

ARO 21807.1-MS-CF
Final Report ①

SEVENTEENTH ELECTROMAGNETIC
WINDOW SYMPOSIUM

July 25-27, 1984

PART 1.

slb 1-22-85

Joe N. Harris
Engineering Experiment Station

George H. Adams
Department of Continuing Education

September 1984

U. S. Army Research Office

P. O. No. 84-M-0346

GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332

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(TITLE): Proceedings of the Symposium on Electromagnetic Windows (17th) Held at
Georgia Institute of Technology, Engineering Experiment Station, Atlanta,
Georgia on 25-27 July 1984. Part 1. See also Part 2, AD-A149 125.

(SOURCE): Georgia Institute of Technology, Atlanta, Engineering Experiment
Station.

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Electromagnetic Windows, Radomes, Symposium		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Thirty papers covering the areas of: radome electrical design and analysis, test and evaluation of radome materials, radome materials, and rain erosion were presented at the Seventeenth Electromagnetic Window Symposium held at the Georgia Institute of Technology, July 25-27, 1984. The history of these symposia and the organization of the current symposium is described. Appendices are given listing papers presented and personnel attending.		

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FOREWORD

The Seventeenth Electromagnetic Window Symposium was co-hosted by the Engineering Experiment Station and the Department of Continuing Education, Georgia Institute of Technology.

The authors would like to acknowledge the support of the organizing committee which included Mr. H. L. Bassett, Dr. J. A. Fuller, Dr. J. C. Handley, Mr. J. M. Newton and Mr. J. D. Walton of the Engineering Experiment Station and Dr. G. K. Huddleston of the School of Electrical Engineering. The authors would also like to acknowledge the support of Ms. Mercedes Edwards, Program Coordinator, Ms. Louise Brown and Ms. Elaine Nicholas of the Department of Continuing Education.

The authors also acknowledge the contributions of Mr. D. J. Evans of the U. S. Air Force, Wright Aeronautical Laboratories, Mr. K. N. Letson of the Army Missile Command, LTC B. L. Thackston of the U. S. Army Ballistic Missile Division Advance Technology Center, and Dr. W. T. Messick of the Naval Surface Weapons Center for serving on the program committee and for monitoring technical sessions during the symposium.

The authors wish especially to thank Dr. John C. Hurt of the Army Research Office for providing support for the attendance of the U. S. Army Scientists and for providing partial support for other costs associated with this symposium.

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1.0 INTRODUCTION

The Seventeenth Symposium on Electromagnetic Windows was hosted by the Georgia Institute of Technology, Engineering Experiment Station and the Department of Continuing Education during the period 25-27 July 1984.

2.0 SYMPOSIUM OBJECTIVE

To disseminate current information on recent developments in the Radome and Electromagnetic Window field.

Information was transferred to the attendees through:

- a. Formal presentations,
- b. Interaction between individuals during breaks and off-hours.

3.0 HISTORY OF THE RADOME/EM WINDOW SYMPOSIA

The need for a general exchange of information on radome technology to stimulate development was recognized in the early 1950's. The first such symposium for guided missile radomes was hosted by the Office of Naval Research in June of 1953 in Washington, D. C. This meeting led Fred H. Behrens to state: "This symposium gave a great deal of impetus to radome development efforts throughout both government and industry. The benefits derived from this meeting, particularly from the written proceedings issuing from it, proved conclusively the need for and value of such meetings".*

This led the U. S. Air Force to sponsor a series of radome symposia. In June of 1955 the U. S. Air Force, Wright Air Development Center (USAFWADC) sponsored a radome symposium with the Ohio State University

*Behrens, F. H., "Origin and Historical Development of Radomes," Chapter 1, Techniques for Airborne Radome Design, Tice, T. E. Ed., AFALTR-66-391, Vol. I, Dec. 1966.

Research Foundation as host. Another radome symposia was held at Ohio State in June 1956 and then they were switched to a biennial basis.

In June of 1966 the USAFWADC began sponsorship of these biennial symposia at the Georgia Institute of Technology. The Air Force provided joint sponsorship for the symposia held at Georgia Tech in 1966, 1968 and 1972. In 1970 and after 1972 an Air Force Policy change prevented any further joint sponsorship of meetings with non-DOD organizations.

Recognizing the importance of these gatherings of government, industry and university personnel to the development of radome and EM window technology, the Georgia Institute of Technology, Engineering Experiment Station decided to continue hosting an EM window symposia in even years. The funds to pay the costs for these symposia in 1970 and in even years since 1974 have been covered entirely by the conference registration fee and by volunteer service on the part of the Georgia Tech organizing personnel.

4.0 U. S. ARMY RESEARCH OFFICE SUPPORT

The funds provided by the U. S. Army Research office in partial support of the 1984 symposium is the first outside support received for any of the symposia since 1972. These funds were used to pay the registration fee of \$105.00 for five of the six U. S. Army scientists attending the meeting and to partially pay printing costs of the proceedings and program brochures. A list of Army personnel whose registration fee was waived/refunded is shown in Appendix A.

5.0 PROGRAM ORGANIZATION

The call for papers for the Seventeenth Symposium on Electromagnetic Windows was mailed in December 1983. The mailing list consisted of 1000 potential attendees, approximately 800 from the U.S. and 200 foreign. The

abstracts received were reviewed by the members of the planning committee shown in the final program and the authors of those papers accepted were notified. The authors were given instructions for paper preparation and deadline dates for printing of the proceedings prior to the meeting.

One thousand copies of the advanced program including hotel registration cards were mailed in May. Twenty-five papers were received in time for printing in the bound proceedings. Five papers were reproduced during the meeting and distributed to the participants. The call for papers and the advanced and final programs are reproduced in Appendix B. The Proceedings and the five paper addendum are being provided under separate cover.

The formal program consisted of 30 papers. Thirty-three presentations were scheduled, but three papers had to be withdrawn because their DOD contract monitors considered them to contain sensitive information.

The quality of paper delivery and technical content was outstanding as compared with previous symposia and other similar meetings.

6.0 ATTENDANCE

A roster of personnel attending is attached as Appendix C. The total attendance at the meeting was 138. This represents an approximate 15 percent increase as compared to the attendance at the two preceding symposia in 1980 and 1982. The attendance is further broken down as follows:

U. S. participants	126
Foreign participants	12
UK 2, France 6, Federal Republic of Germany 1,	
South Africa 1, Israel 2	

DOD participants	21
Army	6
Navy	11
Air Force	3
DNA	1

7.0 RECOMMENDATIONS:

Current government requirements for classification of much of the current research is limiting the number of papers that can be presented as "UNCLASSIFIED." Previously in those symposia co-sponsored by the U. S. Air Force a classified session was held. It is recommended that the U. S. Army Research Office consider monetary support of the same order of magnitude for the 18th EM Window Symposium to be held in June 1986 and also consider co-sponsorship so that a classified session can be held during the symposium. The Georgia Institute of Technology, Engineering Experiment Station and its contracting agency, the Georgia Tech Research Corporation have a Top Secret Facility Clearance and all professional personnel who would be involved in organizing and conducting the conference hold DOD clearances up to the level of SECRET.

APPENDIX A

List of Army Personnel whose registration fee
was waived/refunded

<u>Name</u>	<u>Organization</u>
K. N. Letson	U. S. Army Missile Command DRSMI-RLA Huntsville, AL 35898
G. B. Nicholas	U. S. Army Missile Command DRCPM-MD-T-C Huntsville, AL 35898
S. P. Risner	U. S. Army Missile Command DRSMI-RLA Huntsville, AL 35898
LTC B. L. Thackston	U. S. Army Ballistic Missile Defense, Advanced Technology Center Huntsville, AL 35807
James C. Walck	Army Materials and Mechanics Research Center DRXMR-MCS Watertown, MA 02172

APPENDIX B

1. Call for Papers
Seventeenth EW Window Symposium
2. Advance Program
Seventeenth EM Window Symposium
3. Final Program
Seventeenth EM Window Symposium

SEVENTEENTH SYMPOSIUM
ON
ELECTROMAGNETIC WINDOWS

Georgia Institute of Technology
Atlanta, Georgia 30332

July 25, 26, and 27, 1984

ANNOUNCEMENT
AND
CALL FOR PAPERS

The seventeenth Electromagnetic Window Symposium will be held at the Georgia Institute of Technology, Atlanta, Georgia on July 25, 26, and 27, 1984. The purpose of this biennial gathering of radome specialists is to exchange the latest available technical information on radomes and radome techniques.

Authors are invited to submit unclassified papers on subjects relating to radome technology, including, among others, the following areas:

Radome Materials	Design	Dual Mode Radomes
Radome Coatings	Analysis	Compensation Techniques
Parameter Evaluation	Testing	Broad Band Radomes
	Environmental Considerations	

AUTHORS SCHEDULE

Abstract.....5 copies by March 1, 1984
Final Manuscript (4 pages plus 6 figures max)...May 15, 1984

Submit abstracts and papers to:
Mr. H. L. Bassett
Georgia Institute of Technology
Engineering Experiment Station
Atlanta, Georgia 30332

Authors will be notified of acceptance of papers by April 1, 1984. An advance program with preregistration information will be mailed by May 1, 1984.

If you are no longer involved in this field please pass this announcement along to other personnel in your company.

For additional information contact:

Mr. Joe N. Harris	or Mr. Joe M Newton
Georgia Institute of Technology	Georgia Institute of Technology
Hinman Building	Baker Building
Engineering Experiment Station	Engineering Experiment Station
Atlanta, Georgia 30332	Atlanta, Georgia 30332
(404) 894-3665	(404) 894-3505

B-1. Call for Papers.

registration materials between 8 a.m. and 9 a.m. on July 23, 1984 in the Lower Level of the Space Science Building. The Registration Desk will remain open throughout the Symposium to accommodate late arrivals and provide information on the agenda, including session chairmen and speakers. Please pay registration fees.

Hotel Accommodations

The Headquarters for the Symposium is the Sheraton Atlanta Hotel, 550 W. Peachtree St., N.W., Atlanta, Georgia 30308. Reservations can be made before June 30, 1984 by telephone (404) 481-6600 or by mail using the enclosed postcard. When making reservations, please indicate that you are attending the "Radome Symposium." Rates:

	Rate*
Single	\$49.00
Double	49.00

*Rates subject to 8% City and State Tax

Campus Accommodations

All technical sessions will be held in the Space Sciences Building on the Georgia Tech campus.

A shuttle bus will be provided from the Sheraton to the campus and back during the morning and afternoon of each day.

Pay telephones are available in the Space Sciences Building for outgoing calls. Personal incoming calls should be directed to the hotel or to the Department of Continuing Education (404) 894-3395.

Books will be available in the Student Center for a list of local restaurants.

Introduction

The Space Tech Symposium in Window Symposium will be hosted by the Georgia Institute of Technology, Atlanta, Georgia, USA, July 29-27, 1984. The purpose of the Symposium is to exchange the latest technical information on radomes and radome technology. Papers from the United States and other countries will be presented during this international meeting.

As in the rest of the Southeast, because of the proximity of activities included in the program, sports, tourist attractions, recreation facilities, and shopping centers are abundant. The convenience of location and excellent dining facilities afford an ideal opportunity to combine business with pleasure.

Registration

Please use the attached Advance Registration Form to register for the Symposium. Enclose with the form a check or money order (U.S. dollars) made payable to Georgia Institute of Technology and mail to arrive no later than July 20, 1984 to:

Department of Continuing Education
Georgia Institute of Technology
Atlanta, Georgia 30332-0385

The advance registration fee is \$105.00 for each attendee. On-site registration will be \$115.00. This fee includes a copy of the Proceedings, a single banquet ticket, and a complimentary registration kit. Copies of the Proceedings will be available at the Symposium for \$30.00 each. Extra banquet tickets will also be available for \$21.00 each.

The speaker fee is \$1,000.00. Speakers and other staff members will receive complimentary tickets.

and with banquet attendance will be included in the registration material.

Invited speakers will be invited to give a keynote address at the opening dinner and to give a paper at a symposium in the afternoon.

The International Airport services for Atlanta, Atlanta, and Atlanta are services to the hotel are available. If a flight from the airport takes 180 North and exit at Peachtree St. then follow South to West Peachtree St. (one way north). Hotel is one block off left.

A cocktail reception and banquet will be held on the evening of July 26, 1984 at the Sheraton Atlanta Hotel in the Ball Room. Ball Room West beginning at 6:30 p.m. with dinner at 7:30 p.m.

Agenda

SESSION I RADOME ELECTRICAL DESIGN AND ANALYSIS

Moderator: M.J. Hurlum
(USA-23 QM)

Electromagnetic Analysis of Radomes by the Moment Method, G. Truoles, L.L. Noye and K.A. Hayward, General Dynamics Electronics Division

A Computer Analysis of the RF Performance of a Ground Mounted, Air Supported Radome, M.B. Punnett and E.B. Joy, CH2M Hill and Georgia Institute of Technology

Comparison of Spherical Wave Ray Tracing and Full Boundary Value Solutions for Spherical Radomes, D.A. Bloom, P.J. Overfelt, and D.J. White, Naval Weapons Center

Generalized Radome BSE Characterization Using Superposition Techniques, G. Thompson and M. Corbridge, Raytheon Co.

Registration Form

Name _____ Social Security Number _____

Organization _____ Position _____

Organization Address _____

Organization Phone _____ Home Phone _____

Course Fee: \$105.00 (Speaker) \$115.00 (Attendee)
 Registration Fee: \$30.00 (Attendee)
 Banquet Ticket: \$21.00 (Attendee)

Mail check and money order to:
 Department of Continuing Education
 Georgia Institute of Technology
 Atlanta, Georgia 30332-0385
 Telephone: (404) 894-3395

A Subaperture Approach to the Calculation of Flashlobes Induced by Airborne Radomes, A. Hual and R.W. Lyon, Middle East Technical University and EKA Technology Ltd

SESSION II RADOME ELECTRIC DESIGN AND ANALYSIS-II

Moderator: Harold E. Smith
Georgia Institute of Technology

Near Field Effects on Radome Backscattered Errors, G.K. Hadzilakos, Georgia Institute of Technology

PWS Radome Analysis Including Reflection Coefficients, R. Rappaport, Georgia Institute of Technology and General Electric Co

A Fast Ray Tracing Algorithm for Arbitrarily Monodimensionally Curved, Three Dimensional Radome Shapes, E.B. Joy and D.E. Ball, Georgia Institute of Technology and Hains Corporation

Dual Band Radome Wall Design, B.J. Crowe, Flight Systems Inc.

Study of Laminated Dielectric Behavior at Microwave and Millimeter Wave Frequencies, D.J. White and C.N. Helmick, Jr., Naval Weapons Center

Image Lobe Analysis for Large Radomes, B. Pupko, D. Gordon, and S. Storobinets, Israel Aircraft Industries

SESSION III TEST AND EVALUATION OF RADOMES AND MATERIALS

Moderator: W. Messick
NSWC, White Oak, MD

Supersonic Tactical Missile (STM) Radome Development, A.J. Thompson, Brunswick Corporation

Silicon Nitride Radome Development for Broadband High Temperature Appli-

cations, J.P. Schorsch and G.E. Miller, Boeing Aerospace Company

A Millimeter Wave Apparatus for Free-Space Measurement of Dielectric Constants at High Temperature, D. Gagnon and D. White, Naval Weapons Center

Automated Radome Testing, C.E. Moore and J.B. Stryon, Brunswick Corporation

Design and Calibration of a 35 GHz Dual Frequency J. Hanson and J. Brazel, General Electric Company

Hot Radome Backscattered Error Measurements, C.S. Ward, M. Cerullo, and G. Pimpion, Raytheon Company

Near Field Testing to Investigate Radome Aberration Phenomena, D.G. Burks, Texas Instruments Incorporated

A Broadband Kevlar Radome for Shipboard, J.B. Stryon and R.S. Francisco, Brunswick Corporation

SESSION IV RADOME MATERIALS

Moderator: D.J. Evans, AFAL, Wright Patterson Air Force Base, Ohio

Fiber Reinforced Fused Silica for Hypersonic Radome Applications, F.P. Meyer, G.D. Quinn, and J.C. Walck, U.S. Army Materials and Mechanics Research Center

Pressureless Sintered Silicon Nitride as a Promising Candidate for Radome Materials, M.Y. Hsieh, H. Mizuhara and P.W. Smith, GTE WESGO Division

LL-100, A New Polyimide System for Radome Application, J.W. Eastridge, Brunswick Corporation

Broadband Thermoplastic Radomes, K. Hollenbach, Texas Instruments Inc.

Progress on Transparent Yttria WH Radomes and E.A. Tinkett, GTE Labora-

SESSION V RAIN EROSION

Moderator: J.D. Walton, Consultant Georgia Institute of Technology
Development of a High Temperature Single Impact Rain Erosion Test Capability, K.N. Letson and S.P. Risner, U.S. Army Missile Command

Infrared Material Optical Damage by Rain, A. Deorn, G. Gaultre and D.L. Bulegees, Office National d'Etudes et Recherches Aerospatiales (ONERA)

Rain Erosion Tests of Full Size Ship-Cast Fused Silica Radomes at M, 3.5 and M 4.8, R.K. Frazer, JHU/Applied Physics Laboratory

SESSION VI GENERAL TOPICS

Moderator: LTC B.L. Thackston
U.S. Army, BMDATCR

Dual Mode Cooled Metallic Antenna Window Design Concept, J.W. Hildahl and E.L. Nessler, Aerojet TechSystems Company

A Radome for Air Traffic Control SSR Radar Systems, ESSCO

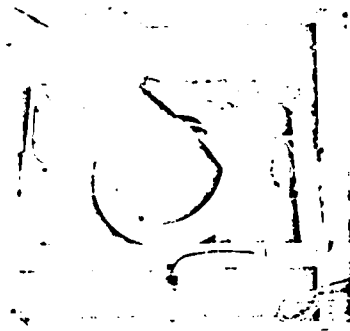
Development of the E-20 Nose Radome, E.L. Cain and P. Tullyathan, Northrop

High Radiant Flux Thermal Testing of Ceramic and Ablative Coatings for Hardening EHF Radomes, K.A. Zimmerman and G.M. Briand, Hains Corp., JJA Fully Georgia Institute of Technology

Nose and Inlet Duct Radomes for the Firebolt Aerial Target, L.C. Hoots, Brunswick Corporation

Seventeenth Electromagnetic Window Symposium

July 25-27, 1984
Atlanta, Georgia



Continuing Education
Georgia Institute of Technology
A Unit of the University System of Georgia

Welcome

Welcome to Atlanta and the Seventeenth Electro Magnetic Warfare Symposium. We think you will enjoy the city and its many cultural, historical, and entertainment offerings. We also feel that you will derive great benefit from the number of excellent papers to be presented here, and from your interaction with your colleagues.

This Symposium is hosted by the Engineering Experiment Station and the Department of Continuing Education, Georgia Institute of Technology, Atlanta, Georgia. The Headquarters Hotel is the Sheraton Atlanta, 280 West Peachtree Street, Atlanta, Georgia, 30308 (404) 881-6800.

All technical sessions will be held in the Space Sciences Building on the Georgia Tech campus.

A shuttle bus will be provided from the Sheraton to the campus and back during the morning and afternoon of each day.

Pay telephones are available in the Space Sciences Building for outgoing calls. Normal incoming calls should be directed to the hotel or to the Department of Continuing Education (404) 894-3295.

Meals are available in the Student Center. In addition, a list of local restaurants and entertainment attractions is included in the registration materials.

Limited pay parking (\$2.50/day) is available on campus. Parking permits must be obtained at conference registration and displayed in the car windshield.

A cocktail reception and banquet will be held on the evening of July 26, 1988 at the Sheraton Atlanta Hotel in the Georgia Ball Room West beginning at 6:45 p.m. with dinner at 7:30 p.m.

Planning Committee

J.N. Harris, Chairman, Georgia Institute of Technology, EES/EMSI
George Adams, Georgia Institute of Technology, Continuing Education
H.L. Bassett, Georgia Institute of Technology, EES/RAI
Mercedes Edwards, Georgia Institute of Technology, Continuing Education
D.J. Evaris, AF/WAL/AFML, Wright Patterson Air Force Base
J.A. Fuller, ElectroMagnetic Sciences, Atlanta, Georgia
J.C. Handley, Georgia Institute of Technology, EES/EMSI

G.K. Huddleston, Martin/Marietta Aerospace, Orlando, Florida
K.N. Letson, USAMICOM, Huntsville, AL
W. Messick, NSWC/K 22, White Oak, MD
J.M. Newton, Georgia Institute of Technology, EES/EML

Technical Program

25 July 1984

8:55 a.m.

Introductory Remarks

Joe N. Harris, Chairman

9:00 a.m.

Welcome to Georgia Tech

Dr. Joseph M. Pettit,

President, Georgia Institute of Technology

SESSION I RADOME ELECTRICAL DESIGN AND ANALYSIS

Moderator: K.N. Letson
USAMICOM

9:20 a.m.

Electromagnetic Analysis of Radomes by the Moment Method, G. Tricoles, E.L. Kope and R.A. Hayward, General Dynamics Electronics Division

9:45 a.m.

A Computer Analysis of the RF Performance of a Ground Mounted, Air Supported Radome, M.B. Punnett and E.B. Jey, CHEMFAB and Georgia Institute of Technology

10:05 a.m.

Comparison of Spherical Wave Ray Tracing and Exact Boundary Value Solutions for Spherical Radomes, D.A. Bloom, P.L. Overfelt, and D.J. White, Naval Weapons Center

10:30 a.m.

Recess and Refreshments

10:25 a.m.

Generalized Radomes BSE Characterization Using Superposition Techniques, G. Plimpton and M. Centullo, Raytheon Co.

11:30 a.m.

A Suboptimum Approach to the Calculation of Flashubes Introduced by Airborne Radomes, A. Huzal and R.W. Lyon, Middle East Technical University and ERA Technology Ltd.

11:45 a.m.

Lunch

SESSION II RADOME ELECTRICAL DESIGN AND ANALYSIS -- II

Moderator: David Barnett
Georgia Institute of Technology

1:15 p.m.

Near Field Effects on Radome Backscattered Fields, G.K. Huddleston, Martin Marietta Aerospace

1:40 p.m.

FWT Radome Analysis Involves Reflections I, B. Joy and H.L. Rappaport, Georgia Institute of Technology and General Electric Co.

2:05 p.m.

A Fast Ray Tracing Algorithm for Arbitrary Mathematically Convex Three Dimensional Radome Shapes, F.B. Joy and D.E. Ball, Georgia Institute of Technology and Harris Corporation

2:25 p.m.

Dual Band Radome Wall Design, B.J. Crowe, Flight Systems, Inc.

2:50 p.m.

Study of Laminated Dielectric Behavior at Microwave and Millimeter Wave Frequencies, D.J. White and C.N. Helmick, Jr., Naval Weapons Center

3:15 p.m.

Recess and Refreshments

3:40 p.m.

Image Lobe Analysis for Large Radomes, B. Pupko, D. Givokan and S. Storobinets, Israel Aircraft Industries

4:05 p.m.

Hypersonic Radome Study, R.J. Joachim, Raytheon Company

SESSION III TEST AND EVALUATION OF RADOMES AND MATERIALS

Moderator: W. Messick
NSWC, White Oak, MD

4:30 p.m.

Supersonic Tactical Missile (STM) Radome Development, A.J. Thompson, Brunswick Corporation

4:55 p.m.

Silicon Nitride Radome Development for Broadband High Temperature Applications, J.F. Schorsch and G.E. Miller, Boeing Aerospace Company

5:20 p.m.

A Millimeter Wave Apparatus for Free Space Measurement of Dielectric Constants at High Temperature, D. Gagnon and D. White, Naval Weapons Center

5:45 p.m.

Adjournment

26 July 1984

SESSION III TEST AND EVALUATION OF RADOMES AND MATERIALS (continued)

Moderator: W. Messick

NSWC White Oak, MD

- 9:00 a.m.
Automated Radome Testing, CE Moore and JB Syron, Brunswick Corporation
- 9:25 a.m.
Design and Calibration of a 35 GHz Dielectric Resonator, J. Hanson and J. Brazel, General Electric Company
- 9:50 a.m.
Hot Radome Bureaucratic Error Measurements, CS Ward, M. Cerullo, and G. Penington, Raytheon Company
- 10:15 a.m.
Recess and Refreshments
- 10:40 a.m.
Near Field Testing to Investigate Radome Aberration Phenomena, D.G. Burke, Texas Instruments Incorporated
- 11:05 a.m.
A Broadband Kevlar Radome for Shipboard, J.B. Syron and R.S. Francisco, Brunswick Corporation
- 11:30 a.m.
Lunch

SESSION IV RADOME MATERIALS

Moderator: D.J. Evans, AFML Wright Patterson Air Force Base, Ohio

- 1:00 p.m.
Fiber Reinforced Fused Silica for Hypersonic Radome Applications, F.P. Meyer, G.D. Quinn, and J.C. Wakk, U.S. Army Materials and Mechanics Research Center
- 1:25 p.m.
Pressureless Sintered Silicon Nitride as a Promising Candidate for Radome Materials, M.Y. Hsieh, H. Mizutani and P.W. Smith, GTE WESCO Division
- 1:50 p.m.
LL-100, A New Polybutadiene System for Radome Applications, G.W. Eastridge, Brunswick Corporation
- 2:15 p.m.
Broadband Thermoplastic Radomes, K. Hollenbeck, Texas Instruments Inc.
- 2:40 p.m.
Progress on Transparent Yttria, W.H. Rhodes and E.A. Trickett, GTE Laboratories
- 3:05 p.m.
Recess and Refreshments

SESSION V RAIN EROSION

Moderator: J.D. Walton, Consultant
Georgia Institute of Technology

- 3:45 p.m.
Development of A High Temperature Single Impact Rain Erosion Test Capability, K.N. Letson and S.P. Kistner, U.S. Army Missile Command
- 4:05 p.m.
Infrared Material Optical Damage by Rain, A. Deom, G. Gouffric and D.L. Balageas, Office National d'Etudes et Recherches Aerospatiales (ONERA)
- 4:30 p.m.
Rain Erosion Tests of Full Size Slip-Cast Fused Silica Radomes at M 3.5 and M 4.8, R.K. Frazer, JHKJ/Applied Physics Laboratory
- 4:55 p.m.
Adjournment
- 6:45 p.m.
Reception
Sheraton Atlanta
- 7:30 p.m.
Banquet
Sheraton Atlanta

27 July 1984

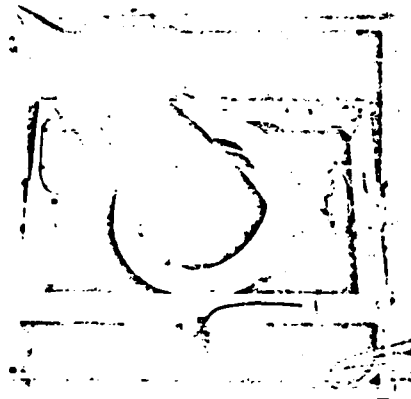
SESSION VI GENERAL TOPICS

Moderator: LTC B.L. Thackston
U.S. Army, BMDATCR

- 9:15 a.m.
Dual Mode Cooled Metallic Antenna Window Design Concept, J.W. Hiddahl and E.L. Nessler, Aerojet Tech Systems Company
- 9:40 a.m.
A Radome for Air Traffic Control SSR Radar Systems, ESSCO
- 10:05 a.m.
Recess and Refreshments
- 10:30 a.m.
Development of the F-20 Nose Radome, E.L. Cain and P. Tullyathan, Northrop
- 10:55 a.m.
High Radiant Flux Thermal Testing of Ceramic and Ablative Coatings for Hardening EHF Radomes, K.A. Zimmerman and G.M. Briand, Harris Corp., J.A. Fuller, ElectroMagnetic Sciences
- 11:20 a.m.
Nose and Inlet Duct Radomes for the Firebolt Aerial Target, L.C. Hoots, Brunswick Corporation
- 11:45 a.m.
Adjournment

Seventeenth Electromagnetic Window Symposium

July 25-27, 1984
Atlanta, Georgia



Continuing Education
Georgia Institute of Technology
A Unit of the University System of Georgia

B-3. Final Program (continued).

APPENDIX C

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SEVENTEENTH EM WINDOW SYMPOSIUM

SEVENTEENTH ELECTROMAGNETIC WINDOW SYMPOSIUM
JULY 25-27, 1984
ROSTER

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