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LEVERAGING U.S. GEO-STRATEGIC POSITIONAL ADVANTAGE TO PREVAIL IN A MERCANTILE WORLD

by

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Biography

Lieutenant Colonel Jeremey Turner graduated from the U.S. Air Force Academy in 1995 with a Bachelor's degree in Operations Research and the U.S. Army School of Advance Military Studies in 2008 with a Master's Degree in Military Arts and Science. Lieutenant Colonel Turner is an HH-60 combat rescue helicopter pilot with nearly 2000 flying hours including combat experience in OEF and OIF. He has also commanded at the squadron level in combat and in garrison and worked in the Office of the Secretary of Defense providing advice on personnel recovery policy.

Abstract

Since World War II, the United States has achieved dramatic economic and political success as guarantor of the global liberal international order. As the Department of Defense considers future planning scenarios, globalization-driven changes in that order may result in a more mercantilist structure dominated by segregation into competitive trade blocs. If such a future comes to pass, three characteristics will define the 2035 strategic environment: demographics will determine many states' power in international relations, the need to guarantee access to natural resources will guide the relations of competitors, and competitors will achieve technology-enabled military capabilities on par with the United States. This study explores how the United States can use its geo-strategic positional advantage to prevail in such a circumstance.

A strategy focused on the area of the globe where the United States has direct access absent a viable competitor – the area of geo-strategic positional advantage – will allow the United States to prevail among competitors. Strategy ends consistent with U.S. interests and a mercantile environment are a well-defended homeland, access to markets and natural resources, and freedom of action in an area of influence. The ways to achieve the ends are building robustness in military and economic security, establishing and maintaining an area of influence, and managing natural resources and trade to exercise control over the area of influence.

A strategy of geo-strategic positional advantage will require changing U.S. military posture and capabilities to enable the control of trade routes and production facilities in the area of interest. While the geo-strategic positional advantage strategy may receive pushback, the U.S. combination of economic power and the ability to mass military power locally will stymie any pushback effort. As a result, a geo-strategic positional advantage strategy can enable the United States to prevail in a mercantilist order.

Introduction

Since World War II, the United States has achieved dramatic economic and political success as guarantor of the global liberal international order.[1] The effects of globalization continue to create shifts within this order, however, and nothing assures the United States of continued military and economic primacy. Future events may result in any number of alternative international structures becoming dominant. This inherent uncertainty is forcing U.S. defense planners to consider what other orders may emerge in an effort to understand the implications of those structures on future defense requirements. One of these variants is the reemergence of a more mercantilist international order dominated by the segregation of economic, military, and political power into competitive trade blocs.[2] This study explores how the United States can leverage its geo-strategic positional advantage to prevail in such an international system by establishing a dominant trade bloc in the Western Hemisphere including western Africa.

Developing a strategy to prevail in this alternative future environment begins by characterizing the future environment, including relevant demographic and military trends. The next step is to explore the geo-strategic positional advantage the U.S. may enjoy in this system and how this position contributes to the development of a hemispheric strategy to prevail against other blocs. Finally, strategy development requires examining potential counter moves and providing considerations to mitigate such resistance. Before delving into the aspects of strategy formulation, however, a discussion of this future competitive trade bloc environment is necessary.

Strategic Environment

The most likely basis for the emergence of a mercantilist future would be a decision made by the United States or China that undermines the current system. Compelling reasons

exist for either of these states to leave the existing international order. China could seek a new balance of power that reflects its growing status. While this can occur under the current structure, Chinese leaders may want a new order that reduces the U.S. structural influence and that reflects the Chinese philosophical view.[3] China's emerging trade policies also imply a movement away from free trade and toward mercantilism. China is actively pursuing strategies to maximize the export of finished products while minimizing their import. Competitors accuse China of manipulating its currency to promote trade imbalances, establishing unfair tariff structures, and using state mechanisms to fund companies while failing to enforce international intellectual property rights. The intended result of these policies is the creation of Chinese monopolies in the international market.[4] The United States may also choose to abandon the current structure.

The underlying democratic construct of the current international order allows weaker states to undermine the U.S. power advantages. The combination of multiple rising powers and democratic equality in the United Nations General Assembly may lead to balancing behavior against the United States on important economic and political concerns. States with views different from those of the United States on liberalization, human rights, and economic policy could unify against U.S. interests.[5] The United States may also turn away from free trade. Globalization allows efficient use of capital and production capacity, but also drives down local wages and places excessive pressure on industry to compete on an uneven field. Facing these results, the United States may decide that free trade does not provide sufficient benefit to continue as state policy.[6] The abandonment of the current international order by either the United States or China will cause its replacement by another order.

A plausible follow-on structure is one more focused on regional trading blocs and regional power arrangements. Several factors could shape the system. First, demographics could determine many states' power in international relations. Second, a need to guarantee access to natural resources could guide the international relations of the competitors. Finally, these forces may spur the competitors to pursue improved military capabilities to secure their respective influence spheres. These characteristics will combine to form the environment.

Demographics[7]

States will seek resources to meet the increasing needs of the world population, but specific demographics will affect each state's ability to influence world affairs. Different states will experience unique demographic challenges as the global population increases significantly.[8] The growth, however, will not be equal across all states. As shown in Table 1, the population of India will increase from approximately 1.2 billion to approximately 1.6 billon, while Russia decreases from 139 million to 130 million.

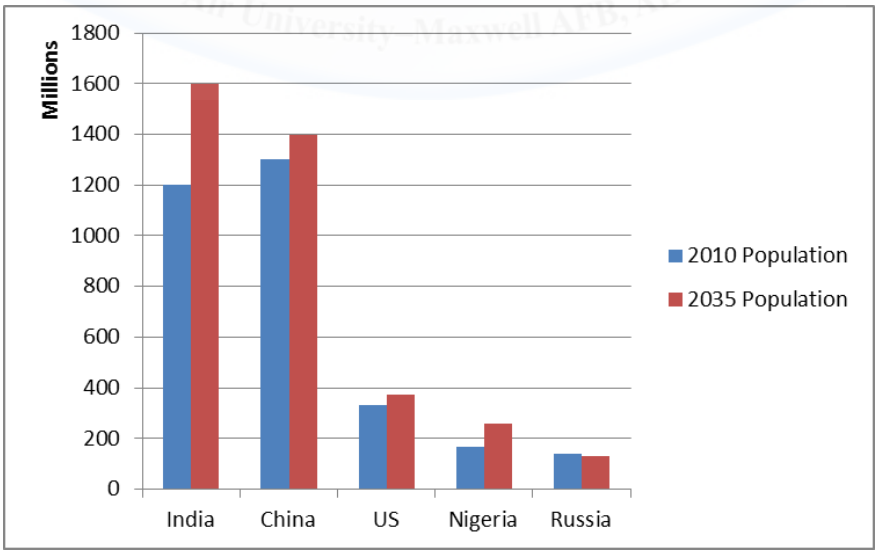


Table 1: Population of Selected States 2010 versus 2035

Demographic factors such as population growth rate and age distribution will enable or inhibit states' application of power in the international order. Russia will undergo a population

decrease even as its population over age 65 expands to more than 20%. This combination will result in internal challenges sufficient to undermine any global leadership aspirations Russia may have. Nigeria will have the opposite problem with the same result. Nigeria will undergo rapid population growth by 2035, with 42% of the population under 15 years old. Meanwhile, India's working population will expand rapidly. In 2035, approximately 65% of the population will be of working age with just 12% over the age of 65. This presents a different challenge for India as the state deals with the stark reality of absorbing 10 million people per year into India's economy. The knock-on effects of India's workforce expansion will require changes in their society, culture, and civil law and order. The challenge of implementing these adjustments, combined with other internal challenges, will relegate India to regional, not global, competition. The manageable growth of the working age populations in China and the United States, though, will drive those states to aggressively pursue access to the resources necessary to support and develop their populations.

Access to Resources

The pursuit of natural resources will define the geographic areas in which the United States will establish its bloc. Figure 1 shows the approximate expected area of influence available to the United States through leveraging geo-strategic positional advantage. The three resources vital to the United States prevailing in a mercantilist competition are petroleum, rare earth elements, and potash. Each of these resources is available in areas where the United States will have a geo-strategic positional advantage over competitors. Petroleum, specifically oil, will determine the areas critical for the United States to control.

Figure 1: United States Area of Influence and Trade Bloc

The United States must maintain access to foreign oil resources despite becoming an energy exporter by 2035. The United States will have an excess of natural gas available for export, but will still require imported oil to fuel its transportation sector for the foreseeable future.[9] Access to and protection of oil deposits in Canada and the Arctic, West Africa, and Brazil will largely define the north, east, and south boundaries of the U.S. area of interest. West African rare earth element deposits will further define the southeast boundary.

The United States does not have the rare earth element production capability required to sustain its high-technology economy and defense system. The unique characteristics of the elements make them indispensable in the fabrication of many modern electronic devices and military systems.[10] To make up for the lack of production facilities, the United States must gain and maintain access to those resources and facilities found on the west coast of Africa.[11] The final vital resource is potash.

Controlling the potash within the United States area of influence will provide strategic leverage against China. Potash is an element of fertilizer necessary to provide food security to

large states. China will require an enormous volume of potash to ensure food production for its population, but it produces little potash domestically. Canada has the world's largest deposits of minable potash and the ability to control China's access to those reserves will strengthen the U.S. competitive position.[12] Consequently, Canada's potash and oil resources are vital to the United States prevailing in a mercantile future and will help define the United States area of interest.

Access to oil, rare earth elements, and potash is vital to determining the extent of the United States area of interest. The U.S. trade bloc will consist of the states within the area of influence. Conflict may occur at the edges of the area as competitors vie for position at the extremes of their influence. That conflict will prove challenging as competitors find themselves in a world of military parity.

Military Capabilities

The United States and China will compete for markets and natural resources. Absent the current trade structure, those competitions will result in the creation of trading zones within which each dominant state will compel exclusive access. To enforce those zones, the states will develop increasingly advanced military capabilities that will result in military parity among the competitors and the military dominance American political leaders previously enjoyed will cease to exist. The ability to control specific geographic areas, specifically trade routes and production facilities, will become vital. Consequently, the application of military mass and persistence will become deciding factors in conflict as technological parity predominates.[13]

With technology generating military parity, the potential for conflict exists at the seams between areas of influence. Success in strategic competition will result from the ability to take and control vital areas by massing forces and then persistently projecting influence. Using this construct in a mercantilist future, the United States must control trade routes and production

facilities as key terrain. A geo-strategic positional advantage strategy will enable the United States to establish the capability to decisively mass forces and persistently control vital areas of the globe.

Geo-strategic Positional Advantage Strategy

Military parity in a mercantile world will undermine the U.S. current security strategy. The United States must therefore develop a new strategy that accounts for parity. Implementing a strategy that focuses on the section of the globe where the United States has direct access without a viable competitor – areas of geo-strategic positional advantage – will allow the United States to prevail among strategic competitors in a mercantile world. The core elements of a geo-strategic positional advantage strategy are securing the U.S. homeland, establishing and controlling trade access to an area of influence, and gaining compliance from the states of the western hemisphere.

The United States can leverage its advantage to establish a trade bloc from western Africa into the Pacific Ocean. Establishing and maintaining the bloc will require minimizing trade between the blocs and the withdrawal of competitors from the U.S. area of influence. The United States must control access by extra-regional competitors. With such control, the United States could lead a significant portion of the global economy.[14] Creating the trade bloc, while increasing U.S. homeland defensive capabilities, will allow the United States to achieve its security ends through achievable ways that leverage available means. To assess the capability of a geo-strategic positional advantage strategy to succeed in achieving security ends, a discussion of those ends is necessary.

Strategic Ends and Ways

Three strategy ends consistent with U.S. historic interests and the mercantile environment are these:

1. A well-defended homeland,
2. Access to markets and natural resources, and
3. Freedom of action in a U.S. area of influence absent a competitor.[15]

These ends provide a security environment that will allow the United States to continue its prosperity. Sovereignty requires a homeland defense that includes both military protection and continuous access to markets and resources for economic development.[16] Finally, in a mercantilist world the United States must have the capability and freedom to exert influence over its area of interest and to suppress or exclude competitors. The United States can achieve these national security ends through several ways.

A strategy of geo-strategic positional advantage would use three ways to achieve its ends:

1. Building robustness into national systems that will ensure military and economic security,
2. Establishing an area of influence enabled by the U.S. geo-strategic positional advantage, and
3. Exercising control over the area of influence by managing access to natural resources and trade.

Several means are necessary for the execution of each of these ways. A convenient model for considering those means is one that addresses power application from diplomatic, information, military, and economic (DIME) domains.

Means to Achieve Economic and Military Security

Robustness in the U.S. economic and military security establishes the conditions necessary for projecting influence over a trade bloc. The diplomatic effort must begin with Canada and Mexico. In many ways, North America is already acting as a single economic and security entity.[17] Sovereignty concerns remain a stumbling block for full integration of security

arrangements, but the diplomatic effort must cement unity among the North American states.[18] The next step in building security is to convey that the United States is resilient.

The information means to economic and military security is to openly send the message that the U.S. has strong protections, survivability if those protections fail, and resiliency to return rapidly to the status quo after a disruption.[19] This effort will induce doubt in an adversary's cost-benefit analysis and the uncertainty may deter the adversary. However, credibility matters for messaging effectiveness and the Unites States must enhance its military defenses to gain the necessary credibility.

A credible homeland defense must include missile defenses able to engage hypersonic weapons, the ability to control and defend access to national shores, and an ability to threaten rapid counterstrikes following an attack. While the United States does currently have some capability in these missions, improvement is necessary. The current missile defense system emphasizes the mid-course phase.[20] The system remains inadequate for engaging sophisticated weapons or more than a limited number of weapons.[21] Maritime control to defend national shorelines also lags behind the necessary capabilities.[22] Finally, a credible defense requires the ability to conduct strikes to prevent or respond to an attack. Hypersonic weapons would provide this capability. This combination of military advancements will provide the military elements necessary to defend the U.S. homeland. It is not reasonable, however, to expect perfect defense.

The United States must create the capability to economically absorb and recover from a disruption. A disruption can come from natural events or manmade occurrences.[23] In either case, the United States must assess and improve its ability to persevere by developing resilient and adaptable infrastructure.

Several critical segments of United States infrastructure are vulnerable to disruption. Among those segments are natural resource processing and distribution and electrical power generation and distribution. Fragile infrastructure limits the resiliency of each of these. The most vital natural resource processing and distribution risk relates to petroleum, because the production and distribution of all other resources rely on its availability.[24] Vulnerability exists in the petroleum refining and distribution system that transports products throughout the United States. A long-term disruption of a small number of refineries will cause petroleum product shortages throughout the system. The gulf coast of the United States contains a cluster of specialized refineries, concentrating the risk of a systemic disruption.[25] Another set of natural resources with production challenges are rare earth elements.

The United States lacks the infrastructure for the rare earth element supply chain. Prior to 2010, the United States imported 100% of rare earth element-based components needed for the production of high-technology electronics used in civilian and military systems.[26] The United States must resolve this limitation to remain competitive in a mercantile environment.

The solution to these natural resource issues is a significant expansion in production and refining capability.[27] The absence of sufficient access to usable natural resources is a strategic vulnerability in a mercantilist world. Failing to address production and refining deficiencies will limit the competitiveness of the United States. Similar challenges exist in power production and distribution.

The 2003 blackout in the northeastern United States demonstrated the fragility of the electrical power system. Direct current connections linking geographic areas allow areas with insufficient power production to pull from areas with excess capacity to meet demand.[28] The electrical system also balances production and demand within an area. This structure results in

consistent access to power during normal usage and inhibits universal system failures through area-level isolation, but also makes each area into an island entity in the case of a failure.[29]

Threats or damage to the system will have broad consequences. Power production margins are narrow and will get worse.[30] A failure of a small amount of production capacity can produce a cascading failure of the system. The power distribution system then isolates, stops attempting to power, the failed segments to reduce the burden on the remaining system. Within an area, the cascade stops when isolation protocols balance with the production and distribution capability margin in the remaining system.[31] The consequences of sustained or rolling power disruptions could devastate the economy and the United States must avoid them.[32]

Inoculating the United States against disruptions in its power generation and distribution system will require significant changes in concept and capacity. The first necessity is the development of distributed production capacity. This will allow the creation of severable power islands each of which will have a capacity margin. Additionally, the power system must be able to specifically deliver capacity to nodes critical to maintaining civil society, such as police and fire stations. These changes, along with increases in distribution line capability and stores of critical equipment, will move the United States toward electrical system resiliency.[33] Combining this effort with assured access to natural resources will bolster the economic resiliency of the United States.

The beginning of a strategy of geo-strategic positional leverage is securing the U.S. homeland economically and militarily. Stronger linkages with Canada and Mexico, messaging robustness to competitors, increasing military defenses, and building robustness into critical infrastructure will provide that security. From that base, the United States can establish an area of influence.

Means to Create an Area of Influence

A combination of geographic location and force projection capability places the United States in a position to exert influence over a vast section of the globe.[34] Establishing an area of influence will require action in each of the domains of the DIME model. The first step is to use diplomacy to gain access to the key terrain under others' control.

The United States can ensure access to strategically vital bases on Ascension Island, Saint Helena, the Azores Islands, and the Galapagos Islands by solidifying relationships with the United Kingdom, Portugal, and Ecuador. Ascension Island and Saint Helena are British Overseas Territories.[35] The United States can expand and leverage its ties with the United Kingdom to secure basing on those islands. The United States is currently the second largest importer of goods from the United Kingdom and allowing the United States to use bases in their territories will maintain good relations. Additionally, the United Kingdom is a net energy importer and has diminishing energy resources.[36] By 2035, the United States will be an energy exporter and can leverage that capability to gain basing rights.[37] Similarly, the United States already uses a position in the Azores.

Portuguese demographic trends provide the opportunity to ensure continuing U.S. access to the Azores. For example, trends indicate that a significant percentage of its population will be older than 65.[38] The United States can ensure cooperation from Portugal by assisting in financially underwriting its retirement program, which is not fully funded.[39] Two options for this effort are increasing imports from Portugal through advantageous trade policies or the use of direct payments. Regardless of the method, simple economics will secure basing from Portugal. Ecuador is more challenging and gaining basing rights on Galapagos will require creative diplomacy.

Helping Ecuador develop industry to expand its natural resource economy can provide the means to secure Galapagos basing. Oil exports currently provide the foundation for Ecuador's economy and the United States is Ecuador's largest oil trading partner.[40] The opportunity for creative diplomacy comes from Ecuador's undeveloped mineral industry. By 2035, Ecuador will have a growing working age population.[41] At the same time, the emergence of the United States as an energy exporter will undermine the state's economic base. Ecuador has substantial deposits of precious and base minerals, but minimal industry to access the deposits.[42] The United States should provide direct investment in infrastructure to enable Ecuador to access its mineral resources in exchange for basing rights on Galapagos. These diplomatic efforts with the United Kingdom, Portugal, and Ecuador will provide the United States access to the key strategic terrain needed for a geo-strategic positional advantage strategy, but broad economic engagement is also necessary.

The United States must establish economic ties with the other countries in its area of influence. Some of those ties will be mutually beneficial, but some will not. In 2035, the United States will have the world's second largest economy. That position will allow it to use economics, supported by military power, to compel participation in a trade bloc.

The information effort toward establishing an area of influence will use two themes. The first will clearly describe the geographic area the United States claims as exclusive. The second theme will convey the certainty of consequences for a competitor's incursion into the area. In effect, the message will convey that the United States is embarking on the next in its series of Monroe Doctrine expansions.[43] The information effort will convey the message, but to succeed in establishing its area of influence the United States will need to redeploy its military forces.

Establishing the area of influence will require a strategic military redeployment and restructuring. A world of mercantilism, military parity, and becoming an energy exporter should limit the interests the United States will pursue. As a result, U.S. military forces should return from Europe, Asia, and the Middle East to redeploy within the homeland and to the locations necessary to execute the geo-strategic positional advantage strategy. The European Union will remain a significant economic power, but the United States will withdraw military forces from Europe.[44] Without a threat to Europe that places United States interests at risk, the United States will expect Europe to take on the burden of its security.[45] Withdrawing from Asia will reduce tensions with China and will establish an expectation of similar disengagement from the U.S. area of interest. Such a quid pro quo balance is consistent with Chinese cultural norms.[46] Finally, energy independence will allow the United States to withdraw from the Middle East since no vital interest will remain there.[47] Balancing the withdrawal will be a deployment of forces into areas that allow power projection into the area of influence. Additional strategic deployments along the United States coast and into Hawaii and Alaska are also necessary. The United States must also conduct a strategic restructuring to establish an area of influence.

A strategy of geo-strategic positional advantage requires changing the U.S. mix of military capabilities. The two capabilities vital to the strategy are homeland defense against deep strike weapons and force projection capabilities. As a result, the United States must shift the force structure away from traditional land power and toward air power, sea power, missile defense, and into resiliency in space and cyber capabilities. Completing the redeployment and restructuring of the United States military will be critical to the strategy. The combined diplomatic, informational, military, and economic efforts will allow the United States to establish its area of influence. The next step in the strategy is controlling a competitor's access.

Means to Control Access

The United States must manage access to natural resources and trade routes within the area of influence. That management will rely on military capability. The military must place at risk valuable trade routes and industrial facilities in uncooperative states. To do so, it must leverage Alaska, Hawaii and Galapagos in the Pacific Ocean and the Azores Islands, Ascension Islands, and St Helena near Atlantic Ocean trade routes as well as homeland bases. From those positions, the United States can place all of the trade routes and industrial capacity in the area of influence at risk.[48] The threat that risk poses to competitors and states within the area of influence will control access to the area. That control, in conjunction with an economically and militarily defended homeland and an established area of influence, will allow the United States to achieve its desired ends in a mercantile environment. A geo-strategic positional advantage strategy, however, could face resistance.

Pushback and Mitigation

Pushback from China

The geo-strategic positional advantage strategy may receive pushback from a competitor or those within the area of influence. China has significant interests and investments in the proposed U.S. area of influence.[49] The United States should expect China to pushback against exclusion from the area. The African continent is the most likely conflict point between the influence areas as the United States and China compete for access to resources there. In that competition, the United States will have two advantages. First, China's military capabilities and strategic culture indicate indirect conflict or harmonizing with the environment as likely responses.[50] Second, India will act as a regional buffer to China's access to Africa.

China's military is growing and modernizing. To confront the United States directly, China must be able to project sufficient military power to force the United States to accept Chinese engagement in the area. China is unlikely to have such a power projection capability by 2035. China is currently 20 years behind the U.S. military power projection capability and if present trends continue, the gap will remain significant.[51] The inability to project power should limit China's ability to compete with the United States in Africa or in the eastern Pacific Ocean. Consistent with its culture and expected military capabilities, China is more likely consolidate its regional power and its bloc. China's regional focus will also provide the United States with a lever against it, China's regional competitors.

If Asian regional powers continue their current policies, they are likely to balance against China. Indications of this exist in India, Japan, and Australia. India's Look East policy seeks to hedge against rising Chinese regional power.[52] Supporting India's efforts could provide a buffer between U.S. interests in Africa and China. Japan has a complicated history with China. As China's regional power increases, Japan will likely increase its efforts to integrate China into regional structures and could cooperate with other Asian states to balance against China's military.[53] Australia is likely to use cultural soft power to influence China as it democratizes.[54] The cumulative effect of these efforts should keep China's focus on regional challenges, not on conflict with the United States. With effectiveness of military conflict questionable, China will most likely adjust to the resulting environment.

China is already pursuing mercantilist policies and should expect the United States to respond.[55] Adapting to the U.S. response, China will probably seek to balance its interests in the resulting environment. Harmonizing with the environment will require withdrawing its commercial interests from the U.S. area in return for similar compensation from the United

States. This separation will define the areas of influence. With the exception of its access to the U.S. trade bloc, China's access to markets will remain unchanged. China has direct connectivity to Asian and Russian markets. It also connects to European markets through the Suez Canal. Additionally, the potential for two new trade routes, a new Silk Road overland and an Arctic Ocean trade route, exists.[56] To aid the acceptance process, the United States should coordinate an accord between the United States, Russia, and China that allows Chinese access to Arctic trade routes through the Bering Strait if the goods are bound for markets outside the U.S. trade bloc. With direct confrontation undesirable and alternatives to confrontation available, China will adapt to the existence of a U.S. bloc. Regional powers within the area, however, may also pushback.

Pushback from Aspiring Regional Powers

Although aspiring regional powers within the U.S. area of influence may resist its creation, the power differential between the United States and the regional powers should compel their acceptance of it. Brazil and Venezuela may provide pushback, but each of these states is weak economically and militarily when compared to the United States.[57] Access to the United States market, particularly as China withdraws from the hemisphere, should compel cooperation. Further, the economy of each of these states relies on petroleum exports. As an energy exporter, the United States will have significant influence over the price of energy commodities, and subsequently over the economic prowess of Brazil and Venezuela. A comparable power difference exists in in the military domain.

The strategic locations the United States must use to establish its area of influence will allow it to threaten trade routes and industrial facilities within trade bloc. Neither Brazil nor Venezuela has the ability to counter United States military capabilities. China is not expected to

be capable of projecting forces into the eastern Pacific Ocean or central Atlantic Ocean against U.S. resistance nor should its interests compel extra regional intervention. Unlike in the Asian case, the vast power differential and the absence of assistance from a peer competitor of the United States should make any balancing effort by Brazil and Venezuela ineffective. The rational choice will be to partner or bandwagon with the United States and accept the benefits of cooperation.

Conclusion

Even without a globally dominant military, the unique geo-strategic position of the United States provides advantages in a mercantilist environment. Establishing a trade bloc, the United States can achieve ends consistent with its traditional interests: a well-defended homeland, suitable access to natural resources and markets, and freedom of action in the U.S. area of influence. The United States can accomplish this by building robustness into national systems that will ensure economic and military security, establishing and maintaining an area of influence, and exercising control over the area of influence by managing access to natural resources and trade routes. While the United States can expect pushback to the strategy, economic and military mitigation avenues exist that should create acceptance of the area of influence.

Notes

1. G. John Ikenberry, "A World of Our Making," *Democracy: A Journal of Ideas* Volume 21, (Summer 2011): http://www.democracyjournal.org/21/a-world-of-our-making-1.php?page=all.

2. Frederic Labarre examined the mercantile aspects of Russia's international relations in his 2007 presentation for the Conference of Defense Associations Institute graduates titled *Russian Neo-Mercantilism*. More recently, the Information Technology and Innovation Foundation published Robert Atkinson's *Enough is Enough: Confronting Chinese Innovation Mercantilism*. Each paper discussed the mingling of government and capitalist economics as a returning means of isolating segments of the world and exerting influence in international relations.

3. Randall Schweller and Xiaoyu Pu discussed this in their article, "After Unipolarity: China's Visions of International Order in an Era of U.S. Decline," as did Dr. Jian Yang, Senior Lecturer, Department of Political Studies, University of Auckland, in his 2008 speech to the Young Leaders Network Forum.

4. Robert Atkinson, *Enough is Enough: Confronting Chinese Innovation Mercantilism*, (Washington, D.C.: Information Technology and Innovation Foundation, 2012), 7.

5. Ali Wyne in "American Decline and the Liberal Order," *The National Interest,* (December 12, 2012): 1 and 2, http://nationalinterest.org/commentary/american-decline-the-liberal-order-7836. See also Tobias Bunde and Timo Noetzel in "Unavoidable Tensions: The Liberal Path to Global NATO," *Contemporary Security Policy*, Vol.31, No.2 (August 2010), 295–312 and Patrick Stewart in "Irresponsible Stakeholders: The Difficulty of Integrating Rising Powers," *Foreign Affairs*, November/December 2010.

6. Ian Fletcher, "Six Reasons for U.S. to Abandon Free-Trade Myth," *Bloomberg*, October 25, 2010, http://www.bloomberg.com/news/2010-10-26/six-reasons-for-u-s-to-drop-free-trade-myth-commentary-by-ian-fletcher.html (accessed January 28, 2013).

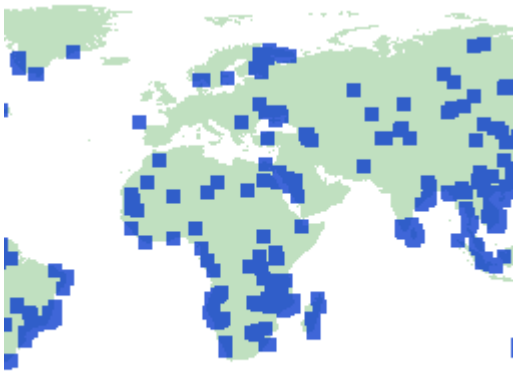
7. All demographic data came from the United Nations Department of Economic and Social Affairs through its online database located at http://esa.un.org/unpd/wpp/country-profiles/country-profiles_1.htm , accessed December 14, 2012.

8. The United Nations forecasts that the world population will increase from approximately 7 billion in 2010 to nearly 9 billion in 2035.

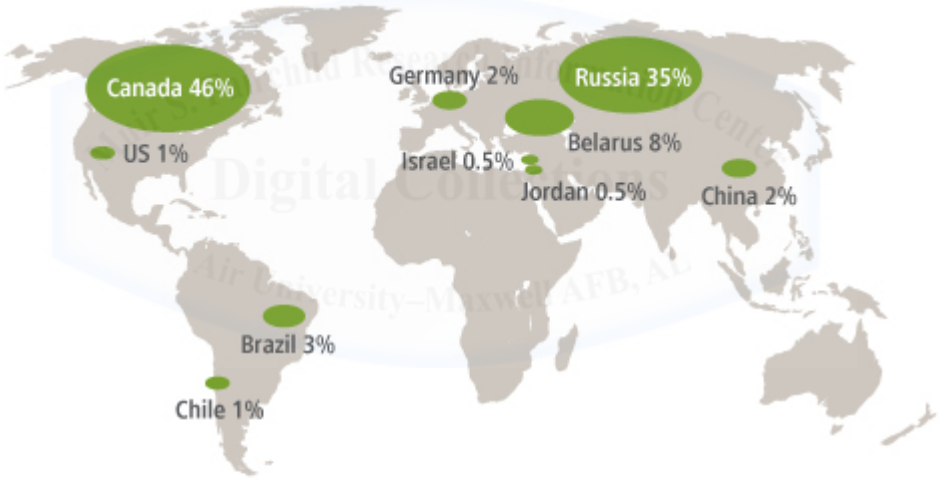
9. US Energy Information Administration, *Annual Energy Outlook with Projections to 2035*, (Washington D.C.: US Department of Energy, 2012), 3.

10. Marc Humphries, *Rare Earth Elements: The Global Supply Chain*, (Washington D.C.: Congressional Research Service, 2012), 2, 11-13.

11. United States Geological Survey data shows significant concentrations of rare earth elements on the west coast of Africa as shown in this map available from http://tin.er.usgs.gov/catalog/cite-view.php?cite=845 accessed January 28, 2013.

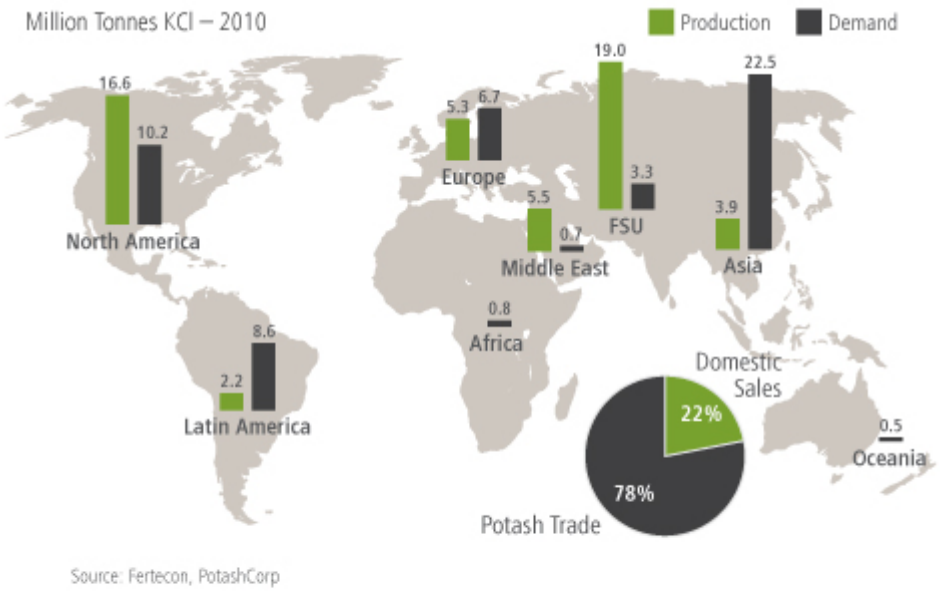


12. As depicted in these 2011 graphics from the United States Geographical Survey and PotashCorp, 46% of the world's potash reserves are in Canada while China has just 2%. Simultaneously, China demands nearly six times its annual production. Graphics available at http://www.potashcorp.com/industry_overview/2011/nutrients/4/ and http://www.potashcorp.com/industry_overview/2011/nutrients/5/ accessed January 28, 2013.



* Share of world's potash reserves; reserves as indicated by the US Geological Survey
Other countries total 1 percent.

Source: United States Geological Service



13. The critical enabler of the advanced military capabilities of 2035 will be phenomenally capable low cost computers. Linking these powerful computers will be a ubiquitous network that uses advanced switches to transmit terabytes of data per second. These combined technologies will allow nearly instantaneous processing and sharing of information. Ray Kurzweil's book, *The Singularity is Near,* offers a compelling discussion of how computing speed and power has grown exponentially since the 1970s. Following what the computer industry refers to as Moore's Law, the speed and power of computers doubles every 18 months to two years, while the cost of a computer decreases by 50% in the same period. The ability to miniaturize transistors and pack them increasingly densely on a silicon wafer is the mechanism of Moore's Law. Current computers use 22 nanometer gaps, but the industry expects to release chips based on 14 nanometer gaps by 2014 and sub-10 nanometer gaps could be available before 2020. Manufacturing challenges, however, plague the pursuit of decreasing gaps on silicon. The limitations of using silicon to produce computer chips may begin to slow the exponential rate, but other technologies are coming to the forefront as potential replacements. In 2012, Hongsik Park and his collaborators published an article in *Nature Nanotechnology* titled "High-density integration of carbon nanotubes via chemical self-assembly" discussing experiments with nanotubules that demonstrated the ability to precisely organize them on a substrate and to create the electromagnetic spectrum band gaps necessary for their effective use in electronics. This type of technology coupled with others in temperature control and multi-chip architecture could provide the background for continuing advances in computing speed and power. The continuation of Moore's law through 2035 will result in 11 to 15 doublings in the power and speed of computers. Michio Kaku discusses processes and information sharing in, *Physics of the Future: How Science will Shape Human Destiny and Our Daily Lives by the Year 2100* (New York, NY: Anchor Books, 2011), 43-46. Military parity has significant implication for defense

planning. Technological advances will drive parity in the war fighting domains and place the United States homeland at risk of conventional attack. Parity will occur in respective domains as a result of the following mechanisms:

Air. In the air domain, networked multispectral sensors linked to advanced computers will allow increased understanding of complex battle spaces. Jiang Weijina and Xu Yuhuib discuss this problem in "Distributed Cooperation Solution Method of Complex System Based on Multi-Agent Systems," *Physics Procedia 25*, 2012, 1438 – 1444. Penetration of that air defense system will not be survivable for strike aircraft and the U.S. advantage in the air domain will disappear. Although offensive systems will also leverage advanced computing, the advantages from Moore's Law will decisively benefit the defense due to the lower cost of system production and potentially shorter acquisition processes enabled by the use of generalist, rather than specialized, nodes. The impact of the machine gun and artillery on linear warfare may provide an instructive historical analogy for consideration. Michael Howard discusses the impact of technological advance in firepower in his article, "Men Against Fire: The Doctrine of the Offensive in 1914," in *Makers of Modern Strategy: from Machiavelli to the Nuclear Age*, edited by Peter Paret. Regarding the acquisition trends, consider 2009's *Defense Science Board Report on Department of Defense Policies and Procedures for the Acquisition of Information Technology* from the Office of the Under Secretary of Defense For Acquisition, Technology, and Logistics.

Nuclear. The nature of the nuclear domain generates parity. The consequences of even a single nuclear attack on the United States would be catastrophic. Despite expected advancements in anti-ballistic missile technologies, the United States cannot expect they will provide an impenetrable defense. The National Research Council discusses this in *Making Sense of Ballistic Missile Defense: An Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives*, (Washington, DC: National Academies Press, 2012), 152. Therefore, the United States will achieve parity, despite an overwhelming weapons advantage, because its definition of success disallows any attack exchange.

Sea. Similarly, technological advances will erode United States dominance in both surface and sub-surface sea power. Swarm attacks from small, autonomous, but cooperative, weapons with advanced explosives will place unacceptable risks on surface ships by overwhelming them or exhausting magazines. Once the weapons penetrate the defense, nanotechnology enabled weapons will levy significant damage on the target. The risks to surface ships and submarines result from the synergy of targeting, networking, advanced explosives and defensive limits. To examine these elements see: Scott Peterson, "How Iran could beat up on America's superior military," *The Christian Science Monitor*, January 26, 2012, accessed at http://www.csmonitor.com/World/Middle-East/2012/0126/How-Iran-could-beat-up-on-America-s-superior-military/%28page%29/2 on December 14, 2012. Cullen Sarles, Alexandria Byrd, Ron Duarte, Dr. Karl von Ellenrieder, Daniel Gorelik, Mark Groden, Robert Gutzwiller, Davis Knox, Greg Koch, Jeremy Payne, John Reeder, Phillip Verbancsics, Virginia Wang, Dr. Robert A. Brizzolara also addressed this topic in "UV Sentry: A Collaborative Approach to Creating a Collaborative System," (Washington, DC: Office of Naval Research). Anupam Tiwari addressed this topic in "Military Nanotechnology," *International Journal of Engineering Science and Advanced Technology* Volume-2, Issue-4, 829. Eric Drexler and Chris Peterson with Gayle Pergamit also discuss this in *Unbounding the Future: the Nanotechnology Revolution*, (New York, NY: William Morrow and Company Inc, 1991), 145, 157. Finally, Sean Naylor examined

it in "War Games Rigged?" *Army Times*, (August 16, 2002), located at http://www.armytimes.com/legacy/new/0-292925-1060102.php, accessed December 14, 2012. Submarine capabilities will likewise be at risk. With technologies under development, oceans may become effectively transparent by 2035, degrading subsurface stealth. Ocean transparency is a serious threat to the U.S. submarine fleet. Emerging technologies that could expose submarines include improved acoustic networks, as discussed in the Georgia Tech research paper, "Underwater Acoustic Sensor Networks," gravimetric analysis, as discussed in the American Scientist article, "Detecting Irregular Gravity," and multi-spectral sensors as discussed by David Stein, Jon Schoonmaker, and Eric Coolbaugh in *Hyperspectral imaging for Intelligence, Surveillance, and Reconnaissance*, from SPAWAR Systems Center San Diego.

Space. In space competitors will match or deny U.S. capabilities. Miniaturization and advanced computing will allow competitors to generate capabilities similar to those of the U.S. space systems at lower cost. Futron Corporation examined space lift costs in *Space Transportation Costs: Trends in Price Per Pound to Orbit 1990-2000*, 4-5. As well, competitors will enjoy increasing returns on investment of deploying space-based systems as the systems get smaller, thus less expensive to deploy, and become more capability dense. China's development of a precision navigation and timing system, BieDou-2, and its deployment of an imaging system, Yaogan, serve as examples of this potential. Ground-based denial and deception systems targeting U.S. space capabilities are also in development. See Robert Ackerman, "Space Vulnerabilities Threaten U.S. Edge in Battle," Signal, June 2005, located at http://www.afcea.org/content/?q=node/973 accessed December 14, 2012. Additionally, Chinese scientific teams led by Cheng Xi-jun recently published papers on executing denial of service and spoofing attacks on the U.S. Global Positioning System from ground positions. The 2011 Department of Defense's annual report to Congress, *Military and Security Developments Involving the People's Republic of China*, states that the Chinese have the capability to attack space-based assets directly and indirectly. For those states that choose to operate in the space domain, the available technologies will rapidly impart parity in space capabilities with the United States. The combination of technologies and reduced cost will dramatically lower the barriers to conducting space operations and individual state interests rather than the ability to overcome technological challenges will determine which states do so.

Cyber. Conflict in the cyber domain will become commonplace. The effects of the conflict will vary from annoyance to serious challenges to the security of the United States. In cyber conflict, defense is exceptionally challenging. Inherent in the network structure are access points and vulnerabilities competitors will leverage. Consequently, successful cyber defense will be a robust capability to absorb attacks and return U.S. systems to pre-attack condition in minimum time. The challenge of offensive cyber conflict is the lack of definitive attribution of actions causing subsequent inability to target adversaries. See Andrew Krepinevich, *Cyber Warfare: A Nuclear Option*, (Center for Strategic and Budgetary Assessment, 2012), 47-51.

Land. The changing character of warfare will erode the U.S. advantages in the land domain. While large traditional land combat capabilities will remain vital, decisive victory will not come from major combat operations. Rather, the effort to achieve political end states will require increasing capability in Phase IV and Phase V operations, peace operations, counter insurgency operations, and counter terror operations. See *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, (Washington, DC: Government Printing Office, 2012), 4-6.

The nature of this type of warfare imparts parity as land forces contend over a population. Simultaneously the nature of cyber operations will impart parity in that domain.

Moral/Ethical. Legal and ethical structures in the United States inhibit the use of some information warfare tactics that its competitors will use. In the information domain, the United States values truth and accuracy over speed. As a result, the United States often delays messaging on a subject. While this provides integrity to its messages, the process is much slower than that of adversaries who are more concerned with shaping the narrative than truth. James Farwell discusses adversary advantages in "Jihadi Video in the 'War of Ideas'" *Survival*, volume 52, number 6, December 2010–January 2011, 145–148. This mismatch will not subside and the United States will constantly find itself attempting to counter the perceptual bias created by its competitor's more rapid response. Truth versus speed will result in parity in information operations.

Finally, advancing technology will place the U.S. homeland under direct risk of attack by non-nuclear weapons. Hypersonic missiles will be able to deliver advanced conventional warheads to the United States accurately from intercontinental ranges. These weapons will travel at speeds between five and eight times the speed of sound and will deliver weapons effects accurately according to Dr. Michael Richman in "High Speed / Hypersonic S&T & Networked Weapons," Office of the Deputy Under Secretary for Science and Technology presentation, charts 8, 23. The United States will not have a defensive network capable to intercept this type of weapon as assessed by the National Research Council in *Making Sense of Ballistic Missile Defense: An Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives*, (Washington, DC: National Academies Press, 2012), 152. Unless the United States builds significant protections and redundancy into its critical infrastructure, a small number of these weapons could produce severe disruptions of its economy. While the United States would hold any competitor at similar risk, the balanced nature of the resulting relationship is parity.

14. Although changes to the international order make economic predictions difficult, a trade bloc covering the U.S. area of influence would control 30% of today's global gross domestic product. The bloc's exclusive market also currently contains more than 930 million people. The bloc would also have shared access to European markets. This information is from the International Monetary Fund World Economic Outlook Database. It is the aggregated 2010 data for the western hemisphere available at http://www.imf.org/external/pubs/ft/weo/2010/01/weodata/index.aspx accessed December 14, 2012.

15. *National Security Strategy*, (Washington, DC: Office of the President of the United States, 2010), 7. Also see Paul Miller, "Five Pillars of American Grand Strategy," *Survival: Global Politics and Strategy*, volume 54, number 5, 7-44 reflect the consistency of these ends over time.

16. Without a secure and economically growing homeland the United States will not be able to pursue its other security ends. Access to markets and natural resources is critical to national security. Such access enables the development and sustainment of economic power. See Michael Beckley, "Economic Development and Military Effectiveness," *Journal of Strategic Studies*, number 1 (February 2010), 43-79.

17. The United States is the largest trade partner for both Canada and Mexico, accounting for nearly 50% of exports in each case. The relationships are mutually beneficial accounting for more than 25% of U.S. imports and more than 30% of its exports. Central Intelligence Agency

World Fact Book, Canada, "Economy," https://www.cia.gov/library/publications/the-world-factbook/geos/ca.html, accessed December 14, 2012; Central Intelligence Agency World Fact Book, Mexico, "Economy," https://www.cia.gov/library/publications/the-world-factbook/geos/mx.html, accessed December 14, 2012. Leaders from the countries also routinely meet during North American Leaders' Summits to coordinate policies on a broad range of issues, including security. See M. Angeles Villarreal, *U.S.-Mexico Economic Relations: Trends, Issues, and Implications*, (Washington, D.C.: Congressional Research Service, August 9, 2012), 11.

18. Roberto Domínguez and Rafael Velázquez, "Obstacles for Security Cooperation in North America," *IPPCS Colloquia*, (Miami, Fl: Florida International University, February 2012), 11.

19. This message will imply that any attack on the United States would produce fleeting advantage at best and would be a futile expenditure of resources at worst. In his book, *Bombing to Win: Air Power and Coercion in War* (Ithaca, NY: Cornell University Press, 1996), Robert Pape presents this concept as coercion through the denial of an adversary's military strategy. The target influences the adversary's calculation of success by introducing doubt about the likelihood of achieving objectives through the available military means. Coercion by denial differs from the coercion through threat of punishment that dominated the Cold War. For more information on coercion by punishment see Thomas Schelling's discussion of punishment strategy in his book, *Arms and Influence* (New Haven, CT: Yale University Press, 1966). Further, establishing this thought structure in an adversary's mind will alter the perception of all other information taken in by the adversary. Any new information will have to break through the perceptual bias. See Edward Russo and Anne-Sophie Chaxel, "How persuasive messages can influence behavior without awareness," *Journal of Consumer Psychology*, volume 20, (2010), 338-342.

20. Department of Defense, *Ballistic Missile Review Report*, (Washington D.C.: February 2010), 15.

21. National Research Council, *Making Sense of Ballistic Missile Defense: An Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives*, (Washington, DC: National Academies Press, 2012).

22. Statement of Admiral James Winnefeld, Jr., Commander of the United States Northern Command and North American Aeorspace Defense Command, before the House Armed Services Committee, March 30, 2011.

23. Potentially devastating natural events include earthquakes, storms, or solar emissions while manmade threats include a competitor's attack using conventional precision strikes or terrorist proxy forces, or an industrial accident.

24. US Energy Information Administration, *Annual Energy Outlook with Projections to 2035*, (Washington D.C.: US Department of Energy, 2012), 71.

25. The petroleum refining capacity of the United States creates the vulnerability. The U.S. 144 refineries operate at more than 96% of their barrel-per-day processing capability. Vulnerability also exists in the transport segment. For example, companies transport petroleum processed along the southern border of the United States to the northeast for commercial sale. Disruption among refineries specialized for processing crude oil from Mexico and Canada could further exacerbate the problem by effectively removing such oil from the world market. Congressional Budget Office, *Energy Security in the United States*, (Washington, D.C.: Government Printing Office, 2012), 29.

26. The United States possesses 9% of the world supply of rare earth elements, but only has two mining facilities. China, the most likely leader of a competitor bloc, controls 97% of the rare

earth element market. See Marc Humphries, *Rare Earth Elements: The Global Supply Chain*, Congressional Research Service (2012), 11 and 13.

27. Expansion of petroleum refining requires overcoming profitability and regulatory hurdles. See Lawrence Kummins, Brent Yacobucci, and Larry Parker, *Refining Capacity – Challenges and Opportunities Facing the U.S. Industry*, Petroleum Industry Research Institute (2012), 9. As well, the expansion of rare earth element component production will require the creation of an entire supply chain according to Marc Humphries, in *Rare Earth Elements: The Global Supply Chain*, (Washington D.C.: Congressional Research Service, 2012), 6.

28. To enhance reliability, the North American, excluding Mexico, power grid has four interconnected areas. National Research Council, *Terrorism and the Electric Power Delivery System*, (Washington, D.C.: National Academies Press, 2012), 22.

29. U.S.-Canada Power System Outage Task Force, *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*, (Washington, D.C. U.S. Department of Energy, 2004), 87.

30. Power production margins are the differential between production capacity and demand. If expected efficiencies from changing consumer behavior do not materialize, they will get much worse. See North American Electric Reliability Corporation's, *2012 Long Term Reliability Assessment*, page 13.

31. A cascading failure results from a failure of a small amount of production capacity that results in increased demand on supporting production distribution systems. If the demand becomes excessive, the system will shut down the production or distribution node to protect it from damage. That action places further demand on the remainder of the network, increasing the probability of another node exceeding its demand capability and shutting down. Recovering from a large shutdown creates challenges. The reintegration of isolated sections must occur in a way that does not initiate a new excessive demand spike. If the power production capability receives damage, there may not be sufficient remaining margin to reenergize the entire system. In that case, the system must use other mitigation methods, such as rolling blackouts, to keep demand manageable. See U.S.-Canada Power System Outage Task Force, *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*, (Washington, D.C.: U.S. Department of Energy, 2004), 73-77.

32. A study on California's 2001 rolling blackouts estimated that they cost the state $32 billion dollars, in 2012 dollars, and more than 135 thousand jobs. According to the US Government Bureau of Labor Statistics Consumer Price Index inflation calculator $21.8 billion 2001 real dollars becomes $32 billon in 2012 dollars. Calculation available at http://www.bls.gov/data/inflation_calculator.htm accessed 14 Dec 2012. See AUS Consultants, *Impact of a Continuing Electricity Crisis on the California Economy*, (Moorestown, NJ: 2001), 2.

33. National Research Council, *Terrorism and the Electric Power Delivery System*, (Washington, DC: National Academies Press, 2012), 65.

34. U.S. Air Force Center for Strategy and Technology, *Striking Globally: Knowledge, Reach, and Power in the Age of Surprise*, Blue Horizons 2012 presentation.

35. The United States already has a presence at the Royal Air Force Ascension Island Station. The United Kingdom is also building an airfield on Saint Helena.

36. Central Intelligence Agency World Fact Book, United Kingdom, "Energy," https://www.cia.gov/library/publications/the-world-factbook/geos/uk.html, accessed December 14, 2012.

37. US Energy Information Administration, Refinery Capacity Report 2012, (Washington, D.C.: U.S. Department of Energy, 2012), 96.

38. All demographic data came from the United Nations Department of Economic and Social Affairs through its online database located at http://esa.un.org/unpd/wpp/country-profiles/country-profiles_1.htm , accessed December 14, 2012.

39. Asghar Zaidi, *Fiscal and Pension Sustainability: Present and Future Issues in EU Countries*, European Centre, (February 2010), 7, 8, and 14.

40. The United States consumes nearly 38% of Ecuador's total exports, the majority in the form of oil. See Global Edge, *Ecuador: Economy,* Michigan State University Board, College of Business, located at http://globaledge.msu.edu/countries/ecuador/economy, accessed December 14, 2012.

41. All demographic data came from the United Nations Department of Economic and Social Affairs through its online database located at http://esa.un.org/unpd/wpp/country-profiles/country-profiles_1.htm , accessed December 14, 2012.

42. Susan Wacaster, *The Mineral Industry of Ecuador,* U.S. Geological Survey, (Washignton, D.C.: U.S. Department of the Interior, 2011), 2 and 3.

43. James Monroe, Annual Message to Congress, (December 2, 1823), located at http://www.ourdocuments.gov/doc.php?flash=true&doc=23, accessed on December 14, 2012.

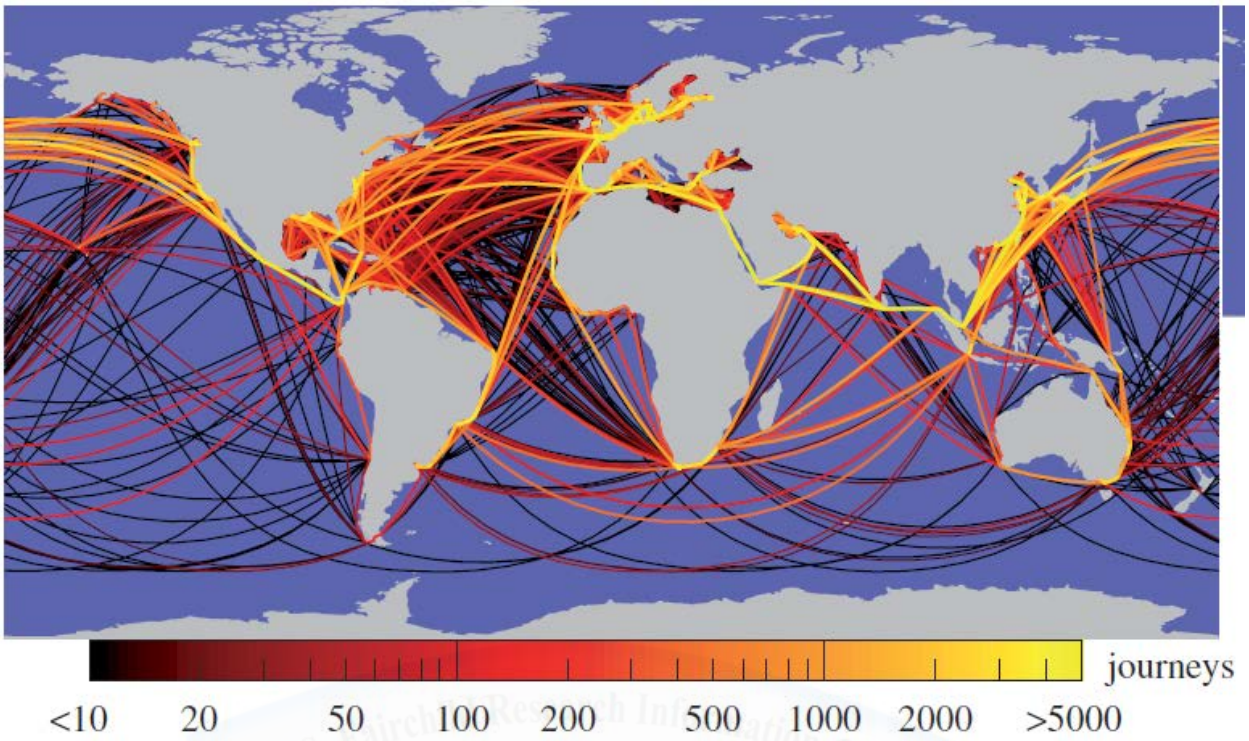
44. Uri Dadush and Bennett Stancil, *The World Order in 2050,* Carnegie Endowment for International Peace, (2010), 2.

45. Ellen Hallams and Benjamin Schreer, "Towards a 'post-American' alliance? NATO burden-sharing after Libya", *International Affairs*, volume 88, number 2, (2012), 313-327.

46. John Geis II, Scott E. Caine, Edwin F. Donaldson, Blaine D. Holt, Ralph A. Sandfry, *Discord or "Harmonious Society"? China in 2030,* Center for Strategy and Technology, U.S. Air Force Air University, (2011), 12, 13, and 100.

47. Loren Thompson, "What Happens When America No Longer Needs Middle East Oil?" *Forbes*, December 3, 2012, http://www.forbes.com/sites/lorenthompson/2012/12/03/what-happens-when-america-no-longer-needs-middle-east-oil/ (accessed December 14, 2012).

48. The figure shows the number of journeys by merchant ships larger the 10,000 gross tons by route in 2007. It is representative of the position and density of trade routes on the seas.



See Pablo Kaluza, Andrea Kölzsch, Michael Gastner and Bernd Blasius, "The Complex Network of Global Cargo Ship Movements", *Journal of the Royal Society Interface*, (19 January, 2010).

49. Statement of Roger Noriega Assistant Secretary, Bureau of Western Hemisphere Affairs, US State Department, before the House of Representatives Committee on International Relations, April 6, 2005.

50. Thomas Mahnken, *Secrecy & Stratagem: Understanding Chinese Strategic Culture*, Lowy Institute for International Policy, (Double Bay, NSW, Australia: Longueville Media, 2011). China's greatest leverage would be through economic conflict including using its ownership of U.S. debt and dollar reserves, but the mercantile environment leading to the creation of the area of influence presupposes the existence of economic conflict; negating any additional advantage from such efforts.

51. Harold Brown, Joseph Prueher, Adam Segal, *Chinese Military Power*, Maurice R. Greenberg Center for Geoeconomic Studies, (Council on Foreign Relations, 2003), 24.

52. Thongkholal Haokip, "India's Look East Policy," *Third Concept – An International Journal of Ideas*, volume 24, number 291, (May 2011), 7-11.

53. The Tokyo Foundation, *Japan's Security Strategy Toward China: Integration, Balancing, and Deterrence in the Era of Power Shift*, (2011), 5-6.

54. Abhijit Iyer-Mitra, *Joining the US against China?: The Secret Chapter in Australia's Defence White Paper*, Institute of Peace and Conflict Studies, (June 2012).

55. Robert Atkinson, *Enough is Enough: Confronting Chinese Innovation Mercantilism*, Information Technology and Innovation Foundation, (February 2012), 11.

56. Yu Bin, "China-Russia Relations: Succession, SCO, and Summit Politics in Beijing," *Comparative Connections*, (September 2012), 5. See also: Arctic Council, *Arctic Marine Shipping Assessment 2009 Report*, (2009), 115-122.

57. Central Intelligence Agency World Fact Book, Venezuela, “Economy,” https://www.cia.gov/library/publications/the-world-factbook/geos/ve.html, accessed December 14, 2012. See also Central Intelligence Agency World Fact Book, Brazil, “Economy,” https://www.cia.gov/library/publications/the-world-factbook/geos/br.html, accessed December 14, 2012.

Bibliography

Ackerman, Robert. "Space Vulnerabilities Threaten U.S. Edge in Battle." *Signal*, June 2005.

Akyildiz, Ian, Dario Pompili, and Tommaso Melodia. *Underwater acoustic sensor networks: research challenges Broadband and Wireless Networking Laboratory*. School of Electrical and Computer Engineering, Georgia Institute of Technology. Atlanta, GA: 21 January 2005. http://www.ece.gatech.edu/research/labs/bwn/surveys/underwater.pdf.

American Scientist article. "Detecting Irregular Gravity." *American Scientist*, May/Jun2010, Vol. 98 Issue 3.

Arctic Council. *Arctic Marine Shipping Assessment 2009 Report*. Washington, D.C. U.S. Department of State, 2009.

AUS Consultants. *Impact of a Continuing Electricity Crisis on the California Economy*, Moorestown, NJ: 2001.

Beckley, Michael. "Economic Development and Military Effectiveness," *Journal of Strategic Studies*, number 1. February 2010.

Bin, Yu. "China-Russia Relations: Succession, SCO, and Summit Politics in Beijing," *Comparative Connections*. September 2012.

Brown, Harold, Joseph Prueher, and Adam Segal. *Chinese Military Power*. New York, NY: Council on Foreign Relations, 2003.

Bunde, Tobias and Timo Noetzel. "Unavoidable Tensions: The Liberal Path to Global NATO," *Contemporary Security Policy*, Vol.31, No.2. August 2010.

Congressional Budget Office, *Energy Security in the United States*. Washington, D.C.: 9 May, 2012.

Dadush, Uri and Bennett Stancil. *The World Order in 2050*. Carnegie Endowment for International Peace, Washington, D.C.: 2010.

Domínguez, Roberto and Rafael Velázquez. *Obstacles for Security Cooperation in North America*. Suffolk University, 2012.

Drexler, Eric and Chris Peterson with Gayle Pergamit. *Unbounding the Future: the Nanotechnology Revolution*. New York, NY: William Morrow and Company Inc, 1991.

Farwell, James. "Jihadi Video in the 'War of Ideas'." *Survival*, volume 52, number 6, December 2010–January 2011.

Fletcher, Ian. "Six Reasons for U.S. to Abandon Free-Trade Myth." *Bloomberg.* October 25, 2010.

Futron Corporation. "Space Transportation Costs: Trends in Price Per Pound to Orbit 1990-2000." Bethesda, MD: 2002.

Geis II, John, Scott E. Caine, Edwin F. Donaldson, Blaine D. Holt, Ralph A. Sandfry, *Discord or "Harmonious Society"? China in 2030*. Center for Strategy and Technology. U.S. Air Force Air University, 2011.

Global Edge. *Ecuador: Economy*. Michigan State University Board. College of Business: 2012.

Hallams, Ellen and Benjamin Schreer. "Towards a 'post-American' alliance? NATO burden-sharing after Libya." *International Affairs*, volume 88, number 2, 2012.

Haokip, Thongkholal. "India's Look East Policy," *Third Concept – An International Journal of Ideas*. volume 24, number 291, May 2011.

Howard, Michael. "Men Against Fire: The Doctrine of the Offensive in 1914." in *Makers of Modern Strategy: from Machiavelli to the Nuclear Age* edited by Peter Paret. Pinceton, NJ. Princeton University Press, 1986.
Humphries, Marc. *Rare Earth Elements: The Global Supply Chain*. Washington D.C. Congressional Research Service, 2012.
Ikenberry, G. John. "A World of Our Making," *Democracy: A Journal of Ideas* Volume 21, Summer 2011.
International Monetary Fund World Economic Outlook Database. http://www.imf.org/external/pubs/ft/weo/2010/01/weodata/index.aspx (accessed December 12, 2012).
Iyer-Mitra, Abhijit. *Joining the US against China?: The Secret Chapter in Australia's Defence White Paper*. Institute of Peace and Conflict Studies, June 2012.
Kaku, Michio. *Physics of the Future: How Science will Shape Human Destiny and Our Daily Lives by the Year 2100*. New York, NY: Anchor Books, 2011.
Kaluza, Pablo, Andrea Kölzsch, Michael Gastner and Bernd Blasius. "The Complex Network of Global Cargo Ship Movements." *Journal of the Royal Society Interface*. 19 January 2010.
Krepinevich, Andrew. *Cyber Warfare: A Nuclear Option*. Washington, D.C.: Center for Strategic and Budgetary Assessment, 2012.
Kurzweil, Ray. *The Singularity Is Near*. New York, NY: Penguin Books, 2005.
Labarre, Frederic. *Russian Neo-Mercantilism.* Presentation for the Conference of Defense Associations Institute, 2007.
Mahnken, Thomas. *Secrecy & Stratagem: Understanding Chinese Strategic Culture*. Lowy Institute for International Policy, 2011.
Miller, Paul. "Five Pillars of American Grand Strategy." *Survival: Global Politics and Strategy* volume 54, number 5, 2012.
Monroe, James. Annual Message to Congress. December 2, 1823.
National Research Council. *Making Sense of Ballistic Missile Defense: An Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives*. Washington, D.C.: National Academies Press, 2012.
National Research Council. *Terrorism and the Electric Power Delivery System*. Washington, D.C.: National Academies Press, 2012.
National Security Strategy. Washington, D.C.: Office of the President of the United States, 2010.
Naylor, Sean. "War Games Rigged?" *Army Times*, August 16, 2002.
Noriega, Roger. Assistant Secretary, Bureau of Western Hemisphere Affairs. U.S. State Department, before the House of Representatives Committee on International Relations, April 6, 2005.
North American Electrical Reliability Corporation. *2012 Long Term Reliability Assessment*, 2012.
Park, Hongsik. "High-density integration of carbon nanotubes via chemical self-assembly." *Nature Nanotechnology*, 2012.
Peterson, Scott. "How Iran could beat up on America's superior military." *The Christian Science Monitor*, January 26, 2012.

Richman, Michael. "High Speed / Hypersonic S&T & Networked Weapons." Presentation at the Precision Strike Technology Symposium. Office of the Deputy Under Secretary for Science and Technology, 2005.
Russo, Edward and Anne-Sophie Chaxel. "How Persuasive Messages Can Influence Behavior Without Awareness." *Journal of Consumer Psychology*, volume 20, 2010.
Sarles, Cullen, Alexandria Byrd, Ron Duarte, Dr. Karl von Ellenrieder, Daniel Gorelik, Mark Groden, Robert Gutzwiller, Davis Knox, Greg Koch, Jeremy Payne, John Reeder, Phillip Verbancsics, Virginia Wang, Dr. Robert A. Brizzolara. "UV Sentry: A Collaborative Approach to Creating a Collaborative System." Washington, D.C.: Office of Naval Research, 2012.
Schelling, Thomas. *Arms and Influence.* New Haven, CT: Yale University Press, 1966.
Schweller, Randall and Xiaoyu Pu. "After Unipolarity: China's Visions of International Order in an Era of U.S. Decline." *International Security* volume 36, issue 1, Summer 2011.
Stein, David, Jon Schoonmaker, and Eric Coolbaugh. *Hyperspectral Imaging for Intelligence, Surveillance, and Reconnaissance*. SPAWAR Systems Center San Diego, 2001.
Stewart, Patrick. "Irresponsible Stakeholders: The Difficulty of Integrating Rising Powers," *Foreign Affairs* 89, November/December 2010, 44-53.
Thompson, Loren. "What Happens When America No Longer Needs Middle East Oil?" *Forbes*, December 3, 2012. http://www.forbes.com/sites/lorenthompson/2012/12/03/what-happens-when-america-no-longer-needs-middle-east-oil/.
Tiwari, Anupam. "Military Nanotechnology." *International Journal of Engineering Science and Advanced Technology*, volume-2, issue-4, 2012.
The Tokyo Foundation. *Japan's Security Strategy Toward China: Integration, Balancing, and Deterrence in the Era of Power Shift.* Tokyo, Japan: Tokyo Foundation, 2011.
United Nations Department of Economic and Social Affairs. "Country Profiles." http://esa.un.org/unpd/wpp/country-profiles/country-profiles_1.htm.
U.S.-Canada Power System Outage Task Force, *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations.* Washington D.C.: U.S Department of Energy, 2004.
U.S. Central Intelligence Agency World Fact Book. Australia, "Economy." 2012.
U.S. Central Intelligence Agency World Fact Book. Brazil, "Economy." 2012.
U.S. Central Intelligence Agency World Fact Book. Canada, "Economy." 2012.
U.S. Central Intelligence Agency World Fact Book. Japan, "Economy." 2012.
U.S. Central Intelligence Agency World Fact Book. Mexico, "Economy." 2012.
U.S. Central Intelligence Agency World Fact Book. United Kingdom, "Energy." 2012.
U.S. Central Intelligence Agency World Fact Book. Venezuela, "Economy." 2012.
U.S. Department of Defense. *Ballistic Missile Review Report.* Washington, D.C.: Office of the Secretary of Defense, February 2010.
U.S. Department of Defense. *Department of Defense's annual report to Congress, Military and Security Developments Involving the People's Republic of China.* Washington, D.C.: 2011.
U.S. Department of Defense. *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*. Washington, D.C.: Government Printing Office, 2012.
U.S. DOD Office of the Under Secretary of Defense For Acquisition, Technology, and Logistics. *Defense Science Board Report on Department of Defense Policies and Procedures for the*

Acquisition of Information Technology. Washington, D.C.: Government Printing Office, March 2009.
U.S. Energy Information Administration. *Annual Energy Outlook with Projections to 2035*. Washington, D.C.: U.S. Department of Energy, 2012.
U.S. Energy Information Administration. *Refinery Capacity Report 2012*. Washington, D.C.: U.S. Department of Energy, 2012.
Villarreal, M. Angeles. *U.S.-Mexico Economic Relations: Trends, Issues, and Implications.* Congressional Research Service, August 9, 2012.
Wacaster, Susan. *The Mineral Industry of Ecuador*. U.S. Geological Survey, US Department of the Interior, 2011.
Weijina, Jiang and Xu Yuhuib. "Distributed Cooperation Solution Method of Complex System Based on Multi-Agent Systems." *Physics Procedia* 25, 2012.
Winnefeld, Jr., James, Commander of the United States Northern Command and North American Aeorspace Defense Command. Statement before the House Armed Services Committee, March 30, 2011.
Wyne, Ali. "American Decline and the Liberal Order," *The National Interest*, December 12, 2012.
Yang, Jian. Senior Lecturer, Department of Political Studies, University of Auckland. Speech to the Young Leaders Network Forum, 2008.
Zaidi, Asghar. *Fiscal and Pension Sustainability: Present and Future Issues in EU Countries*. European Centre, 2010.