



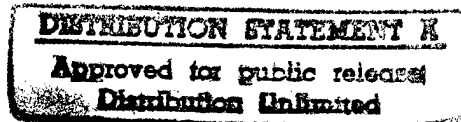
**The Research Foundation  
of State University of New York**

**The University at Stony Brook  
Office of Sponsored Programs  
Stony Brook, NY 11794-3366  
Telephone: 516-632-9039 Fax: 516-632-6963**

December 17, 1997

Program Manager/Officer ONR: 313  
Rabinder N. Madan  
Ballston Centre Tower One  
800 North Quincy Street  
Arlington, VA 22217-5660

RE: N000149511217



Dear Dr. Madan:

Enclosed is three copies of Dr. Rappaport's semi-annual Progress Report for the above mentioned award.

If you need any additional information, please call me at 516-632-9039.

Sincerely,

*Karen Pfister*  
Karen Pfister

Sponsored Program Coordinator

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Dr. S. Rappaport  
File 431-0454A

Director (1)  
Naval Research Laboratory  
Attn: Code 2627  
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19980217 531

REPORT DOCUMENTATION PAGE			Form Approved GSA No. FPMR 0189	
<small>1. SUBMITTING AGENCY USE ONLY (Leave blank) 2. REPORT DATE 3. REPORT TYPE AND DATES COVERED 4. TITLE AND SUBTITLE 5. FUNDING NUMBERS 6. AUTHOR(S) 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) 8. PERFORMING ORGANIZATION REPORT NUMBER 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) 10. SPONSORING/MONITORING AGENCY REPORT NUMBER 11. SUPPLEMENTARY NOTES 12a. DISTRIBUTION/AVAILABILITY STATEMENT 12b. DISTRIBUTION CODE 13. ABSTRACT (Maximum 200 words) 14. SUBJECT TERMS 15. NUMBER OF PAGES 16. PRICE CODE 17. SECURITY CLASSIFICATION OF REPORT 18. SECURITY CLASSIFICATION OF THIS PAGE 19. SECURITY CLASSIFICATION OF ABSTRACT 20. LIMITATION OF ABSTRACT</small>				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE Dec. 31, 1997	3. REPORT TYPE AND DATES COVERED Progress Report - 30 June'97-31 Dec.'97		
4. TITLE AND SUBTITLE Mobile and Wireless Communications - Progress Report			5. FUNDING NUMBERS Grant # N0001495-11217	
6. AUTHOR(S) Stephen S. Rappaport				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Research Foundation State University of New York Stony Brook, NY 11794-2350			8. PERFORMING ORGANIZATION REPORT NUMBER Progress Report Dec. '97 Grant 431-0454A	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of Naval Research Resident Representative, New York 33 Third Avenue, Lower Level, New York, NY 10003-9998			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for Public Releases; Distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  This report lists publications, patents, presentations and honors related to an ONR sponsored research grant on Mobile and Wireless Communications. The investigation develops new techniques, as well as performance evaluation models and tools for mobile and wireless communication systems. Configurations that support a mixture of mobile platform types and mixed types of telecommunications traffic are emphasized. Channel assignment and cellular layout strategies are investigated and an analytical framework based on multi-dimensional birth-death processes is developed to encompass a broad range of relevant issues. Specific topics include consideration of new channel borrowing schemes, mixed satellite and terrestrial systems, and methods that support platforms with differing mobilities and mixed teletraffic sources, such as data, voice and images. Important recent contributions include: (1) several important extensions of our analytical framework which allow platforms with highly variable mobility characteristics to be considered; (2) adaptive location management schemes for mobile communications; (3) performance models for mobile computing and communications; and, (4) cellular systems with multibeam antenna configurations.				
14. SUBJECT TERMS Mobile communications, wireless communications, personal communications, cellular communications, traffic performance, mobility management, mobile networks.			15. NUMBER OF PAGES 3	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT unclassified	20. LIMITATION OF ABSTRACT SAR	

**OFFICE OF NAVAL RESEARCH**  
**PUBLICATIONS / PATENTS / PRESENTATIONS / HONORS REPORT**  
for  
**30 June 1997 through 31 December 1997**

**R&T Number:**  
**Grant Number:** N00014-95-11217  
**Grant Title:** MOBILE AND WIRELESS COMMUNICATIONS

**Principal Investigator:** Stephen S. Rappaport  
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a. Number of papers submitted to refereed journals but not yet published:	<u>7</u>
b. Number of papers published in refereed journals: (list attached)	<u>0</u>
c. Number of books or chapters submitted but not yet published:	<u>0</u>
d. Number of books or chapters published: (list attached)	<u>1</u>
e. Number of printed technical reports & non-refereed papers: (list attached)	<u>6</u>
f. Number of patents filed: (list attached)	<u>0</u>
g. Number of patents granted: (list attached)	<u>0</u>
h. Number of invited presentations at workshops or professional society meetings.	<u>0</u>
i. Number of presentations at wrkshps or prof. soc. meetings. (list attached)	<u>2</u>
j. Honors/Awards/Prizes for Contract/Grant Employees: (List attached). (Includes scientific soc. awards/offices, Promotions, Faculty Award/Offices).	<u>5</u>
k. Total number of graduate students and post-docs supported at least 25% this year on this contract, grant: <i>graduate students</i> <u>5</u> and <i>post-docs</i> <u>0</u>	
grad student female	0
grad student minority	0
grad student Asian e/n	4
post-doc female	0
post-doc minority 0	0
post-doc Asian e/n	0

**PUBLICATIONS, PATENTS, PRESENTATIONS, AND HONORS REPORT****b. Papers Published in Refereed Journals****d. Books or Chapters Published**

- [1] Y. Park and S.S. Rappaport, "Cellular Communication Systems with Voice and Background Data," *Mobile Multimedia Communications*, Plenum Publishers. November 1997.

**e. Technical Reports and Non-Refereed Papers**

- [1] D. Gu and S.S. Rappaport, "A Dynamic Location Tracking Strategy for Mobile Communication Systems," CEAS Technical Report No.741, July 24, 1997, College of Engineering and Applied Sciences, State University of New York, Stony Brook, NY 11794.
- [2] P.V. Orlik and S.S. Rappaport, "A Model for Teletraffic Performance and Channel Holding Time Characterization in Wireless Cellular Communications with General Session and Dwell Time Distributions," CEAS Technical Report No.742, July 31, 1997, College of Engineering and Applied Sciences, State University of New York, Stony Brook, NY 11794.
- [3] Guodong Zhang and Stephen S. Rappaport, "Simulation of Blocking, Hand-off and Traffic Performance for Cellular Communication Systems with Mixed Platforms," CEAS Technical Report No. 743, August 4, 1997, College of Engineering and Applied Sciences, State University of New York, Stony Brook, NY 11794.
- [4] Y. Park and S.S. Rappaport, "Performance Analysis of Session Oriented Data Communications for Mobile Computing in Cellular Systems," CEAS Technical Report No. 744, August 4, 1997, College of Engineering and Applied Sciences, State University of New York, Stony Brook, NY 11794.
- [5] J.-L. Pan, S.S. Rappaport, and P.M. Djuric, "Multibeam Cellular Communication Systems with Dynamic Channel Assignment across Multiple Sectors," CEAS Technical Report No. 749, October 22, 1997, College of Engineering and Applied Sciences, State University of New York, Stony Brook, NY 11794.
- [6] D. Gu and S.S. Rappaport, "Location Tracking in Hierarchical Cellular Systems: An Adaptive Algorithm," CEAS Technical Report No. 750, November 14, 1997, College of Engineering and Applied Sciences, State University of New York, Stony Brook, NY 11794.

**f. Patents Filed****g. Patents Granted**

**i. Presentations at Workshops and Professional Society Meetings**

- [1] H. Takanashi and S.S. Rappaport, "Analysis of a Simple PCS System with Nonuniformly Distributed Mobile Users," Proc. IEEE International Conference on Universal Personal Communications, ICUPC '97, San Diego, Oct. 12-16, 1997, pp. 572-576.
- [2] P. V. Orlik and S.S. Rappaport, "A Model for Teletraffic Performance and Channel Holding Time Characterization in Wireless Cellular Communication," Proc. IEEE International Conference on Universal Personal Communications, ICUPC '97, San Diego, Oct. 12-16, 1997, pp. 671-675. (with P. V. Orlik)

**j. Honors/Awards/Prizes**

S.S. Rappaport

- [1] Technical Program Committee, ICUPC '97 San Diego.
- [2] Vice-Chair, Technical Program, ICUPC '98 Florence.
- [3] Editorial Board, *Wireless Networks Journal*.
- [4] State University of New York at Stony Brook, - Faculty Senate.
- [5] Certificate of Appreciation for Service to IEEE Communications Society as Technical Committee Chair (received November 1997).