

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 12/17/96	3. REPORT TYPE AND DATES COVERED SemiAnnual 6/1/96 - 11/30/96
----------------------------------	----------------------------	--

4. TITLE AND SUBTITLE Advanced Signal Processing Techniques for Wireless Communications	5. FUNDING NUMBERS N00014-95-1-0834
--	--

6. AUTHOR(S) Prof. Gregory W. Wornell	1313148
--	---------

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Research Laboratory of Electronics Massachusetts Institute of Technology 77 Massachusetts Avenue Cambridge, MA 02139	8. PERFORMING ORGANIZATION REPORT NUMBER
---	--

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of Naval Research Ballston Tower One 800 North Quincy Street Arlington, VA 22217-5660	10. SPONSORING/MONITORING AGENCY REPORT NUMBER
--	--

11. SUPPLEMENTARY NOTES
The view, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited.	12b. DISTRIBUTION CODE
--	------------------------

13. ABSTRACT (Maximum 200 words)
Work by Prof. Wornell and his collaborators is summarized here

FINAL QUALITY INSPECTED 4

19961223 026

14. SUBJECT TERMS			15. NUMBER OF PAGES
			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 UL

Interim Progress Report for
ONR Grant No. N00014-95-1-0834

Advanced Signal Processing Techniques
for Wireless Communications

for the period

June 1, 1996 through November 30, 1996

Principal Investigator: Prof. Gregory W. Wornell

Research Laboratory of Electronics
Massachusetts Institute of Technology
Cambridge, MA 02139-4307

Efficient solutions fundamental problems of wireless communication continued to be explored during this period. This has included our work on developing promising new and bandwidth-efficient classes of time, frequency, and space diversity strategies for single- and multi-user wireless communication in multipath fading environments. A particular focus during this reporting period has been on techniques for exploiting transmitter antenna arrays to combat the effects of fading in wireless systems, and some exciting new results have been obtained. The full set of results for this period are described in detail in the following publications.

1. G. W. Wornell and M. D. Trott, "Efficient Signal Processing Techniques for Exploiting Transmit Antenna Diversity on Fading Channels," to appear in *IEEE Trans. Signal Processing*, Special Issue on Signal Processing Advances in Communications, Jan. 1997.
2. A. Narula, M. D. Trott, and G. W. Wornell, "Information-Theoretic Analysis of Multiple-Antenna Transmission Diversity for Fading Channels," in *Proc. Int. Symp. Inform. Theory and Appl.* (Victoria, Canada), Sept. 1996.
3. B. Chen and G. W. Wornell, "Efficient Channel Coding for Analog Sources using Chaotic Systems" in *Proc. IEEE GLOBECOM*, (London), Nov. 1996.
4. J. M. Ooi and G. W. Wornell, "Decentralized Control of a Multiple Access Broadcast Channel: Performance Bounds," to appear in *Proc. Int. Conf. Dec. Control*, (Japan), Dec. 1996.
5. J. M. Ooi and G. W. Wornell, "Fast Iterative Coding Techniques for Feedback Channels," submitted Oct. 1996 to *IEEE Trans. Inform. Theory*.
6. A. Narula, M. D. Trott, and G. W. Wornell, "Information-Theoretic Analysis of Multiple-Antenna Transmission Diversity," submitted Nov. 1996 to *IEEE Trans. Inform. Theory*, Nov. 1996.
7. S. H. Isabelle and G. W. Wornell, "Recursive Multiuser Equalization for CDMA Systems in Fading Environments," in *Proc. Allerton Conf. Commun, Contr., Signal Processing*, (Illinois), Oct. 1996.

ATTACHMENT NUMBER 1REPORTS AND REPORT DISTRIBUTIONREPORT TYPES

- (a) Performance (Technical) Report(s) (Include letter report(s))
Frequency: Semiannual
- (b) Final Technical Report, issued at completion of Grant.
- (c) Final Financial Status Report (SF 269)
- (d) Final Patent Report (DD882)

REPORTS DISTRIBUTION

<u>ADDRESSEES</u>	<u>REPORT TYPES</u>	<u>NUMBER OF COPIES</u>
PROGRAM MANAGER/OFFICER ONR: 313 Rabinder N. Madan OFFICE OF NAVAL RESEARCH BALLSTON TOWER ONE 800 NORTH QUINCY STREET ARLINGTON, VIRGINIA 22217-5660	(a) & (b)	3
ADMINISTRATIVE GRANTS OFFICER OFFICE OF NAVAL RESEARCH REGIONAL OFFICE (c) & (d) ROOM 103 495 SUMMER STREET BOSTON MA 02210-2109	(a), (b),	1
DIRECTOR, NAVAL RESEARCH LABORATORY ATTN: Code 2627 WASHINGTON, DC 20375	(a) & (b)	1
DEFENSE TECHNICAL INFORMATION CENTER BUILDING 5, CAMERON STATION ALEXANDRIA, VIRGINIA 22304-6145	(a) & (b)	2
OFFICE OF NAVAL RESERACH BALLSTON TOWER ONE ATTN ONR OOCCL MR WILLIAM F MCCARTHY 800 NORTH QUINCY STREET ARLINGTON, VIRGINIA 22217-5660	(d)	1

If the Program Manager/Officer directs, the Grantee shall make additional distribution of technical reports in accordance with a supplemental distribution list provided by the Program Manager/Officer. The supplemental distribution list shall not exceed 250 addresses.