



**Third Annual Proteus Futures Academic Workshop
U.S. Army War College - Carlisle, PA
16-18 September 2008**

Panel 1 and Abstracts

Dr. Phil Williams, Proteus USA, Moderator

Dr. Thomas Bowditch, Center for Naval Analyses

William G. Glenney, IV, CNO Strategic Studies Group

Matt Sollenberger and Josh Calder, Social Technologies

Colonel Steven M. Zotti, Strategic Vision Group

Dr. David Kanin, Office of the Director of National Intelligence

The Future of Global Systems: Collapse or Decline?

Phil Williams, Visiting Scholar, Proteus USA

The paper examines a number of global systems – the governance system, the geopolitical system, the Westphalian state system, the global trade and financial system, the rule of law system, the global urbanization system, and the non-proliferation system – considers the external and internal stresses that are likely to be imposed on them during the next few decades and the degree of resilience and adaptability they are likely to exhibit.

Using a framework of potential outcomes that includes transformation, enhancement, equilibrium, decline, and collapse, it identifies the most probable outcome for each system.

The analysis concludes that collapse is readily imaginable in several areas, including the economic and financial system, where the dangers come from external shocks and cascading effects. In other areas, however, the more likely outcome is long term decline rather than system collapse.

**Getting it Right the Second Time;
Recreating a Stable World Order at the Edge of Chaos**
Dr. Thomas Bowditch, Center for Naval Analyses

The future national security of the United States will not be guaranteed by striving to maintain our current monopoly on either conventional or nuclear military superiority over all comers. In the extended transition between the last century's Cold War and what comes next the U.S. has emerged unmatched in global power. This unique position has enabled if not encouraged America to take an expansive view of its role in the world and its ability to bend the course of empire to suit its own purposes. By the time the U.S extricates itself from its self-imposed desert tar baby in Iraq, the world's remaining super power will find that the playing field has changed dramatically while it was distracted in the Middle East. For a variety of reasons as the 21st century deepens, the long-vaunted economic and military preeminence of the United States will mean much less in a direct security role.

A review of future trends and their implications for the politics of nations, and the evolution of conflict strongly suggests that the world to come will be much less hospitable to American strengths as traditionally defined. This will be particularly evident since one of the clear trends affecting the contours of the future landscape is the steady erosion of America's relative economic power in the world. This is one of a reasonable set of large trends that most futures researchers agree will shape the global environment out at least to the middle of this century.

Principal among these trends is economic globalization, by which is meant the increasing integration of state economies, greater development of emerging markets, and general flattening and shrinking of the globe. This increasing interconnectedness leads to both interdependence among countries and selective perceptions of vulnerability. Another undeniable trend is the inevitability of China's rise as a global competitor, not just to the United States, but to the West in general. Global interconnectedness and continued functioning of what can be called a "world order" is meanwhile threatened by a decentralization and diffusion of destructive power to small groups, most dangerously the non-state actor, epitomized by al Qaeda and other internationally networked and highly lethal groups of Islamist "jihadis". All of which is only made more sinister by the fraying of the tethers on WMD proliferation. It is increasingly ironic that in today's highly sophisticated information age, our tightly integrated system of international commerce and global financial interactions is increasingly threatened by a techno-empowered rabble living on dreams of the seventh century.

Moreover, the interconnected and mutually dependent world system will mean that major economic failures will be likely to spread, as will the destabilizing effects of failed or anarchic states, some of which will come about at a result of the uneven gains of globalization. We are already seeing a decentralization and diffusion of destructive power to small groups. Add to these destabilizing threads in our futures quilt the building competition for dwindling energy and other resources, changes in the climate affecting littoral habitability, social dislocation and migration from selective wallows of famine, and the picture is nothing less than gloomy.

Bowditch (cont'd)

Against this disturbing glimpse of the future we are wise to identify enduring U.S. national interests – those lasting interests that will guide our strategy deliberations into the middle of the century. More difficult is agreeing on what are the policy outlines of a grand strategy to preserve those interests. The future will be different; national security interests do not change. Our fundamental interest is of course the continued freedom and security of our country, the welfare of its citizens and their economic well being in an increasingly dangerous and uncertain world. The primary contention of this paper is that national security will in the future no longer be defined by military preeminence. Tomorrow's U.S. national security will depend on the nature of the international system and America's continued ability to compete economically in that system.

Since the end of the Second World War and the formation of the Bretton Woods system of monetary management, the developed world has generally played by the rules of a liberal international economic system. That system was severely strained when the U.S. suspended the convertibility of its currency from dollars to gold in 1971. Nonetheless, today the consensus of international institutions like the World Bank, the International Monetary Fund, and the World Trade Organization is still characterized as the "Washington consensus". It is important that this system be fixed, expanded, and made more inclusive, or the world stands a chance of slipping into a spiral of chaos, signs of which are already evident. We will not fix the world's problems through independent action on the part of any state, even the American colossus.

For the moment, however, the United States remains the only plausible quarterback for the international system.¹ The key is for the United States to seize the existing window of opportunity to reform, reshape, and reinforce the existing liberal world order toward two purposes. First to better manage economic globalization so that it improves as a force for good in the world, improving the conditions of all, especially the have-nots outside the "functioning core".² Second, a reinvigorated global system has to enable the peaceful integration of rising China into a strengthened world order as a responsible stakeholder.

Without these two crucial reforms, the U.S. is fated to exhaust its resources unilaterally, contending with an increasing array of global instabilities and threats arising out of the chaos of uneven competition among the haves and have-nots, the contagion of failed states, and the increasing lethality of militant Islam. The U.S. military, however strong, can't address these global challenges by itself. Into this unregulated maelstrom an increasingly unbridled and powerful China will begin to impose its influence irrespective of the interests of an increasingly irrelevant and aging West. This, then, is the task before us now, to revitalize an inclusive liberal world order, getting it right the second time in anticipation of the serious challenges at the far end of today's emerging trends.

¹ Sebastian Mallaby, "Why Globalization Has Stalled," *Washington Post*, April 24, 2006.

² Cite Thomas Barnett

Groupcraft and National Security

William G. Glenney, IV, Deputy Director, CNO Strategic Studies Group

The U.S. National Security Strategy over the next 20 years will be based on the need to maintain the viability of the nation-state of the United States, protect its territory and citizens, promote stability, maintain peace and deter aggression, leverage technology, and enable economic growth and freedom. Simultaneously, the U.S. government must foster the growth of the power of the individual and responsible groups—people naturally joined over a common idea or vision that is not necessarily related to a nation-state. The U.S. National Security Strategy for 2025 must ensure that the United States can act in an environment and succeed in a worldwide competition using tools of statecraft and groupcraft.

As the international security environment evolves economically, politically, informationally, and diplomatically, globalization will continue to be the prime factor of change and be the primary cause of the erosion of the relative power of the nation-state. Equally as powerful will be the combination of ubiquitous information, proliferation of modern technology, and improved human rights that will cause the further emergence of the individual and groups. The shift in relative power and influence from nation-states to groups will undermine the ability of the nation-state to “control and influence” while increasing the ability of a group to “control and influence.” Actors other than the nation-state will have a stronger role in the inputs to or conditions of the environment within which global activity will occur. And these effects will be felt internationally and domestically.

In the context of groupcraft, groups can be described as collections of people that have significant political, economic or military power such as the Direct Action Network, Anti-globalization Groups, Hezbollah, Social Movement Organizations, Communities of Interest, Affinity Groups, Flash Mobs, gangs, and various terrorist and insurgent organizations. Groups do not include organizations that function within an existing domestic political framework, such as the political parties in the U.S. or the Sunnis within Iraq.

The nation-state no longer has a monopoly on, or arguably even the preponderance of, knowledge, force or resources. Much of the knowledge, force or resources in the world are under the control of groups. The nation-state hasn't been entirely successful competing against human trafficking, illegal drug trafficking, arms smuggling, international crime, intellectual property theft, pandemic disease, or handling the shift of conventional war from “conquest” to “contest”. A common thread through these problems is that they are the domain of groups, or the role of groups has significantly changed what has historically been a matter for the nation-state.

State-to-state approaches and capabilities are becoming and will continue to become less useful. Statecraft will remain a "necessary" but by no means a "sufficient" condition for the security of Americans and the U.S. We may find that "sufficient" conditions can exist through ubiquitous technology that minimizes the involvement of citizens with the workings of the formal governance—national, state and local level—while promoting a sense of security for American citizens through involvement in groups. As long as the nation-state exists, statecraft will remain a necessary capability and a required domain of competition. Proficiency with the tools of statecraft such as diplomacy, information, economics, technology, military, and

Glenney (Cont'd)

infrastructure will remain necessary. Yet, statecraft must be complemented by the tools of groupcraft. And, the U.S. government will need to develop the capability to compete in the domain of groups. Finding their basis in social networks, cooperation, crowds, tribes, and individual behavior, the tools of groupcraft include trust, law, persona, finance, social capital, collective action, cooperation and influence.

Statecraft assumes that the nation-state acts much like a single entity where its behavior can be distinctly different from the people within the nation-state. Groupcraft assumes that the behavior of groups of individuals cannot be established only by knowing the behavior of the individuals. Particularly in groupcraft, scale and time matter greatly. Statecraft tends to view power, influence and various activities on time scales measured in years, decades and even centuries. Groupcraft treats these factors on time scales measured in hours, days, months and maybe years. Entities in a nation-state perspective are fairly well defined and emerge only with significant alertment; groups are frequently ill-defined, emerge and disappear with little warning. Statecraft deals with populations measured in millions or billions of people; groups can range from dozens to thousands of people. The emergent behavior referred to as “flocking” is an example of the speed with a group can form or disappear. Within the process of “flocking”, the use of “trusted sources” as a sensor for flock formation is an example of the dynamics surrounding and within the group. The U.S. government needs the means to detect group formation and dissolution; whether to engage or neglect a group; whether act to facilitate or to counter a group; or even whether to let the group flash by.

Understanding the principles underlying groupcraft and its to national security will demand an understanding of subject such as: complex adaptive systems, general emergent behavior, flocking, human cooperation, communication and collaboration, community structure, clustering and preferential attachment, localized ethnic conflict and genocide, gangs, social order and control, community structure and dynamics, collective action, adaptive governance, loyalty and trust, social capital, community governance, and chaos and politics.

It is clear that non-state groups will be a source of power despite the lack of affiliation with a nation-state. As a result, continuing to use only the nation-state as the unit of analysis (or the central perspective) from which the environment is viewed and related policy is developed will be inadequate. A group perspective must be co-equal with a nation-state perspective in the pursuit of U.S. national security. In the world of the future, the survivability of the U.S. as a nation-state and America as a society will demand that the U.S. government adapt to the growing power of groups. The government’s ability to sustain American interests and ensure stability in a globalized world is directly linked to its capabilities with and ability to use tools of statecraft and groupcraft.

Transparency and Geopolitics: Future Issues

Matt Sollenberger and Josh Calder, Social Technologies

The world is becoming more transparent: governments, corporations, and even individuals' lives are more open to observation and examination. By 2030, the potential for transparency will be far greater than today: the vast majority of people will have highly capable mobile information devices, and billions of sensors and computers of all kinds will be linked to the Internet and other networks.

The primary driver of transparency is technology:

- The proliferation of information technologies is causing an explosion in data flows.
- Information technologies are enabling ordinary people to generate and disseminate information in unprecedented ways.

A secondary driver is ideological:

- The idea that institutions of all kinds should be subject to scrutiny is gaining strength in many places.
- Theorists such as Ronald Inglehart suggest that economic development is likely to drive the spread of transparency as a value.

By changing the operating environment for governments, militaries, the media, and other institutions, rising transparency will lead to geopolitical issues in a variety of areas, including:

- Military operations
- Intelligence
- Governance
- Culture

Military operations

Military operations will be challenging in a transparent world. Effective information superiority will be difficult. As large organizations, militaries will have difficulty concealing their activities from the media and from opponents. Authoritarian governments may gain a comparative advantage in war-fighting over democracies, as the former might be able to better limit domestic transparency and information flows. Battlefield information dynamics could shift significantly, with enemy forces able to use relatively unsophisticated technology (next-generation mobiles, etc.) to more rapidly and comprehensively assess force strength and quickly adapt to changing situations.

Intelligence

Ubiquitous, diffuse monitoring and sensing will present immense opportunities and challenges for intelligence users. It may become very easy to gather information on a particular target, but the signal-to-noise ratio may be immense. User-driven transparency will provide opportunities for "crowdsourced" intelligence.

Sollenberger and Calder (Cont'd)

Governance

Governments will face sharply higher potential levels of scrutiny, whether from their own publics or from international actors. Governments that seek to control information are likely to find the environment much more challenging. Governments could face new pressures to adopt reactive and responsive stances, limiting their ability to engage in long-term strategic approaches, as rising transparency leads citizens to demand instantaneous responses from leaders.

Culture

Different cultures will come to divergent conclusions about preferable and tolerable levels of transparency. They will take different and often conflicting approaches to regulating transparency. Some privacy issues could become international issues.

Strategic Trends and Implications for Future Conflict

Colonel Steven M. Zotti, Director, Strategic Vision Group

This presentation provides updated Strategic Vision Group assessment of future trends and implications. Intensive data collection and literature survey uncovered a wide variety of potential strategic “drivers,” but seven stood out as particularly relevant for the Marine Corps for the 2007-2025 estimate period:

Strategic Trend #1: Uneven Prosperity.

As the pace of globalization accelerates further, it will provide more benefits to the developed world/population. Unfortunately, the gap between non-connected peoples and globalized societies will grow larger. Globalization has helped raise hundreds of millions out of poverty, but more than a billion people still live in extreme poverty, defined as less than \$1 a day and there are almost 3 billion people living on less than \$2 per day. Some societies will not have the capital or human resources to acquire or exploit the positive elements of globalization. Even within societies, globalization generates uneven benefits and backlash.

Strategic Trend #2: The Demographic Dichotomy.

This dichotomy is characterized by two polar trends in national populations. One is the *graying of the developed world*. Given birth and death rate statistics, demographic projections forecast an aging and/or declining population in the developed world. Of note, further in the forecast period China will also experience significant aging of its population, with nearly 400 million citizens over the age of 60. Throughout Europe, as well as Russia and Japan, the population base will shrink and a larger proportion will be supported by a smaller working force. Alternatively, the underdeveloped world will be swamped with *adolescents idled by poverty and perhaps faced with a poverty of hope*.

Strategic Trend #3: Urban Density and Sprawl.

Demographic and migration patterns point to increased urban populations especially in coastal areas, and largely in the developing world. Urbanization will be most extensive in Asia and Africa, in developing countries that lack employment opportunities and adequate services, potable water or sanitation. Half the world’s population now lives in an urban area, and more than 50% of humanity lives within the littorals--defined as 200km or 120 miles from a coastline. At least two thirds of the world’s population, more than 4 billion people, live within 400km of the coast. By 2035 that figure should grow to 75%.

Strategic Trend #4: Accelerating Resource Scarcity.

Current patterns regarding resource availability (e.g., energy, water, arable land, foodstuffs, etc.), resource extraction and distribution methods, and international financing suggest that they will likely not keep pace with accelerating demographic demand and climatic changes, particularly in the developing world. Global consumption of oil is expected to rise by 45% to 121 million b/d. Eighty percent of the energy demand growth will be from the developing world, especially China and India. Current US gross petroleum imports are 13.7 million b/d with a projected increase to 17.7 in 2030, furthering US reliance on imported oil. Current dependence on net petroleum imports is just over 60 %, double the foreign dependency of 1975, and projected to grow to at least 67% barring new sources of energy. The percentage of

Zotti and Hoffman (Cont'd)

people worldwide who have access to an improved water supply has risen from 78% in 1990 to 83% in 2004. Some 1.2 billion more people have been served during this time period. But water demand continues to outstrip supply. Globally, 1.2 billion people are currently without access to improved water supply and 2.8 billion have no form of improved sanitation services (figures for 2004). Most of these people live in Asia and Africa. In Africa, for example, 2 out of 5 people lack an improved water supply. It is projected that by 2015 at least 40% of the world's population will live in water-stressed environments, and that by 2030 up to 67% may face water shortages.

Strategic Trend #5: China and India Rising.

Economic and political patterns point to the rise of China and India, with corresponding increased capabilities in political/ diplomatic, economic, and military instruments of national power. China's GDP (measured by purchasing parity) exceeds that of the UK, Germany and Japan; and by 2040 India *could* do the same. Neither country will displace the US as the world's largest economy between now and 2040. Their rate of progress will be dependent on competing demands for services, resources, and infrastructure while preserving political and social cohesion. Both states face continuing challenges to maintain political control, maintain economic growth, and meet rising expectations for improved quality of life. Their extensive market growth generates great opportunity for global trade, and reduced global poverty, while contributing to a shift in economic power towards Asia.

Strategic Trend #6: The Struggle for Sovereign Legitimacy over Identity.

Due to the political, economic, and informational effects of globalization, traditional sovereign nation-state legitimacy is being challenged. Global interdependence reduces the ability of states to control or influence the resulting dislocating social and economic effects that globalization produces. The state's authority is weakened by internal factions which are often based on ethnic and religious identity. Identity, based on tribal or religious affiliation, can fuel tensions and conflict as factions compete with states for governance/loyalty.

Strategic Trend #7. Blurring Character and Forms of Warfare.

Historical patterns and future trends point to potentially significant shifts in the character and forms of warfare. The most significant shift is the blurring of what was previously thought to be distinct forms of war or human conflict; traditional wars, irregular conflicts, terrorism and criminal disruption. While the nature of war will not change, and some states will establish traditional forces, states and non-state entities will adapt new ways of fighting that combine the various categories. The SVG refers to this blurring character as the hybrid challenger or threat. *Hybrid Wars incorporate a range of different modes of warfare including conventional capabilities, irregular tactics and formations, terrorist acts including indiscriminate violence and coercion, and criminal disorder.* These multi-modal conflicts can be conducted by separate units, or even by the same unit and coordinated within the main battlespace to achieve synergistic effects.



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Panel 2 and Abstracts

Carol Dumaine, U.S. Department of Energy, Moderator

Arnold Dupuy, Virginia Polytechnic Institute and State University

Lawson W. Brigham, Ph.D., U.S. Arctic Research Commission

Mixing Oil and Water:

Are ‘resource wars’ the wave of future international conflicts?

Arnold C. Dupuy, Ph.D. Candidate, Polytechnic Institute and State University

Human conflict over resources is an age-old condition. The eighteenth-century English political philosopher, Thomas Robert Malthus, made a famous prediction. He said that widespread hunger and human dislocation are inevitable with growing populations and static rates of food production. Although Malthus has been proven wrong, modern-day experts warn of similar consequences regarding a wider range of resources with broader international security implications.

The concept of resource security, or the freedom from resource scarcity and environmental destruction, may sound appealing, however creating and enforcing such a regime is difficult. This is particularly true as developing nations demand the same right to economic expansion that today’s developed nations have received. Such conditions will undoubtedly strain resources, heighten cross-border tensions, particularly among developing nations, and reinforce environmental concerns.

There are two critical resources to human development that nations depend on for viability: water and fossil fuels (or hydrocarbons). Though there are distinct differences in the function, value, and geopolitical implications of these resources, there are also many similarities, such as the potential to cause of human conflict.

A basic necessity of life and generator of some forms of energy, water has great strategic value, and, therefore is a natural source of contestation. Greater pressure on productive land causes increased human migration, which creates an imbalance among more populated urban areas and newly desertified areas. Indeed, history demonstrates that mass migrations often create broader social instability and bloodshed, underscoring water conflict as an emerging challenge capable of triggering conditions that could cause tremendous human suffering, regional instability, and a threat to many nations’ survival.

The other resource discussed in this paper, fossil fuels, is behind the tremendous worldwide economic expansion of the past 150 years. According to the International Energy Agency (IEA), the anticipated demand for energy will increase by more than 50% over the next 25 year and fossil fuels will meet nearly 90% of this requirement. As there is no fossil fuel substitute that experts can produce economically, at least over the next quarter century, all indications point to a continued reliance on oil and gas. Considering its values as the world’s economic lifeblood, securing energy resources has the potential of eliciting a hard power response.

To adequately assess the impact of resource conflict, a range of scenarios must be considered. For instance, we may be witnessing the dawn of a new era of big power rivalry based on access and control of vital resources and commercial markets. Under these conditions it is plausible to imagine a multi-polar world of large powers and their satellites, competing in Cold War fashion for these valuable resources around the world. An alternative scenario is a series of brushfire wars resulting in humanitarian crises of unimaginable proportions.

Dupuy (Cont'd)

As globalization progresses, resource competition can only intensify, creating an environment of domestic and international insecurity. Resource wars are not in society's best interest, as most rational states can agree. Yet, potentially violent clashes are inevitable as humans strain to secure resources for growing populations and economies.

The paper highlights these resources' respective positions within the broader international security milieu and possible means of reducing tensions. Additionally, the paper argues that a Neo-Malthusian collapse is far from a certainty. In fact, a combination of conservation measures, advanced technology and diplomacy can avert most serious conflicts. A requirement is a genuine interest and commitment to finding equitable solutions that reduce global resource anxiety by encouraging cooperative measures and interdisciplinary research, especially to integrate social and natural science. Furthermore, this requires broad, long-term, and pro-active policies by states and international organizations to address resource competition, while strengthening regimes already in existence.

Implications of Globalization and Environmental Change in the Maritime Arctic

Lawson W. Brigham, Ph.D. - Captain, U.S. Coast Guard (Retired)
Deputy Director - U.S. Arctic Research Commission - Anchorage, Alaska

Extraordinary changes have come to the Arctic and Arctic Ocean early in the 21st century. The region is understood to be a large storehouse of yet-untapped natural resources and exploration and development have accelerated to where the Arctic is set to be a new player in the global economy. Marine access in the Arctic Ocean is also changing in unprecedented ways and the extraordinary transformation Arctic sea ice is undergoing ~ thinning, extent reduction and a reduction in the area of multiyear ice in the central Arctic Ocean ~ holds significant implications for longer seasons of navigation. Substantial and continuing increases in marine access will present real challenges to the existing legal and regulatory structures which cannot meet today's needs of the Arctic states. In addition, the ongoing process for delimitation of the outer continental shelf in the Arctic Ocean (under Article 76 of UNCLOS) presents unique challenges and unusual geopolitics to an already uncertain future for the maritime Arctic. It is plausible that security and law enforcement responses will also involve much more attention from the Arctic states as they are forced to address complex marine issues, many without precedent in polar affairs.

The Arctic Council, an intergovernmental forum of the eight Arctic states, is currently embarked on a comprehensive assessment of Arctic marine activity in the 21st century ~ the Arctic Marine Shipping Assessment (AMSA). One of the challenges for AMSA has been to identify the major uncertainties that will be central to shaping the future of marine use to 2050. Using scenario planning, the AMSA team has identified two primary drivers and major uncertainties: (A) Resources and trade: development of the Arctic's natural resources; potential market developments; and, regional and global political/economic instabilities; and (B) Governance: the degree of relative stability both within the Arctic and around the globe; this driver implies a need for effective and efficient legal and regulatory structures. Four scenario narratives have been developed with these two, key uncertainties as the framework elements. The main arguments focus on the fact the Arctic has experienced globalization early in the century and that the global maritime industry has already ventured into the Arctic Ocean. It is clear that the high prices of global commodities such as oil & gas and hard minerals (for example, copper, nickel and zinc) have generated high levels of demand for Arctic natural resources. Other significant uncertainties include: changing marine access under climate change; the roles of Arctic indigenous communities; a major shipping disaster in the polar regions; the rise of Asia and Asian shipbuilding; evolving legal regimes; influences of the maritime insurance industry; and limited windows of operation in ice-free conditions. The Arctic states are challenged by the overall lack of maritime infrastructure to adequately support the current level of Arctic marine operations; ports, communications, environmental monitoring, search & rescue, salvage, incident response, aids to navigation, and coastal charting, all require substantial and timely investment by the coastal Arctic states and maritime industry. A second challenge is the development of an integrated system of rules and regulations governing Arctic navigation that will enhance marine safety and marine environmental protection, while also ensuring the basic principles of freedom of navigation.....a complex balancing act! Such challenges will require historic levels of cooperation among the Arctic states and broad engagement with many non-Arctic stakeholders and actors within the global maritime industry.

Brigham (Cont'd)

Although a small region on the planet, the Arctic and its ocean are rapidly being integrated with the rest of the globe. The implications for the eight Arctic states and global community are many. Vexing challenges such as boundary disputes, marine navigation rights, trans-border pollution, access to living and non-living resources, regional military presence, and more, will test Arctic diplomacy and security to their core.



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Panel 3 and Abstracts

Dr. Joseph Chamie, Center for Migration Studies, Moderator

Dr. Jennifer Dabbs Sciubba, Rhodes College

LtCol Otto J. Rutt, USMC

Jeremy Tamsett, Henley-Putnam University

Heather Williams, Analytical Services, Inc.

Population Aging and U.S. National Security

Jennifer Dabbs Sciubba, Ph.D.

Mellon Environmental Fellow, Department of International Studies, Rhodes College

Many policymakers and scholars underestimate the effects of aging in the US and overestimate aging in China and India. In the policy world, such miscalculations could have dangerous implications for national security planning; in academia, these unsubstantiated arguments have thus far misguided efforts to build a serious and sustainable research agenda on the defense implications of demographic trends. On the contrary, population aging could create significant security challenges for the US because it will unevenly affect the great powers, likely fostering instability in some, weakening those that are US partners, and avoiding a few altogether over the next several decades. The absence of aging in several of the great powers highlights the need to analyze the variety of population trends present among this diverse group. Instead of a “geriatric peace,” what we are increasingly likely to see is a divide between the aging industrialized great powers, and the still youthful industrializing powers—a global version of intergenerational conflict, in a way similar to domestic scuffles over scarce resources and political power.

This paper attempts to avoid the demographic determinism that characterizes many policy debates about population aging by exploring five topics in detail. First, the transitional age structures of China and India will prevent them from facing issues stemming from an aging population in the near future and mean that when they do finally face them, their experiences may be different from those of Europe and Japan. Second, the economic crunch from aging in Europe and Japan may not be as bad as expected because governments can enact policies to mediate some of the effects. Third, any assessment of military spending and economic potential is incomplete without a consideration of the personalities and goals of each of the great powers. Geopolitics may play as big of a role as demographic structure in driving defense spending. Additionally, we must remember that military spending alone does not guarantee hegemony. Fourth, differential demographic trends among not only the great powers but also other states may lead to a more turbulent world instead of a more peaceful one. Finally, the US is not exempt from economic and military problems associated with population aging.

Doing Windows in Wanlaweyn?
Youth Bulges, Culture, and Governance in the U.S. Central Command States
Otto J. Rutt, LtCol, USMC

The Afghanistan experience by itself, with the rise of the Taliban and al Qaeda, demonstrates that no state from the developed world was willing to do nation building. The armed conflicts that plague such lesser developed countries represent the nadir of disorder and their causes are intensely debated. The states within the United States' Central Command (CENTCOM) area of responsibility (AOR), such as Afghanistan, are under demographic, cultural, and political stress. Will the youth bulges, tribal disputes, or governmental malfeasance in these states precipitate armed conflict?

This debate over the causes of armed conflict can be separated into three camps: the neo-Malthusian camp, the cultural camp, and, the governance camp. The neo-Malthusian camp argues that demographic stress leads to deprivation conflicts. The cultural camp argues that the tensions between ethnic or religious identities lead to conflict. The governance camp argues that the effectiveness of governing bodies will either succeed or fail at preventing armed conflict.

This presentation seeks to provide an analysis of these competing ideas and discuss their relative strengths. Research supports the good governance camp as predominant. Promoting good governance can be the basis of mutual security and threat reduction around the globe and especially within CENTCOM.

**Catastrophic Convergence 2030:
Transnational Criminals, Jihadi Terrorist Networks, and WMD**
Mr. Jeremy Tamsett, Research Analyst, Henley-Putnam University

Hypothesis: The catastrophic convergence of transnational crime, jihadi terrorism, and Weapons of Mass Destruction (WMD) is likely to be one of the pressing threats to international strategic security in the year 2030.

Theme: Today's security environment is marked by complexity and uncertainty. The evolving threat of terrorism coupled with the rampant increase in technological innovation spurred by globalization has led the world dangerously close to the precipice of catastrophe, where the possibility of jihadi-inspired WMD terrorism remains a potentially insuperable risk.

Introduction: Framing the Problem

The potential for criminal activity to converge with terrorist activity is one growing area of concern where intelligence and law enforcement should increase focus and investment. The potential for collaboration between transnational criminal networks and jihadi terrorist cells pose significant security challenges. Pin-pointing specific loci where shared interests overlap, like money laundering, drug trafficking (to raise money), and other types of financial support networks are examples where cross-cutting cleavages may exist between crime and terrorism.

Other nodes where criminal and terrorist interests are likely to converge may at least be partially driven by geographies where illicit activities flourish in the absence of state controls or, worse still, where their actions are supported or tolerated for a variety of reasons.

The Jihadist and Criminal Threat Space: Closed Communities, Cultures, and Societies

A prominent challenge lies in the fact that jihadists in embedded or distributed resourced organizations and networks are difficult to identify, fully characterize, gain access or proximity to and effectively neutralize or act against in unstable societies or under weak governments – both of which may be heavily influenced by radical Islamist views or sympathizers.

It is likely that communities in which jihadi cells and transnational criminal networks operate are self-policed. This is especially likely to be true in certain societies, cultures, and geographic regions like Middle East where the role of family, tribe, clan and ethnic group often take precedence over government and conventional rule of law. Consequently, it is relatively easy for the adversaries in culturally homogenous societies and locales to spot the presence of preternaturalness in their environs.

The WMD Threat Space: Diffusion of Knowledge and Capability

The potential for malevolent use of any chemical, biological, radiological, or nuclear (CBRN) weapon presents a catastrophic convergence of considerable complexities, challenges, and risks that intelligence, law enforcement, and counterterrorism professionals must face. The world-wide diffusion of science and technology is one product of globalization that lends to the empowerment of individuals and, thus, introduces a trend toward knowledge-based risk that could play to the advantage of jihadists and criminal networks. It is the structure of global enterprise that could provide jihadists and criminals the opportunity to create multiple, parallel,

Tamsett (Cont'd)

and non-traditional pathways to the development of critical WMD capabilities through a wider range and more diverse array of legitimate dual-use covers for malignant activities. In a world where the state is competing with the dynamic forces of globalization, communications and transportation, the law of averages favors the violent non-state actor.

Conclusion: Framing the Solution

Technology is changing the perspective of the geographic space in which threats are traditionally characterized. There has been a shift in intelligence from threat-centric targeting to future-oriented risk mapping (singularization); an enterprise known as risk intelligence. Risk intelligence is a process of minimizing uncertainty through proper categorization of knowledge as well as accepting the uncertainty that remains as an inherent fixture in the equation that must be accounted for (not ignored), thereby, overcoming our ontological insecurities about the threat environment.

So how do we effectively risk-map and track the threat of jihadi WMD terrorism? Because of the large number of uncontrollable variables in the risk equation, threats obey the laws of Newtonian physics and are always in motion; therefore, we need to develop capacities to be more proactive in our approach to counter and mitigate the threat. Fundamentally, intelligence and law enforcement need to be able to fully characterize jihadists and networks of criminal groups organizationally (do they operate in dispersed cells or in linear hierarchies?) and functionally (are they technically adept and predisposed to cyberterrorism?).

In addition, we must establish taxonomies of supporting networks (to include transnational criminals and gangs) as a means map linkages for future attribution and disruption (including, ideally, prosecution). Key nodes (persons including specialized expertise, information, materials and equipment, logistics and finance) and links (by which the highest priority transfers occur) should be the subject of appropriate law enforcement and intelligence attention, action, exploitation and manipulation. Critical path maps can be developed and evolved over time to enable visualization and effective information and intelligence requirements, planning, collection, analysis, sharing and use.

To be comprehensive, solutions must also include analysis and assessment of the nature and level of intent as well as sophistication of capabilities (which is a measurement of technical maturity delimited by the product of knowledge acquired over time). Jihadist and criminal intentions and motivations are unlikely to change dramatically in the near future, even though their tactics, methods and relative capabilities (access to resources as well as ability to organize, train, formulate and develop plans and corresponding logistics, and implement successfully) will be adversely affected (increased likelihood of detection) as more effective approaches to HUMINT (such as incorporating the use of "local" law enforcement that possess unique "street knowledge" of their communities) are incorporated by counterterrorism, law enforcement, and intelligence operations.

The Future of Transnational Organized Crime: Political Branches, Economic Roots
A Case Study of Russian Organized Crime
Ms. Heather Williams, Analytic Services, Inc.

As the United States learned from 9/11 and other crises in the past ten years, threats seemingly far removed from our borders can erupt on our homeland and impact American and international security in the worst of ways. These lessons demonstrate that we must be prepared for the unimaginable and remain knowledgeable and engaged in a wide variety of potential threats in order to thwart catastrophe in the future. Non-state actors emerged in the past decade as a leading threat to national security, one which the US was ill prepared to track and thwart. Due to interagency relations and a continued lack of foresight in foreign policy, the US lacks the agility and forward-thinking to prevent future threats from terrorist organizations, empowered private citizens, and organized criminal networks, such as Russian Organized Crime (ROC), which is the topic of this study.

The future impact and role of ROC is uncertain today because of recent and vital changes within Russia itself: the change of administration, increasing wealth from natural resources, and aggressive overtures towards regional neighbors and the US. Since the collapse of the Soviet Union, ROC has been linked to arms trafficking, drug trafficking, financial crimes, and terrorism. The result is a trend of consolidation and the internationalization of organized crime that, if left unchecked, could lead to an increase in illicit activity and surprise attacks and threats to the US and its partners.

As a non-state actor, ROC is free of the restraints of arms control agreements, the threat of economic sanctions, and international disapproval. Perhaps the greatest threat from ROC is its access to and trafficking in weapons and the legacy of the Soviet Union's WMD stockpile. When the Soviet Union collapsed it was the world's second largest owner of WMD, but it lacked the means to secure all of its materials. ROC has the ability and financial motivation to align the supply of weapons with the demand on the international market from terrorists, insurgents, and paramilitary groups. In one such example, the ROC allegedly assisted with a transaction in the Caucasus to attempt to sell chemical weapons to al Qaeda.

ROC dates back to the 19th century, and it continues to grow in strength today having outlasted the Soviet Union and the privatization of the Russian economy. It has become tied to the country's future. There are four notably unique features to ROC: the level to which it has infiltrated the government, its role in internationalizing organized crime, its increasing focus on financial crimes, and its access to WMD. ROC directly impacted the US financial sector in the late 1990's when in over forty separate transactions it laundered \$4 billion from Russia to the Bank of New York, \$200 million of which may have come from IMF loans to Russia. ROC has also worked with La Cosa Nostra to develop gasoline evasion schemes in the US, and regularly trades arms for cocaine with Columbian drug cartels and FARC rebel leaders. ROC serves as an amorphous hub for illicit activity, supplying arms to insurgents in Georgia, trafficking heroin from Afghanistan to Europe, and selling WMD materials and information to interested buyers. Organized criminal networks provide an opportunity for governments to tackle multiple threats in one fell-swoop by focusing on organized crime.

Williams (Cont'd)

Past and current efforts to mitigate the threat of ROC have failed to make a significant impact on the spread of crime across the globe because policies have been short-sighted and failed to address the underlying issue: economic and political instability in Russia itself. The case study of ROC highlights themes for other transnational threats and begs the question, is ROC a cause of economic instability, weak rule of law, and the growth of terrorism, or is it an effect of these and other factors in Russia?

This study takes a holistic view of the problem of ROC, starting with and focusing on the Russian government, economy, infrastructure, and identity. It distinguishes trends in ROC directly linked to Russia's economic instability and the absence of the rule of law. Other study variables included the collapse of the Soviet Union, privatization, international institutions, regional stability, access to WMD, and US involvement. The study also tracks the corporate development of ROC and expansion into new market sectors, along with the consolidation of criminal networks. It concludes with an evaluation of past and present US initiatives to tackle ROC, and offers recommendations for the future.

While a great deal of attention is currently focused on the new Russian President, it remains unclear what his and his successors' impacts will be on the diverse and entrenched Russian underground in the next 25 years. Assuming the trends of economic instability and lack of political legitimacy continue, ROC will continue to grow and develop into a globally integrated and versatile corporation by 2030 with increased activity and assistance to other illegal transnational networks.

The implications for the US are increased threats to the homeland, tense relations with Russia, and threats to the US economic sector. US policy failed in the past to confront the underlying issues of ROC, and was mired down by a lack of interagency coordination, lack of foresight, and an American-centric mentality. These actions suggested that if a threat wasn't imminent, it will fly under the radar and be of little concern to policy-makers and the public. 9/11 taught us that we can no longer afford to turn a blind eye or assume that what happens in Russia or Britain or Afghanistan no longer affects us in the US. Decision-makers and policy analysts must act now to plan for the future threats from organized crime, and develop a strategy for tomorrow and for 2030.



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Panel 4 A and Abstracts

Kevin Cogan, Center for Strategic Leadership, USAWC, Moderator

Dr. Tom Longstaff, Applied Physics Laboratory (APL)

Dr. James H. Irvine and Sandra Schwarzbach,
U.S. Naval Weapons Center Weapons Division

Lt Colonel Rod Azama (USA Ret.), The Chancellor Group and
Sam DeWolfe, Computer Sciences Corporation

Sense – Shoot – Command on the Battlefield After Next
Kevin Cogan, Center for Strategic Leadership, USAWC

By some measures, the progress of the 19th century was equivalent to all the progress in the eight centuries preceding it. Similarly, the progress of the first twenty years of the 20th century equaled all that of its preceding 100 years. It is predicted that the progress of the 21st century will be 1000 times that of the 20th century. What does the staggering exponential growth of technology mean to society, and in particular, to the battlefield after next?

The term “disruptive technologies” was coined by author Clayton M. Christensen in the book *The Innovator’s Dilemma* to describe new products used in new ways which force older technologies out of the market. When focused on the current OODA Loop (observe, orient, decide, act) paradigm of warfare which strives to execute this sequence faster than the adversary, shifts to new paradigms enabled by disruptive technologies may cause a shift to an OODA Loop alternative itself. Consequently, the battlefield after next could be a radical departure from its current state as disruptive technologies contribute to the 1000-fold, 100 orders of magnitude growth of the 21st century. This presentation will first look historically at predicted and observed technological growth on the 20th century battlefield and then examine the characteristic S-curve which describes the life-cycle of an emerging technology. A plot of sample S-curves from past technologies prepares the casual observer for exponential growth in the future, despite the human tendency to predict linearly. In this context, current war games using future scenarios seem to lag technological projections, falling well short of the realm of the possible. Armies are sometimes accused of preparing to fight the last war and to some degree this is true. Not only does doctrine tend to lag innovative use of off-the-shelf technologies, it is caught wholly off guard when faced with disruptive technologies. Exceedingly difficult then are attempts to raise and equip a military force with available technologies when encumbered by cycle times of a decade or more due to the formal acquisition process imposed on programs of record.

Looking beyond the impediments to insert disruptive technologies in a timely manner and making the assumption that these problems will be resolved, a closer inspection of what it means to create a battlefield which fully implements a vast array of disruptive technologies on a grand scale gives pause to what it means to occupy a highly sensed and lethal battlefield at all. Who are the commanders and foot soldiers, where do they reside, how do they observe, orient, decide, and act? Does the OODA Loop shrink and transform to a nanoscale process like its enabling technologies? Is there only time to observe and act with no attempt to orient and decide?

There is some discussion already of taking the holistic view of “command and control” and recognizing that command and control are two separate entities. It will soon, if not already, be impossible to humanly control the confluence of all pertinent battlefield data and expertly decide and act with a real-time and expected exact response. Emerging and disruptive technologies could revolutionize what it means to control the battle. Greatly expanded control capabilities could revamp what it means to command.

Cogan (Cont'd)

The future will empower the commander and yet decouple him from the tools needed to control the flow of battle in much the same way that we can now speed-dial any telephone in the world with one stroke, unaware of the complexity and robustness of the technology that permits this. Disruptive technologies occur at random times and random intervals eventually causing vast departures from the way in which we functioned before them. Our digital native children do not discern the pace of communication before the internet and almost forgotten is how we ourselves conducted business before our present times. Likewise, the battlefield after next will be vastly different than our current practice in this domain, disrupted by the technologies of those who predict the future by inventing it.

The New Technologies and the World Ahead
The Top 20 Plus 5

Dr. James H. Irvine and Sandra Schwarzbach
U.S. Naval Warfare Center Weapons Division

The Revolution in Military Affairs (RMA) Center

Approximately 10 years ago the Naval Air Warfare Center Weapons Division (NAWCWD), China Lake, set out to determine what future wars and conflicts would look like; what the evolution of military technical programs and technologies would be; and what our world, as a Department of Defense (DOD) Research and Development Laboratory, would look like. We studied both the history of RMAs and projections of future military evolution, and also built and studied scenarios based on future geopolitical options.

For the DOD's Office of Net Assessment, we provided the director, Andy Marshall, a paper on the Geopolitical Model Set in support of his Summer Studies Program. We concluded that the geopolitical models were probably not going to be the major drivers of future military history, but that technology would be, for both future military history and human affairs. We also found that the emerging technologies that would reshape the world were advancing independently of the geopolitical models.

We concluded that in order to understand the nature of war, armaments, and the military in the coming age, we must look at the basic technologies driving the new order, and then ascertain what effect these technologies will have on military affairs.

The Technology Study Program

The RMA Center embarked on a Technology Study Program to identify emerging technologies, their military potential, and their probable effect on future warfare. The Center also needed to ascertain which of these technologies would be disruptive to our society and our current military operational model. This Technology Study Program was organized into nine subject areas: Computers and Telecommunication, Robotics, Materials, Energy, Space, Manufacturing and Production Technology, Bio-Technology, Nano Technology, and Pure Science Developments. The 3-year effort resulted in 28 briefings (with a total of 4,000 viewgraphs) on emerging technologies and their potential effects on the military and on society in general.

As a result of this effort, the RMA Center believes that it has the most comprehensive list and analyses of emerging technologies available within the U.S. Government, the top 20 of which are:

Irvine and Schwarzbach (Cont'd)

1. Computer Technology
2. Ubiquitous Computing
3. Human Language Interface for Computers
4. Machine Vision
5. Robot Technology
6. Information Technology
7. Fullerene Chemistry
8. Multi Level Coding System in DNA
9. Biotech Computerized Analysis Instrumentation
10. Human Bio Genetic Chemical Model
11. Treatment of Hereditary Genetic Diseases
12. Control of Bio-Metabolic Diseases
13. Blood and Tissue Matching of Drugs
14. Tissue Engineering
15. Neuroscience
16. Neuropharmacology
17. Cellulose to Glucose Process
18. Nanotechnology
19. Chaos Theory
20. Fuel Cells to Permit Deep Sea Habitation

Plus 5 “Not Improbable” Technological Developments

Several emerging technologies may not come to fruition, but if they do, they could have an effect. The top five are:

1. Superconductors
2. Low Cost Space Lift
3. Artificial Intelligence
4. Cellulose to Liquid Hydrocarbon Path
5. Life Extension

Closing Discussion

We will discuss three effects of these emerging technologies:

1. The effect these emerging technologies will have on society and social structure, using Social-Technologic Age Theory as the basis for our discussion
2. The impact of these emerging technologies on social structure over the next 40 years
3. A projection of the effect these emerging technologies will have on military operations over the next 50 years, using RMA Theory as the basis for our discussion

Implications of Trends in Biometric Technologies: Military Opportunities and Challenges

Lt Colonel Rod Azama (USA Ret.), The Chancellor Group

Mr. Sam DeWolfe, Computer Sciences Corporation

This paper provides two professionals' views of trends in biometric technologies and subsequent implications for military organizations and operations. The document provides a brief introduction to biometric technologies, their general history and recent developments. Current biometric technology trends are examined, and the authors discuss the impact that these trends are likely to have on military organizations and operations.

Biometrics is the science of systematically utilizing physical and behavioral characteristics of individuals to identify persons or to verify their identities. While fingerprints are historically the biometric modality in longest use, technology is rapidly enabling the usage of other modalities such as iris patterns, facial and voice recognition, DNA analysis, etc. These biometric technologies have various applications for military organizations and can be used to identify "unknown persons," for physical and logical access control, for counter-intelligence – as well as intelligence purposes – and for tracking "friendly" forces, credentialing, managing privileges and authorization, etc. These technologies are providing new opportunities in areas such as intelligence and counter-intelligence.

In addressing current biometric trends, this paper will address large-scale biometric matching technology such as automated fingerprint processing systems, their current usage by local, state and federal governments, and the expanded applications of this technology for military operations. Recent military operations have pushed these large-scale biometric matching systems into the hands of war-fighters to accomplish their missions. As in many historical instances, when a new technology becomes available that can affect the dynamics of warfare and military operations, it is often employed in innovative ways.

The conduct of warfare and military operations, post-conflict stabilization and border management operations are addressed in this paper as these are major factors in the success of current and future military operations. Biometrics has impacted all of these areas and is an enabling technology which will affect even more aspects of modern military operations and activities. The usage of biometric technologies in military operations and activities will continue to expand, and the community of biometric technology "stakeholders" will continue to grow also in military organizations.

However, as the technology evolves, provides new capabilities, and is further employed operationally, interoperability and data-sharing can affect the net outcomes and become increasing concerns. Coordination also becomes a challenge with the growing number of "stakeholders" utilizing biometric systems and services. These are just a few of the challenges to the overall success employment of biometric technology.

This document addresses some of the emerging technological trends such three-dimensional (3D) facial recognition systems. These types of systems use a multi-view face recognition system, utilizing three-dimensional (3D) imaging. Other developments such as voice recognition and gait recognition technologies will also be discussed.

Azama and DeWolfe (Cont'd)

Biometric technology advances are also affecting forensics, a sister science to biometrics. Biometric processing and forensic applications are getting increased attention within military organizations. Advances in fingerprint technology, such as the ability to collect higher-resolution images, will affect the way forensic examiners collect data, as well as the processing of forensic data such as latent fingerprints.

As biometric technologies develop and their applications expand within the private sector, government organizations, and military organizations, this will require that military organizations examine the impact of these trends on future operations and activities, and adjust their doctrine, manning, equipping, training, techniques, policies, and planning accordingly.



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Panel 4 B and Abstracts

Timothy Rosenberg, White Wolf Security, Moderator

Dr. Margaret M. Polski, George Mason University

Robert Holder and R. Scott Cost
Johns Hopkins University Applied Physics Laboratory

Edward Zelinski, Northrop Grumman Corporation

Future Information Technology Trends, Threats and Opportunities
Mr. Timothy Rosenberg, White Wolf Security

Technology continues its invasion into every facet of the global environment. Time and again, we have seen the widespread adoption of some technologies impact personal, organizational and even national security. The fields of nano and bio-technology and robotics continue to push science fiction into science fact. These diverse fields of research are comingled and interconnected through more powerful personal and portable computing devices.

The focus of this paper will be on the emerging IT threats in the 5 to 15 year forecast period. It will focus on the mass weaponization of reliable network attack tools, the growth bio/IT convergence and the reality of merging humanity with technology in ways that are irreversible, unpredictable; all in the context of the risks these items pose to personal and national security.

Wiring Societies of Minds for Survival
Reflections on Networked Brains, Choice, and Change

Margaret M. Polski, Ph.D.

Center for the Study of Neuroeconomics, George Mason University

Among the members of the family of concepts that guide the development of future capabilities identified in the “living draft” of the U.S. Joint Forces Command’s (JFCOM) Future “Joint Operational Environment” dated May, 2007, are the pervasiveness of networks and network-centric operations, knowledge, and culture. JFCOM estimates that by 2030, humans will be inextricably linked and in some cases it will be impossible to differentiate between man and machine: Individuals and groups will have the ability to become “super-empowered” – for good or evil.

Each of the above-referenced concepts is related to human cognitive capacity, which may be improved over time by developments in neuroscience. This paper, which is based on the forthcoming book, *Wired for Survival: The Rational (And Irrational) Choices We Make From The Gas Pump To Terrorism* (Wharton School Publishing), draws on cutting-edge research in the social neurosciences to reflect on the security implications of rapid change in the emerging economies. A close examination of the underpinnings of human thinking and choice suggests that the most powerful political and economic policies at work in the world at any point in history are codified not in law, culture, or technology platforms, but in neural biological networks in our bodies and brains, which are embedded in and influenced by our social and physical environment.

The emerging neuroscience evidence implies that we think and choose quite differently than standard economic and public policy models suggest. Rather than being dispassionate optimization machines with stable preferences and an objective knowledge base (that we update, following Bayes' rule), we are highly advanced but biased sensory systems that adapt intuitively to a physical and social context that is partly real and partly imagined. Our stock of knowledge is a pattern of neurobiological connections that integrates sensations, emotions, and past training and experience; our actions spring from neuronal signaling triggered by our perception of our experience in our environment, which generates associations between what we perceive to be going on around us and our experiences in past interactions in similar circumstances. Adapting to and combating changing geo-political rivalries is a mind-body-environment problem that requires changing our individual and collective experience.

Challenges of Resource Integration for C2 Collaborations Within Virtual Environments

Robert Holder and R. Scott Cost

Johns Hopkins University Applied Physics Laboratory

The emergence of virtual environments, initially in the form of social networks, and now more recent elaborate incarnations such as Second Life, Virtual Battlefield Systems, There, Entropia Universe, and hundreds of others, create opportunities for new means of collaboration that negate the typical constraints of physical environments. Virtual worlds are an increasing means by which the DoD may facilitate effective collaborations for C2 operations and offer advantages over the traditional communication mediums such as telephone, text, videoconferencing. This technology offers a new dimension of collaboration while increasing convenience and flexibility, and lowering cost. Fortunately, many current collaborative tools are already suited to the digital environment of virtual collaborations. However, the inherent differences between traditional physical environments and these new virtual environments require that old methods of evaluating, acquiring, and integrating resources into collaborations be updated.

This process of establishing a traditional C2 collaboration can be assisted by a resource broker which automates the necessary iterations of resource evaluation and acquisition. However, virtual collaborations are often not constrained by the same basic premises governing traditional collaborations, such as a resource being restricted to one location at one time. As the use of virtual environments becomes more pervasive, we must examine these differences between physical and virtual environments, and how they impact the use of a traditional resource broker built for use in physical environments. In this paper, we discuss the different opportunities and challenges associated with the identification, acquisition, and integration of resources in the context of virtual environments. We also present a concrete scenario to help illustrate the relevant issues.

Management of R&D: Planning for the Accelerating Pace of Technologies
Edward Zelinski - Director, Strategic Operations - Northrop Grumman Corporation

The accelerating pace of technologies driven by global research and development (R&D), technology transfer, knowledge diffusion, shortening product life cycles, and convergent technologies (nanoscience, biotechnology, information technology, and cognitive science) creates both opportunities and threats for organizations. In order for organizations to thrive in the global environment, management must strategically plan change in its R&D model of operation.

Technological change is occurring and the accelerating pace of technologies will establish a rapid movement that will change global, political, and economic landscapes. In turn, these events could cause global competition to speed up and increase at a faster innovation rate regarding new and enhanced products, processes, and services. R&D plays a significant function in the organization's innovation activities. However, research reflects that the survival and success of organizations depends on their ability to innovate and to exploit innovations globally. And customers are demanding higher quality products with much more capability at a shorter response time. The combined pressures of scale, scope, and integration, place a tremendous burden on organizations, and leadership in terms of approach of R&D.

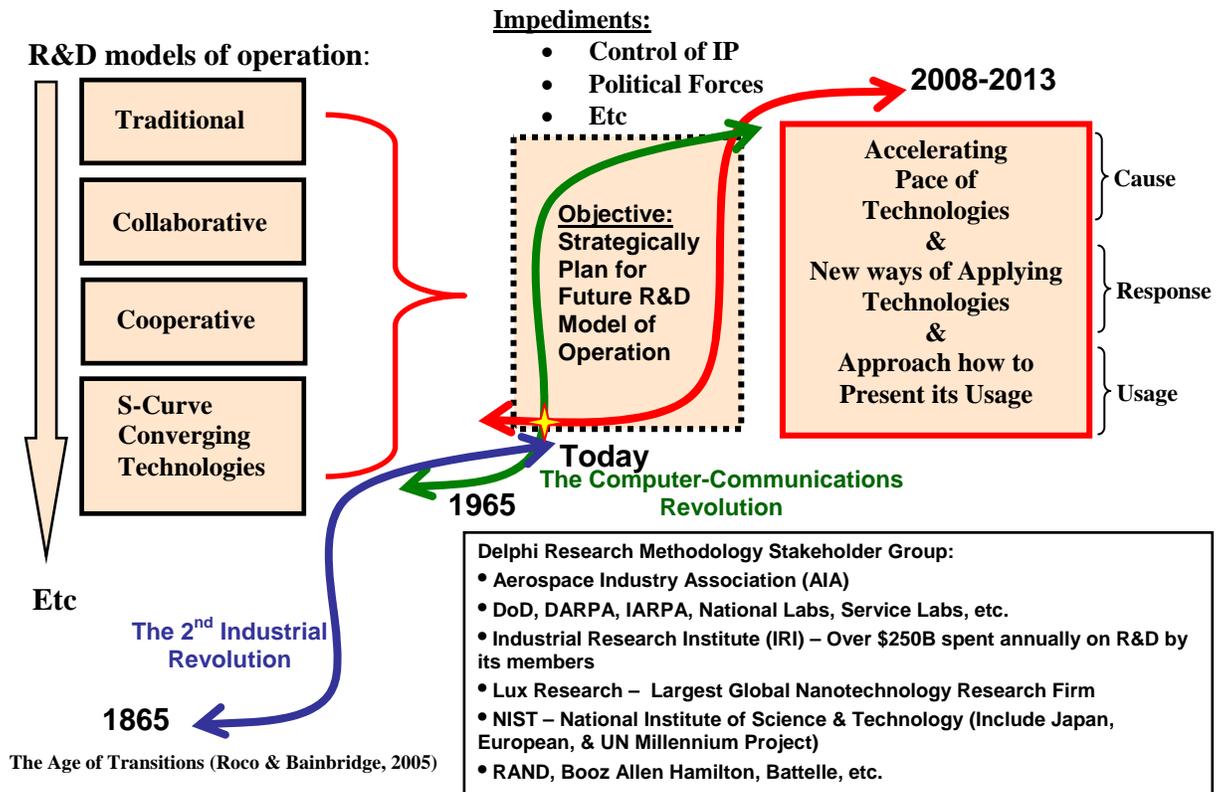
However, management of R&D organizations will continue to face the pressures of shortened product development cycles and business pressures to build innovative and disruptive applications faster. Globalization of R&D, the rapid diffusion of technologies, limited access to a technically skilled labor workforce, and expanding global knowledge makes managing R&D in today's organization very complex. Additionally, internal and external influential impediments require nearly daily planning in order to adjust to continuing threats to insure survival. And now the onslaught of converging technologies could make managing R&D in the future further complex. Therefore, a new R&D model of operations that copes with growing uncertainties, internal and external impediments such as Politics and IP rights, warrants research.

Holmes & Glass (2004) argue that "a firm's R&D investment plays a pivotal role in the firm's innovation activities, representing future growth opportunities and organizing for innovation involves at least three interrelated facets: incentives, structure, and culture."

As shown in Figure 1, the concept model of research approach, will study the quantitative empirical data through literary research from current R&D models of operation and through a Delphi methodological approach to gather expert inputs from a stakeholder group.

Zelinski (Cont'd)

Figure 1. Concept model of research approach



As R&D and innovation becomes more dispersed, it is expected that firms will face a new set of challenges. Global innovation presents opportunities and challenges for organizations. The drivers behind R&D internationalization have been changing in response to the increasing dispersion of knowledge and industry along with the accelerating pace of technologies that includes technology convergence. Organizations will need to develop new R&D models of operation in order to survive. While most companies are increasing their alliances with more international R&D networks, few have really begun to build the internal capabilities to run these networks effectively and efficiently. Managing R&D activities will require continual models of operation renewal, requiring new organizational structures, processes, and capabilities. Management opportunities exist for those organizations to replace Tactical with Visionary, Bold Leadership.



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Panel 5 A and Abstracts

Michael Jeffress, National Intelligence Office for Warning, Moderator

Terry E. Grim, Social Technologies, Inc.

Dr. Michael Jackson, Shaping Tomorrow

Dr. Stephen M. Millett, Futuring Associates LLC

Dr. Barton Kunstler, Independent Consultant

Paul Martin, United States Joint Forces Command

Assessing Foresight Capabilities

Terry E. Grim, Social Technologies, Inc.

This session is designed for those who want to improve the foresight capabilities of their organization. Clients often ask us to articulate good futures practices and to offer concrete objectives for improving their futures work. Social Technologies has addressed this by developing the first-of-a-kind foresight maturity model. The foresight maturity model offers clear definitions and associated measurements for best practices in organizational foresight. The model articulates the general disciplines and everyday activities that typify foresight at all capability levels, from the most nascent of functions to those operating at a world-class level.

The maturity model has several objectives. By offering organizations a means to understand the full character of their foresight activities, it helps to articulate a pathway to improvement. The model also builds a common language and framework for the profession, along with a measurement tool to establish a baseline for specific practices. And, by approaching foresight as a function that must be integrated across an entire organization, we improve the probability that foresight knowledge will be widely used.

Our model is based on an approach first developed by the Department of Defense Software Engineering Institute (SEI) at Carnegie Mellon University. The SEI created an objective tool, the capability maturity model, to evaluate software and software subcontractors, the premise being that the improvement of organizational practices would significantly increase the probability that good software would be developed, reducing the risk of failed projects. Today, software companies commonly use the model's metrics in internal conversations and planning, and are frequently asked by potential business partners where they fall on its scale. Similar models are employed in numerous industries throughout the world.

As with SEI's approach, Social Technologies' foresight maturity model may be used either to assess an organization's internal foresight capabilities or to evaluate the competency of a contractor. More specifically, it answers the questions:

- What are good futures practices?
- Where might a particular organization be on the scale of those practices?
- How can these practices be improved?
- What goals ought the organization to strive for?

Grim (Cont'd)

We view six disciplines as defining the area of foresight (below) and five levels of maturity: 1) ad hoc 2) aware 3) capable 4) mature and 5) world-class.

Leadership	Clear ownership and active leadership to implement and institutionalize foresight capability
Framing	Establishing the boundaries and scope of the endeavor
Scanning	Collection of appropriate and relevant information in a format and timeframe that support useful retrieval
Forecasting	Description of long-term outcomes that contrast with the present to enable better decision-making
Visioning	Creation of a preferred future that imaginatively captures values and ideals
Planning	Ensuring that the plans, people, skills, and processes support the organizational vision

For each of these key disciplines we describe three to five independent supporting practices. The model describes in detail each practice along each level of maturity. This level of detail allows organizations using the model to fully map their own work against the model and helps describe the many dimensions that foresight can encompass.

The content of the model is derived from several sources of futures understanding: the methods, assessments, and feedback contained in a book edited by Andy Hines and Dr. Peter Bishop, titled *Thinking about the Future: Guidelines for Strategic Foresight*; the experience and knowledge our practitioners have gained from teaching and educational relationships with the Futures Studies program at the University of Houston; and Social Technologies' nearly 10 years of practice as one of the world's largest futures/ foresight consulting firms. As with the SEI model, we expect the content to evolve through experience and use.

The benefits of this model are significant. We believe that it provides an easy-to-understand framework which defines good futures practices and supports an inclusive dialogue. Stakeholders are able to see what those practices look like and to contribute at each level of competency. By using the maturity model for gathering and evaluating information, and applying its proven foresight practices, organizations can do a much better job of leveraging the value that foresight creates.

Advances Futures: Collaborative Foresight

Michael Jackson, Ph.D., Shaping Tomorrow

Abstract: This paper will describe the analytical methods, processes and approaches to Horizon Scanning, Strategic Thinking, Action planning and Networking used by many leading organisations around the world.

Mike Jackson, Chairman of Shaping Tomorrow, will describe a now integrated approach to open source and private third party intelligence gathering, trend analysis, sense-making and path finding used by these organisations. The approach was developed through Shaping Tomorrow's offer to automate these organisations foresight processes through a single system approach. As a customer and client-focused organisation Shaping Tomorrow has succeeded in meeting the needs of all its clients through intense listening and quick action on delivering their ideas, needs and desires for the benefit of all.

Horizon scanning

The paper will describe these organisations common approach to:

- source identification
- scanning for collecting and analysing raw Insights
- visualising results
- the use of meta-data to reveal hidden relationships, new players and ideas
- finding serendipitous surprises

The use of Web 2.0 tools to facilitate the sharing and aggregation of client Insights will be covered as well as new developments in user profiling, filtering and narrative analysis that lead to dynamic understanding of changing user, team and organisational perceptions.

Strategic Thinking

The paper will describe the policies and methods used by Shaping Tomorrow its and clients to identify, rank, rate and qualify key Trends from the raw Insights.

The use of both qualitative and quantitative assessment tools will be covered and how these commercial organisations use a simple, but comprehensive, traffic lighting system to spot emerging opportunities and risks.

A description of how organisations use a funnel ranking technique to determine, change and communicate their highest priorities will be provided. A high-level overview of how organisations then Plan & Act on these priorities will cover the use of a common set of tools to assist with, determine and manage:

- Breakout thinking
- Scenario planning
- Competitor analysis
- Stakeholder mindsets
- Organisational critiques
- Plausible responses
- Agreed strategy
- Strategy development
- Action planning

Jackson (Cont'd)

Action planning

Key to any foresight project or programme are the execution of agreed decisions. The paper will describe both the existing methods employed by organisations and suggest more ways to extend their use in an integrated system.

Networking

The paper will describe how smart organisations are increasingly engaging stakeholders in collaborative foresight and combining this with the more traditional methods above through blogs, forums and special interest groups.

The Future

Lastly, ideas about where collaborative foresight is heading and the types of developments to be expected over the next ten years will be described.

Additional notes: The paper is illustrated with practical examples and where possible case studies and experiences of clients in using collaborative foresight.

Trend Analysis as Pattern Recognition

Stephen M. Millett, Ph.D., Futuring Associates LLC

Trend analysis remains the prevailing method for generating forecasts. After all, trend information from the past and the present is the only empirical data that we have to use in thinking about the future – nobody has data from the future. In many day-to-day applications, forecasts are linear extrapolations of the past. Although it is inadequate as our only method for forecasting, trend analysis will likely continue as the prevailing method of forecasting in the future, so we would be well served by developing better approaches to doing it.

Historically, trends in the social sciences have borrowed liberally from the physical sciences. Philosophers, historians, and futurists have searched for natural forces in such things as economics, politics, and social structures as though they moved according to immutable laws of nature like Newtonian mechanics. For example, Adam Smith in his *Wealth of Nations* (1776) described the market forces in the capitalist system as moving according to an “invisible hand.” Since Smith, economists have worked from the premise of equilibrium with concepts and equations rivaling those of physics. They wished that economics could be as predictable as $F=ma$ or $E=mc^2$. In addition, both economists (like Joseph Schumpeter) and historians (like Ibn Khaldun) have looked for cycles in trends that may be predictive of the future. Some, especially Karl Marx, saw a determinism, like a powerful force of nature, leading to inevitable results in the future. None of these efforts, however, has proven to be particularly prescient.

So, let’s shift our perspective and see whether a new line of vision can better illuminate paths to the future. Let’s think of trends in the social sciences as being based upon, or at least analogous, to human biology and psychology. If we think of history as the study of human behavior over the last 9,000 years or so, then we can think about the future in terms of historical patterns of human behavior with varying probabilities of re-occurrence in the future. This perspective leads me to the observation that trend analysis is a type of pattern recognition, broadly defined, and that research in pattern recognition may help use develop more reliable tools for trend analysis for forecasting.

I submit, as a working hypothesis, that there are three types of pattern recognition that correspond to three types of trend analysis:

- Type I: where we have a thorough knowledge of and primary interest in the background. We look for information that tells us more about known patterns. The more complete the data and the stronger the pattern, then the greater the reliance on trend projections as predictions. Deviations from the background pattern, however, may be detected but they are often unknown, confusing, and discarded. Most conventional trend analysis, models, and projections are Type I pattern recognition.
- Type II: where we have a thorough knowledge of the signal, although we may know little or nothing, or even care, about the background – we are looking for pre-selected signatures, the observance of which leads us directly to assumed consequences in the future. In trend analysis, this type of pattern recognition focuses on trend changes, disruptive events, or “black swans.”

Millett (Cont'd)

- Type III: where we have data but no known background or signal – where we plot the data in scatter diagrams, literally or figurative, and perform cluster analysis with the assumption that proximity, either spatial or temporal, reveals relational patterns. The patterns could be all kinds of plots, clusters, and figures, not exclusively lines and cycles.

Many examples of each type could be presented, but only a few will do for now. This frame of reference seems particularly useful to us today when we think about applying it to such issues as the future price of energy and Muslim terrorism.

Several cautions to trend analysis as pattern recognition must be recognized and managed. In Type I trend analysis, there is the temptation to assume that the future will be only a continuation of the past and the present. We must remember that the future has always been, and will likely always be, a combination of continuity and change. Trends capture continuity, but they miss changes. Since trend projection is a form of inductive reasoning, we must recall the warning of Karl Popper (1935) that we can never conclusively prove that a hypothesis is correct -- we can conclusively prove only that it is wrong. Popper's maxim should be combined with the concept of judgment probabilities by the Rev. Thomas Bayes (1763) to allow us to express trend forecasts with varying degrees of intuitive uncertainty. Therefore, a forecast based on trend analysis is an inductive hypothesis, or expectation, with a probability for the future subject to adjustments according to new information. I will go further to assert that all forecasts, produced from whatever method, are considered expectations.

But just as Type I cannot be our only approach to forecasting, we must realize that Type II is valid only in limited situations and that the future will not likely be all change, just as it will not likely be all continuity. Type II trend analysis out of control leads to science fiction.

A further consideration of the types of trend analysis shows us that the types may overlap and even converge. For example, Type III could evolve into Type I. Further, a convergence of Type I and Type II would likely provide better results than either one alone and may foresee new patterns emerge in Type III. Correspondingly, forecasts can be more prescient if they incorporate elements of trend analysis, expert judgment, and scenarios.

The paper concludes with recommendations for further investigation of the hypothesis that trend analysis is a form of pattern recognition and that further knowledge of pattern recognition will provide us with more prescient methods and tools for using trend analysis for forecasting.

**Complementing the NIC Report:
Adding Important Domains, Providing Alternatives to Selected NIC Conclusions**
Barton Kunstler, Ph.D.

The NIC 2020 report is an impressive document – balanced, thorough, imaginative, and useful, as well as being an elegant example of scenario-based futurist planning. I propose to complement the NIC report by addressing several important domains of activity absent from it and providing alternatives to several of NIC’s conclusions, highlighting those areas that still remain in shadows, often as a function of the report’s guiding assumptions.

This proposal contains five axioms intended to illuminate the shadowed areas. More generally, they can be used to modulate, expand, and fill in the shadows of any forecasting effort. The first axiom is the “Uncertainty Principle” – “uncertainty is certain.” The unforeseen will arrive with the power of a freight train, as history incessantly demonstrates. In human affairs, things do not play out according to a logic based on limited sets of variables. This axiom directs us to address “wild cards” and overlooked forces not yet manifest as trends, and to adopt a contrarian approach to trends whose momentum seems secure.

The second axiom is the “Qualitative Imperative:” qualitative shifts in attitudes, aspirations, values, discourse, and style can emerge from nowhere to catch fire and demolish expectations based on quantitatively-based forecasts. For example, it is impossible to imagine today’s world without the upheavals of the 1960s, yet their intensity took the world and the U.S. by surprise. Wild card events, such as the assassination of President Kennedy, played their part in shaping the decade as well. The fragmentation of the Soviet Union was predicted by, as far as I know, only one set of forecasters (those at Shell). In fact, almost every major historical event has arrived before it was foreseen or, if not, it has arrived in unforeseen ways. Forecasting can, however, provide a set of guidelines, fault-lines, and power lines (the play of influential forces) that render the future more familiar to us as it approaches.

Iran’s future is a case in point. Most Iranians dislike the current regime, yet it seems in firm control at the moment and is asserting itself as a regional power. Yet a democratic resurgence in Iran is not unthinkable, and its impact on Muslim youth throughout the world could be galvanic. All our scenarios about terrorism, Middle East conflict, and the oil crisis would be subject to massive revision if such an event occurred.

The third axiom we can call the “Tolstoy Effect,” which holds, as did the great Russian writer, that history is driven from the bottom up. The NIC employs the top-down variety – nations that prosper versus those that don’t, etc. But Tolstoy believed in the power of an animating idea that takes shape among, and draws its impetus from, the “folk.” Oswald Spengler’s differentiation between culture and civilization reflect this concept as well. We can also speak of a cultural *zeitgeist* whose mysterious transformations, while as insubstantial as the wind, nonetheless raise and level empires. Just as one can sense the oncoming weather or even the fruitfulness or severity of a season at its onset by the scents, pressure, humidity, and temperature that ride in on the wind, so too can we anticipate sea-changes in the foundational strata of a society and sketch out the broad outlines of what it may mean for the future.

Kunstler (Cont'd)

The fourth axiom is the “Ideational Supremacy,” that the idea is the most powerful force in history. Every great event – wars, depressions, technological innovations, the emergence of leaders and empires, periods of great prosperity – is ultimately driven by a matrix of powerful ideas, by some galvanic ideational force, even if that force is the suppression of ideas and a numb vacancy at the heart of its leaders’ vision, as is the case today with Myanmar or North Korea. Sometimes the ideas are explicit, as with communism, fascism, the market economy, the Declaration of Independence, etc. But most often they are articulated most fully by artists and thinkers, or given embodiment by scientists, while those we think of as decision-makers are only the exploiters of selectively chosen shards of those ideas. Even behind the choice of shards lie other ideas, other choices. Taken together, this synergy of science and art forecast the century of turmoil and relativism in regard to values, standards, assumptions of governance, rights, etc. which have manifested themselves in a far more haphazard manner than in the original articulation by the artists and scientists of early modernism.

The fifth axiom, the “Next Ultimatum,” is embodied in history’s overriding message: “You’re next.” Whether literally true or not, that is, whether a given society or community’s head is next on history’s chopping block, the reminder, like a sword of Damocles, should ever be in our thoughts. There is, of course, a general human antipathy to recognizing this which in turn distorts our best efforts at forecasting, *because few forecasts depict the forecast’s sponsors as becoming insignificant or eclipsed*. It simply runs contrary to human nature; unconsciously, we may be guided by the feeling that if we’re no longer going to be major players in the game, why bother with the forecast anyway? While we often can imagine a single-event catastrophe, we find it more difficult to imagine ourselves sliding gradually into irrelevance or superfluity.

The spirit of this proposal is exploratory and suggestive, a chance to question the assumptions and certainties with which policy-makers approach the next decade. Its purpose is to advance the discussion inaugurated by the NIC report by indicating new dimensions for analysis and study, rather than to undercut or refute the report’s important assertions. The five axioms will:

- 1) illuminate unforeseen possibilities by using forecasting algorithms that incorporate uncertainty; 2) analyze qualitative factors currently running under the radar; 3) scan street-level cultural trends that may upset the NIC’s scenarios; 4) identify core ideas that could erupt and divert trends addressed by the NIC; and 5) assume the hypothetical that “we (the U.S.) are next” and factor that into our calculations and configurations.

Some general areas to be addressed include the impact of technology on the younger generations, significance of catastrophism, loss of faith in leadership, development of “mind-tech,” growth of super-cities, changing notions of self and identity, changing role of the nation-state, and oft-ignored aspects of ecological decline. I will also identify a number of possible wild cards and percolating trends with the power to upset the NIC’s scenarios.



**Third Annual Proteus Futures Academic Workshop
U.S. Army War College - Carlisle, PA
16-18 September 2008**

Panel 5 B and Abstracts

Robert Allen, U.S. Army TRADOC, Moderator

Dr. Sheila R. Ronis, PNSR Vision Working Group Leader

Dr. David J. Staley, The Ohio State University and The DStaley Group LLC

Joshua Work, iSIGHT Partners

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**The Project on National Security Reform (PNSR):
Vision Working Group Methodology and National Security Scenarios**
Sheila R. Ronis, Ph.D., PNSR Vision Working Group Leader

This paper will describe the methodologies used to develop scenarios of the future for the Project on National Security Reform (PNSR), a congressionally mandated, federally funded project of the Center for the Study of the Presidency, sponsored by the Office of the Secretary of Defense. Ultimately, PNSR will offer recommendations on changes to the National Security Act of 1947 and its amendments, presidential directives to implement reforms, and new congressional committee structures and practices. The project is strictly nonpartisan. (www.pnsr.org).

Using expert insights on future trends and milestones, scenarios of the future will be built to stress test PNSR assumptions, solution sets, and recommendations for changes in national security structures and practices.

This paper will describe the methodology used by the Vision Working Group, the scenarios that will have been developed and the solution sets that will be stress tested for the Project's deliverable to Congress on the 1st of September that will identify the new set of system characteristics for the National Security System of the United States for the 21st Century.

Some of the Issues that will be explored include:

VISIONING IN THE U.S. GOVERNMENT

Core Problems and Impediments to Success

1. There is currently no single overarching vision (product) for the U.S. National Security System, the U.S. Government, or the broader nation.
2. There is currently no established process or forum to enable the development of a common vision for the U.S. National Security System, the U.S. Government (USG), or the nation.
3. U.S. Government Departments and Agencies participate in planning processes on a case-by-case basis but never in a holistic and separate visioning process.
4. Most individual departments and agencies produce "vision statements" that fail to proceed beyond the very cursory first steps of a true visioning process.
5. In some instances, mission statements are used in lieu of vision statements and use the terms interchangeably.
6. In the absence of a government-wide vision, department and agency level visions are rarely reinforcing and potentially contradictory.
7. There is a lack of "bandwidth" for strategic visioning.
8. Some critics have claimed that it is unconstitutional or anti-democratic for the USG to ascribe to a binding long-term vision or plan as would be intended for a proper use of both the process and products involved.
9. A critical distinction exists between thinking about the future (visioning) and developing strategies with long-term and real investments for achieving that future.

Ronis (Cont'd)

10. There is difficulty dealing with disconnects between the way the government is organized and the way the world comes at us.
11. Bookkeeping or the way the government keeps its books and manages its resources is lacking as a complimentary element in visioning.
12. There is no unified, accessible map of USG capabilities and capacities to inform a visioning process.

Prerequisites for successful visioning in the USG

1. National Visioning must be “transcendent” of departmental levels in venue, process, and product. The NSC will not likely be able to serve in this function.
2. Visioning as a concept whose time has come must be distinct and understood as such from all other processes and products such as missions, planning, policy-making, and strategy development.
3. Visioning needs to be linked to resource consequences but not constrained by them as is policy-making and strategy development.
4. Any and all legal impediments must be removed.
5. Senior leadership and endorsement is essential for success.

Imagination Management: Visualizing Future Scenarios

David J. Staley, Ph.D.,

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The 9/11 Commission reported that the failure to anticipate and prevent the events of September 11 was as much a “failure of the imagination” as anything else. “It is therefore crucial,” concluded the Commission, “to find a way of routinizing, even bureaucratizing, the exercise of imagination.” This presentation details a method organizations engaged in futuring and foresight work can use to manage imagination, through an instrument called a “scenario space.”

Analysts face a twin problem: developing the skill to imagine wild card, outlier and Black Swan scenarios, but also managing and organizing these potentially innumerable scenarios in such a way as to make them intelligible and actionable. A scenario space is designed 1) to organize the imagination 2) to act as a diagnostic tool as to an organization’s imaginative capacity and 3) to encourage imaginative thought and peripheral visioning.

A scenario space is bounded by two axes: one representing the impact of the scenario, the other reflecting a qualitative assessment of the probability of the scenario. A scenario space can include other dimensions as well: time horizon, threat vs. opportunity, need to monitor, etc.

1) To organize our imagination: A scenario space works in tandem with other expert judgment techniques; I prefer to use a nominal focus group technique as a way to generate scenarios. During the “scoring” portion of the focus group, participants are asked to provide a score for each of the dimensions under consideration. After results are averaged, each scenario is then placed within the resulting scenario space. Scenarios in the upper right quadrant (high impact, high probability) are located in the region of “due diligence.” Other scenarios, with less impact and/or less probability, are situated in the region of “peripheral vision.” The result is a way to manage an organization’s perceptions about future scenarios, distinguishing between those scenarios that are actionable and those that need to be monitored on the periphery. (The scenario space is not static: over time, different scenarios will shift position within the region, becoming more probable, for example. A scenario that begins somewhere on the periphery of the scenario space still bears watching, as it can move into the region of due diligence.)

2) To act as a diagnostic tool as to an organization’s imaginative capacity: After all the scenarios have been mapped out in scenario space, an organization can then assess its imagination capacity. Too many scenarios that end up in the region of “due diligence” reflect an organization that has not fully considered outliers and other wild cards on the periphery of the scenario space. The organization suffers from too little imagination. Surprise is born in this yellow peripheral region, not in the area of high impact/high probability. On the other hand, if an organization has too many scenarios located on the periphery, then the organization is missing potentially obvious threats. The organization may in fact be suffering from too much imagination.

Staley (Cont'd)

3) To encourage imaginative thought and peripheral visioning. If there are far too few scenarios included within the periphery of the scenario space, then it is incumbent upon the organization to revisit their scenarios, and push their imaginations into this region. The presentation will conclude with techniques for expanding our imagination, to move the organization's imagination into this "peripheral zone," including "scenario shifting," structural scenarios, hypothetical modification of the actual world drawn from analysis's evidence, question stimulation, analogies, the search for more data, and an examination of "load-bearing assumptions." The resulting scenarios might be less probable, but rather than overlooking them, placing them within scenario space makes them part of our peripheral attention.

Imagination management works best if there is an "imagination manager" who oversees this process, uses "scenario space" to organize perception, and encourages imagination.

Long Tail Intelligence: Leveraging Niche Capabilities for Strategic Insight

Joshua Work, iSIGHT Partners

The evolution of the US intelligence community has led to a disproportionate focus on a small number of high value sources and methods: the penetration agent, the communications intercept, and the overhead imagery photo. While these sources and methods have proven invaluable in understanding the capabilities and intentions of high priority targets, and allowed the IC to leverage a limited resource set to maximum effect to meet the most pressing requirements levied by policymakers and warfighters, they represent only a small percentage of the total spectrum of available information sources. The IC has evolved ever more sophisticated and robust tradecraft designed to employ these sources and methods to develop an understanding of hard targets and denied areas, and to more effectively target the employment of these capabilities through focused analysis and rigorous collection management processes.

However, the focus on this limited set of potential accesses and productive reporting lines has too often resulted in the opportunities available in the wider environment being overlooked. This may occur due to a lack of time, a lack of funding, or simply the cognitive biases imposed by the lack of awareness of such gaps and the other means by which these gaps may be filled.

In the commercial sector, this concept is known as the Long Tail. The term refers to a power law or Pareto distribution, in which the greatest value is found at the “short head.” where a small number of items return the majority of utility (or return on investment). However, recent research has indicated that the total value of the Long Tail in the ignored remainder of potential options may exceed that of the short head, if properly leveraged through new engagement strategies and enterprise models.



Classic “Long Tail” distribution

Work (Cont'd)

The focus on the short head of only immediate high value activities within the IC is nonetheless a recent historical anomaly. Throughout the early years of the intelligence profession, the limited availability of many kinds of information – especially against hard targets and denied areas – resulted in the flourishing of creative innovation in both collection and analysis that reflected strategies designed to exploit the Long Tail. Subsequent technical innovation and the ultimate dominance of the United States as the sole superpower reduced the reliance on such methods – and led to many of these techniques being lost from institutional memory even as the post-Cold War world saw an unprecedented explosion in the volume, variety, and velocity of raw information available to the intelligence community.

Yet both historic and other alternative options remain available to meet a wide range of standing and emergent intelligence requirements through the application of Long Tail principles to collection and analysis problems. The success of certain “new” innovative programs – such as gray literature acquisition, Large Scale Internet Exploitation, low level human source operations, analytic outreach efforts, and public / private sector information sharing programs - can be attributed to the successful application of Long Tail intelligence principles.

This paper explores historic examples of successful Long Tail intelligence activities, examines recent successful examples in both government and the private sector, and presents a series of principals and model options derived from these cases for consideration in future programs intended to leverage niche capabilities to pursue strategic and enduring insights into the hard problems facing the US intelligence community today and into the future.