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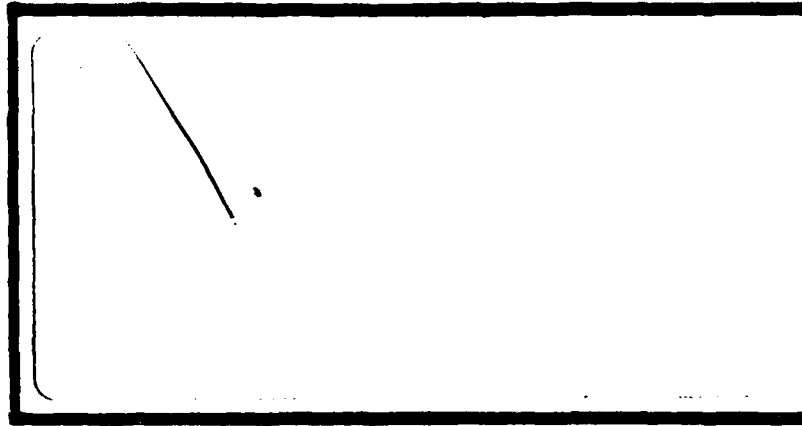
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DEPARTMENT OF THE AIR FORCE

**AIR UNIVERSITY**

# AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

AFIT/GE/ENG/88D-11

A COMPUTER SIMULATION ANALYSIS OF CONVENTIONAL
AND TRUNKED LAND MOBILE RADIO SYSTEMS AT
WRIGHT PATTERSON AIR FORCE BASE

THESIS

Thomas C Farrell
Captain, USAF

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LAND MOBILE RADIO SYSTEMS AT WRIGHT PATTERSON AIR FORCE BASE

THESIS

Presented to the Faculty of the School of Engineering

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science in Electrical Engineering

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Thomas C Farrell, B.S.

Captain, USAF

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## Preface

My interest in land mobile radio (LMR) began in Europe when, as an additional duty, I became our unit's Site Security OIC. Subsequent exercises and real world events demonstrated the need for reliable intra-base communications, and how easily the communication systems (public telephone, field phone, and radio) could become saturated with calls in an emergency.

Hybrid trunked LMR should go a long way to solving these problems. Although this thesis explores the effects of some increases in loading on fleets of a trunked system, more research on LMR loads during exercises would be profitable. Of particular interest would be the probability distributions and statistics (described in Chapter V) of various LMR nets currently in use at Air Force bases during exercises.

In conducting this research I have been helped by many people. In particular, I would like to express gratitude to my sponsor, Mr Gardner, who provided much of the background information about LMR systems and answered many questions, and to my committee, Maj Prescott, Maj Norman, and CPT Shaw. CPT Shaw deserves special thanks for the time he spent and advice he gave, both on the queueing aspects of this thesis, and on good engineering practices in general. I would also like to thank my parents who, through example, demonstrated the benefits of academic discipline and self motivation. Finally, I would like to thank the technical people I have known, and learned from, who are serving in the United States armed forces around the world.

Thomas C Farrell

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