



The Laboratory for Unconventional Conflict Analysis and Simulation

## Capability Statement

### Differentiators

The Laboratory for Unconventional Conflict Analysis and Simulation is at the forefront of Computational Security Studies, a new domain dedicated to addressing the complex, ill-structured problems of the contemporary security environment. Rapid changes in technology, power configurations, and the overwhelming amount of information that constitute current security problems demand new and combined efforts. LUCAS uses historical, social scientific, and case study qualitative research for advanced computational modeling. Our modeling combines rich theoretical and empirical inputs to produce robust agent-based, system dynamic, dynamic social network, geographic information system, semantic and sentiment analysis models. Our recent and current projects include studies of the sister city relationship between Liepāja, Latvia and Bellevue, Washington; a social network analysis of the Shi'a Marja'iyya to forecast the successor of Grand Ayatollah Ali Al-Sistani of Iraq; an analysis of the Iranian Al Quds Force and Hizb'allah in Northern Africa and Latin America, and a study on the impact of drought on civil wars. Our research is timely, interdisciplinary, and focused on the security dilemmas of the present and the future.

### Core Competencies

**LUCAS combines social scientific, quantitative, and computational methods to address the complex, ill-structured problems of the contemporary security environment.**

We specialize in social scientific and quantitative research methods:

- Complex Adaptive Systems Theory and Modeling
- Political, Social, and Advanced Mathematical Theory
- Grand Strategy
- Social mobilization
- Middle East Strategic Landscape
- Latin American Strategic Landscape

We have expertise in the following types of analytical techniques:

- Hermeneutics
- Agent-based modeling
- Dynamic social network analysis
- GIS
- Semantic and sentiment analysis



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LUCAS brings to bear an amazing talent pool of over a dozen trained researchers and modelers. Our people are well-trained and motivated to address the ill-structured and complex problems of computational security studies.

Our Leadership:

- Dr. Tony Rivera, director, modeler, analyst, consultant, Iran, Middle East, political theory, computational security studies, and grand strategy subject matter expert
- James Wu

Further, LUCAS is well-positioned through partnerships with faculty, researchers, and practitioners in

- The Triangle Institute for Security Studies
- The Department of Political Science, Duke University
- The Information Initiative at Duke (big data)
- The Sanford School of Public Policy, Duke University
- The American Grand Strategy program at Duke University
- U.S. Army Special Operations Command
- The Joint Special Operations Master of Arts program
- Lustick Consulting
- The Computation Institute (University of Chicago)



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The following examples of our performance typify our successful record, high level of services, diversity of skills and talents, and precision that LUCAS is committed to delivering to your organization—social scientific, security focused, computationally driven.

## Performance 1



### Minerva Initiative

**Period of Performance:**  
**Contact:**

From September of 2015 through August of 2018

Lisa Troyer, Ph.D.  
Senior Research Scientist VI  
Bennett Aerospace, SETA Contractor, Assigned to:  
Social & Behavioral Sciences Program  
Life Sciences Division  
Army Research Office

**Project Description:**

The objective of this study is to build a model of the elements of national power that is rooted in resource and resiliency theory from environmental science and informed by international relations theory (IR), cognitive neuroscience, and Department of Defense (DOD) doctrine. This model will enable scholars, analysts, practitioners, and decision makers to better understand non-trivial issues such as: the way in which fungible natural resources can be used to bypass economic sanctions using diplomatic, informational, or other forms of power, i.e. the fungibility of resources across domains; the time it takes to recover from shocks, internal or external; and the time it takes to bring resources to bear in changing contexts. This model will also enable profiling of key decision-making processes that account for cultural differences, risk acceptance/aversion, rationality, and emotion among other factors impacting decisions to allocate resources. Finally, this model will consider the impact of decisions to deploy resources within specific types of socio-political ecosystems and the impact the particular niche has on decision-making, the resources deployed, and subsequent decisions by other actors.

- To provide U.S. policy-makers with a modeling platform that will enable conflict forecasting and provide a range of policy and course of action options across multiple regions, issue areas, and time frames
- To further enable inter-agency and partner nation solutions, through strategic and empirical real-time data fed, modeling ability of their area of responsibility with second and third order effects.



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## Performance 2



### United States Southern Command

**Period of Performance:**  
**Contact:**

Summer 2015  
Juan Perez  
MAJ, SF

**Project Description:**

This research project posits the following questions: Is the FARC ready to demobilize its militia and engage in a peaceful political solution? Or is this a question of a long disarmament that is a gambit meant to buy time for the FARC to reenergize, rearm, remobilize, while gaining political legitimacy?

This project locates an answer to these questions in the myriad mix of social networks, public discourse, and the strategic deployment and contestation over resources. Primarily we will focus our efforts in a qualitative research and computational methods investigation of these phenomena.

- To identify indicators of the FARC's intent to demobilize
- To identify networks of support and influence for the FARC's activities and decision-making
- To produce courses of action analysis and to further develop course of action decision support tools for strategic security studies and operations



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### Performance 3



## United States Army Special Operations Command

**Period of  
Performance:  
Contact:**

Completed February 2015

PAUL J. TOOLAN  
MAJ, SF  
Commander's Initiative Group (CIG)  
HQ USASOC  
Fort Bragg, NC 28310  
Email: paul.toolan@soc.mil

**Project Description:**

This project will examine the existing sister city relationship between Bellevue, Washington and Liepāja, Latvia as a strategic redoubt against spreading Russian influence in the former Soviet sphere of influence. To do so these subsidiary questions will be addressed: what is the nature of this relationship, to what degree are the relationships institutional and/or personal, how multidirectional are the links, how fluidly does information flow, how well does this example generalize?

- To identify the nature, scale, scope, and salience of the relationship between Bellevue, Washington and Liepāja, Latvia
- To explore that relationship for opportunities to strengthen good governance
- To develop a theoretically rich, empirically grounded, methodologically rigorous method for conducting this analysis for other pairs of sister cities



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#### Performance 4



### Joint Special Operations Master of Arts Program College of International Security Affairs National Defense University

**Period of  
Performance:**  
**Contact:**

2013-Present

Mr. David Walton  
3915 Ardennes Road  
Fort Bragg, NC 28310  
Phone: 910-907-0654  
Email: [waltondavidc@gmail.com](mailto:waltondavidc@gmail.com)

**Project Description:**

An important part of our mission is to support the Joint Special Operations Master of Arts program with computational and analytical modeling and methods. LUCAS will support special operators and academics that can benefit from deep social scientific, game theoretic, agent-based, system dynamics, GIS, and network models, as well as other computational methods. Further, LUCAS staff engages in training and support so that special operators understand that complex problems require complex thinking and decision-making, especially in the human domain, where computational modeling can be most salient.

Another important part of our mission, of no less importance than the first, is supporting Special Operations. Special Operations' charge of fighting the war on terror and protecting U.S. interests in unconventional ways continues to mark its unique posture and its unique needs. This unique mission set and its complexity has increased considerably. Special Operations have by necessity become smarter and more complex by adapting to the changing operational and strategic environments. The work LUCAS undertakes is designed to support this complexity approach with academic approaches to modeling and analytical thinking along with special training where needed. Since Special Operations requires non-SOF support, LUCAS is leveraged to be a key component of that non-SOF support through its partnership with TISS and JSOMA and our location on Ft. Bragg.