An instructor provides input to ORSA-MAC students as they prepare their final analysis and briefing during the capstone project. (Photo by Adam Gramarossa)

Logistics and Analysis

■ By Maj. William T. Smith

Appreciating great analysis is much like enjoying a meal from a fine restaurant. We order from a menu and anticipate the outcome when simple ingredients are put into the hands of an expert chef. When the meal arrives, we judge its value commensurate with our expectations. Despite recognizing the ingredients and even which tools were likely used by the chef, we would be hard pressed to reproduce the process that led to the result laid out before us.

This is similar to the military logistics community today. We have data and know great analysis when we see it, but we are often unable to find analysts who are capable of evaluating the data in a manner that would benefit logicians.

A naive approach would be to rely on software to churn through data and provide results. However, if the user is unfamiliar with various analytic methodologies, he may be faced with the old adage of garbage in, garbage out. For this reason, the Army logistics community would benefit from officers trained in the core competencies of analysis.

ORSA–MAC

The Army Logistics University offers a course dedicated to the mathematics and art of analysis. The Operations Research/Systems Analysis–Military Applications Course (ORSA–MAC) is designed primarily for officers and civilians entering the military ORSA community. Currently, most Army officers attend as they transfer to functional area (FA) 49 (ORSA). However, other Army officers may attend, earning the ORSA additional skill identifier 4B upon completion of the 14-week course.

Students first complete a four-week refresher on calculus, statistics, probability, and data analysis. The students then advance to graduate-level study in linear statistical modeling, simulation, mathematical modeling, cost analysis, and other topics for the remaining 10 weeks.

Logistics officers attending this course leave with a better understanding of what data is important, which questions can be answered, and how to present that analysis to decision-makers in a way that is easily understood.

Finding Qualified Candidates

ORSA–MAC students must have knowledge of calculus and a mathe-

matical acumen to successfully complete the course. So, given that we have data and a course to inculcate officers in data analysis, how do we ensure we have logistics officers with the right skill set to qualify for the course?

Finding a multifunctional logistics officer (FA 90) with an undergraduate or graduate degree in mathematics may be difficult. However, most degrees in business administration cover the basic mathematics required for ORSA–MAC. A degree in a technical field is not a prerequisite for the course.

The Army should attempt to commission more logistics officers with the ORSA prerequisite skill set, identify them for possible ORSA–MAC attendance after company command, and create an environment that recognizes them for their willingness to learn about analysis. This would provide the Army with more logistics officers who are equipped with the skills to do front-end analysis and the knowledge to effectively engage the ORSA community when necessary.

Why Take ORSA–MAC?

In ORSA–MAC, logistics officers learn several disciplines applicable to supply concerns. One such subject, mathematical modeling, teaches students to deconstruct larger problems into key components that are linked to a desired outcome. Once the problem is deconstructed, students learn how to optimize the problem based on various constraints to achieve a desired maximum or minimum or a defined goal, such as which route maximizes throughput along a given road network.

Linear statistical modeling, another subject taught in ORSA–MAC, provides the tools of regression and variance, which allow analysts to forecast requirements based on historical data. Students learn how to model using simulation to create systems based on observed behavior. Using simulation, changes to established systems, such as supply networks, can be investigated without disrupting operations.

Decision analysis teaches students how to map out decision trees, weigh attributes, and explore trade spaces in ways more useful and insightful than the decision matrix often used in the military decision-making process.

One area that would benefit from analysis is consumption rates. Given situation-specific data, an analyst could develop custom statistical models using regression to determine how much of a commodity is required given various inputs, such as the number of troops, number of vehicles, and type of mission, that might contribute to the rate. Such a model could be developed and maintained for every forward operating base, combat outpost, or unit on the battlefield.

Logistics convoys also could benefit from analysis. Mathematical optimization can assist with scheduling while minimizing route distances and man-hours. Decision analysis, along with other disciplines, can assist in determining whether to use contractors or military convoys to deliver commodities.

Simulations could be used to model an established system of distribution and gain insights as changes are applied to the model. Skills that students learn in ORSA–MAC could also help route logistics convoys in such a manner as to minimize exposure to high-risk areas while identifying random paths during continuous operations.

Enterprise Resource Planning

The biggest benefit of developing a body of logisticians with a capacity for analytics will be fully realized with the enterprise resource planning initiative. A single repository for data that is well-structured, current, and comprehensive across all classes of supply and services would be a treasure trove for analysis. Since the Global Combat Support System–Army is built on an SAP infrastructure, it would be relatively easy to leverage other SAP products to conduct analysis on real-time and historical data.

Network analysis could be used to uncover which supply chains are historically congested and assist with rerouting future demand. Maintenance work-order times for similar repairs can be compared across the Army to discover if one unit is faster than others, thus leading to insights on best practices.

Comparisons among like units before and immediately following initial deployment could be scrutinized to see if excess supplies are being ordered. The questions that can be asked of the data are endless, but the knowledge to make use of these opportunities is in short supply within our ranks.

Simply trying to adopt best practices from civilian enterprises and systems is not enough. The Army's problems are unique. Using the latest analytical software package does not provide insight; an experienced analyst must build the model before running the numbers. ORSA–MAC provides students with the opportunity to become proficient at these tasks.

Although learning the disciplines of analysis is not easy, the Army must develop logisticians who can ask the right questions, seek the right data, apply the right techniques, and present insights in a manner that can be understood by all.

Maj. William T. Smith is an operations research and systems analysis instructor at the Army Logistics University at Fort Lee, Virginia. He holds a bachelor's degree from Cameron University and a master's degree from the Naval Postgraduate School, both in mathematics. He is a graduate of the Ordnance Officer Basic Course, Combined Logistics Captains Career Course, Combined Arms and Services Staff School, the Defense Language Institute's Russian Basic Course, and the FA 49 Qualification Course.