NBSIR 75-801

A BIBLIOGRAPHY ON AUTOMATED MEASUREMENTS (July 1, 1969, to July 1, 1974)

Compiled by:

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U.S. DEPARTMENT OF COMMERCE, Elliot L. Richardson, Secretary
James A. Baker, III, Under Secretary
Dr. Betsy Ancker-Johnson, Assistant Secretary for Science and Technology

NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Acting Director

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A BIBLIOGRAPHY ON AUTOMATED MEASUREMENTS

Compiled by

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This bibliography lists approximately 1000 citations pertinent to the field of automated measurement of electrical/electronic quantities and characteristics. In addition, approximately 400 citations are included that should be helpful in applying computers to the automation of measurements. Only references appearing in the open literature between July 1, 1969, and July 1, 1974, are listed.

Key words: Automated measurements; computer-aided measurements; computer-controlled instruments.

INTRODUCTION

This bibliography provides an overview of the field of automated measurement of electrical/electronic quantities and characteristics for managers, systems designers and users, and other persons interested in the automation of measurements for calibration, quality control, and production testing. The references listed range from high precision systems and components to systems suitable for the production line, and for the most part represent the state-of-the-art in automated measurements of electrical and electronic quantities and characteristics as of July 1, 1974.

This document is an outgrowth of an earlier literature search on the many developments in the field of automated measurements from July 1, 1969, through June 30, 1972, for a triannual progress report on automated measurements in the United States. The original literature survey also was the basis of an article "U. S. Automated Test Instrumentation Progress" by Dr. George E. Schafer, which appeared in the Microwave Journal, April 1973, Vol. 16, No. 4, pp. 27-29.

The uses of this publication are manyfold. When it was first written it provided a state-of-the-art overview. Now, two years later, it documents a major literature search which provides a starting point for further studies. Other uses are to assist the user or system designer to find either a system or component that will provide a solution to a measurement automation problem, or to find an idea for a likely candidate measurement system for automation, or to find information on components or computers that are needed to make such a measurement system work.

SOURCES OF MATERIALS

The open literature was examined for appropriate articles by perusing several abstract journals and current awareness publications. The articles were identified, and then either the abstract or the full text or both were examined before being included in this bibliography. An estimated 6000 to 7000 titles were reviewed for potential inclusion; approximately 1400 titles were selected. Nearly 1000 of these articles are directly relevant to the field of automated measurement of electrical/electronic quantities and characteristics. The 400 additional articles should be helpful in applying computers to the automation of measurements.

Approximately 90% of the citations listed were articles originally selected for the "Electromagnetic Metrology Current Awareness Service" [1].* The remaining 10% of the citations were found in "Electrical and Electronic Abstracts" [2], "Computer and Control Abstracts" [2], "Current Contents/Physical and Chemical Sciences" [3], "Current Contents/Engineering and Technology" [3], plus other technical journals.

SCOPE

This bibliography includes the U.S. open literature between July 1, 1969, and July 1, 1974, and the foreign literature between July 1, 1972, and July 1, 1974. Although this time division may seem strange to the reader, the original charter of the literature survey was only to determine the progress in the U.S. in the automation of measurements; later the survey was expanded to cover activities on a world-wide basis.

TOPICS COVERED

The references included in this bibliography can be divided into three broad categories: (1) those directly related to automated measurement of electrical/electronic quantities and characteristics; (2) those indirectly related, but containing information needed to produce successful automated measurement systems; and (3) those related to the management, and economic and social aspects of automated measurement systems.

The following sections deal directly with automated measurements:

(1) automated measurements of measurands,**
(2) computer-aided measurements,
(3) computer control of measurands,
(4) programable or automated components and instruments,
(5) computer-controlled test instrumentation,
(6) sampled data systems,
(13) digital control, and
(14) data handling.

The following sections deal indirectly with automated measurements, and thus contain references that either provide background on components of automated systems or contain ideas of possible candidate systems and components for automation:

(7) broadband measurements,
(8) broadband components and instruments,
(9) pulse measurements,
(10) computers,
(11) peripheral equipment for computers, and
(12) converters and conversion.

The miscellaneous section (15) contains articles dealing with management, economics, social impacts, and standardization of automated measurements. This section has articles of a general nature that are too broad in content to be easily classified into other subject areas.

*Figures in brackets indicate the literature references at the end of this pape

**Measurand is defined as the quantity or characteristic being measured. For example: attenuation, voltage, current, etc.

ARRANGEMENT

A few remarks on the arrangement of citations within this bibliography may assist the reader in finding the information he seeks.

The major divisions are those of the original literature search (July 1, 1969 - June 30, 1972) and are maintained for the convenience of the compilers and typists.

The minor subdivisions are based on those of the Electromagnetic Metrology Current Awareness Service.

Within each subsection the citations are arranged by date in ascending order. This arrangement was selected to facilitate adding citations to each list without completely rearranging the citations on the magnetic-tape-selectric-typewriter tapes.

No author index is included since the basic premise of the bibliography is to introduce subject matter and to permit retrieval by subject, not author.

SUMMARY

This bibliography contains approximately 1000 references related to the automated measurement of electrical/electronic quantities, some 530 of these dealing directly with automated measurements and 450 providing a source of ideas for potential automated systems. There are also some 400 references to computers and their peripherals which are necessary adjuncts to the automation of any type of measurement or control system.

The document provides an overview of the present state-of-the-art in automated measurements, but does not pretend to be complete as completeness in a bibliography of this size is virtually impossible in such a fast growing field of endeavor.

The bibliography should prove useful to technologists who need an already developed automated measurement system as well as to those who cannot find a ready-made system and instead need an idea of what systems could be automated.

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(none)

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ACKNOWLEDGMENT

This bibliographic project was supported in part by the U. S. Army Electronic Proving Ground, Ft. Huachuca, Arizona, under contract MIPR No. AEPG-1010-71 (14 Sept. 1971).

The authors gratefully acknowledge the assistance of Mrs. Margaret L. Woolley, Miss Sharon C. Foote, and Mrs. Janet R. Jasa without whose typing expertise this manuscript might never have been published. In addition, the authors would like to express their appreciation to Mrs. Florence M. Indorf for her careful format review of this manuscript.

NBS-114A (REV. 7-73)

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET	1. PUBLICATION OR REPORT NO. NBSIR-75-801	2. Gov't Accession No.	3. Recipient's Accession No.

4. TITLE AND SUBTITLE

A Bibliography on Automated Measurements (July 1, 1969 to July 1, 1974)

5. Publication Date: April 1976

6. Performing Organization Code: 276.10

7. AUTHOR(S): Gloria A. Teamer and Anne Y. Rumfelt

8. Performing Organ. Report No.

9. PERFORMING ORGANIZATION NAME AND ADDRESS

NATIONAL BUREAU OF STANDARDS
DEPARTMENT OF COMMERCE
WASHINGTON, D.C. 20234

10. Project/Task/Work Unit No.: 2769103

11. Contract/Grant No.

12. Sponsoring Organization Name and Complete Address (*Street, City, State, ZIP*)

Same as 9.

13. Type of Report & Period Covered

14. Sponsoring Agency Code

15. SUPPLEMENTARY NOTES

16. ABSTRACT (*A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.*)

This bibliography lists approximately 1000 citations pertinent to the field of automated measurement of electrical/electronic quantities and characteristics. In addition, approximately 400 citations are included that should be helpful in applying computers to the automation of measurements. Only references appearing in the open literature between July 1, 1969, and July 1, 1974, are listed.

17. KEY WORDS (*six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons*)

Automated measurements; computer-aided measurements; computer-controlled instruments.

18. AVAILABILITY

- [ ] Unlimited
- [ ] For Official Distribution. Do Not Release to NTIS
- [ ] Order From Sup. of Doc., U.S. Government Printing Office Washington, D.C. 20402, SD Cat. No. C13
- [X] Order From National Technical Information Service (NTIS) Springfield, Virginia 22151

19. SECURITY CLASS (THIS REPORT)	21. NO. OF PAGES
UNCLASSIFIED	157
20. SECURITY CLASS (THIS PAGE)	22. Price
UNCLASSIFIED	$6.25