



®The Institute of Electrical and Electronics Engineers, Inc.

NATIONAL CAPITAL AREA COUNCIL

# SCANNER

October/November 1996

Volume 11, No. 5

## **Personal Communications via Present and Future Satellite Systems**

(See Microwave Theory and Techniques Society  
Tuesday, October 8)

## **Frequency Management for Low Earth Orbiting Satellites**

(See Communications Society, Thursday, October 17)

## **Radiation and Scattering by Antennas**

(See Antennas and Propagation Society, Thursday, November 6)

## **Search for a New Editor-in-Chief for SCANNER Newsletter**

(See Editor's Corner, page 8)

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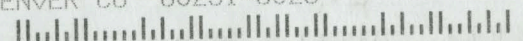
A Joint Publication of the Northern Virginia and Washington Sections

# SCANNER

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### SCANNER EDITORIAL STAFF

<b>Editor-in-Chief</b> Tom Doeppner 8323 Orange Court Alexandria, VA 22309 703/780-3983 Fax: 703/799-9084	<b>Associate Editor</b> Jim Strother P.O. Box 3296 Alexandria, VA 22302 703/751-6186 Fax: 703/751-6869	<b>Advertising Manager</b> Charles W. True III TruTech Labs Corp 8200 Greensboro Dr, Suite 130 McLean, VA 22102 703/448-7622	<b>Business Manager</b> Jackie Hunter P.O. 220521 Chantilly, VA 22022-0521 703/803-8701 Fax: 703/222-5971
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### Calendar of Events

**Attendance at IEEE Meetings.** IEEE meetings are open to members and guests. When meetings are combined with meal functions, it is not mandatory — although desirable — to attend the meal functions. Please make timely reservations for all meetings (cancel early, if necessary). Any IEEE member may attend Council and Section Administrative Committee (ADCOM) meetings.

**Announcements.** Calendar information should follow the format used in this Calendar of Events. The calendar item listing includes the abbreviation for the managing section after each society chapter listing. In the case of joint chapters, the managing section is listed first. A diamond (◆) preceding the event in a calendar item indicates that further information on that event is provided in the

"Diamond Stories" Department of that issue. Articles for the "Diamond Stories" Department should be limited to 150 words, and include a synopsis of the talk or event, and a biosketch of the speaker which lists, if available, his or her academic background, current position, and IEEE as well as other professional societies memberships, if any.

All announcements, diamond stories, and other material to be printed in an issue of the SCANNER must be sent or faxed to the Editor-in-Chief in time to arrive on or before the 25th of the second month preceding the month of desired publication. The deadline for camera-ready material (e.g., ads) is the first workday of the month preceding the month of desired publication.

### October 1996

- Tue Oct 1 NCAC ADCOM/EXCOM Meeting with Northern Virginia Section**  
**Place:** Tyson's Corner Marriott, J.W. Restaurant, Tyson's Corner, VA; Take Route 495 to Route 7 West to 8028 Leesburg Pike; on the right side just outside of the beltway.  
**Time:** Dinner 6:00 pm to 8:00, followed by Northern Virginia Section Meeting  
**Contact:** Call NCAC Office, 703/803-8701, Jackie Hunter
- Fri Oct 4-◆ 6th AICN Conference:**  
**Sun Oct 6 "Growing Your Consulting Business"**  
**Sponsor:** NCAC PACE Consultants' Network  
**Place:** Sheraton National Hotel, Columbia Pike and Washington Blvd, 900 S Orme St, Arlington, VA

- Times:** Friday Registration 5:45 pm, Session 7:00 pm; Saturday Registration 7:00 am, Sessions 8:00 am -5:45 pm; Sunday Sessions 8:00 am to 1:00 pm  
**Contact:** For further details and/or reservations, call 301/924-2610 or 301/921-9712
- Tue Oct 8 Personal Communications via Present and Future Satellite Systems**  
**Sponsor:** Microwave Theory and Techniques Society (W/NV)  
**Speaker:** Dr. A.E. Williams, COMSAT Laboratories  
**Place:** U of MD Adult Education Center, University Blvd & Adelphi Rd, Adelphi, MD  
**Time:** Cocktails 5:30 pm; Meal 6:30; Meeting 7:30  
**Contact:** For info and dinner reservations: Ron Hooker, e-mail "ronald.j.hooker.1@gsfc.nasa.gov" or el 301/286-3216

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- Tue Oct 8 PES Organization Meeting**  
**Sponsor:** Power Engineering Society Chapter (W/NV)  
**Place:** George Washington University Academic Center, 22d & I Street, Room T-640 EECS Dept. One block from Foggy Bottom/GWU Metro Station. Parking across from Academic Center  
**Time:** Pre-Meeting Dinner at Bertucci's Restaurant, 21st and I Streets NW, downstairs: 6:00 pm; Meeting 7:30  
**Contact:** Dr. Robert Harrington, GWU, 202/994-3158;  
**Reservns:** NCAC Office, 703/803-8701

- Wed Oct 9 Restructuring of the Telecommunications Industry** (First seminar of a series of 6 monthly seminars)  
**Sponsor:** MIT Seminar Series, MIT Club of Washington  
**Speaker:** Dr. Gerald W. Brock, George Washington University  
**Place:** American University, Mary Graydon Center  
**Time:** Cash Bar 6:15 pm; \$185 for the series of 6 dinner meetings (series subscription only — no individual meeting option)  
**Contact:** Dr. Barbara Gordon, 301/469-9240

- Tue Oct 15 Conference Wrap-up and General Networking Session**  
**Sponsors:** NCAC PACE Consultants' Network (W/NV)  
**Place:** Dinner — Seven Seas Restaurant (College Park, MD) Meeting -- Univ of MD, College Park Campus, AV Williams Eng Bldg, Room 2460; Take Rte 1 South from I-495. Right onto Campus Drive and immediate right onto Stadium Drive; 1-1/2 blocks to Eng Bldg on right; park on left in lot G  
**Time:** Dinner 5:30 pm; Meeting 7:30  
**Contact:** For further details and/or reservations, call 301/460-4693, or 301/924-2610 by noon, Oct 15

- Tue Oct 15 Progress Update on Design and Construction of AMTRAK Northeast Corridor Project**  
**Sponsor:** Vehicular Technology Chapter, Land Transportation Committee  
**Contact:** John C Gambrell, 703/971-4150, or Lou Sanders, 202/898-4086 (No other information available at this time)

- Tue Oct 15 EMS Organizational Meeting**  
**Sponsor:** Engineering Management Society Chapter (W/NV)  
**Place:** George Washington University Academic Center, 22d & I Street, Room T-640 EECS Dept. One block from Foggy Bottom/GWU Metro Station. Parking across from Academic Center  
**Time:** Pre-Meeting Dinner at Bertucci's Restaurant, 21st and I Streets NW, downstairs: 6:00 pm; Meeting 7:30  
**Contact:** Catherine Jordan, 703/883-5951  
**Reservns:** NCAC Office, 703/803-8701

- Thu Oct 17 ◆ Frequency Management for Low Earth Orbit Satellites**  
**Sponsor:** Communications Society (W/NV)  
**Speakers:** Don Rickerson and Mark Rhoads, System Engineers, Lockheed Martin Corporation  
**Place:** George Washington University, Academic Center (22nd & I Streets, NW) Room T-640, EE Dept. One block from GWU/Foggy Bottom Metro Station; Parking across from Academic Center  
**Time:** Brown bag lunch (bring your own) 11:45 am; Registration 12:00 noon; Presentation 12:15 pm to 1:00  
**Contact:** Everyone is welcome; for information call Don Rickerson, 202/651-3912

### November 1996

- Tue Nov 5 ◆ Networking with the Experts**  
**Sponsors:** NCAC Consultants Network (W/NV) (For further details, call 301/464-4603 or 301/924-2610)
- Wed Nov 6 ◆ Radiation and Scattering by Antennas**  
**Sponsor:** Antennas and Propagation Society (W/NV)  
**Speaker:** Dr. Walter K. Kahn  
**Place:** Comsat Corporation, Multi-Purpose Room 6560 Rock Spring Drive, Bethesda, MD  
**Time:** 6:30 pm  
**Contact:** David T. Auckland, 301/982-5285

- Tue Nov 12 NCAC ADCOM/EXCOM Meeting with Washington Section**  
**Place:** Pook's Hill Marriott, Allee's Pantry Restaurant, Bethesda Marriott Hotel  
**Time:** Dinner 7:00 pm; Meeting until 8:00, followed by Washington Section Meeting  
**Contact:** Call Jackie Hunter, NCAC Admin Office, 703/803-8701

- Tue Nov 12 Where Might this Revolution in Telecommunications be Taking us?** (Second seminar of a series of 6 monthly seminars; the first was Oct 9)  
**Sponsor:** MIT Seminar Series, MIT Club of Washington  
**Speaker:** Esther Dyson, Publisher of "Release 1.0"  
**Place:** American University, Mary Graydon Center

- Thu Nov 14 ◆ Controlling the Size and Timing of Repeated Surveys**  
**Sponsors:** Control Systems Society (NV/W), Society on Social Implications of Technology (NV/B/W), and Washington DC Alumni Chapter, Tau Beta Pi  
**Speaker:** Dr. Wray Smith, Synectics for Management Decisions, Arlington, VA  
**Place:** Aegean Taverna, Clarendon Blvd and Garfield (one block from Clarendon Metro Station)  
**Time:** Social 6:30 pm; Dinner 7:00; Presentation 8:00  
**Contact:** Dr. William J. Kelly, 703/610-2067

- Tue Nov 19 ◆ Accounting Basics for Consultants** (For further information, see Consultants Network entry, Oct 15)



**Wed Nov 20 ♦ Spectrum and Technology of a Wireless Local Loop System**  
**Sponsor:** Microwave Theory and Techniques Society (W/NV)  
**Speaker:** Dr. William Y.C. Lee, Air-Touch Communications, Inc.  
**Place:** Univ of MD Adult Educ Ctr, University Blvd & Adelphi Road Adelphi, MD  
**Time:** Cocktails 5:30 pm; Meal 6:30; Meeting 7:30  
**Contact:** For info and dinner resvns: Ron Hooker, 301/286-3216 or e-mail: ronald.j.hooker.1@gsfc.nasa.gov

**Thu Nov 21 ♦ Voice over Packet Networks**  
**Sponsor:** Communications Society (W/NV)  
**Speaker:** Ed Morgan, Director, Voice Networking Group, Telogy Networks  
**Place:** George Washington University, Academic Center (22nd & I Streets, NW) Room T-640, EE Dept. One block from GWU/Foggy Bottom Metro Station; Parking across from Academic Center  
**Time:** Brown bag lunch (bring your own) 11:45 am; Registration 12:00 noon; Presentation 12:15 pm to 1:00  
**Contact:** Don Rickerson, 202/651-3912 Bob Hollingshead, 301/464-8900 (W), or 301/794-4035 (H)

## ◆ DIAMOND STORIES ◆

*This Department of the SCANNER provides short abstracts and biosketches to accompany those calendar items which show a diamond (◆) before the item's subject or event.*

### "Growing Your Consulting Business" The 6th Conference of the Alliance of IEEE Consulting Networks

*(See Calendar of Events, Friday Oct 4 to Sun, Oct 6)*

Whether you've been in the consulting business for a few years now, are just starting out, or are just thinking you might (or might HAVE to) get into the consulting business, this weekend conference is for you!

From the innovative Friday evening opening session that helps us all to get to know each other while at the same time teaching us new tricks in how to network through the Saturday sessions on getting the most out of your consulting business, to the closing session on Sunday, you'll hear fresh ideas and proven techniques from experienced consultants. You'll get a chance to make great contacts and find out "how the other guy does it." You'll find an ideal informal atmosphere in which to compare notes with others to find out what works, and what doesn't, from people who KNOW. We'll have sessions on:

- o Marketing: Segmenting, making capability statements, utilizing marketing groups, etc.
- o Government Contracting: Pros and Cons, teaming and sub-contracting, etc.
- o International Consulting: how to benefit, how to start, where to get info, banking issues, US govt agencies, etc.
- o Running as a business: avoiding the mistakes others have made about taxes, insurance, equipment, location, etc.
- o Fee setting: getting what you are worth, setting fees, how to collect, etc.
- o Contracts: what is a contract, essential components of legal contracts insuring enforcement even if not cited.
- o Left/Right Brain Consulting: recognizing the functions of and working with both halves of your brain.
- o Effective writing: how to write and organize good proposals, memos, and letters; how to help others understand your wonderful ideas.
- o Balancing your Business and Personal Life: Can it be done?

All this and more, plus networking galore! "Growing Your Business" will be Oct 4-6 at the Sheraton National Hotel in Arlington, VA. Bring your family — DC is always interesting, and the weather is lovely in October.

For additional details, check the web page for this conference: <http://www.access.digex.net/~rboucher/ieee/>

### Personal Communications via Present and Future Satellite Systems

*(See Calendar of Events, Tuesday, Oct 8)*

A number of satellite systems have been approved for personal communications via such satellites as IRIDIUM, INMARSAT-P, GlobalStar, Odyssey, and Agrani. Many of these have moved from system concept to development with a promise to make global personal communication services available before the year 2000. The status and trends in personal communications via satellites and key features of proposed systems & technology trends related to the satellite designs will be presented.

Dr. Williams is Vice President of the Satellite & Systems Technology Division of COMSAT Laboratories, where he directs R&D of microwave subsystems for communications satellites. He has been a major contributor to the development of dual-mode microwave filter technology that was first used on INTELSAT IV-A satellites, and is now standard for all channelizing filters on communication satellites. Dr. Williams is a Fellow in the IEEE, has served as session chair for many MTT-S conferences, published over thirty papers, and is the recipient of several awards and patents.

This opening lecture is the first of the course presentations of the 1996-97 lecture series "Future R/F/Microwave Wireless Systems and Technologies" organized by the W/NV chapter of the MTT Society. All are welcome to attend.

### Frequency Management for Low Earth Orbit Satellites

*(See Calendar of Events, Thursday, Oct 17)*

This talk will examine the characteristics of the new Mobile Satellite Services of the Big LEOs, Globalstar, Iridium, Odyssey and ICO to identify frequency and modulation interference issues. It will also detail how each of these systems will reuse frequencies to obtain the maximum number of subscriber channels within their allowed bandwidth, and discuss the interference issues between providers that are sharing the same spectrum.

## CALL FOR PAPERS.

12<sup>th</sup> Annual Conference on Computer Assurance -  
 June 16-20, 1997 Gaithersburg Maryland

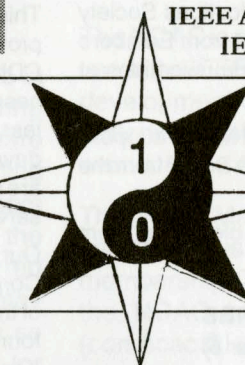
## CALL FOR PAPERS

Web Site: <http://hissa.ncsl.nist.gov/compass>

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# COMPASS '97



1997 THEME: "ARE WE  
 MAKING ANY  
 PROGRESS TOWARD  
 COMPUTER  
 ASSURANCE?"



The purpose of COMPASS is to bring together researchers, developers, integrators, and evaluators interested in problems related to specifying, building, and certifying high-assurance systems. What distinguishes COMPASS from similar conferences is its emphasis on bridging the gap between theory and practice. The theme of COMPASS '97, "are we making any progress toward computer assurance?", will focus discussion on whether the approaches that have been developed and reported on during the past 25 years have any hope for solving today's assurance problems. In addition to exposing technical weaknesses in the state-of-the-art and state-of-the-practice, conference goals include: identifying barriers to applying existing assurance technologies in industry, understanding the properties new technologies must have to meet industrial needs, and identifying evidence where advanced technologies are effective in attacking the key problem areas of safety, security, fault-tolerance, and real-time.

For researchers, COMPASS '97 provides an opportunity to present new theories, techniques, methods, or results of case studies to other researchers and to practitioners who can put them to use. COMPASS '97 also provides a unique opportunity to learn from practitioners about issues and problems encountered in constructing practical systems. Practitioners have the opportunity to present results and lessons learned to researchers as well as to learn of new

research targeted to problems in high-assurance systems. For practitioners, COMPASS provides the unique opportunity to influence future research directions. **The conference will be held June 16-20, 1997, at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland, a suburb of Washington, D.C. The proceedings will be published by the IEEE Computer Society.**

### Call for Papers

Papers should present advances in the theory, design, implementation, evaluation, or application of high-assurance systems, or report on experiments, case studies, evaluations, and problems in the application of computer assurance technology. Special consideration will be given to presentations that directly address the conference theme. Proposals for panels are also sought, particularly panels that directly address the conference theme. There will be a tools fair, and the conference will be preceded by one or two days of tutorials. Papers, panel proposals, tutorial proposals, and tools fair proposals are solicited in relevant areas including:

- |                      |                            |
|----------------------|----------------------------|
| Software Reliability | Software Safety            |
| Computer Security    | Formal Methods             |
| Tools Support        | Human-Computer Interaction |
| Real-Time Systems    | Embedded Systems           |
| V & V Practices      | Certification              |
| Standards            | Measurement and Metrics    |
| Life-Cycle Processes | Case Studies               |
| Fault-Tolerance      | Software Liability         |
| Software Testing     |                            |

**PAPER ABSTRACTS SHOULD BE SUBMITTED TO:**  
 Dick Hamlet  
 e-mail: [hamlet@cs.pdx.edu](mailto:hamlet@cs.pdx.edu)  
 Fax: +1 (503) 725-3211

### Instructions to Authors

**Paper abstracts must be RECEIVED by October 21, 1996, and the full paper submitted by November 8, 1996.** The preferred form for abstracts is e-mail, limited to a single page when printed at 10-pitch on 8-1/2 x 11 paper. Author names and affiliations are not counted in the 1-page limit. Abstracts will be used to help assign reviewers. For those without access to e-mail, a single hard copy abstract should be sent to arrive on time by fax or postal mail. The paper itself may NOT be submitted by e-mail or fax, except by prior arrangement with a program co-chair. Send six hard copies (printed on both sides if possible) of the paper, including author names, affiliations, addresses, etc., and including the previously submitted abstract. Paper length is limited to 7,500 words. For papers with multiple authors, clearly indicate the author who will serve as contact. Only full original papers, which have not previously appeared and are not submitted to any other conference or publication, will be considered. Authors are responsible for obtaining, prior to acceptance, all necessary permissions and clearances for publication and are expected to present their papers in person if accepted. Authors will be notified of acceptance by February 17, 1997. Camera-ready copies will be due March 15, 1997. Papers that describe the use of technology presented at a previous COMPASS conference (excluding previous work of the same author) are eligible for a special award. Submit panel, tools-fair, and tutorial proposals by November 15, 1996. and mail with or without an envelope. For best results, use a medium to heavyweight paper. If mailing without an envelope, seal with a label.

**FOR FURTHER INFORMATION CONCERNING THE CONFERENCE, CONTACT:**  
 Jeffrey Voas General Chair  
 (703) 404-9293 fax: (703) 404-9295  
[jmvoas@testability.rstcorp.com](mailto:jmvoas@testability.rstcorp.com)  
 Reliable Software Technologies  
 21515 Ridgetop Circle  
 Sterling, VA 20165



Don Rickerson has 24 years experience with military and civilian communications systems. He was a US Army Signal Corps Officer and worked with the Army's MSE system. Today he is a systems engineer supporting FAA air/ground communications systems. An IEEE member and officer in the W/NV Communications Society Chapter, he received his BS in Computer Science from Edinboro University, and is a graduate student in Telecommunications at George Mason University.

Mark Roads is a systems engineer with Lockheed Martin supporting FAA communications projects. He received his BSEE from the University of Maryland.

If you have any questions about the presentation, please fax them to Don Rickerson at 202/651-3940.

### Radiation and Scattering by Antennas

(See Calendar of Events, Wednesday, November 6)

Radiated electromagnetic energy is scattered by physical objects, as evidenced by radar system operation and multipath interference in communication systems. An antenna is distinguished from an ordinary scatterer by the presence of one or more accessible local ports through which power may be transmitted, received, and/or reflected. Conventional network analysis and modal matrix methods, which may be employed to interrelate radiation and scattering by antennas, are reviewed. Some applications are discussed.

Dr. Walter Kahn received degrees in Electrical Engineering from Cooper Union and the Polytechnic University of New York. He has been at the George Washington University since 1969, with positions as Engineering Department Chair and Director of the Institute for Information Science and Technology. He has published over 80 papers in electromagnetics, microwave components, antennas, and optics, and is a Fellow in the IEEE and past editor of the IEEE Transactions on Antennas and Propagation.

### Controlling the Size and Timing of Repeated Surveys

(See Calendar of Events, Thursday, Nov 14)

Control Systems principles can be applied in making optimal use of scarce resources in the conduct of repeated surveys. Costs for periodic surveys include start-up costs, unit costs of interviews, and (possibly) imputed costs of "not knowing" (represented by a loss function). In earlier work the speaker used Kalman filter methods to choose sample sizes and intersurvey intervals for repeated surveys of households. Recent research has exploited a family of "probable error" models to assist in choosing the best size and periodicity for surveys of schools and teachers. Other design problems in survey research may also be amenable to the use of control concepts.

Dr. Wry Smith, an IEEE member, is Director of Advanced Studies at Synectics for Management Decisions, Inc., Arlington, VA. Previously he was a university research administrator and a technical executive in several federal agencies. He has

taught operations research, statistics, and simulation and modeling. He has served as an expert advisor on the collection and use of socioeconomic and other public data for policy planning, program design, and management. He received a certificate in EE at the University of Arizona, a B.S. at George Washington University, and an M.S. in Instrumentation Science (Control Systems) at the University of Michigan, and earned a D.Sc. in Operations Research at George Washington University. He is a Fellow in the American Statistical Association.

### Spectrum and Technology of a Wireless Local Loop System

(See Calendar of Events, Wednesday, Nov 20)

This lecture will describe why the wireless local loop always provides more capacity than mobile cellular systems, and why CDMA provides more capacity than mobile cellular multiple access schemes. The radio propagation environment for the wireless local loop is different from the mobile radio environment. In developing countries, the requirements (low-cost, high capacity) are different from those in industrialized countries (high quality and service features).

Our speaker, Dr. Lee, is Chief Scientist and Vice President of Corporate Technology at AirTouch Communications, and author of the book *Mobile Cellular Telecommunications Systems*. He was founder and co-chair of CTIA's subcommittee for Advanced Radio Technologies. This committee generated the User's Performance Requirement — the guidelines for future cellular systems. Dr. Lee is a graduate of the ElectroScience Laboratory at Ohio State University.

This lecture is one of the course presentations in the series on wireless technologies organized by the Washington DC Chapter of the MTT-S.

### Voice over Packet Networks

(See Calendar of Events, Thursday, Nov 21)

Today, a fundamental change is taking place in the way that voice traffic is transported between end users. With the widespread proliferation of packet networks based on ATM and Frame Relay, the old model of digital circuit switching is being replaced with packet switched voice.

The current switched telephone systems have gone to great lengths to emulate the circuit switched telephone network that has been around since the days of Alexander Graham Bell. Timeslots are used to emulate wires, digital switches are used to emulate relays, and digital tie trunks even carry bits that represent the state of an emulated 4-wire interface.

A paradigm shift has begun and these systems are changing to a new model that involves voice that is segmented, loaded in packets, and transmitted over data networks. Extraneous packets that carry silence are deleted and the voice packets experience variable delays as they transverse the network.

This presentation explores the issues in the migration of existing legacy voice networks to the new integrated voice/data systems. How will packet networks provide a Quality of Service equal to the wired network? What is the impact of delay and how is it being dealt with? How is packet loss handled? Why is voice compression used, and what is the progress of low bit rate compression?

Ed Morgan has 15 years of experience in the design and development of digital communications systems with Telogy Network Inc. and AT&T Bell Labs. He has a number of patents in the area of digital circuit/packet switching. An IEEE member, he received his BSEE and MSEE from Drexel University, and an MBA from Purdue University.

You can fax any questions for the talk to Ed at 301/417-0324

## CHAIRMAN'S CORNER

### National Capital Area Council Chairman's Message

The NCAC Officers attended the '96 PACE Conference in Phoenix, and have brought back some interesting observations about the IEEE which they would like to share with the local membership. What appears most interesting about their discoveries is that the number of IEEE members is declining in most areas of the country; here in the Washington metropolitan area a 3.5% decline occurred over the last year. Many of the officers have asked what may be attributing to this general decline, especially when so many engineers should be depending on the IEEE for guidance and support in their careers.

One opinion is that engineers have been experiencing many ups and downs that come along with 21st century jobs — downsizing, budget cuts, layoffs, freezes, work delays, furloughs, complemented with extra hours to make up for smaller staffs, etc. Engineers need to deal with these issues as stress and challenges on the job. However, some engineers' response is, "Not much can be done." As engineers we often need the advisement of experienced peers to help us in our careers. The IEEE and its officers can provide a road map for career enhancement activities to survive these conditions.

What the NCAC is seeing as a decline in membership can be viewed as the response by some to not take positive steps in their career professional development. How do we know this? Generally when young engineers go into the work place for the first time, they are not aware of the knowledge needed to implement long-term professional development skills, and without that information they miss dealing with engineering development issues throughout their careers.

The IEEE Road Map to professional development has many key parts to deal with the developing engineer, the mid-career engineer, and the senior engineer, as well as the retired engineer who takes on the role of consultant. The NCAC has such a Road Map for the IEEE Capital Area members. It has the following cornerstones: the job placement workshop; the officers training/planning workshops; the Continuing Education Training seminars; the Society technical conferences; the seven student branches and the Consultants Network. Yes, all of these are right here in the Washington area. And they are all complemented with the support and services of the NCAC Administrative Office, the 23 local Society chapter officers, and the two Sections' officers of Washington and Northern Virginia. The IEEE Road Map does not stop in Washington. The Map goes on to the seven Regions of the U.S. where support for membership comes from the IEEE professional development and the IEEE technology boards. These boards helped bring the PACE conference together and coordinate

IEEE position papers with the Government to promote the interest of IEEE members.

The NCAC is ready to provide its members with direction for use of the IEEE Road Map to achieve successful professional development. As a supplement we can also provide the Actions Planning Guide for scheduling your participation in events of the NCAC and the two local IEEE Sections.

The Road Map to a successful year means the NCAC knows and is ready to serve its customers — you the membership. To help respond to the membership's needs, the NCAC has in place the NCAC e-mail Hot Line (con.ncac@ieee.org) so you can contact us and the Administrative Office for more information supporting members, including chapter and section meetings and program activities.

On another side, the NCAC officers are busy, but never too busy to pass up additional help from new volunteers who want to become active in IEEE programs and the opportunity to learn how efficient organizational managements really work in the NCAC.

Jorome T. Gibbon, Chairman, NCAC  
Nino Ingegneri, Vice Chairman, NCAC

### Update Your Membership Record!

The current IEEE membership database provides a valuable resource in planning activities and providing support for the NCAC, sections, and chapters. The more accurate the data is, the better the support will be. Therefore, when you receive your life member annual notice or member dues renewal, please ensure that the information which you return is complete and accurate. In particular, include your home address and office address; include your preferred mailing address, correct employer name, and all telephone numbers - office, home, and FAX. Also, please obtain an E-Mail IEEE alias (See article on Page 9) and include it in your reply.

## TruTech Labs Corporation

8200 Greensboro Dr., Suite 130, McLean, VA 22102

**Electrical Engineering Positions Available**

**A small Quick-Reaction Electronics Development**

**Laboratory has positions for Electronic Design**

**Engineers to support RF, analog and digital**

**product design, prototyping and production.**

**Entry level welcome, full time and part time.**

703 448-7622 fax 703-448-9680



## EDITOR'S CORNER

A few months ago, I notified the NCAC Chairman, Rex Klopfenstein, that I would resign as Editor-in-Chief of the SCANNER Newsletter effective with the Dec '96/Jan '97 issue. My rationale for this action is very simple: Based on the urging of my family, including recently even our granddaughters, I plan to write my memoirs of what has been a rather unconventional life.

Whatever success we have had with the SCANNER would not have been possible without the support of the SCANNER staff: Jim Strother, the associate editor (and former editor) of the SCANNER; Jack Kelleher, another former editor; Fred Haismaier, our "layout editor;" Charlie True, our advertising manager; Jackie Hunter, business manager; and Sam Fishbein, a former business manager who still contributes regularly to the SCANNER's "Elsewhere in our Profession" Department.

Others whose assistance has been invaluable include Bob Hunt who prepares the SCANNER labels in the proper order; Lalit Batra, our treasurer; and Karen Marsten from "Automated Graphic Systems," our printer, who puts it all together helped many times when our deadlines weren't quite met.

### Help Wanted:

#### A New Editor-in-Chief for the IEEE SCANNER Newsletter

The National Capital Area Council (NCAC) of the IEEE in the Washington, DC Metropolitan Area publishes six editions of the SCANNER newsletter per year to over 15,000

members, providing valuable information on technical presentations, conferences, and continuing education opportunities supported by local IEEE members, 23 Society Chapters, and the two Sections of Northern Virginia and Washington, DC.

The editor-in-chief leads a staff of five volunteers in the collection, editing, layout and publication of the SCANNER newsletter. This is a part-time activity, preferably held by a retired IEEE member who has extra time available, is a good writer, and is willing to share his or her expertise with the NCAC newsletter staff. Some knowledge of the publications business is desirable.

While the retiring editor did not accept any compensation except reimbursement for expenses, an honorarium can be provided.

A large part of the expenses for the publication, lay-out, printing, and mailing of the SCANNER is derived from advertising; the remainder, if needed, is funded by the two supporting sections. The annual budget for the SCANNER has been about \$50,000 to \$60,000.

Interested individuals must have a personal computer, resources for e-mail, a separate IEEE telephone number (costs reimbursable), and facsimile support. Such individuals should contact the NCAC chairman with application to the Internet e-mail address: [con.ncac@ieee.org](mailto:con.ncac@ieee.org)

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### Engineering Management Society Announces "Engineering Managers of the Year"

At the Spring Board of Governors meeting on April 27, 1996 at the Sheraton Hotel in Arlington, VA, two awards for "Manager of the Year" were presented. We feel that these remarks made by the awardees were of such significance that they deserve to be shared with our readers.

- Remarks by Helen Wood,  
1994 EMS Manager of the Year:

Mark Twain said, "It is better to deserve honors and not have them, than to have them and not deserve them." Such remarks serve to keep one humble in the face of an award such as this one, the IEEE Management Society's "Engineering Manager of the Year" Award.

I must say that it is especially gratifying to take part in an event in which two US Government managers are being recognized. I know many outstanding managers in government service. Today, these managers, like those in other organizations around the world, are being challenged to maintain quality of products and services, while accepting major funding reductions. And Government's science and technology programs are not being spared, either. While we might debate the wisdom of some of these cuts, that's not the message I want to leave with you tonight.

In spite of the downsizing facing many organizations, I believe that scientists and engineers will continue to find career opportunities at all levels of experience. But now, perhaps more than ever, it is essential to maintain current knowledge and skills and to develop and nurture an extensive network of contacts in the field.

Personally, I credit my involvement with IEEE and its societies as having helped me in this regard — throughout my career.

The Engineering Management Society fills a special role — it strives to help engineering managers, as well as those who aspire to become managers. Keep up the good work! And thank you...

(Dr. Helen M. Wood, Director, Office of Satellite Data Processing and Distribution, US Department of Commerce, National Oceanic & Atmospheric Administration, may be reached via e-mail at [hwood@nesdis.noaa.gov](mailto:hwood@nesdis.noaa.gov))

- Remarks by Dennis Bodson,  
1995 EMS Manager of the Year

The topic "Challenge of Engineers in Today's environment" is both timely and appropriate. There is a saying that "The Old Gray Mare, She Ain't What She Used to Be." I believe this to be especially true with regards to management philosophy. Our management strategy today is certainly not what it was a decade ago, and probably will never be that way again. Heretofore, stability was a key factor both in terms of people, budgets, and job security. In today's environment, instability is very prevalent. The only constant we can depend upon is CHANGE. We are continuously being asked to do more with less in shorter periods of time. However, the workload continues to increase (if we are truly fortunate, perhaps this will remain approximately as it was before.)

Our challenge is, "How do we manage transition to our new environment in a constant turmoil of change. Interchange International, Inc., has developed the Change-Cycle (TM) locator [from Interchange International, Inc. (800/878-8422)]. It depicts how people react, respond, and adjust to change in a sequence of six predictable stages. The Change Cycle model identifies the thoughts, feelings, and behaviors associated with each state of change. The stages of change in sequential order are Loss, Doubt, Discomfort, Discovery, Understanding, and Integration. The Change Cycle Model indicates that you would not know whether or not a specific change can achieve its desired outcome until Stages 5 and 6. However, in our current environment, we seldom make it to Stages 3 or 4, much less Stage 6, before we have changed the thrust of the original proposal. Hence we have no real method of evaluating a proposed change. It is my opinion that the single most key factor in any environment is people. They are our greatest resource. We may have tremendous amounts of funding, but without capable people who are loyal and dedicated to the specified objective, we will not succeed. The question that we must address is, "How do you manage people in a very turbulent environment to ensure high productivity, creativity, loyalty, with few if any rewards other than the fact that you might have job retention?"

In accepting this award, I would like to thank all of my colleagues who helped me achieve this recognition. I do not believe that I received it for any singular accomplishment on my own; on the contrary, it was a team effort, and I thank them and the Engineering Management Society for this recognition.

(Dr. Bodson, National Communications System, Chief, Technology and Standards Division, may be reached via e-mail at [bodsond@ncr.disa.mil](mailto:bodsond@ncr.disa.mil))

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## ELSEWHERE IN OUR PROFESSION

[The following items are excerpted from IEEE, National Institute of Standards and Technology (NIST), and the Aerospace Technology Committee of the National Air and Space Museum, Smithsonian Institution. Sources are provided where available.]

### Radar Catches a Tornado in the Act

While the hit movie *Twister* sucks in viewers by the millions with its computer-drawn tornadoes and caricatures of meteorologists, real-life researchers are quietly unraveling the hidden structure of nature's most violent storms. This week, three Oklahoma tornado chasers report that they have captured the most detailed portrait of a twister yet, thanks to a new mobile radar system.

Capable of "seeing" the winds and debris whipping around in the heart of a storm, the Doppler radar has already confirmed some theories about tornadoes and presented additional puzzles, says Joshua Wurman of the University of Oklahoma in Norman. "We're the first ones to have taken three-dimensional images of a tornado structure. We see where the maximum winds are and how strong they are. These things have never been measured before because nobody's been able to get up close to a tornado with a radar before," says Wurman, who collaborated with Jerry M. Straka of the University of Oklahoma and Erik N. Rasmussen of the National Severe Storms Laboratory in Norman.

Wurman and his colleagues constructed the Doppler-on-Wheels radar last spring and have caught three tornadoes so far. They describe the measurements of one storm in the June 21 *Science Magazine*. Despite the preliminary nature of their work, it is already garnering accolades from fellow tornado researchers.

(*Science News*, vol. 149, 22 Jun '96, pg 388)

### Laser-Ranging Station Tracks Satellites

The US Naval Research Laboratory (NRL) announced the operation of a new Satellite Laser Ranging (SLR) station it set up with the Air Force and NASA. The experimental SLR station, located at the Air Force's Starfire optical range in Albuquerque, N.M., was designed to precisely determine the location of satellites and verify onboard spacecraft system performance. Results have been obtained from satellites as low as 370 km, and as high as 20,200 km. The SLR is now tracking an NRL tethered satellite experiment.

(*Aviation Week & Space Technology*, 1 Jul '96, pg 28)

### Filter Center

DSDC has one patent and expects to receive two more soon covering the use of differential-Global Navigation Satellite Systems for three-dimensional surveillance of aircraft and vehicles in the airport environment. The two-person company demonstrated its technology at the Manchester, NH, airport starting in 1991. The patents cover the ways differential-GNSS

could be used to support future airport operations. DSDC intends to license the basic patents and its copyrights to people involved in airport technologies — manufacturers of air traffic control and avionics systems — which would allow their products to be used for a variety of 3D airport control and management operations. These could include airborne and surface conformance monitoring, traffic resolution and avoidance, and lighting.

(*Aviation Week & Space Technology*, 1 Jul '96, pg 64)

### In Orbit

The ninth Intelsat 7 satellite is undergoing checkout following the deployment of all its antennas. Intelsat 709 was successfully launched June 15 on an Ariane 44P from Kourou, French Guiana. The satellite will be stationed over the Atlantic Ocean at 18 deg. West though it is being checked out at 57 deg. West. Testing of the bus of the Space Systems/Loral spacecraft is due to be completed early this week. Payload tests are to run July 12. Intelsat expects to bring the satellite into commercial service early in August.

(*Aviation Week & Space Technology*, 24 June 1996, pg 72)

### Dual-Band, Sea and Land Radar under Development

A US Air Force-led team is developing a dual-band, land-and-sea-based radar system to detect launches of Scud-class missiles. The Cobra Gemini program will include three X- and S-band radar systems capable of detecting, acquiring, tracking and collecting high-precision metric and signature data on targets.

Testing of a ground-based prototype may be completed by mid-1998 and aboard ship by 1999. A competitive production contract will be awarded in 1998 to build two systems and to complete integration of a US Military Sealift Command modified oceanographic survey ship.

The prototype development team includes the Electronic Systems Center, Hanscom AFB, Massachusetts; MIT Lincoln Lab; and the MITRE Corporation. Cobra Gemini's user will be the Defense Intelligence Agency's central management and signatures intelligence office. The radar will complement Cobra Judy, which monitors intercontinental ballistic missile launches.

(*Signal*, July '96, pg 7)

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## Command, Control Update

The US National Command Authority's airborne command and control platform is receiving a trio of upgrades to its communications systems. The improvements to the four E-4B, 747 aircraft will allow high-quality voice and data communications.

The additions include ultra-high frequency, two-way satellite communications, commercial telephone capabilities and a fiber-optic communications backbone in the aircraft for a local area network. The satellite communications upgrade will allow the E-4B to transmit and receive voice and data in secure format from operational and command locations throughout the world. Commercial international maritime satellite, or INMARSAT, service will provide the aircraft with worldwide telephone capability. The aircraft's computer and communication systems will exploit the additional bandwidth of a fiber-optic backbone.

The total cost of the upgrades will be between \$20 million and \$30 million. A prototype, the Air Force Chief of Staff test aircraft, will demonstrate the new capabilities using asynchronous transfer mode, versa module Europe commercial chassis and fiber optic cables.

*(Signal, July 1996, pg 7-8)*

## Third EGNOS Satellite Considered

The partners responsible for developing the European Geostationary Navigation Overlay System (EGNOS) now have leases for the first navigation transponders to be flown on two Inmarsat satellites, and are considering the need for the use of a third satellite.

The EGNOS is intended to upgrade the integrity, availability and accuracy of the Global Navigation Satellite system (GNSS) signals to provide the equivalent service to that of the U.S. Wide Area Augmentation System. The partners in the consortium responsible for the development of the EGNOS, which is dubbed the Tripartite Group (TPG), include Eurocontrol, the European Space Agency, and the European Commission (EC).

*(Flight International, 10-16 July 1996, Pg. 12; Max Kingsley-Jones and Iieran Daily/London)*

## Canada Starts Trijammer Training

Kista — Canada has begun training its CF-18 pilots with a new export version of the Ericsson Erijammer A100 electronic warfare training system. The EW jammer pods, fitted to T-33 aircraft, were recently employed in Canada in NATO Maple Flag exercises. Canada has purchased eight of the pods, which are designed to train radar operators in electronic counter-countermeasures. The responsive EW training system includes built-in radar warning and set-on receivers that provide situational awareness of the "target" to the

instructor, who can monitor the trainee's response and adjust the level of jamming. The A100, which operates in the 6.8-10.5 GHz range, can be modified for use as a support and escort jammer. The Swedish air force has acquired two of the pods, and the Swiss air force has also produced a pair.

*(Aviation Week & Space Technology, 8 Jul 1996, pg. 56)*

## Reentry Vehicle Demonstrator Tested

The European Space Agency's unmanned Atmospheric Reentry Demonstrator recently completed its first recovery qualification test over the Mediterranean. The ARD, the first large European spacecraft developed for reentry and recovery, is about half the size of the command module or the proposed Crew Transfer Vehicle that would carry astronauts to the international space station. The test simulated the final phase of the planned suborbital ballistic trajectory and validated the parachutes and recovery systems.

The ARD was expected to be launched late this year by the second Ariane 5 qualification booster, but in the wake of the Ariane 5 accident, the ARD program now faces a still unspecified delay.

*(Aviation Week & Space Technology, 29 Jul '96, pg 34)*

## Matra Marconi Space Offers New Station

Paris — Matra Marconi Space is promoting a geostationary communications satellite system scheduled to cover Southern and Eastern Europe, Africa and the Middle East. MMS' proposed Euro-African Satellite Telecommunications System (EAST) would have 6,000 mobile-telephone and 20,000 fixed-telephone circuits, a capacity that could fill the needs of about 1 million subscribers. Estimated price of a mobile telephone call would be about 80 cents/min., a company official said.

The planned system is based on the new 1-10-kw Eurostar 3000 platform, which is scheduled to be qualified next year. MMS recently completed an avionics qualification model and a full-scale structural test model.

The EAST system would comprise one in-orbit satellite, one backup spacecraft, a network control center and gateways for operators. Envisioned entry-into-service date is late 1999, on the condition MMS can gather parties to share the \$750 million investment.

*(Aviation Week & Space Technology, 29 Jul '96, pg 59)*

## Filter Center

a. A new high-performance Ashtech GPS system can provide centimeter accuracy for data from highly dynamic flight tests of aircraft performance and guidance systems, according to the company. The differential-GPS system

achieves precise position, velocity, course and time using two Ashtech Z-12 receivers, one in the aircraft and one at a surveyed location on the ground. Ashtech's Precise Navigation (PNAV) post-processing software merges data from the two receivers to determine the aircraft antenna's positions.

b. The FAA has certified Lockheed Martin's "Microprocessor En route Automated Radar Tracking System" (Micro-EARTS), which is now approved for deployment. Micro-EARTS is Lockheed Martin's solution for the FAA's standard terminal automation replacement system, and uses off-the-shelf equipment. The FAA decided in December 1994 to use Micro-EARTS as the radar tracking system for the Oceanic Integrated Product Team. Capabilities include conflict alert, minimum safe altitude warning, Mode C intruder and approach path monitoring. Facilities using Micro-EARTS include Nellis AFB, Anchorage ARTCC, Honolulu and San Juan CERAPS, and the FAA's Tech Center.

c. An Interstate Electronics Corporation GPS Flight Management system (FMS) can provide a long-range navigation system for aircraft not even equipped with an FMS. The IEC 9002 will interface with flight instruments and autopilot, and is targeted for aircraft such as older 727s. The FAA recently certified it for en route, terminal and non-precision approach navigation. With upgrades, it will be able to accept accuracy-enhancing data from the wide area and local area augmentation systems, when they are in place.

*(Aviation Week & Space Technology, 29 Jul '96, pg 61)*

## Age of the Universe

Only a handful of the exploding super-bright stars called supernovae were recorded before the development of the telescope. Among them were five that ancient Chinese astronomers recorded as "guest stars" — appearing in 185 near the end of the Han Dynasty, 1006, 1054, 1572, and 1604 A.D. Some current astronomers have tried to figure out the age of the universe by correlating these sightings with modern data.

Now Yale University astrophysicist Bradley E. Schaefer has concluded that the guest star of 184 A.D. was not supernova at all, but the Swift-Tuttle comet. His conviction stems from ancient Chinese astrological tracts, which say that stationary guest stars (supernovae) foretell an invasion, but moving guest stars (comets) foretell a rebellion. Sure enough, a rebellion called the massacre of the eunuchs occurred in 189 A.D., and the astrologers linked it to the guest star. For the astrologers to have celebrated the accuracy of the prognostication means the guest star was in fact a comet, and not a supernova.

That changes the basis for some recent estimates of the age of the universe, Schaefer says. His own calculations, based on both the ancient sightings and those of six modern

supernovae, result in an age of 18 billion years, "give or take a few billions."

*(Popular Science, August 1996, g. 30, Arthur Fisher)*

## GPS Satellite for Beyond 2000

Seal Beach, CA — With the civilian Global Positioning System (GPS) fully operational for only little more than a year, plans are already in the works for its more advanced replacement.

The new GPS network will be built by Rockwell Aerospace at a cost of about \$1.3 billion, and will consist of 22 satellites, the first to be launched in 2001. The current system uses 24 satellites that orbit the Earth twice a day, at altitudes of about 11,000 miles. A civilian GPS receiver that locks onto signals from any four of these satellites can compute longitude, latitude and altitude to within 50 feet., although military locators can fix a position within about a yard.

Next-generation GPS technology is expected to usher in a new wave of robotics technology, including, among other things, self-steering farm tractors and unattended earth-moving equipment that operates with 6-inch accuracy.

*(Popular Mechanics, Aug 1996, pg 16)*

## Cheap Helium Alternative

McCook, NE — Free ballooning is the oldest and, some say, the most awe-inspiring flight experience. It is also surprisingly expensive in a helium-filled airship. A load of the inert gas sufficient to lift a standard-size balloon can cost the lofty sum of \$3,000 or even more.

The Kugler Oil Co. has a down-to-earth solution for making the sport more affordable: filling balloons with ammonia crop fertilizer. Heavier than helium, ammonia is still lighter than air. About 46,000 cu. ft. does the job of 36,000 cu. ft. of helium. The lower price more than makes up for the extra gas. Sufficient ammonia for a 2-day flight costs only \$350. At that price, ammonia could make balloonists out of would-be flyers whose wallets have anchored them to Earth.

*(Popular Mechanics, Aug '96; no author listed)*

## Compact Jet for Homebuilts

Chetek, WI — Kitplane builders take note: A small family-owned "skunk works" here has developed a low-cost, ultra-compact turbine for your dream aircraft.

Weighing in at just under 20 pounds, the SR-30 engines feature a single-stage centrifugal compressor, a reverse-flow annular combustor and a single-stage axial turbine. About 100 engines have been delivered to research groups with the Army, Air Force, and Dept. of Energy.



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Proposals from corporations, academia and government professional engineers will be accepted based on content and technical merit. Proposals that meet these criteria will be given full consideration. Optional requirements must be identified. The program is being arranged to accommodate the student, academic, professional and technical communities. To be considered, candidates should plan to submit written abstracts of papers and presentations as early as possible, but no later than **October 25, 1996**. Presentations should be 20 to 30 minutes long. Draft papers with visuals are required by **November 15, 1996**.

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(Popular Mechanics, Aug '96, pg 24; no author listed)

#### Flight Interference

Laptop computers, compact-dish players, computer games, and other portable electronics used by airplane passengers stand accused of endangering the operation of the aircraft's equipment. Reports filed by flight crews find reason to suspect the devices of causing malfunctions ranging from erroneous compass headings to misbehaving automatic pilots. In response, the aviation industry has attempted to measure and analyze any safety hazards created by passengers' use of electronic devices, and a lot of experts are beginning to believe the risk is real and warrants a change in policy.

(IEEE Spectrum, Aug '96, pg 10; no author listed)

#### Ripples in the Crab Nebula

Baltimore, MD — Images from the Hubble Space telescope have once again surprised astronomers, this time by revealing waves spreading away from the pulsar at the center of the Crab Nebula. Beginning last August, J. Jeff Hester and Paul A. Scowen (Arizona State University) acquired a nine-month-long sequence of HST images that show the nebula's innermost wisps brightening and fading like widening ripples in a pond. The wisps develop as the pulsar's powerful magnetic field spreads equatorially away from the star, and light is emitted from charged particles spiralling around the field lines.

Closer to the pulsar, the images display another startling feature. As a polar jet of material rushes way from the collapsed star, it collides with the surrounding nebula, producing a bow shock. Over several weeks the shock front, which the astronomers likened to a "dancing sprite," wobbles back and forth. Hester explains that these views will likely yield new clues to the processes behind high-energy flows throughout the universe. Scrutiny of the Crab Nebula's jets could refine astronomers' understanding of the more powerful streams spewing from the cores of active galaxies and quasars.

(Sky & Telescope, Aug '96, pg 10)

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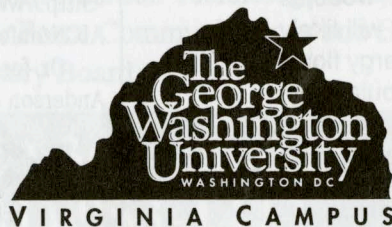
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