FINAL REPORT

"Fundamental Investigations in Methods of Operations Research"

U.S. Army Research Office - Durham
ARO-D Project Number P-9239-M
Contract DAHC04-70-C-0058
M.I.T. DSR 72650

Contract Period: July 1, 1970 - June 30, 1973

and

U.S. Army Research Office - Durham
ARO-D Project Number P-9239-M
Contract DAHC04-73-C-0032
M.I.T. OSP 81219

Contract Period: July 1, 1973 - May 31, 1976

Principal Investigators: John D.C. Little
Professor of Operations Research and Management

Jeremy F. Shapiro
Professor of Operations Research and Management

Operations Research Center
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139
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<table>
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<td>Jeremy F. Shapiro</td>
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<tr>
<th>20. ABSTRACT (Continue on reverse side if necessary and identify by block number)</th>
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FINAL REPORT TO ARO-D

This final report covers the contract period, July 1, 1970 through May 30, 1976. Professor John D.C. Little, former Director of the Operations Research Center, was Principal Investigator from July 1, 1970 through May 30, 1976. Joining him as Co-Principal Investigator during that period was Professor Jeremy F. Shapiro, former Associate Director of the Operations Research Center. Professor Little was on-leave from M.I.T. from June 1, 1975 through May 30, 1976. At the end of that period he resigned as Director of the Operations Research Center. Professor Shapiro served as Acting Director of the Center during Professor Little's leave; he continues to hold that position.

STATEMENT OF PROBLEM STUDIED

This project was concerned with basic research into methods of operations research, especially mathematical programming and their applications to a variety of decision problems. Basic research in mathematical programming included the development and testing of a new duality theory for integer and combinatorial programming, new methods for linear fractional programming, a synthesis of duality theory and dynamic programming and results illuminating the relationship between generalized linear programming and mathematical programming duality theory. Additional basic research was performed on Markovian decision models and fixed point theory, network optimization models and multi-attributed utility theory. Mathematical programming methods and models were applied to a variety of problems including machine replacement, energy planning, pollution control and location problems.

PUBLICATIONS supported entirely or in part by ARO-D during the contract period:

Journal Articles and Books


Publications, cont.


Technical Reports and Working Papers


Publications, cont.


Publications, cont.


Publications, cont.


Publications, cont.


SCIENTIFIC PERSONNEL supported entirely or in part by ARO-D during the contract period:

Professor John D.C. Little
November 1, 1970 - May 31, 1971
September 1, 1971 - May 31, 1972
September 1, 1972 - May 31, 1973
September 1, 1973 - May 31, 1974
September 1, 1974 - May 31, 1975
September 1, 1975 - January 15, 1976

Professor Thomas L. Magnanti
June 1, 1972 - June 30, 1972
January 16, 1973 - May 31, 1973
September 1, 1973 - May 31, 1974
September 1, 1974 - May 31, 1975

Professor Philip M. Morse
April 1, 1971 - May 31, 1971
October 1, 1972 - June 30, 1973
September 1, 1973 - May 31, 1974
September 1, 1974 - September 30, 1974

Professor Jeremy F. Shapiro
July 1, 1970 - July 31, 1970
June 1, 1971 - June 30, 1971
July 1, 1973 - July 31, 1973
July 1, 1974 - July 31, 1974
July 1, 1975 - July 31, 1975

Professor Ronald W. Wolff
October 1, 1971 - May 31, 1972

Steven M. Barta
September 1, 1973 - December 31, 1973
September 1, 1974 - January 15, 1975

David E. Bell
September 1, 1971 - January 15, 1972
September 1, 1972 - June 30, 1973

Oded Berman
September 1, 1974 - March 31, 1975

Jeremy A. Bloom
September 1, 1973 - September 30, 1973
March 1, 1974 - March 31, 1974

Robert E. Brooks
July 1, 1975 - August 15, 1975

Kenneth R. Chelst
March 1, 1973 - April 30, 1973
Scientific Personnel, cont.

Samuel S. Chiu  
September 1, 1975 - January 15, 1976

Joseph S. D'Aversa  
January 16, 1974 - May 31, 1974  
September 1, 1975 - January 16, 1976

Rene Dionne  
September 1, 1970 - May 31, 1971

Dorothy P. Elliott  
September 1, 1975 - April 30, 1976

Susan Finger  
September 1, 1974 - May 31, 1975

Henry Gabbay  
January 1, 1973 - May 31, 1973

Bruce L. Golden  
September 1, 1973 - December 31, 1974  
February 1, 1975 - April 30, 1975

John R. Hauser  
September 1, 1974 - January 15, 1975

John A. Mazzarino  
September 1, 1974 - May 31, 1975

Scott A. Neslin  
December 1, 1974 - January 15, 1975

Nitin R. Patel  
September 1, 1972 - January 15, 1973

Jean-Marc Rousseau  
October 1, 1970 - May 31, 1971  
September 1, 1971 - May 31, 1972

Hubert M. Tavernier  
September 1, 1970 - January 31, 1971

Norman W.G. Wilde  
July 1, 1970 - January 15, 1971

DEGREES AWARDED during contract period, supported (in part) by ARC-D:

Degrees Awarded, cont.


Degrees Awarded, cont.


ABSTRACTS OF RESEARCH FINDINGS supported entirely or in part by ARO-D during the contract period and cited in this final report were appended to all progress reports and are not included here.