Key Points from Applied Forecasting: Promises and Performances Workshop (3 March 2006)

The purpose of the workshop was to examine the potential role of mathematically based modeling of political, social and economic interactions as a support for policy-making. Co-chairs were Dr. Hans Binnendijk and Professor Leon Fuerth. The audience is identified by name and affiliation below.

Co-chairs presented the following introductory points:

- The array of policy issues is becoming increasingly complex in the technical sense of the word. Events are interactive, concurrent, and networked.
- Modeling techniques are becoming more sophisticated and powerful.
- There is no effective common language for modelers and policy-makers to use in searching for effective matches between what the former can offer and what the latter require.

Presentations were given in the following order, representing specific modeling systems, as indicated. A more extended discussion of these individual presentations is included below.

- Dr. John Hiles, U.S. Naval Postgraduate School
- Dr. Barry Hughes, University of Denver
- Dr. Nazli Choucri, MIT
- Michael Baranick, Center for Technology and National Security Policy
- Dr. James Dewar, RAND
- Joseph Eash, former Deputy Under Secretary for Defense

General discussion began. Major points, approximately in order of presentation, were:

- **Hiles.** The objective of modeling is to help policy-makers operate in complex, rapidly evolving environments, especially in times of crisis. He describes the circumstances of the Proteus game as "an adaptive maze; an avalanche of surprises." His goal in Proteus is to forecast knowledge and harness it so that people can have "pre-experience," learning to connect knowledge to response. "Avoiding hubris."

- **Hughes.** Modeling must represent the interaction of multiple issues and long-term simulation. It must provide the means to study and develop "alternative intervention tools." The core purpose of modeling is " exploration of what-if?" Modeling must first, however, help identify these exploratory questions, and assist in the organization of issues.

- **Gordon.** Modeling systems that deal with modern complexity must capture "non-state originated threats." International crime, terror, etc. are much harder to model than the older form of state-directed threat. Perhaps systems that can deal with these networked issues relating to non-state challenges could be grafted onto the more traditionally organized main models.

- **Hughes**. We can and should link such systems to policy.

- **Choucri**. Useful model-based forecasts reveal the unexpected. They "generate ranges of outcomes, trajectories, rather than point outcomes." They help in formulating "plan B" alternative scenarios. Multiple views are needed.

- **Fuerth.** Need "brokers" who can act as go-betweens linking modelers and policy-makers, also helping to design the what-if questions.

- **Burke**. Need to pay attention to the "sociology of the modeling group, and to structuring the meta-modeling process." Commonality is good. Group- think is bad.

- **Baranick.** Modeling can be used to analyze and predict the behavior of stakeholders in a political process. It is not applicable to economic or market systems, because actors cannot be identified. Modeling can best be used to explore the implication of policy choices, by making possible assessments of overall interaction among a large group of entities. Modeling can help explore which policy alternatives are "stable" and what may be the limit of the accomplishable.

- **Lempert.** Modeling can help address "deep uncertainty, where key parties do not know or don't agree on the system mode." It can be used to search for "robust policy" – strategies that do not collapse abruptly in the face of sub-optimal circumstances, and that can be adapted to change over time. The way to do this is through computer-assisted generation of multiple plausible scenarios. The objective is "Robust Decision- Making." Agrees that the "broker" concept for mediating between modelers and policy-makers is vital.

- **Fuerth.** Asks if there is possibility that search for "robustness" operates as filter to remove high-gain, high-risk policies with the perverse consequence that bold problem solving is ruled out.

- **Eash.** Agrees that "brokers are crucial to the linking of foresight and policy." Forecasting systems should consider data error and uncertainty. They need to be aware of "model pathology." It is necessary to build a "modeling culture within institutions."

- **Pauline.** Modeling has been used to generate indicators of state stability. These indicators allow examination of policy options that would produce best results. An improved level of transparency in forecasting would help the incorporation of models into policy. What is needed is "credible knowledge based on empirical data, and assessment of risk or the probability of change." The function of a "broker" would be to frame issues and means for analysis.

- **Fuerth.** Suggests "pooled" modeling centers, in partnership with universities and the private sector. Asked whether NDU could set up public- private partnership for development of modeling as tool for policy-makers.

Summary observations:

- Policies derived from excessively simplistic models of the world are failure-prone.
- Excessive simplification is a choice, rather than an imposed consequence of human limitation in the face of complexity.
- It is a choice because of the increasing sophistication of models as a means for identifying alternative futures, and facilitation study of those futures in a disciplined framework.
- The predictive power of models is increasing, because of more sophisticated understanding of underlying processes, and more supple ways for incorporating that understanding into the operation of models.
- No one maintains that models deal with risk by eliminating uncertainty.
- The greatest contribution of models is to explore the range of uncertainty, and to permit operators to interact with it.
- Few modelers have a deep understanding of policy-making, and few policy-makers understand the inner-working of mathematical models, or their applications to policy.
- There is a need to develop, perhaps as a specialty, a "brokering" function in which the needs of policy-makers and the possibilities offered by modeling are mutually interpreted, so that both "communities," can talk to each other.
- In general, much more can be done to improve the systematic development of "foresightedness" as a routine attribute of the policy-making process.
- The rate of incidence of major change/challenge is increasing. Consequently, so are the stakes for failure to perceive and prepare in a timely fashion.
- Modeling can substantially improve the odds that our perceptions and responses will be in time and on point.