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Comments on
Intelligence Operations Research
by Edward H. Kaplan

Ed Kaplan has provided an excellent and useful overview of the intelligence process within the United States. This overview provides operations researchers with a framework for understanding the intelligence process and for determining where they can provide useful assistance to the Intelligence Community (IC). In the first four sections of his paper, Kaplan defines intelligence, tell us who produces it, and steps the reader through the intelligence cycle which involves, planning and direction, collection, processing and exploitation, analysis, and dissemination.

Kaplan then describes the known applications of Operations Research to intelligence operations starting with papers published in 1958. Compared with the application of OR to military operations, the contributions of OR to intelligence analysis are remarkable thin. While this may be regrettable, it presents an important opportunity for the OR community. A primer for intelligence operations as suggested in the paper would be useful in defining and developing this opportunity.

The author identifies a number of areas where OR can make significant contributions. I would like to emphasize one area that could benefit significantly from the application of analysis, namely combining information from disparate sources. Bayesian inference provides a probabilistic framework for combining information from these sources into an estimate in terms of a posterior probability distribution. Kaplan cites the use of Bayesian analysis applied to the intelligence data obtained prior to and during the Cuban missile crises of 1962 to update the

probability that the Soviet Union had shipped missiles to Cuba. In this case the analysis was used to balance reports from agents and refugees against the lack (until October 14, 1962) of photographic evidence of missile emplacements. Unfortunately, the precedent of using Bayesian analysis to inform intelligence estimates does not seem to have been sustained in subsequent years.

A starting point could be the Analysis of Competing Hypotheses (ACH) method in which an analyst develops a matrix. On the rows are observations or "facts." The columns represent potential explanations or hypothesis. For each observation and hypothesis, the analyst indicates in the matrix whether the observation is consistent with the hypothesis or not. The analyst then scans the columns to see which hypotheses are most consistent with the data. This process is a short step from a Bayesian analysis where the hypotheses are given prior probabilities and the rows corresponding to the observations are converted to likelihood functions where the entries in the matrix give the probability of obtaining the observation given the hypothesis is true. The matrix combined with the prior will produce a Bayesian posterior on the hypotheses. The usual objections to Bayesian inference because it requires subjective judgments are moot here. The present ACH process requires subjective judgments. The Bayesian process quantifies these judgments and combines them in a principle and consistent manner. It also provides a methodology for extending this process to more complex situations that arise in intelligence analysis.

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