RESEARCH SUMMARY

Using Modeling and Simulation to Advance Effects-Based Security Forces Planning

Developing Prototype Approaches to Estimate Risk Reduction Across Security Missions

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ISSUE

U.S. Air Force (USAF) Security Forces (SF) are responsible for detecting, deterring, denying, and defeating security threats in both garrison and expeditionary environments. The SF must address everyday threats that are very similar to those that a civilian law enforcement organization responds to on a day-to-day basis. Simultaneously, the SF must address threats that are distinctly military in nature: protecting bases from potentially highly capable attackers. Air Force Global Strike Command (AFGSC) has the added requirement of protecting critical nuclear weapons assets, as well as the aircraft and personnel involved in the management and deployment of those assets.

Although existing security planning supports detailed bottom-up, asset-based security planning (e.g., the current Enterprise Protection Risk Management process and supporting tools), such processes do not fully explore the risk trade-offs that are associated with different security strategies, nor do they identify opportunities for SF strategies to manage multiple risks simultaneously.

APPROACH

This report summarizes research that explored how top-down risk analysis models could help inform decisions regarding SF staffing, systems, and strategies. Given the project's scale, the scope was limited. The goal was not to build a fully fledged risk tool that could be immediately applied to USAF SF personnel and other planning but to take a substantial step in building the foundation for such a tool. During this research, we modeled and explored five different scenarios that involved risks to USAF (1) personnel, systems, and facilities and (2) nuclear assets and sites. Those risks were

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- incursions within a base perimeter
- missile field operations and security threats
- active shooter threats
- outside-the-perimeter indirect fire or small unmanned aircraft systems threats
- routine law enforcement incidents.

The process of building the models was informed by existing analysis of USAF SF concerns, interviews with SF subject-matter experts (SMEs) at AFGSC bases, and analysis of USAF data provided to us.

To minimize the need for significant amounts of base-specific sensitive information during this prototyping effort, we applied the models to a notional AFGSC base. The models are relatively simple and transparent, representing SF personnel and their capabilities to perform their roles to protect against each of the five threat scenarios. The models were challenged with security demands or incidents of different characteristics, from which the goal was to explore how the risk of negative outcomes changes with different levels of SF manning, training, and equipping or with different assumptions about base infrastructure or technical protections.

CONCLUSIONS

The prototype tools that were developed in this project demonstrate approaches to estimate the effects of the SF on those different risks. Some takeaways from this research include the following:

- **Modeling can show SF outcomes as different types of risk reduction, which can better inform effects-based planning.** The fact that the SF manages a wide variety of risks makes assessing the full consequences of manning, technology, and other changes in practice more difficult. Models, such as those developed in this research, can show how choices affect day-to-day risks (e.g., responding to routine law enforcement incidents), and potentially much higher-consequence incidents, to allow more-informed choices and to make consequences clearer.
- **Models can demonstrate the tangible effects of key SF concerns.** In our work, SF SMEs raised concerns about the potential for stress to reduce SF effectiveness in protecting USAF assets and personnel. Modeling can make the potential effects of such abstract issues more tangible and better inform decisions.
- **Models can show trade-offs among different risk types.** In the missile field, the SF protect silos from incursion and are responsible for securing maintenance operations on missile systems. If personnel numbers are constrained, trade-offs might have to be made between managing adversary risk and readiness risk from deferred maintenance operations. Tools, such as these prototype models, can make those trade-offs explicit, better defining how security decisions could be forced to trade off one type of risk for another.
- **Risk modeling can help explore how the SF in one role can reduce multiple risks simultaneously.** SF personnel in different posts can play a role in managing multiple threats. For example, neutralizing a base incursion attempt on nuclear armed platforms would draw on SF personnel involved in gate security and mobile units conducting daily, routine law enforcement operations, in addition to providing dedicated SF to those assets. A system- or effects-based approach to security planning, such as modeled in this report, provides an approach for estimating the effectiveness of those combined forces, potentially allowing for strategies that better address multiple types of risks simultaneously.

The USAF integrated defense approach has moved from a compliance-based to an effects-based framing for security planning and execution. This research demonstrates how top-down, outcome-based risk analysis tools could contribute to that effort, better informing planning and risk tolerance decisions made by commanders at Air Force bases at home and abroad. Future efforts could build on this foundation to use more-detailed combat models, modeling the SF response to different risks simultaneously, and to use other innovations to link these

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types of tools to the current Enterprise Protection Risk Management process and related planning efforts. That the basic prototypes developed here could successfully examine multiple key SF planning challenges suggests that continued effort to improve tools for effects-based planning is warranted and could make a tangible contribution to manpower, planning, and resource allocation decisionmaking.

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