Dr. Robert Popp
Deputy Director
Information Exploitation Office

Utilizing Social Science Technology to Understand and Counter the 21st Century Strategic Threat

During the Cold War era, the strategic threat was clear. And the United States responded clearly, with a policy toward the Soviet threat that centered on deterrence, containment, and mutually assured destruction. To enforce this policy, the United States created a strategic triad of nuclear intercontinental ballistic missiles, Trident nuclear submarines, and long-range strategic bombers.

Today, however, our security environment is profoundly different. The strategic threat is far more complicated and dynamic. New and deadly challenges—from irregular adversaries to catastrophic weapons to rogue states—have emerged. The 21st century strategic threat triad—failed states, global terrorism, and WMD proliferation—represents the greatest modern day strategic threat to our national security interests.

With the emergence of this new strategic triad comes the need to craft a new agenda of military and national security priorities. Winning the war against these new threats will require more than just victory on the battlefield.

Recently, a revised national security strategy was published [1]. It charters our military to reassure our allies and friends, to dissuade future military competition from would—be aggressors, to deter

threats against US interests, and to decisively defeat any adversary if preemption and deterrence fail.

To execute the new strategy, our military must understand these new strategic threats. It is not sufficient to simply predict where we might fight next and how a future conflict might unfold. We can no longer simply prepare for wars we would prefer to fight, but must prepare for those we will need to fight. Our new strategy requires we make every effort to prevent hostilities and disagreements from developing into a full-scale armed confrontation. It requires military, diplomatic, and social engineering skills and an understanding of the cultures and motivations of potential adversaries. Indeed, we need to be able to shape the attitudes and opinions of entire societies, with predictable outcomes.

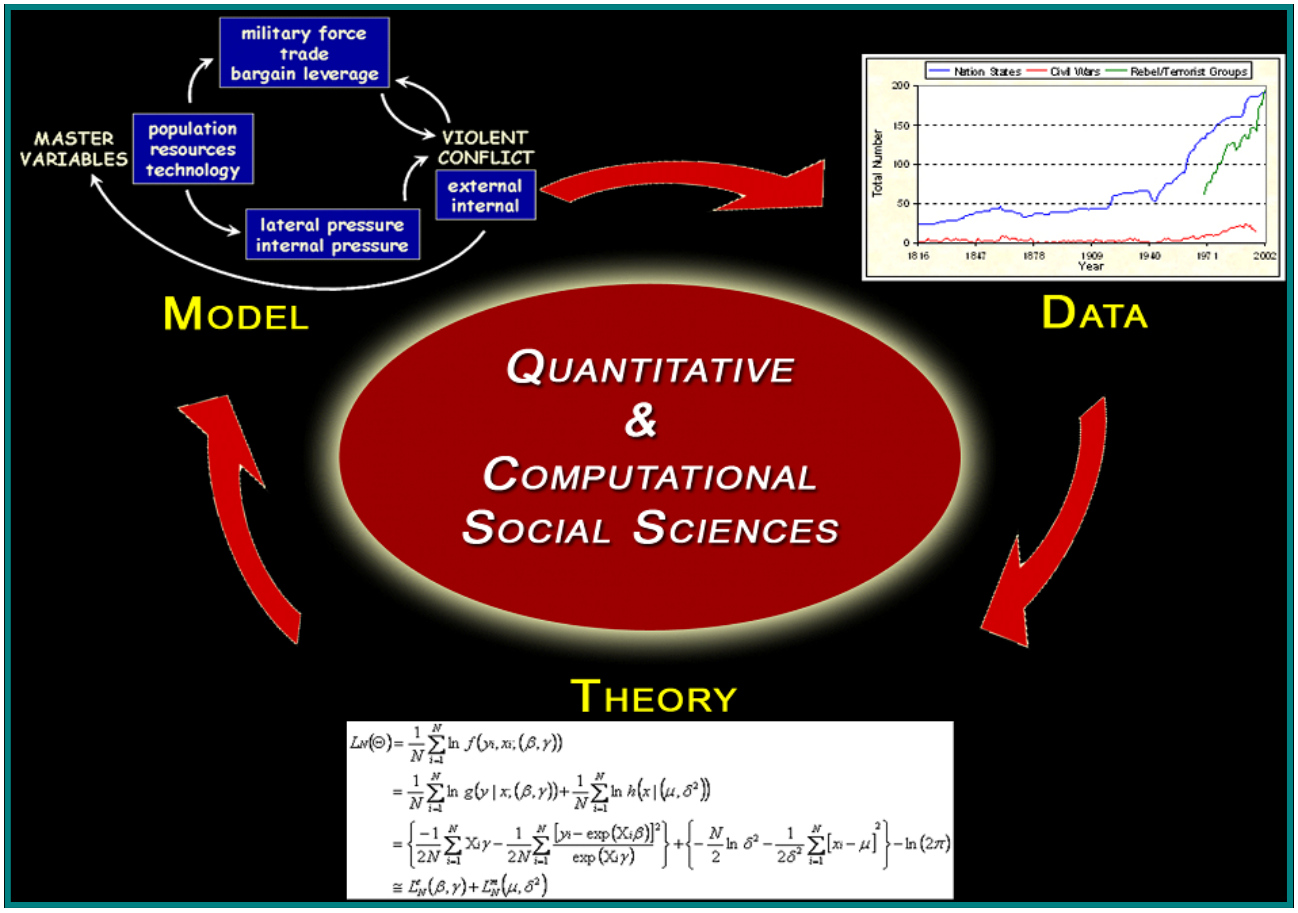
Recent experience in Iraq and Afghanistan taught us that military success in pre- and postconflict stability operations requires a deep social awareness of the threat and the operational environments in which they reside. In fact, managing successful stability and reconstruction operations requires just as much social awareness as it does military combat savvy.

In this new century, our adversaries seek to paralyze US influence by employing unconventional methods and weapons of mass destruction. These new adversaries are asymmetric, transnational terrorists, insurgents, criminals, warlords, smugglers, drug syndicates, and rogue WMD proliferators. They are indistinguishable from, and intermingled among, local civilian population. They are not part of an organized conventional military force, but rather have formed highly adaptive organizational webs based on tribal or religious affinities. These new adversaries conduct quasimilitary operations using instruments of legitimate activity found in any open or modern society. They make extensive use of the Internet, cell phones, the press, schools, mosques, hospitals, commercial vehicles, and financial systems. They do not respect the Geneva Convention or the time-honored rules of war. They see WMD not as a weapon of last resort, but as an equalizer and a weapon of choice. These new adversaries perpetuate religious radicalism, violence, hatred, and chaos. They seek safe haven and harbor in weak, failing, and failed states.

What do I mean by failed states? Failed states have cultures and world views that are vastly different from those of the United States. In today's increasingly interconnected world, they pose an acute risk to US national security. Failed states facilitate the routine brutalization and repression of their own people. They reject basic human values and are less concerned with international order and more with lawlessness, demagoguery, hatemongering, and thuggery. Failed states are internally divided along ethnic, religious, and ideological lines and are ruled by thugs who act not in the interests of their citizenry, but to settle scores and retaliate against perceived humiliations. Failed states, like the threats they harbor, see the acquisition of WMD technology as empowering and essential to their own prestige on the world stage. Failed states provide breeding grounds for terrorists, narcotics trade, black marketeering, human slavery, weapons trafficking, and other forms of organized crime. In failed states, the population suffers in a climate of fear, institutional deterioration, social deprivation, and economic despair [2].

The ballistic missiles and conventional ISR systems that were so effective at ending the Cold War are no longer sufficient, nor are well suited, to countering the 21st century strategic threat. These new threats, who are willing to accept almost any degree of risk to achieve their objectives—often under the false pretext of religion—are often able to foil our conventional surveillance systems.

In many instances, the decisive terrain in 21st century warfighting is the vast majority of noncombatants who are not directly involved in the fighting, but whose support, willing or coerced, is critical to influence. Winning over the hearts and



minds of the local population by providing aid to improve their lives is equally as important, and can no longer be subordinated, to projecting military force or capturing and killing the enemy.

How are we to implement this new national strategy? We believe the way forward is clear. It does not involve spending billions of dollars procuring more conventional ISR or high-profile weapon systems to gain incremental improvements in precision, speed, or bandwidth. What is needed is a strategy that leads to a greater cultural awareness and thorough social understanding of the threats comprising the new strategic triad.

What technologies must we develop to understand and influence nation states, societies, thugs and terrorists, WMD proliferators, and zealots in failed states?

I believe the path to understand people, their cultures, motivations, intentions, opinions and perceptions lies in applying interdisciplinary quantitative and computational social science methods from mathematics, statistics, economics, political science, cultural anthropology, sociology, neuroscience, and modeling and simulation. A commander from the Third Infantry Division motivated this need brilliantly while commenting on his march to Baghdad when he said, "I knew where every enemy tank was dug in on the outskirts of Tallil….Only problem was, my soldiers had to fight fanatics charging on foot or in pickups and firing AK-47s….I had perfect situational awareness. What I lacked was cultural awareness. Great technical intelligence…wrong enemy." [3]

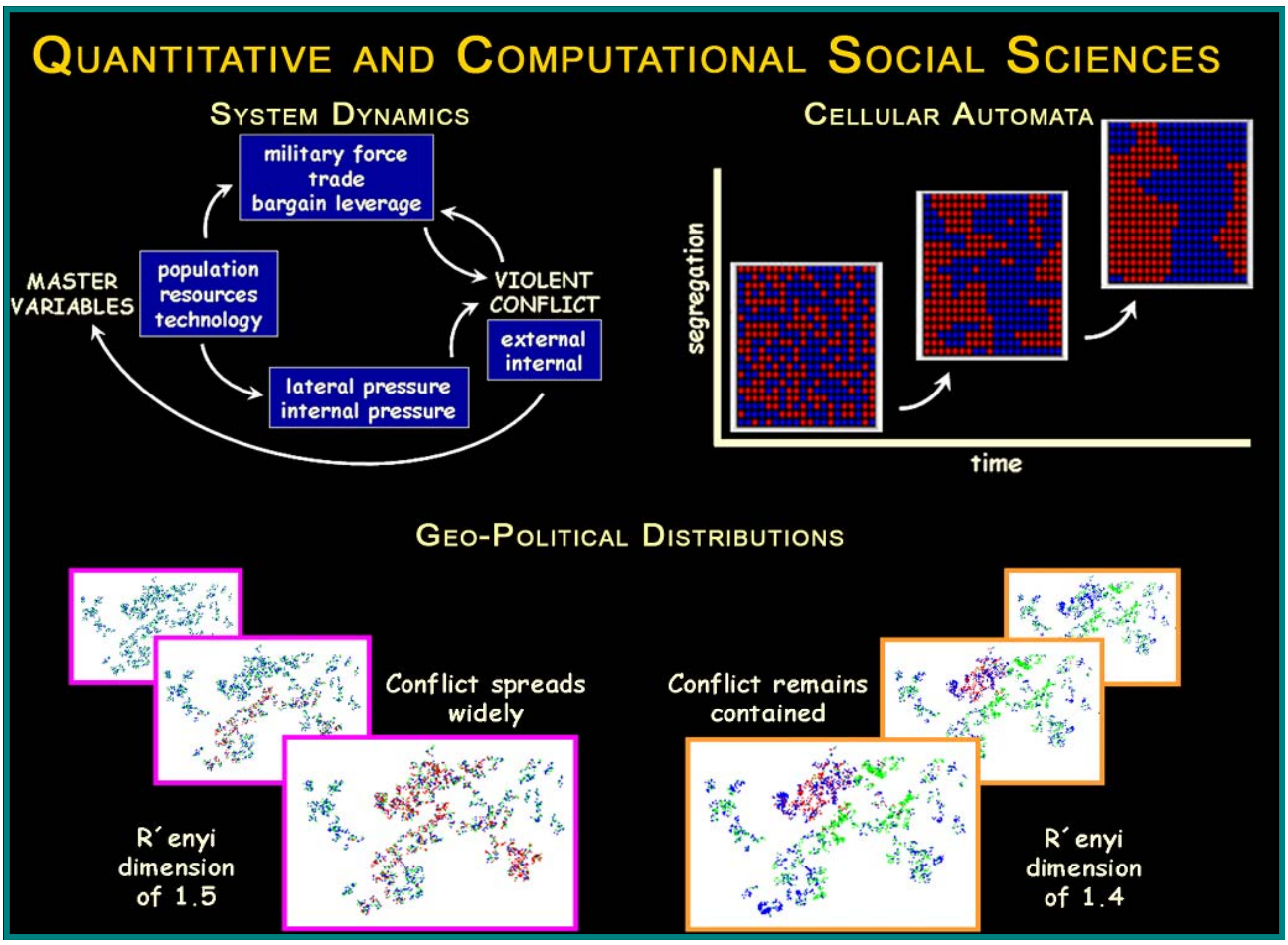
Understanding and countering today's strategic threat that is inherently dynamic and socially complex is not easily reduced or amenable to classical analytical methods. It requires applying quantitative and computational social sciences that offer a wide range of nonlinear mathematical and nondeterministic computational theories and models for investigating human social phenomena.

These analytical techniques apply to cognition and decision-making. They make forecasts about conflict and cooperation and do so at all levels of data aggregation from the individual to groups, tribes, societies, nation states, and the globe. These analytic techniques use the equations of dynamical systems and are based on models: models of reactions to external influences, models of reactions to deliberate actions, and stochastic models that inject uncertainties.

Research in the areas of quantitative and computational social science is vital. We need good models, good theories, and good tools to apply these technologies. These tools are as critical as any new weapon system. They are central to our war against terrorism, WMD, and failed states—the elements of the new strategic threat triad.

Military commanders need means for detecting and anticipating long-term strategic instability. They have to get ahead, and stay ahead, of conflicts, whether those conflicts are within nation states or between nation states. In establishing or maintaining security in a region, cooperation and planning by the regional combatant commander is vital. It requires analysis of long-term strategic objectives in partnership with the regional nation states. It requires a careful balance of finite resources such as humanitarian relief, political and economic outreach projects, infrastructure rebuilding projects, joint military training and exercises and, when needed, military combat operations.

Innovative tools provided by the quantitative and computational social sciences will enable military commanders to both prevent conflict and manage its aftermath when it does occur. These tools will allow a greater understanding of the complex political, military, economic, sociological and demographic landscape associated with nation states. They can predict the loads and demands



placed on the state as a function of its capability to manage the stresses. They will allow alternative shaping options to be evaluated for their ability to mitigate destabilizing events; enhance peacekeeping measures; and influence choices about economies, political systems, rule of law, and internal security.

Because the analysis of conflict and nation state instability is inherently complex and deeply uncertain, no one social science theory or quantitative/computational model is sufficient. An ensemble of models—containing more information than any single model— must be integrated within a single decision support framework, to generate a range of plausible futures. Robust adaptive strategies, vice optimal ones, that hedge across these plausible futures will provide practical options for the decision-maker to consider [4]. Within the right theoretical framework, these models and decision support tools will provide strategic early warning capability and actionable options for winning the peace, preserving stability, and minimizing deadly conflict.

Quantitative and computational social science has begun to show promise toward understanding nation states. DARPA is funding research to model and understand the preconditions that give to nation state instability and conflict [5]. In any field of science, the best work is that with the strongest empirical support and explanatory power. This field is no different. For example, one model using system dynamics successfully explains how internal and external state pressures can lead to violent conflict. It shows the long-term consequences, oftentimes unexpected, that conflicts can have on a population. Another model involving cellular automata shows how simple microlevel grievances or preferences from a small number of actors can diffuse and spread in counterintuitive ways. Again, we see surprising macrolevel outcomes. For example, in Schelling's segregation model, even moderately tolerant neighboring groups can produce significant ethnic segregation over time. Another model, based on geopolitical distributions, can show that spatial dynamics, such as the spread of conflict, can differ and depend on the scale invariance of subpopulation distributions as defined by political, ethnic, religious or economic features. These and other theories and modeling paradigms from the quantitative and computational social sciences are making powerful contributions to our understanding of the 21st century threat triad and to improved policy solutions that can provide strategic and tactical advantages.

Victory in the 21st century strategic threat environment no longer belongs to the side that owns the best and most sophisticated ISR or weapon systems. It belongs to the side that can combine these cutting-edge technological marvels, which emerged from the physical sciences, with methods from the quantitative and computational social sciences.

References

[1] The National Security Strategy of the United States of America, http://www.whitehouse.gov/nsc/nss.pdf, September 2002.

[2] Rotberg, Robert, L., “The Failure and Collapse of Nation-States: Breakdown, Prevention, and Repair,” When States Fail: Causes and Consequences, (Ed. R. Rotberg), Princeton University Press, pp. 1 – 49, 2004.

[3] Scales, Robert H. Jr., “Culture-Centric Warfare,” Proceedings, Annapolis, MD: U.S. Naval Institute, September 2004.

[4] Popper, Steven, W., Robert J. Lempert and Steven C. Bankes, “Shaping the Future,” Scientific American, pp. 66 – 71, April 2005.

[5] Popp, Robert, L., “Exploiting AI, Information and Computational Social Science Technology to Understand the Adversary,” AAAI Spring Symposium on AI Technologies for Homeland Security, Stanford University, CA, March 2005.