

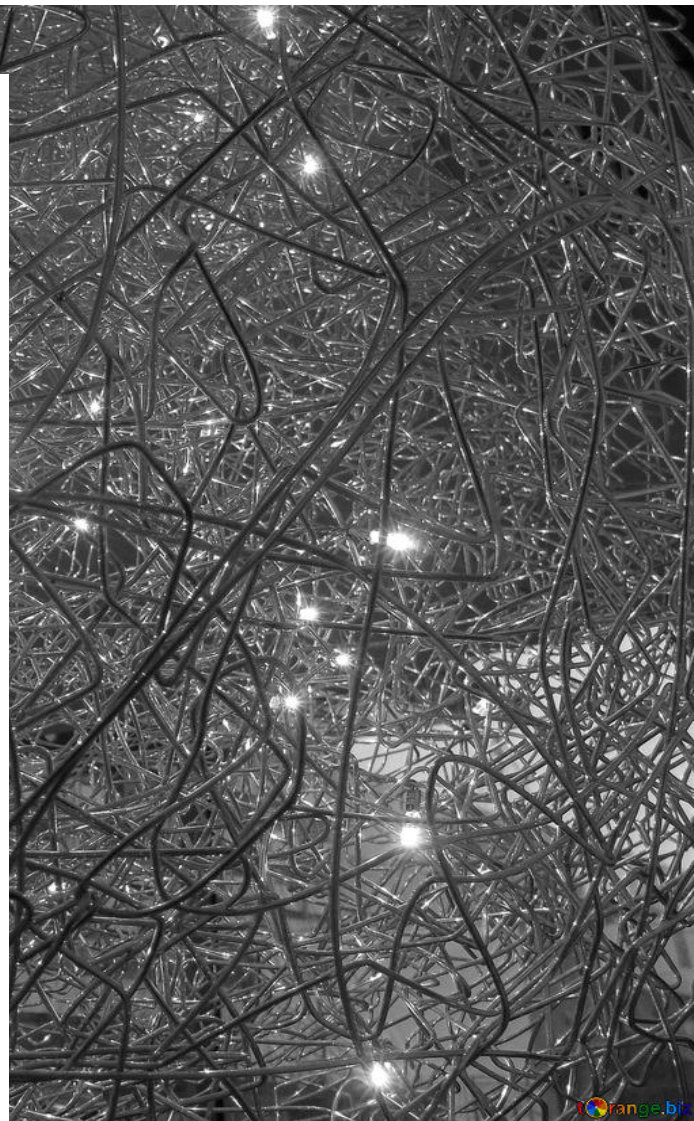
# Radical Leveling and Emerging Technologies as Tools of Non-Kinetic Mass Disruption

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## Invited Perspective Series

*Strategic Multilayer Assessment (SMA)*

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## STRATEGIC MULTILAYER ASSESSMENT

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**Series Editor: Sarah Canna, NSI Inc.**



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## James Giordano (PhD)



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J5 Donovan Senior Fellow for Biowarfare and Biosecurity at US Special Operations Command (USSOCOM); Research Fellow and Task Leader of the EU-Human Brain Project Sub-Program on Dual-Use Brain Science; an appointed member of the Department of Health and Human Services Secretary’s Advisory Committee on Human Research Protections (SACHRP); and senior consultant to the *Organisation for Economic Cooperation and Development* Working Group on International Neurotechnology.

Prof. Giordano is Editor-in-Chief of the BMC international journal *Philosophy, Ethics, and Humanities in Medicine*; Associate Editor-in-Chief of the *Cambridge Quarterly of Healthcare Ethics*, Associate Editor of the *Dynamics of Asymmetric Conflict Journal*, and Co-Editor in Chief of the Brill Press book series *HomoTechnicus-Technologicus*. The author of over 300 papers, 7 books, 21 book chapters, and 18 government white papers on brain science, national defense and ethics; in recognition of his work he was elected to the European Academy of Science and Arts, and named an Overseas Fellow of the Royal Society of Medicine (UK).

Prof. Giordano was awarded a PhD (with highest honors) in biological psychology from the City University of New York. He was NIEHS Post-doctoral Fellow in neurotoxicology and neuropathology at the Johns Hopkins University; APA Fellow in Neuroimaging at Harvard University Medical School/Massachusetts General Hospital; and completed post-graduate training in bioethics and health policy at the Neiswanger Institute of Loyola University (IL). Prof. Giordano previously served as a designated Aerospace Physiologist, and Research Psychologist with the United States Navy and Marine Corps, and was a Safety Advisor to the Federal Aviation Administration.

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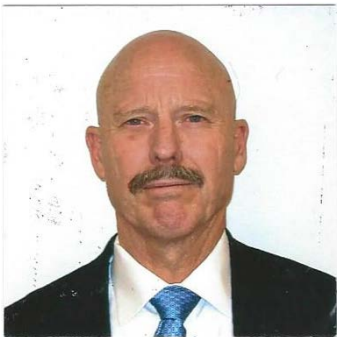
### **Joseph DeFranco**



Joseph DeFranco is a Scholar Fellow of the Defense Operational Cognitive Sciences section of the Strategic Multilayer Assessment Branch, Joint Staff, Pentagon. He is currently pursuing graduate studies in biodefense at the Schar School of Policy and Government of George Mason University, and working toward a Ph.D. in War Studies at Kings College, London, with emphasis upon biosecurity and neuroscience. His current research focuses on possible uses of novel microbiological agents, neurotechnologies, and ancillary science and technology as force-multiplying elements in non-kinetic, hybrid, and kinetic engagements; and the role of international agencies and policies in global biosecurity.

He previously served as J-5 Donovan Group Fellow in Biowarfare and Biosecurity, at US Special Operations Command (USSOCOM), and was on the staff of Congressman Donald S. Beyer (VA-08). Mr. DeFranco is the author of several papers in the international, peer-reviewed literature, U.S. Army TRADOC Mad Scientist Laboratory Blogs, online news articles, and government white papers that have addressed the intersection of brain science and national security.

### **L. R. Bremseth CAPT, USN SEAL (ret.)**



Rick Bremseth served as the Deputy Senior Director of the Integration Support Directorate (ISD) for the Department of the Navy (DON). As such, he was a key advisor to the Secretary, Under Secretary and Deputy, Under Secretary of the Navy for sensitive activities. He was responsible for the synchronization, facilitation, overall planning, coordination, and execution within the DON for Sensitive Activities, Irregular Warfare, and Special Operations Forces support. He served as a primary liaison and interface for these areas from the DON to the Office of the Secretary of Defense, the Chief of Naval Operations, the Commandant of the Marine

Corps, the Naval Criminal Investigative Service, and various other departments and agencies of the U.S. Government.

Mr. Bremseth was appointed to the Defense Intelligence Senior Level on 26 August 2012. He worked in the ISD for over six years and served as the Director, Operations and Executive Director prior to his appointment as Deputy Senior Director. He retired from the Navy in 2006 with twenty-nine and a half years of service. He earned a Bachelor of Arts degree in psychology from the University of California, Riverside, and a Master of Science degree in Strategic Studies from the U.S. Marine Corps War College.

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Mr. Bremseth's naval service was all within the Naval Special Warfare community. His assignments were varied and included tours of duty at three separate Theater Special Operations Commands. He commanded SEAL Team EIGHT (1996-1998) and his major command tour was at Naval Special Warfare Group THREE (2003-2005). He served as Deputy Commander, Special Operations Command, Pacific and Deputy Commander, Combined/Joint Special Operations Task Force, Bosnia-Herzegovina. He also commanded the Joint Special Operations Task Force, Operation Enduring Freedom – Philippines.

His military awards include the Defense Superior Service Medal, Legions of Merit, and associated joint, unit, and campaign awards and decorations by the Department of Defense and the Department of the Navy.

### *Acknowledgements*

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# Radical Leveling and Emerging Technologies as Tools of Non-Kinetic Mass Disruption

James Giordano (PhD), Joseph DeFranco, & L. R. Bremseth CAPT, USN SEAL (ret.)<sup>1</sup>

America's wars and longstanding military doctrine, established by the Department of Defense (DoD), emphasize kinetic warfare. Principles of kinetic warfare, however, do not necessarily or appropriately apply when addressing, mitigating, or preventing non-kinetic threats (i.e., "left of bang" engagements). As well, existing and emerging developments in science and technology are being used to leverage power in non-kinetic engagements. Such radical leveling technologies (RLTs) and emerging technologies (ETs) are being used as "*weapons of mass disruption*" (versus destruction in the classical sense) to incur rippling effects in and across targeted individuals, societies, and nations. Strategic competitors and adversaries are increasingly integrating and employing RLTs and ETs for synergized attacks against the United States and its allies. This paper will describe and define the viability and value of non-kinetic engagements that are synergized by the use(s) of RLTs and ETs, and will propose a paradigmatic whole-of-nation approach to assessing, quantifying, mitigating, preventing, and developing/using offensive capabilities to thwart competitors' and adversaries' progress in RLT and ETT development and use.

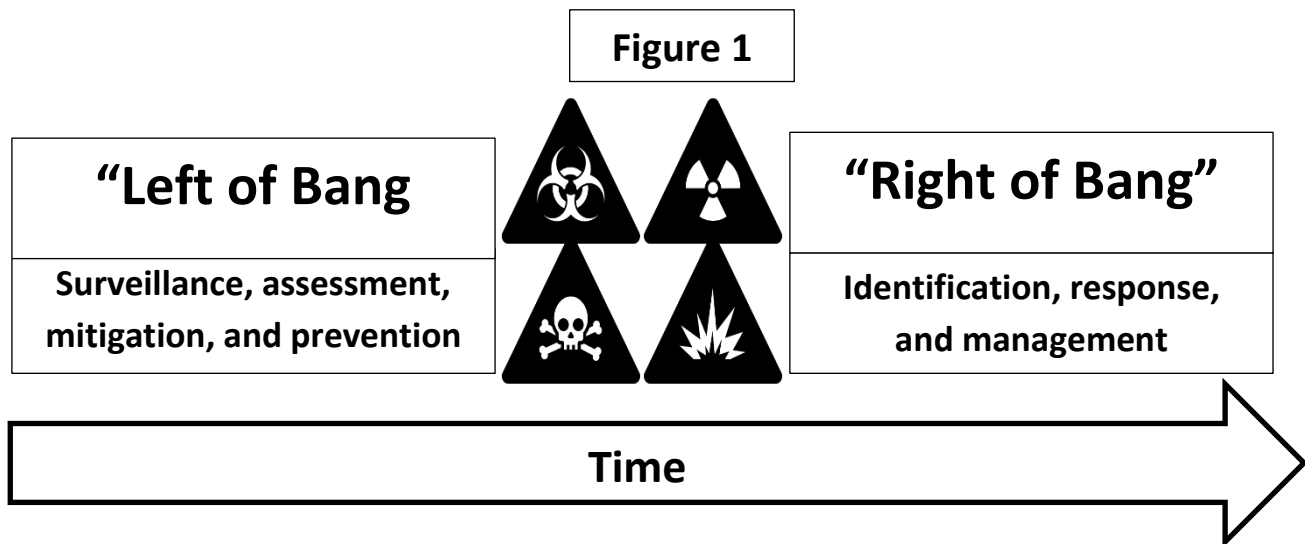
## Non-kinetic (vs. Kinetic) Engagements

Political and military actions that can adversely impact, if not defeat, an opponent often involve clandestine operations that are articulated across a spectrum. These operations frequently do not meet current criteria for explicit acts of war. As shown in Figure 1, clandestine kinetic operations are employed more readily after the initiation of conflict (i.e., "right of bang"). However, clandestine non-kinetic activities are less visible and are particularly effective because they occur prior to bellicose engagement (i.e., "left of bang"). The United States' (US) and its allies' strategic competitors and adversaries understand the economy of force that non-kinetic engagements enable and are increasingly focusing upon developing and articulating advanced methods for their execution.<sup>2</sup>

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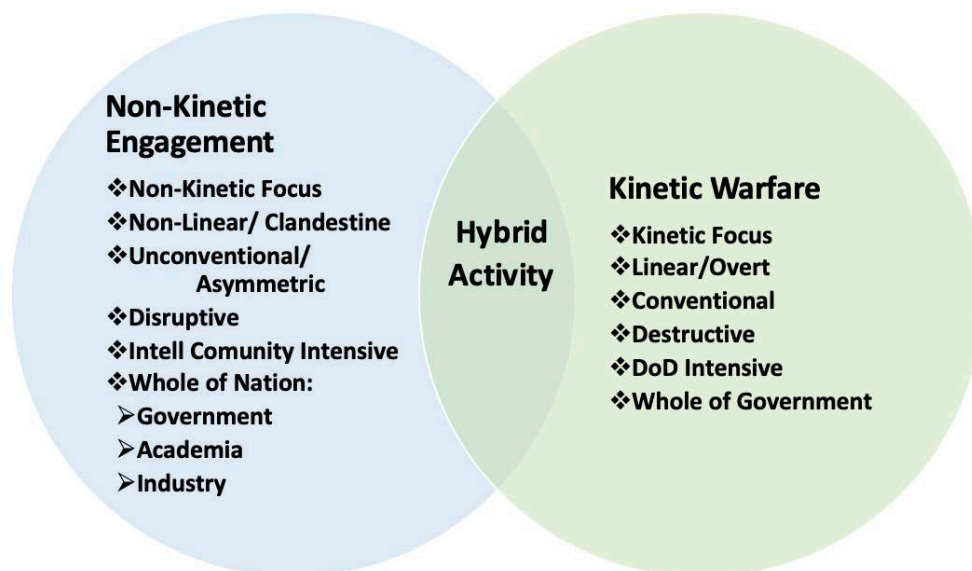
<sup>1</sup> The opinions expressed in this white paper are those of the authors, and do not necessarily reflect those of the United States Department of Defense, United States Special Operations Command, and/or the organizations with which the authors are involved.

<sup>2</sup> DeFranco J., DiEuliis D., Bremseth L.R., Snow J.J., & Giordano J. (2019). Emerging Technologies for Disruptive Effects in Non-Kinetic Engagements. *Journal of the Homeland Defense & Security Information Analysis Center*, 6(2), 48-55.



Indeed, non-kinetic engagements can exploit the fog of war by creating uncertainties prior to—and/or outside of currently accepted definitions of—traditional warfare, precisely because they are qualitatively and quantitatively ambiguous as blatant acts of aggression (Figure 2). Non-kinetic engagements incur disruptive effects in and across various dimensions (e.g., biological, psychological, and social) that can lead to intermediate to long-term destructive manifestations (in a number of possible domains, ranging from the economic to the geo-political). The latent, strategic effects evoke outcomes in a “long engagement/long war” context, rather than in more short-term tactical situations.<sup>3</sup> In light of this, non-kinetic operations should be regarded as methods of mass disruption that sustain compounding results that can evoke direct and indirect de-stabilizing effects.

**Figure 2**



<sup>3</sup> Davis Z. & Nacht, M. (2018). *Strategic Latency—Red, White and Blue: Managing the National and International Security Consequences of Disruptive Technologies*. (Eds.) Livermore CA: Lawrence Livermore Press, 2018.

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Non-kinetic engagements often utilize non-military means to expand the effect-space beyond the conventional battlefield. The Department of Defense (DoD) and Joint Staff do not have a well agreed-upon lexicon to define the full spectrum of current and potential activities that constitute non-kinetic engagements. It can be politically problematic, if not dangerous, to militarily define and respond to non-kinetic activities. Thus, a limited scale non-kinetic action can place the targeted recipient(s) at a disadvantage in two ways. First, the criteria for response (and proportionality) are vague and therefore any reaction could be seen as questionable. Second, if the targeted recipient(s) responds with bellicose actions, there is strong likelihood that they may be viewed as (or provoked to be) the aggressor(s) and, therefore, susceptible to some form of retribution that may be regarded as sanctionable. This can establish plus-sum advantages for the executor(s) and zero-sum dilemmas for the target(s).

### **Use of Technologies for Peer Capability—or Superiority—in Non-kinetic Engagements**

Nation states', virtual nations', and state- and non-state actors' abilities to exert change are enhanced both by (1) radical leveling technologies (RLTs)—extant technologies that can be employed in novel ways to exert disruptive effects in certain contingencies (e.g., influencing socio-economic vulnerabilities and volatilities); and (2) emerging (i.e., newly developed) technologies (ETs). Both RLTs and ETs can be utilized for their novel properties and capabilities to produce multi-focal and multi-scalar disruptions that evoke transformative and de-stabilizing effects in (support of) non-kinetic engagements. RLTs are often not viewed for their (dual-use) potential in warfare, intelligence, and national security (WINS) operations. The use of ETs in WINS operations can be particularly problematic to surveil given that they are new, may not be defined as threats, and can evoke effects which, while potent, may not be easily recognizable or attributable to the technology or the actor(s).

The threats posed by existing radiological, nuclear, and (high yield) explosive technologies have been—and remain—generally well regulated and controlled. However, new and convergent innovations in the chemical, biological, cybersciences, and engineering fields are yielding ever more sophisticated and capable tools and methods. As recently noted in the *Worldwide Threat Assessment of the US Intelligence Community to the Senate Select Committee on Intelligence*,<sup>4</sup> RLTs and ETs can be applied in both kinetic (e.g., chemical and biological operations that may sidestep definition—and governance—by the current Biological Toxin and Weapons Convention (BTWC) or Chemical Weapons Convention (CWC)) and/or or non-kinetic ways (that fall outside of the BTWC or CWC and, therefore, are not explicitly constrained by their scope and auspices).<sup>5</sup> An overview of these ETs are provided in Table 1.

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<sup>4</sup> Coats, Daniel. (2019). *Worldwide Threat Assessment of the US Intelligence Community to the Senate Select Committee on Intelligence*. Available online at: <https://www.intelligence.senate.gov/sites/default/files/documents/os-dcoats-012919.pdf>; accessed 24 September, 2019.

<sup>5</sup> Gerstein D. & Giordano, J. (2017). Re-thinking the Biological and Toxin Weapons Convention? *Health Security* 15(6): 1-4.

**Table 1: Emerging Technologies as Threats to International/National Security**

Type of Threat <sup>6</sup>	Examples
Chemical-Biological	<ul style="list-style-type: none"><li>• Novel drugs and pharmaceutical preparations/delivery systems</li><li>• Modified microbes (and/or hosts)<ul style="list-style-type: none"><li>○ Gene-edited benign-to-pathogenic agents (e.g., using CRISPR-Cas9/Cas12)</li><li>○ “Precision” pathologies and immunities</li></ul></li><li>• Organic toxins</li></ul>
Devices	<ul style="list-style-type: none"><li>• Directed energy technologies</li><li>• “Cyborg drones”</li><li>• Human-machine interfaces</li></ul>
Nanotechnologies	<ul style="list-style-type: none"><li>• Vectorable, stable nanomaterials</li></ul>
Biodata	<ul style="list-style-type: none"><li>• Manipulable/targetable information</li></ul>

It is important to recognize that the dedicated enterprises of major strategic competitors’ (e.g., China, Russia) and potential near-term adversaries’ (e.g., Iran, North Korea) in developing RLTs, ETs, and methods of non-kinetic operations, may not comport with ethical systems, principles, and restrictions of the United States and its allies.<sup>7</sup> These differing ethical standards and practices if, and when, coupled to states’ highly centralized abilities to coordinate and synchronize activity of the so-called “triple helix” of government, academia, and the commercial sector, can create synergistic, force-multiplying effects to mobilize resources and services that can be non-kinetically engaged.

Consider, for instance the following vignette. The year is 2045; the centenary anniversary of the Maoist Revolution (i.e., 2049) is rapidly approaching. China has become established as the dominant global superpower through commitment to “creating” a future that was envisioned decades prior. Vital to this success were concentrated efforts to define the factors necessary to establish a “total ecology of power” at a specified point in time (i.e., at the “zone of potentiality,” 16-30 years into the future). By deductively determining what elements would be needed to develop, sustain, and grow this power ecology, China then committed enterprise and resources to iteratively instantiate these sequences and spheres of influence in the near (i.e., “zone of probability,” 0-5 yr. future) and intermediate (i.e., “zone

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<sup>6</sup> Endeavors in each/all of these domains can be sustained/fortified via funding enterprises provided by both real and virtual currency. In the latter case, virtual currencies, such as bitcoin, etc. can afford relative ambiguity of provenance, involvement, and attribution. For further address of the role of virtual currencies to support (RLT and ET use in) non-kinetic engagements, see (ref. 2, above): DeFranco J, DiEuliis D, Bremseth LR, Snow JJ. & Giordano J. (2019). *Journal of the Homeland Defense & Security Information Analysis Center*, 6(2), 48-55

<sup>7</sup> Chen C., Andriola J., & Giordano, J. (2018). Biotechnology, Commercial Veiling, and Implications for Strategic Latency: The Exemplar of Neuroscience and Neurotechnology Research and Development in China. In: Davis Z. & Nacht, M. (Eds). *Strategic Latency—Red, White and Blue: Managing the National and International Security Consequences of Disruptive Technologies*. Livermore CA: Lawrence Livermore Press.



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of possibility,” 6-15 yr. future) terms. China exploited numerous opportunities to create “tactical bluffs” in order to over-commit competitors’ focus on more proximate effects. Such feints, coupled to strategic planning and patience, has enabled the fruition of strategically latent outcomes to secure and maintain China’s status as the global hegemon in multiple domains of influence.

Now, let us return to the present. It is clear that due to current tactics of economic infiltration and saturation, China seeks to create power hierarchies that induce ‘bio-political,’ strategically latent effects that both influence real and perceived positional dominance, and affect world order. Hence, the US and its allies must (1) recognize the reality—and gain insight to processes/mechanisms—of China’s ascendant science and technology (S/T) capability; (2) evaluate what current and near-term trends in S/T portend for global position, influence, and power; and (3) decide which option—and paths-to-effect—to accept and assume.

But at this juncture it will be important to pose—and answer—two crucial questions. Namely, should the US and its allies be content to let a strategic competitor, such as China, continue to rise in S/T capability and become a co-superpower, thereby rivaling, if not surpassing, the global influence of the US and the West? Or, should strategic competitors’ current and planned activities in S/T prompt the US and its allies to adopt renewed, new (or perhaps even competitors’) strategies to increase investment, innovation, and enterprise to maintain dominant, if not sole superpower status?

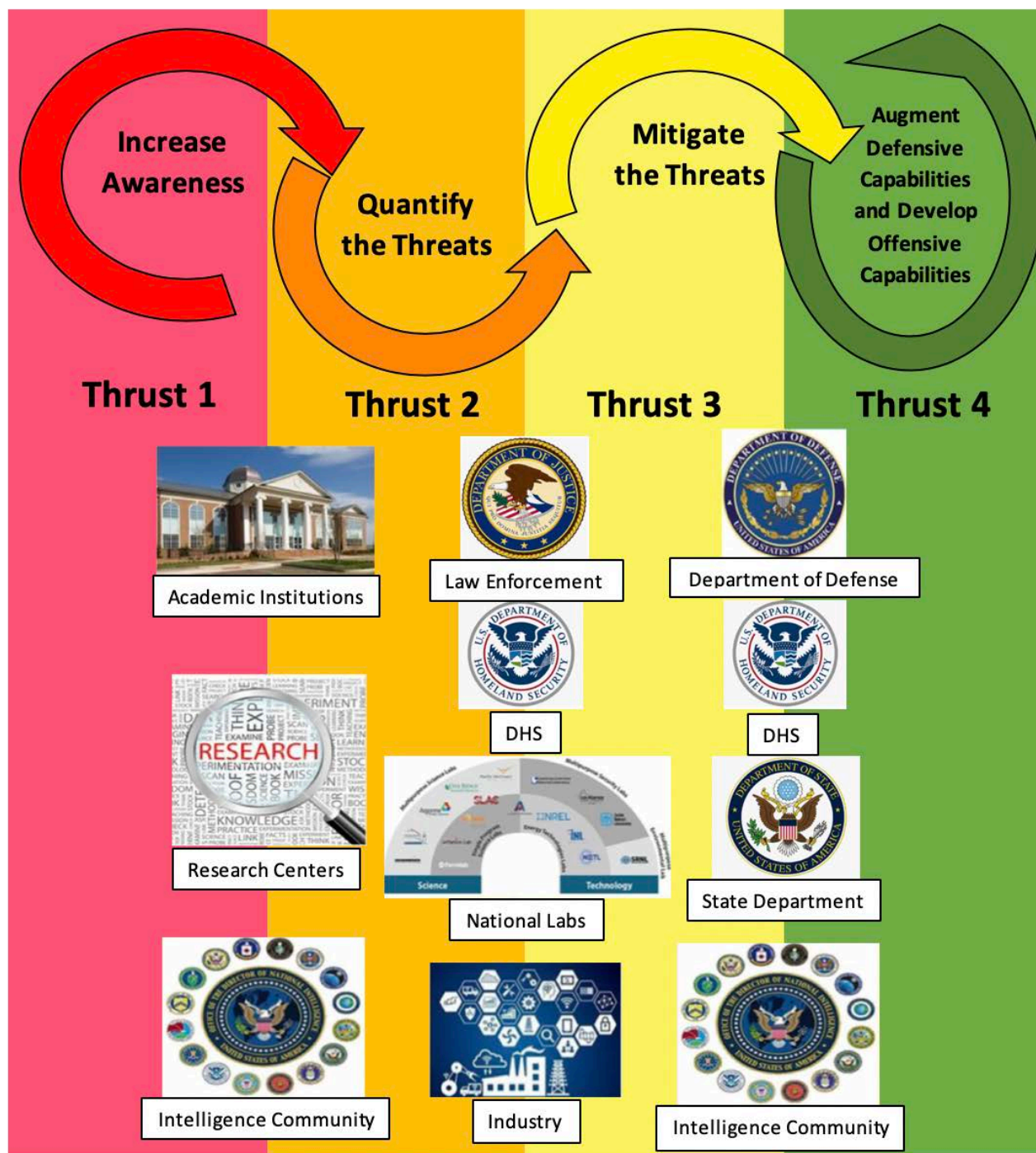
### **Toward a Possible Solution**

Without a philosophical understanding of, and technical insight into, the ways that non-kinetic engagements entail and affect civilian, political, and military domains, any coordinated assessment and response to such engagement(s) becomes procedurally complicated and politically difficult. Therefore, we propose and advocate increasingly dedicated efforts to enable sustained, successful surveillance, assessment, mitigation, and prevention of the development and use of RLTs and ETs as threats to national security. We posit that implementing these goals will require coordinated activities to: (1) increase awareness of RLTs and ETs that can be utilized as non-kinetic threats; (2) quantify the likelihood and extent of threat(s) posed; (3) counter identified threats; and (4) prevent or delay adversarial development of future threats (see Figure 3).

However, for a program of coordinated assessment, mitigation, and prevention to effectively exert a sustained and iterative effect, it must exist within, and be synergized by a larger infrastructure of dedicated effort. Toward this end, we opine the need for a whole of nation (versus merely a whole of government) approach to mobilize the organizations, resources, and personnel required to meet other nations’ synergistic triple helix capabilities to develop and non-kinetically engage RLTs and ETT (see Figure 3).

**Figure 3**

**4-Thrust Whole-of-Nation Approach**



We contend that the success of this approach will necessitate establishment of:

1. An office (or network of offices) to coordinate academic, industrial, and governmental research centers to study and to evaluate current and near-future non-kinetic threats.

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2. Multi-disciplinary approaches to create and to support analytic assessments of threats across a wide range of RLTs and ETs that may be employed in non-kinetic engagements.
  3. A variety of means for defending US and allied interests from these emerging threats.
  4. Development of methods to exploit competitors' gaps and weaknesses in these domains so as to maintain a favorable balance of power (in and across socio-economic, political, and military domains) in global engagements.

In light of other nations' recent, ongoing, and planned research, development, testing, and deployment of RLTs and ETs, we consider their use in non-kinetic operations to be a clear, present, increasing, and evermore viable future threat.<sup>8</sup> Therefore, as we have stated in the past<sup>9</sup> and reiterate here, it is not a question of if RLTs and ETs will be utilized, but rather when, how, to what extent, by which group(s), and, most importantly, if the US and its allies will be prepared to address, meet, counter or prevent these threats.

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<sup>8</sup> Pillsbury, Michael. (2016) *The Hundred-Year Marathon: China's Secret Strategy to Replace America as the Global Superpower*. NY: Griffin..

<sup>9</sup> Giordano, J. (2015). *Neurotechnology in National Security and Defense: Technical Considerations, Neuroethical Concerns*. (Ed.). Boca Raton: CRC Press.