Environmental correspondent, Reuters, 9/17/06, “Water Wars” loom? But none in past 4,500 years” <http://harowo.com/2006/09/17/water-wars-loom-but-none-in-past-4500-years/>

"If there is a war between two countries the 15th reason could be water but the first 14 reasons will have absolutely nothing to do with water," said Asit Biswas, head of the Third World Centre for Water Management in Mexico City. "But if I want to get in the media the easiest thing is to say that a water war is about to break out in the Middle East," he said. "The last war over water was thousands of years ago."

# \*\*\*Space Race Advantage\*\*\*

## Myth

### Neg: Ideas of a “space race” is a myth

Day 07**-Dwyane A. Day works for the Space Studies Board of the National Research Council/National Academy of Sciences, where he has served as a study director on studies concerning NASA's planetary exploration program, the threat of asteroids striking Earth, NASA workforce skills, radiation hazards to astronauts on long duration spaceflights, and other projects, Nov. 12, 07, “Exploding Moon myths: or why there’s no race to our nearest neighbor,” The Space Review, http://www.thespacereview.com/article/999/1**

**Germany recently announced that they possibly, maybe, might launch a robotic spacecraft to the Moon. That now brings to six the number of countries with spacecraft at the Moon in development to go to the Moon, or at the very least thinking about sending a spacecraft to the Moon. The others are: China, Japan, India, the United States, and the Russians (who have lots of plans, along with an official motto: “Please send money.”)**

**Just what the heck is going on?**

The lay press, which has only a superficial understanding of space issues, has taken notice of all this space activity and struggled to understand it. They have reached for explanations, and in the process produced several erroneous theories based upon poor understanding both of what is currently happening, and what has happened in the past regarding exploration of the Moon. These Moon Myths include:

These countries are involved in a “space race” to the Moon.

**China, Japan, and India are engaged in an “Asian space race.”**

The scientific community is newly interested in the Moon and driving these efforts.

There must be something on the Moon that all these countries want—helium-3, other resources, or extraterrestrials.

**These robotic missions are precursors to something bigger, such as human missions.**

There is practically no truth to any of these myths**, but they have appeared in numerous articles and, more often, in television news segments. They are worth exploring, if only to shed a little more light on what is currently going on.**

**The lay press, which has only a superficial understanding of space issues, has taken notice of all this space activity and struggled to understand it.**

**Recently China’s Chang’e-1 spacecraft entered lunar orbit. It followed the Japanese Kaguya mission. (Kaguya is the Japanese nickname for the satellite, which was previously named “Selene,” after a Greek lunar deity.) Those two missions are currently in orbit. However, a European Space Agency spacecraft named SMART-1 was there a few years ago, slowly spiraling down to a deliberate impact with the surface last year. The Indians plan on launching their Chandrayaan spacecraft next year. The United States will launch its Lunar Reconnaissance Orbiter next year as well. In addition, Russia has announced plans for a lunar mission known as Luna-Glob and scheduled for launch in 2012, but their plans are tentative at best.**

Assuming that the Japanese and Chinese spacecraft are still operating a year from now, lunar orbit is going to get pretty crowded. This confuses the press, who look for big picture explanations for all this interest. Here are the myths deconstructed.

A “space race” to the Moon

**This is the most common myth about all the new lunar activity. That’s not surprising considering that it’s the easiest explanation and the one that reporters are most familiar with—they think that they understand space races. All that activity must be due to competition, right? It must be because all of these countries are struggling to get to the Moon first, or best, or some other competitive goal.**

But it’s not really true. **If you look at the stated reasons for each of these missions and apply a little filtering and some knowledge of space policy and technical capabilities**, it becomes obvious that the actual explanation is much less exciting: many of these missions are happening because these countries have recently acquired the capability to go beyond Earth orbit, and the Moon is the closest—and therefore easiest—target beyond Earth orbit. That’s it. It’s that simple.

**There are of course other targets beyond Earth orbit, including** Mars, Venus, near Earth objects (i.e. asteroids), and comets. But these are generally out of reach for less mature space powers. **The European Space Agency, which is quite mature, has mounted missions to Mars, Venus, and a comet—but no lunar missions other than SMART-1. Japan has also mounted a mission to an asteroid. But those missions require more resources and capabilities than the Moon, such as access to deep space communications and better navigation. So for countries like China and India, the Moon is an easy first step beyond low Earth orbit, but essentially their gateway to more ambitious missions beyond the Moon.**

Many of these missions are happening because these countries have recently acquired the capability to go beyond Earth orbit, and the Moon is the closest—and therefore easiest—target beyond Earth orbit. That’s it.

### No space race-there is cooperation

Day 07**-Dwyane A. Day works for the Space Studies Board of the National Research Council/National Academy of Sciences, where he has served as a study director on studies concerning NASA's planetary exploration program, the threat of asteroids striking Earth, NASA workforce skills, radiation hazards to astronauts on long duration spaceflights, and other projects, Nov. 12, 07, “Exploding Moon myths: or why there’s no race to our nearest neighbor,” The Space Review, http://www.thespacereview.com/article/999/1**

Many of the current plans for exploring the Moon were developed with little regard to what other countries are doing, and certainly not in response to them**. In fact, that’s part of the problem; there’s little coordination between the participants when coordination might produce complementary data instead of redundant data**. But there is some cooperation. The Indian spacecraft, for instance, will carry American and European instruments. The Russian spacecraft, if it gets built, may carry Japanese impactors intended for Lunar-A. The relevant space agencies are planning, or at least discussing, sharing their data. This is not a “space race” by any definition.

An “Asian space race”

**Of course, three of these countries are Asian, leading many in the press to talk about an “Asian space race,” even if they have no data to back it up**. There is no Asian space race, and just because three Asian countries are sending missions to the Moon does not mean that they are racing each other there**.**

## Moon not key

### Neg: Wanting to explore moon is not a space race-mistaken assumption

Day 07**-Dwyane A. Day works for the Space Studies Board of the National Research Council/National Academy of Sciences, where he has served as a study director on studies concerning NASA's planetary exploration program, the threat of asteroids striking Earth, NASA workforce skills, radiation hazards to astronauts on long duration spaceflights, and other projects, Nov. 12, 07, “Exploding Moon myths: or why there’s no race to our nearest neighbor,” The Space Review, http://www.thespacereview.com/article/999/1**

**This is a little more complicated. There is renewed scientific interest in the Moon, but it is not driving these missions. Politics, both domestic and international, is driving these new efforts and because these countries have decided to send spacecraft to the Moon, their respective scientists are naturally interested in conducting science there.**

The obverse of this argument is the theory that there is nothing of scientific interest on the Moon—Apollo answered it all—and therefore the current interest is all political, i.e. a space race. But this too is based upon a mistaken assumption. It is common for lay journalists with little understanding of space policy **(Gregg Easterbrook comes to mind—he wrote this in a January 2004 blog posting)** to claim that there is so little of scientific interest on the Moon that NASA abandoned it for decades.

There is renewed scientific interest in the Moon, but it is not driving these missions.

That’s a terribly superficial explanation for why there was such a long gap in between lunar missions**—26 years from Apollo to Lunar Prospector, or 22 years from Apollo 17 to the Department of Defense Clementine mission. The reality is more complex, and mundane. The United States spent a tremendous amount of money on Apollo and returned a tremendous amount of scientific data from the Moon—despite the fact that Apollo was never about science. That data was investigated and analyzed and churned and debated and, like all scientific data, raised even more questions. Some members of the press and the public even labeled Apollo a “scientific failure” because it did not definitively answer questions about the Moon’s origins. (Newsflash: despite tens of thousands of geologists crawling all over the surface of the Earth for, well, centuries, there remain many unanswered questions about Earth’s geology as well. That’s the way science works: often the answer to one question is a half dozen more complicated questions.)**

The problem for lunar scientists was that Apollo had cost so much that it exhausted both the decision makers at the top of the agency and the larger scientific community, which was clamoring for its own big ticket items**. You lunar scientists have had your chance, they said, it’s time to spend finite dollars on other targets.**

**But it was not that there was no longer important science to conduct at the Moon, instead, the cost-benefit equation for lunar science had an added component, the Apollo legacy. Legitimate lunar science questions existed, but could not overcome the Apollo legacy. Gradually all those lunar scientists dispersed to other disciplines and other questions, primarily those concerning Mars, a bigger rock with big mysteries of its own.**

This highlights the fact that space science priorities are not set by a computer; they are established by humans, in a social context. **Human biases, emotions, and even history all affect those priorities. Unsurprisingly, this happens not only with the Moon, but with other space sciences as well. Consider the long delay between Mars missions—Mars Observer was not launched until 1992, seventeen years after the Viking missions. Was this long delay because of little scientific interest in Mars? No. It was due to many factors, including delays in the Space Shuttle program. But it was also due to the fact that Viking had been extremely expensive, and had raised expectations so high (they were hoping to find life on Mars, and didn’t) that Mars advocates had a difficult time building a coalition to pursue another mission for a very long time. There’s an unfortunate lesson based on history**: if you’re going to spend a lot of money on something, you better get a positive result, or it will be much harder to argue for additional funding in the future**.**

**Resources (or little green men)**

### Neg: No space competition for U.S.-no other country is serious about a lunar mission

Day 07**-Dwyane A. Day works for the Space Studies Board of the National Research Council/National Academy of Sciences, where he has served as a study director on studies concerning NASA's planetary exploration program, the threat of asteroids striking Earth, NASA workforce skills, radiation hazards to astronauts on long duration spaceflights, and other projects, Nov. 12, 07, “Exploding Moon myths: or why there’s no race to our nearest neighbor,” The Space Review, http://www.thespacereview.com/article/999/1**

**There is a humorous offshoot of this theory. Richard Hoagland, who achieved fame and notoriety in the 1980s by claiming that the “Face on Mars” was evidence of extraterrestrial life, has claimed that there are giant extraterrestrial structures on the surface of the Moon—and that’s why so many countries are sending spacecraft there. Of course, none of these countries have said that this is why they are launching these missions. But the lack of evidence has never stopped Hoagland before, so why should it do so now?**

**Human missions**

**Naturally, all these robotic missions have led to press speculation that they are simply precursors to human missions to the Moon**. But there is only one country with declared ambitions to send humans to the Moon, the United States. **NASA’s Lunar Reconnaissance Orbiter is clearly designed to support the human lunar program, and its primary mission is to return high resolution maps of the lunar surface for planning operations for humans.** No other country—not Germany, India, Russia, Japan or China—has intentions of sending humans to the Moon. Russia has discussed the possibility of tourist missions around the Moon **(remember their motto: “Please send money.”).** India has announced preliminary plans to launch a human spacecraft in perhaps ten years, and recently at the International Astronautical Federation (IAF) conference in India some of their officials mused that they might like to send humans to the Moon—someday.

### Neg: Experts say we shouldn’t be focusing on the Moon-should invest our time in Mars

Chow 11**-Denise Chow, writer for space.com, 1-13-11, “The case against the moon: Why we shouldn’t go straight back,” http://www.marssociety.org/home/press/news/thecaseagainstthemoonwhyweshouldntgostraightback**

**Eleven other American astronauts would follow in Armstrong's footsteps over the course of NASA's Apollo program, which produced six moon landings in all**. Yet in the 38 years since the sixth landing, humans have not ventured back to their closest cosmic neighbor.

And perhaps we should not. **As NASA embarks on a new plan for space exploration amid political uncertainty and budgetary constraints**, some experts are hoping the space agency will look beyond the moon for the future of human spaceflight, and instead push deeper into our solar system than ever before.

"We've done the moon – we understand it better than anything else," Buzz Aldrin**, lunar module pilot on the Apollo 11 mission and second man to walk on the moon, told SPACE.com.** "We've got to stop thinking of short-term hurrahs and start thinking of long-term investments."

**With China and India aggressively moving forward with robotic and manned missions to the moon, some analysts envision a rehash of the 1960s moon race between the United States and the Soviet Union. And while some camps are calling for a return to the moon to expand lunar science and potentially construct moon bases, others are less thrilled at that prospect.**

**"As long as I've been involved in spaceflight, for about 20 years now, there has been this debate going on between the two groups," said Roger Launius, senior space history curator at the Smithsonian National Air and Space Museum in Washington. "I refer to them as the Martians and the Lunatics – the people who want to go to Mars, and the people who want to go back to the moon. No one side has the clear-cut answer. There are positives and negatives for both."**

**Moon vs. Mars**

**Launius said returning to the moon could address important scientific questions, such as the existence of water ice, but with the objective of traveling to Mars on the horizon, he wonders whether it would cause NASA to be "sidetracked with years upon years of lunar exploration."**

"I'm less excited about a human mission back to the moon," Launius said. "I remember the first ones – they were cool. I'd love to see us go to Mars, but it's much more complex and difficult. And I really question whether we're going to be able to develop the expertise to take a task like that on."

Others agree Mars is a more exciting destination and that a return to the moon should come eventually but should not top the space agency's list of priorities.

"A return to the moon should not be NASA's primary goal or focus in this decade," said Robert Zubrin, president of the Mars Society. "Rather, the proper goal of NASA's human spaceflight program should be human missions to Mars. From a technological point of view, we are much closer today to being able to send humans to Mars than we were to sending men to the moon in 1961, and we were there eight years later."

### Neg: No room for moon mission in obama’s budget and expert says investment in mars is more important

Chow 11**-Denise Chow, writer for space.com, 1-13-11, “The case against the moon: Why we shouldn’t go straight back,” http://www.marssociety.org/home/press/news/thecaseagainstthemoonwhyweshouldntgostraightback**

**Political climate**

**NASA's now-canceled Constellation program, established during the administration of President George W. Bush, aimed to return American astronauts to the moon by 2020. As part of the roughly $9 billion program, NASA was charged with developing new Ares rockets and a space capsule called Orion that would act as a replacement for the agency's retiring space shuttle fleet.**

But President Obama's 2011 budget request effectively shut down the moon-oriented Constellation program and shifted the focus of future U.S. space exploration toward asteroids and Mars**.**

**On Oct. 11, 2010, Obama signed a major NASA act that turned these lofty goals into law**. The signing officially scrapped the Constellation program and set the stage for a manned mission to an asteroid by 2025, followed by a manned mission to Mars, currently envisioned for some time in the 2030s.

**The new space plan also opens the door for private spaceflight companies to create commercial vehicles to ferry astronauts into low-Earth orbit (LEO) while NASA sets its sights on targets deeper into the solar system.**

**One such commercial firm is Space Exploration Technologies, commonly called SpaceX. The Hawthorne, Calif., company's Dragon capsule is designed to transport cargo, and eventually humans, aboard the company's Falcon 9 rocket to the International Space Station.**

"I think Mars, given that it holds the potential for making life multi-planetary, is much more important than the moon, and that should be the focus of future manned exploration," said Elon Musk, the chief executive of SpaceX**. "However, if there turns out to be a market for traveling to the moon, SpaceX will support that just as we support LEO activity."**

### U.S. will lose leadership if they go to the moon

Chow 11**-Denise Chow, writer for space.com, 1-13-11, “The case against the moon: Why we shouldn’t go straight back,” http://www.marssociety.org/home/press/news/thecaseagainstthemoonwhyweshouldntgostraightback**

**Maintaining a reputation of leadership**

In addition to his concern that sending more Americans to the moon would tie up resources that could be used to develop Mars-bound technology, Aldrin said engaging in another moon race would jeopardize the legacy of U.S. dominance in space exploration.

"Manned missions to the moon should carefully consider U.S. leadership in space as we expand human presence outward into the solar system," Aldrin said. "If we go back to the moon and get there second or third, that is not U.S. leadership.

Activities going back to the moon should be led by the U.S. – but not at the expense of leading the world in space and expansion outward."

**Arguments for human exploration of the Red Planet are no less politically charged.**

"Given courageous leadership, we could be on Mars by 2020. That should be our goal," Zubrin said**. "To say we cannot do it is to say we have become less than the kind of people we used to be, and that is something this country cannot accept and cannot afford."**

## A2 China

### A2 to space race advantage- China will win, the US doesn’t have the infrastructure

Gass 11- Henry Gass, contributor for The Ecologist, July 7, 2011, “Plans to Strip Mine the Moon May Soon be More Than Just Science-Fiction,” http://globalresearch.ca/index.php?context=va&aid=25542

Genge expects there won’t be mining operations on the Moon until there is a Moon base which mining operations can then attach themselves to. ‘It’s going to be a government that sets up a Moon base, whether it be the Americans—who are going to have to plan this from scratch. Probably more likely the Chinese,’ he says. In January 2004, Chinese Premier Wen Jiabao officially launched phase one of the Chinese Lunar Exploration Programme (CLEP), a three-phase programme aiming to send rovers to the Moon to collect lunar soil by 2017. In 2002, CLEP chief scientist Ouyang Ziyuan said: ‘Our long-term goal is to set up a base on the moon and mine its riches for the benefit of humanity.’

### Neg: No chance of China exploiting lunar resources-lacks technology and expertise and no reason to lie

Day 07**-Dwyane A. Day works for the Space Studies Board of the National Research Council/National Academy of Sciences, where he has served as a study director on studies concerning NASA's planetary exploration program, the threat of asteroids striking Earth, NASA workforce skills, radiation hazards to astronauts on long duration spaceflights, and other projects, Nov. 12, 07, “Exploding Moon myths: or why there’s no race to our nearest neighbor,” The Space Review, http://www.thespacereview.com/article/999/1**

**China is more complicated, however.**

**As Jim Oberg, a well-known and longtime observer of the Soviet and Russian space programs has noted, today we know far more publically about what the Chinese space plans are than we ever did about what the Soviet plans were during the Cold War. The Chinese release photographs and video of their spacecraft, talk about them at conferences and special events (see “China, competition, and cooperation”, The Space Review, April 10, 2006), and even produce PowerPoint slides on their future plans.** They have made clear that their lunar robotic plans include an orbiter in 2007, a soft landing in 2012, and lunar sample return in 2017. **Their human plans are slightly more obscure, but Chinese officials have stated that their goal is to conduct a spacewalk in 2008, a rendezvous perhaps by 2010, followed eventually by a small space station by 2015**. They have also stated that they have no plans for landing humans on the Moon in the next decade, but might begin thinking about it only after they have conducted a sample return mission by 2017.

**After Chang’e was launched, Chinese officials were even more blunt. In its November 5 issue Aviation** Week & Space Technology quoted several Chinese space officials emphatically denying that they have any manned lunar plans, and all noting that China lacks the technology or the expertise to undertake such a mission**.** This was borne out by a peculiar observation made by a lot of people at the recent IAF conference in India: virtually no Chinese space officials showed up despite the fact that China is located right next door to India. When one of the few who did show was queried about it, he said that virtually everybody was involved with the Chang’e launch and could not attend. Certainly the launch was important to China, but so is showing off to the rest of the world at space conferences, and their lack of attendance is consistent with what the officials told Aviation Week: the Chinese simply don’t have the depth of technical experience to do much more than they are doing already.

Of course, they could be lying. But **why should they? Or more precisely,** why should they tell the truth about the rest of their civil space program and lie about this? **Chinese officials prefer secrecy and obfuscation to baldfaced lies. They keep their military space plans secret, but they talk about their space exploration efforts quite a lot.** And so far their statements concerning space exploration have been consistent with their actions, so allegations of deception require a higher standard of proof than simply a gut instinct.

**Furthermore, there’s been no indication that they are lying about their lunar plans. High resolution commercial reconnaissance satellites overfly China every day.** Where’s the evidence of Chinese construction of lunar rocket launch facilities, or the kinds of test facilities they will require for a lunar lander? All of the media reports that China is planning on sending humans to the Moon are based upon flimsy evidence that, when traced back to its source, quickly falls apart due to poor translation or misunderstanding of Chinese comments**. For example, several years ago it was common for media sources—Agence France Press was the worst—to assume that Chinese discussions of plans for “lunar sample return” in 2017 meant “human lunar landing” in 2017.** They didn’t. Members of the media claiming that China has plans for sending humans to the Moon need better evidence than their own sloppy past articles.

It’s all happening on the Moon

### Does not matter if China exploits lunar resources first/China and U.S. are cooperating over space mission

O’Neill 08**-Ian O’Neill, Discovery News Space Science Producer, space physics doctor,Science communication, solar physics research, July 15, 08, “Griffin: China Could Beat US in Moon Race,” http://www.universetoday.com/15559/griffin-china-could-beat-us-in-moon-race/**

**As to whether it actually matters whether China are the next to land on the Moon is open to interpretation. After all, the first nation to set foot on Earth’s natural satellite was the USA, so is a return trip a big psychological “victory” for China? “I’m not a psychologist, so I can’t say if it matters or not. That would just be an opinion and I don’t want to air an opinion in an area that I’m not qualified tos discuss,” Griffin added.**

**Recently, there has been increased cooperation between the US and China when sharing science and information. “We do have some early co-operative initiatives that we are trying to put in place with China, mostly centred around scientific enterprises. I think that’s a great place to start,” he said. Although many will view an early Chinese lunar mission as a NASA failure, both nations appear to be trying to forge close relationships that could possibly lead to joint space missions in the future. After all, even at the peak of the Cold War, the US and Russia began working on a common goal.**

**“I think we’re always better off if we can find areas where we can collaborate rather than quarrel. I would remind your [audience] that the first US-Soviet human co-operation took place in 1975, virtually at the height of the Cold War. And it led, 18 years later, to discussions about an International Space Station (ISS) programme in which we’re now involved.” – Dr Michael Griffin**

**Regardless of who gets to the Moon first, Griffin will be feeling the pressure of the “five-year gap” between the Shuttle being retired in 2010 and Constellation completion in 2015, there is still little alternative than relying on Russia and Europe for US access to space. Griffin has tried to increase Constellation funding by $2bn to bring completion forward by a year, but the application was quickly turned down by Congress. Those five long years may be more costly than the US government realizes as NASA loses more footing in manned access to space…**

### Their impacts are inevitable- China’s rise to hegemony is unstoppable.

Yoon-Je – 11, Cho Yoon-je, professor at Sogang University Graduate School of International Studies,

6/27/11, “[Viewpoint] Planning for China’s hegemony” <http://joongangdaily.joins.com/article/view>. asp?aid=2938060

he Chinese economy has been galloping away at an average annual pace of 10 percent for the last three decades.The pace beats Korea’s 9.7 percent average during its first 30 years of industrialization from 1962 to 1991, Taiwan’s 8.8 percent from 1957 to 1986, and Japan’s 8.3 percent from 1946 to 1975. In comparison, Great Britain, Europe and the United States grew from 2 percent to 4 percent during their economic leaps in the 18th and 19th centuries.Even if China’s growth falls to between 5 percent and 6 percent over the next two decades, the country will soon match our per capita income level of $20,000. If its currency is allowed to appreciate to reflect its economic might, the country will attain such an income level much earlier. In one or two decades, there will be around 30 countries with economies similar in size to ours.While Korea grew its per capita income from $5,000 to $20,000, the global economy underwent changes, adjusting economic policies and systems as well as manufacturing and exporting structures.In turn, the exceptional growth of the four Asian tigers - Korea, Taiwan, Hong Kong and Singapore - caused few ripples in the global economy.But China’s ascent to a high-income industrialized economy in the next few decades will reshape the world economy. The world will have to adjust to having scarcer commodities and accommodate environmental pollution from massive Chinese-funded investments and consumer spending. Economies will be flooded by a cascade of cheaper Chinese products and services.When China reaches a per capita income of $20,000, the world will become China’s oyster. Taiwan, Hong Kong and Singapore - which are also run by ethnic Chinese - have already entered the $20,000 income threshold. There is no reason why the mainland, with its broader and better pool of human resources and tradition, cannot join the ranks.All other Asian countries with the same Confucian roots - except North Korea and Vietnam - have graduated into becoming advanced economies.The next two decades will bring about staggering changes and conflict within China as well as with the world. A China with a $20,000 per capita income will outshine the U.S. economy in many ways. It would become the largest stakeholder in international lenders like the International Monetary Fund and the World Bank if they remain viable until then.And China will be a powerhouse, wielding enormous clout in international forums and the global economic order. The renminbi will become as much of a standard in the global market as the U.S. dollar. […]We must realign our state strategy with the recognition of China’s inevitable hegemony in the coming years. China, the world and the Korean Peninsula will face turmoil in the next one or two decades. But how prepared are we? Do we have reliable leadership and social potential as well as economic resilience to weather the enormous historical headwind? We don’t have much time to get our act together.

### Chinese hegemony good- solves democracy and North Korea

Yoon-Je – 11, Cho Yoon-je, professor at Sogang University Graduate School of International Studies,

6/27/11, “[Viewpoint] Planning for China’s hegemony” <http://joongangdaily.joins.com/article/view>. asp?aid=2938060

No country can sustain an imbalance between economic and political freedoms for long.Autocracy eventually crumbles once an economy becomes wealthier and developed.China’s economic success will most likely accelerate demands for reform in its political system. Different forces could come together and shake China’s economic and political landscapes to pursue greater balance between political and economic freedoms. Japan during the postwar period as well as Korea and Taiwan during their industrialization in the 1980s and 1990s transformed into democratic societies as a result of a deepening imbalance.China will have to accelerate liberalizing reforms if it wants to achieve high income, but that will come at the cost of political instability and democratization.The changes could also spill over to North Korea.

**Democratic consolidation crucial to global stability and preventing extinction**
Diamond – 95, Larry Diamond, Hoover Institution, Stanford University, December 1995, Promoting Democracy in the 1990s” [http://www.carnegie....y/diam\_rpt.html](http://www.carnegie.org//sub/pubs/deadly/diam_rpt.html)

Nuclear, chemical and biological weapons continue to proliferate. The very source of life on Earth, the global ecosystem, appears increasingly endangered. Most of these new and unconventional threats to security are associated with or aggravated by the weakness or absence of democracy, with its provisions for legality, accountability, popular sovereignty and openness. The experience of this century offers important lessons. Countries that govern themselves in a truly democratic fashion do not go to war with one another. They do not aggress against their neighbors to aggrandize themselves or glorify their leaders. Democratic governments do not ethnically "cleanse" their own populations, and they are much less likely to face ethnic insurgency. Democracies do not sponsor terrorism against one another. They do not build weapons of mass destruction to use on or to threaten one another. Democratic countries form more reliable, open, and enduring trading partnerships. In the long run they offer better and more stable climates for investment. They are more environmentally responsible because they must answer to their own citizens, who organize to protest the destruction of their environments. They are better bets to honor international treaties since they value legal obligations and because their openness makes it much more difficult to breach agreements in secret. Precisely because, within their own borders, they respect competition, civil liberties, property rights, and the rule of law, democracies are the only reliable foundation on which a new world order of international security and prosperity can be built.

Korean war escalates and goes nuclear
STRATFOR – 10, 5/26/10, “North Korea, South Korea: The Military Balance on the Peninsula,” <http://www.stratfor.com/analysis/20100526_north_korea_south_korea_military_balance_peninsula>, JMP)

Managing Escalation But no one, of course, is interested in another war on the Korean Peninsula. Both sides will posture, but at the end of the day, neither benefits from a major outbreak of hostilities. And despite the specter of North Korean troops streaming under the DMZ through tunnels and wreaking havoc behind the lines in the south (a scenario for which there has undoubtedly been significant preparation), neither side has any intention of invading the other. So the real issue is the potential for escalation — or an accident that could precipitate escalation — that would be beyond the control of Pyongyang or Seoul. With both sides on high alert, both adhering to their own national (and contradictory) definitions of where disputed boundaries lie and with rules of engagement loosened, the potential for sudden and rapid escalation is quite real. Indeed, North Korea’s navy, though sizable on paper, is largely a hollow shell of old, laid-up vessels. What remains are small fast attack craft and submarines — mostly Sang-O “Shark” class boats and midget submersibles. These vessels are best employed in the cluttered littoral environment to bring asymmetric tactics to bear — not unlike those Iran has prepared for use in the Strait of Hormuz. These kinds of vessels and tactics — including, especially, the deployment of naval mines — are poorly controlled when dispersed in a crisis and are often impossible to recall. For nearly 40 years, tensions on the Korean Peninsula were managed within the context of the wider Cold War. During that time it was feared that a second Korean War could all too easily escalate into and a thermonuclear World War III, so both Pyongyang and Seoul were being heavily managed from their respective corners. In fact, USFK was long designed to ensure that South Korea could not independently provoke that war and drag the Americans into it, which for much of the Cold War period was of far greater concern to Washington than North Korea attacking southward. Today, those constraints no longer exist. There are certainly still constraints — neither the United States nor China wants war on the peninsula. But current tensions are quickly escalating to a level unprecedentedin the post-Cold War period, and the constraints that do exist have never been tested in the way they might be if the situation escalates much further.

[insert terminal impact/ other Korean war impact]

## A2 Germany

### Germany not interested in lunar resources-another example of press getting it wrong

Day 07**-Dwyane A. Day works for the Space Studies Board of the National Research Council/National Academy of Sciences, where he has served as a study director on studies concerning NASA's planetary exploration program, the threat of asteroids striking Earth, NASA workforce skills, radiation hazards to astronauts on long duration spaceflights, and other projects, Nov. 12, 07, “Exploding Moon myths: or why there’s no race to our nearest neighbor,” The Space Review, http://www.thespacereview.com/article/999/1**

The recent press coverage of Germany’s possible interest in the Moon is yet another demonstration of how the press can get it wrong about this subject. **To be fair, the article itself was pretty clear**: the German government did not announce an actual lunar program, even if Reuters chose the misleading and awkward headline “Germany Plans Unmanned Lunar Orbit.” **(How does one plan a “lunar orbit” anyway?) A senior government official merely acknowledged that the German aerospace agency was submitting a plan for a Lunar Exploration Orbiter to the government leadership for approval**. The German government long ago gutted its space program following reunification in order to divert money to rebuilding the former East Germany—in some ways putting German aerospace in the same situation as emerging space powers like China and India.

**The Chinese lack of attendance at the recent IAF conference is consistent with what officials told Aviation Week: the Chinese simply don’t have the depth of technical experience to do much more than they are doing already.**

**But Germany’s recent announcement was not a complete surprise to close observers of international space programs. A German company recently completed a government-funded study of a potential planetary exploration program called Mona-Lisa which includes both lunar orbiters and landers. So clearly somebody in the German government was thinking about changing course and possibly reinvigorating their space program.**

**Whether the German government wants to truly revive its moribund space program remains an open question**. But the German parliamentary official stated why he thinks Germany should do this and it has nothing to do with a space race (Asian or Aryan), resources, or humans, although he said it would be “useful” for scientific research. “It is,” he said, “a chance for Germany to prove its competence in this area.”

India, China, and Japan have all said that same thing. It’s too bad that often the press prefers their myths to the facts.