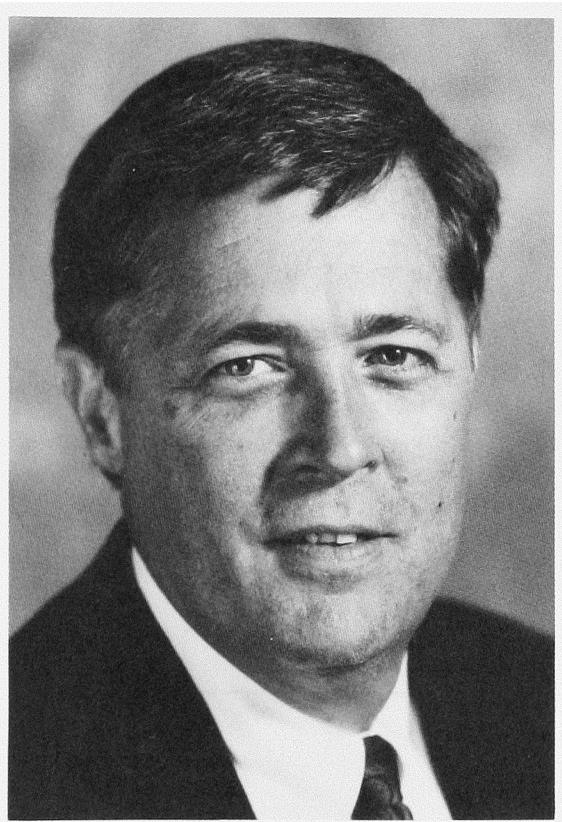


**KEYNOTE ADDRESS:
SIMULATION APPLICATIONS AT AMERICAN AIRLINES**

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ABSTRACT

Discrete digital simulation has always been an important tool for an OR/MS professional, but at American Airlines Decision Technologies (AADT) the use of simulation has exploded. Senior management has become increasingly dependent on simulation to assist with a wide variety of strategic and tactical decisions. This talk will provide an overview of some of the more important and interesting applications including:

- Simulating the Airside and Landside of an Airport. AADT has participated in the devel-

opment and validation of the FAA's SIMMOD model for simulating the airside (outbound from the gate) of an airport. In addition to aiding the development, AADT has applied the tool in Sydney and Melbourne for Qantas Airways, in Stockholm for the Swedish CAA, in Madrid and Palma de Majorica for the Spanish Director General of Civil Aviation, and in Chicago, Dallas, San Jose, Miami, Nashville and Raleigh/Durham for American to support a wide variety of management decisions. On the landside of an airport AADT has used simulation to analyze passenger flow, to size a wide variety of facilities and to determine the operation feasibility of major scheduling initiatives. In these airside and landside simulations, animation graphics have been a key to management acceptance.

- Simulating American's Yield Management System. This year AADT won the Edelman Prize for developing DINAMO, American's system that overbooks flights and allocates seats to the various fare classes. Because of the huge amount of leverage contained in the yield management system it is absolutely essential to be able to ascertain, through simulation, the revenue and traffic impacts of proposed changes to the system before implementation.
- Simulating Computer Reservation Systems. Because the distribution channel for an airline's product are the various computer reservation systems (CRS), it is important to be able to predict screen presence in each CRS so that market share can be forecast. This is done at American using deterministic simulation.
- Simulating Cargo Terminals. A major effort is underway at American to redesign our cargo terminals to improve productivity and the quality of customer service. AADT has developed detailed simulation models to determine work flow

policies, terminal layout and the appropriate material handling systems.

Simulating Spare Part Inventory. American's investment in spare parts inventory exceeds \$1 billion. This inventory is managed by a sophisticated model-driven real-time inventory control system. AADT has built and validated a simulation of the spare part inventory control system to forecast the impact on inventory investment and service level of a wide variety of potential policy and/or modeling changes.

The emphasis of this presentation will be placed on the business decision being aided by the simulation analysis rather than the details of the simulation modeling.

AUTHOR BIOGRAPHY

THOMAS COOK is president of American Airlines Decision Technologies. Dr. Cook holds an AB in mathematics from Grinnel College, an MBA from Southern Methodist University and a Ph.D. in Operations Research from the University of Texas at Austin. He manages both the internal and external consulting activities of Decision Technologies. Decision Technologies is composed of approximately 330 consultants that specialize in modeling, industrial engineering, and model-based system development.

Prior to joining American nine years ago, Dr. Cook spent three years consulting for a large international consulting firm, seven years developing large-scale computer based systems for an aerospace corporation and six years teaching and researching at the graduate and undergraduate level. He has coauthored two text books published by Prentice-Hall and has published papers in journals such as Management Science, Decision Sciences, Operations Research Quarterly, Transportation Research, IEEE Transactions and Interfaces.

Dr. Cook is currently President of The Institute of Management Sciences, a member of Operations Research Society of America, special editor of Interfaces, associate editor for Operations Research, and President of the Airline Group of the International Federation of Operation Research Societies.