This report summarizes the progress made since November 1, 1984 under this grant. The primary contributions have been on nonlinear smoothers, quantization, and nonparametric and robust detection and filtering. We will continue efforts in these directions in the second year.
STATISTICAL TECHNIQUES FOR SIGNAL PROCESSING

Research Progress and Forecast Report

AFOSR Grant AFOSR 82-0022

Principal Investigator: S.A. Kassam

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This report summarizes the progress we have made since November 1, 1984 under AFOSR Grant 82-0022 for continuing research on "Statistical Techniques for Signal Processing". It also summarizes our objectives and anticipated results for the second year of the above grant.

The progress made so far can be inferred from the list of publications and of items in preparation for publication since November 1, 1984, [1]-[10] on page 3. The invited paper [1] is a comprehensive survey of robust signal processing schemes. In [2] a new coding scheme for binary images has been described. In the main area of our research, that of nonlinear smoothers and filters based on generalizations of medians and other robust estimators, references [3]-[6] contain our recent results and interpretations. References [7] and [8] are on the subject of optimum quantization of data and coefficients in estimation and detection problems. Finally, [9] and [10] contain recent results on nonparametric and robust detection and filtering. Those of the listed papers which have not yet been sent to AFOSR will be mailed in a package within the next three months.

In the second year of the current grant we will continue to focus on the important area of nonlinear filters and smoothers based on robust estimators. We plan to study in particular the class of moving-window (non-recursive) filters which utilize in a general way both temporally-ordered and rank-ordered data weighted by appropriately designed weighting matrices. In addition, we will continue our statistical characterizations of the edge-preservation and noise-rejection properties of such filters, and consider also recursive versions. The primary application area to which we will attempt to apply promising results will be that of image...
restoration and also that of constant-false-alarm-rate radar processing.

As a secondary activity we expect to be able to continue our research on new methods for nonparametric detection and robust signal processing.
LIST OF PUBLICATIONS


