Section Four: Mitigating

Mitigation of behaviors in support of operational objectives

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The capabilities described in the previous sections provide a foundation for the final step in the operational cycle: mitigating the influence of adverse sociocultural behavior in the conduct of a mission. To accomplish this, commanders must develop, prioritize, execute, and measure courses of action (COAs) grounded in the social and behavioral sciences (Schmorrow, 2011). This mitigation capability builds on all the foregoing ones, and should begin the cycle anew by providing new information that updates U.S. forces' understanding of the sociocultural behavior terrain. Projecting the impact of sociocultural behavior interacting with COAs requires the use of models for robust decision making, for strategic-level sociocultural theory, for systems integration, for decision space visualization, and for agile data collection. Moreover, operating these new models and their applications requires new kinds of training.

Making robust mitigation decisions in today's complex, uncertain environment demands more than situation awareness. Decision makers must achieve *option awareness* (Pfaff, Klein, Drury, Moon, Liu, & Entezari, 2012). Option awareness level 1 means recognizing which option will yield the most satisfactory results over the widest swath of plausible futures. Therefore, this level requires an ability to compare the landscapes of plausible outcomes that may occur for each COA under a variety of conditions. Option awareness level 2 means comprehending which factors to facilitate or mitigate in order to increase the likelihood of achieving satisfactory outcomes. Hence, this level requires the ability to "drill down" to discern the sociocultural factors and environmental conditions that interact with each COA to produce better (or worse) outcomes. Finally, option awareness level 3 requires the ability to map the factors discovered through analysis back to the real world so that commanders can conceive the real-world actions needed actually to facilitate or mitigate those factors. Supporting option awareness calls for unique applications of modeling to generate multi-dimensional decision spaces, data processing to feed those models, visualization to make those decision spaces comprehensible, and training to engage in this sophisticated level of development and analysis. Each chapter in this section describes how its technology area applies to these endeavors.

The chapter on computational modeling examines a sampling of computational approaches that may facilitate COA development, analysis, and comparison, noting the potential for positive impact on decision making for mitigation. Even with the visualization, data processing, and modeling techniques described in previous chapters, no human analyst, no matter how talented or knowledgeable, can manage the amount and complexity of the information that must be weighed for mitigation decisions. In this chapter, the authors discuss how computational modeling can relieve some of this burden, allowing decision makers to synthesize and integrate the models, knowledge, and insights from the understand, detect, and forecast phases of analysis to provide better operational awareness. Using many methods similar to the big-data analytics employed by corporations such as Amazon or Google, analysts can exploit this wealth of sociocultural knowledge to support decision making and determine the most robust COA in many critical situations.

Because decision making for mitigation relies so heavily on computational modeling, data processing for the mitigation capability must support interfaces among disparate models – interfaces so complicated that their design is itself an act of modeling. Consequently, the chapter on data processing centers on the representation of the data that are input, output, and traded between models and the interfaces among the models that arrange how those data are traded and are translated into the languages of the different models. Applied to COA analysis in sociocultural scenarios, data representations span strategy and narratives. They also include co-evolutionary model interfaces, game theoretical arrangements of disparate models, and interfaces that preserve uncertainty. This chapter first presents an example of an irregular warfare battlespace, and then discusses state-of-the-art social data representations and interfaces of social data for COA analysis of irregular warfare, giving examples of their value in representing social phenomena.

At its best, effective visualization can lead to a deeper understanding of COA robustness, resulting in better outcomes in more situations. The chapter on visualization covers the underpinnings of effectively using visualization to help decision makers deeply comprehend their options. The author discusses the research to date in this area and promising directions for future research in this nascent area of using interactive visualization to help compare and contrast COAs. Most visualization tools today present situation awareness data, leaving the burden on the user to extrapolate from the details of a situation to decide on a good COA. This chapter describes new interactive visualization tools that support each level of option awareness, giving decision makers a much broader and deeper view of their options. If the visualization enables option awareness level 1, decision makers will more rapidly see and understand the comparative robustness of their options. If the visualization enables option awareness level 2, the decision makers will comprehend the key trade-offs between those options and the factors that make one option more robust than another. Building on levels 1 and 2, decision makers who achieve option awareness level 3 can conceive new, more effective options based on a deep understanding of relative robustness and the factors driving that robustness.

As additional technologies to support sociocultural mitigation improve and are deployed, more operational users will need training on how to use these tools, data, and analytics appropriately and optimally to mitigate and shape potential futures. In contrast, limited time, tools, and capacity currently restrict the number of prospective COAs for mitigation that operational planners can generate and assess, because the processes implemented today are manually intensive and seldom integrated (computationally) with sociocultural knowledge. The quality and kinds of information that new technologies make available to users and the potential utility of this content will begin to blur the traditional "lanes" separating current career fields such as intelligence, operations research, and operational planning. This, in turn, will require innovation in training to prepare users to effectively recognize and leverage relevant content in order to analyze COAs for mitigation. For example, training on model interpretation, typically concentrated in a particular career field such as operations research, must be expanded to ensure all operational users can use emerging mitigation technology rapidly and properly. The chapter on training focuses on defining the skills (abilities necessary to perform the task) and knowledge (facts, concepts, and principles needed to perform the task) for mitigation decision making in order to establish new guidelines for training. An initial analysis of the functional tasks involved in mitigation highlights several key training considerations, such as appropriate objectives and ideal training formats (e.g., computer-based training, classroom, or exercise).

References

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