

SATELLITE AND SPACE COMMUNICATIONS

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IEEE COMMUNICATIONS SOCIETY



SSC Newsletter

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The Satellite and Space Communications (SSC) Committee is a volunteer group actively involved in advancing satellite and space communication technologies within the IEEE. This committee is approved by the IEEE Communications Society and is governed by the constitution and bylaws of the IEEE as well as the other twenty Technical Committees in the Society.

SATELLITE & SPACE

- JOIN US -

All conference attendees are welcome to join us in the SSC Committee meeting.

Pan Pacific Hotel, Pavilion B
Tuesday, June 8th
7:30 am - 9:00 am

Future SSC Meetings

Dec. 7, 1999	Rio de Janeiro
June 20, 2000	New Orleans
Nov. 29, 2000	San Francisco

ICC'99 SSC COMMITTEE ACTIVITIES

Sunday, 7 June Broadband Satellite
2:00 pm - 5:30 pm Networks
Tutorial TU08

Tuesday, 8 June Handover
9:00 am - 12:30 pm
Session S19

Tuesday, 8 June Satellite Communication
9:00 am - 12:30 pm Systems Design
Session S27

Thursday, 10 June Satellite Communications
9:00 am - 5:30 pm Architectures and Networks
Workshop WK01



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MESSAGE FROM THE CHAIR

New and revolutionary developments continue to take place in the field of satellite and space communications. The goal of the satellite and space communications (SSC) committee is to be actively on top of these new developments, insure that they are made visible to the IEEE COMSOC community, and provide a forum to facilitate technical interchange among those working in the field. Toward this objective, the committee is in the process of formulating plans to expand activities, enhance the visibility of the committee, and to attract new members, particularly from the industries and organizations at the fore-front of these new developments.

First, the committee will continue to meet semi-annually at the ICC and Globecom conferences and regularly sponsor technical sessions, tutorials and workshops at ICC, Globecom, and MILCOM conferences. Recent workshops have addressed topics such as "Future Satellite Communications Systems, "Audio and Video Compression Technology for Satellite Communications" and "Satellite Communications Architecture and Networks". These workshops have been organized by Past Chair Satchandi Verma, Chair Walter Ciesluk, and Member Marie-Jose Montpetit. Marie-Jose Montpetit has also presented tutorials on "Broadband Satellite Networks" at several recent

conferences. Committee Secretary Ron Smith has participated and presented papers at various workshops.

The committee has also been actively promoting satellite communications systems and technology via professional journals, transactions, and magazine publications. Members Marie-Jose Montpetit and Sastri Kota have recently sponsored IEEE Communications magazine feature topic issues associated with satellite communications. Recent feature topic issues have addressed, "Broadband via Satellite", "Satellite ATM Network Architectures", and "Wideband Satellite Performance and Experimentation". In addition, Marie-Jose Montpetit and Walter Ciesluk serve as area editors on radio and satellite communications for the IEEE "Communications Surveys" electronic magazine. In the near future, the committee will be working to establish a more active relationship with the IEEE Journal on Selected Areas in Communications and the International Journal of Satellite Communications.

The Committee is also involved in the development of emerging standards related to satellite communications. Sastri Kota is active in ITU-R Ka-band Fixed Satellite Service standards development activities.

(continued on page 3)

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Because of the broad range of the technologies involved, and the necessity of integrating and interfacing satellite communications with other networks, the committee has attempted to develop liaisons with other committees such as Multimedia Communications, Personal Communications (PC), and Communications Simulation and Modeling (CSIM). In addition, the committee is striving to develop a joint working relationship with the American Institute of Aeronautics and Astronautics (AIAA) with the objective of co-sponsoring an annual conference on Satellite Communications. The AIAA technical committee on communication systems (TCCS) has historically sponsored such an event on a biannual basis. In my view, this "AIAA International Communication Satellite Systems Conference" has been the premier engineering conference on satellite communications. Ron Smith, who is also a member of the AIAA TCCS and serves on its steering subcommittee, also serves as liaison between SSC and TCCS. The AIAA TCCS web site is at <http://www.aiaa.org/tc/cms/>.

The committee has also initiated development of a plan for the recruitment of new members particularly from the satellite communications industry in Europe and Asia as well as North America. The committee has also prepared a letter of welcome for new members describing the nature of our goals and activities. Our desire is to bring on new members willing and anxious to accept assignments and organize

activities, and not just to expand the membership roles.

The committee has recently added color and a new face to "SSC Newsletter" which is published semiannually. In addition, Ron Smith has newly renovated the committee web pages. The SSC web site now includes a list of reviewers with preferred topics for conference and publication reviews, a list of Technical Program Committee (TPC) representatives and liaisons, past newsletters, meeting minutes, calls for papers and other information to help members be active without needing to attend committee meetings. At the request of the IEEE Communications Magazine, Global Communications Newsletter (GCN) editor, Walter Ciesluk and Vice Chair Iwao Sasase prepared an "SSC Committee Overview" article for publication in the April 1999 GCN. We are hopeful that this article will lead to new interest in our committee.

Clearly, the field of satellite communications continues to grow rapidly and remains interesting and exciting. I encourage all who are interested in this field to join our committee. Visit our web site (<http://www.comsoc.org/socstr/techcom/ssc/>) where you can get information on events and upcoming meetings, and interact with committee officers and members.

Walter Ciesluk, Chair
Satellite and Space Communications
Technical Committee

FORTHCOMING GLOBECOM AND ICC CONFERENCES

Globecom'99
Dec. 5 - 9, 1999,
Rio de Janeiro, Brazil

ICC 2000
June 18 - 22, 2000,
New Orleans, USA

Globecom 2000
Nov. 27 - Dec. 1, 2000,
San Francisco, USA

COSPONSORING / RELATED CONFERENCES AND WORKSHOPS

PIMRC'99 (Sept. 12 - 15, 1999, Osaka, Japan)
The tenth International Symposium on Personal, Indoor and Mobile Radio Communications will be held in Osaka, Japan, featuring a panel discussion on PCS in various continents, several panels on networking issues, and various sessions on networking propagation, modulation and coding for satellite, personal and cellular communications.

WCNC'99 (Sept. 21 - 25, 1999, New Orleans, USA)
The first IEEE Wireless Comm and Networking Conference will be held in New Orleans, USA featuring radio technology, networking, services and applications, satellite and hybrid systems, technology development and trials, standards, spectrum and regulatory issues.

SCANNING THE WORLD

In the field of satellite communications, new and revolutionary developments are taking place. First, narrowband systems using L/S-band frequencies and low-altitude earth orbit (LEO) satellites start to provide cellular like services to handheld satellite terminals. Second, wideband systems using Ka-band or higher frequencies and some also using non-geostationary earth orbit (non-GEO or NGSO) satellites are emerging to provide multimedia type services to very small aperture satellite terminals. Especially, the ITALSAT satellite and the American ACTS Programs demonstrated the suitability of the Ka-band technologies and proved that direct-to-user (DTU) service requirements can be satisfied by a single multispot GEO satellite, provided with on-board processing (OBP) capabilities such as hopping spot-beams, demodulation, switching, and remodulation.

The dramatic increase of interest in the Ka-band and higher frequencies is motivated by the forecasted need for the development of new interactive multimedia services as well as basic communications services to a large number of users via satellite with worldwide coverage. Ka-band is very desirable since it can offer wide-bandwidth channels with worldwide allocations, enabling the implementation of inexpensive global services with small user terminals. Main characteristics of Ka-band systems are mesh and star network topologies, bandwidth on demand, circuit and packet switching services, worldwide coverage with spotbeams and intersatellite links (ISL). The Ka-band GEO systems are Spaceway and Astrolink in the United States and EuroSkyWay in Europe. The Ka-band LEO systems such as Teledesic are also proposed. The first Ka-band systems aiming at providing cost-effective interactive multimedia DTU services are expected to become operational in 2000-2005.

Several research programs for the exploitation of the extremely high frequency (EHF) band and the use of ISL technologies at

RF and/or optical frequencies are also going on to provide higher data-rate satellite personal communication services. Typical EHF experiments are Engineering Test Satellite IV (ETS-IV), and Communication and Broadcasting Engineering Test Satellite (COMETS) both in Japan, and the Data Audio and Video Interactive Distribution (DAVID) mission in Europe.

The Satellite and Space Communications (SSC) Technical Committee has been providing valuable information about the new systems and new developments in satellite communications via technical sessions, workshops, and tutorials at ICC and Globecom conferences. At ICC'99 in Vancouver, SSC sponsors two technical sessions on "Satellite Communication Systems Design", and "Handover", a full-day workshop on "Satellite Communications Architecture and Networks", and a half-day tutorial on "Broadband Satellite Networks". In the workshop, the architectures, applications and technologies of narrowband and wideband satellite networks are examined, focusing on their roles in the current and next generation information services infrastructure, and hot topics such as TCP/IP, ATM and multicasting over satellite, digital video broadcasting, integration of satellite and terrestrial networks are addressed. At Globecom'99 in Rio de Janeiro, SSC plans to organize a Services, Applications and Systems (SAS) session on "Satellite Communications in Latin America", examining how market, economic, technical, and regulatory factors are affecting satellite communications in Latin America. Also, in the IEEE Communications Magazine, a feature topic issue on "Satellite ATM Network Architectures" was published in March and one on "Wideband Satellite Performance and Experimentation" will be published soon.

Prof. Iwao Sasase, Vice Chair
Satellite and Space Communications
Technical Committee

CONFERENCE CALENDAR

Conference	Date	Place	Information
PIMRC'99 Personal, Indoor and Mobile Radio Communications	Sept. 12-15, 1999	Osaka, Japan	Prof. R. Kohno Electrical & Computer Engineering, Yokohama National University Hodogaya, Yokohama, 240-8501 Japan Fax: +81 45 338 1157 E-mail: kohno@kohnolab.dnj.ynu.ac.jp http://pirmc99.kuee.kyoto-u.ac.jp
VTC'99 Vehicular Technology Conference	Sept. 19-22, 1999	Amsterdam, The Netherlands	VTC Fall'99 Conference Secretariat c/o EUROCONGRES Conference Mgmt J. van Goyenkade 11 NL-1075 HP Amsterdam, The Netherlands Tel: +31 20 6793411 Fax: +31 20 6737306 E-mail: VTC@eurocongres.com
WCNC'99 Wireless Communications and Networking Conference	Sept. 21-25, 1999	New Orleans, USA	Jerry D. Gibson, Chairman Department of Electrical Engineering Southern Methodist University Contact: Teresa Harvey Tel: +1 214 768 4120 E-mail: tharvey@seas.smu.edu
MILCOM'99 Military Communications International Symposium	Oct. 31 - Nov. 3, 1999	Atlantic City, NJ, USA	http://www.milcom1999.com/
Globecom'99 Global Communications Conference	Dec. 5-9, 1999	Rio de Janeiro, Brazil	Prof. Raimundo Sampaio Neto Technical Program Chair, Globecom'99 PUC-Rio/CETUC Rua Marques de Sao Vicente 225-22453-900, Rio de Janeiro, RJ, Brazil Tel: +55 21 274 3664 Fax: +55 21 274 3664 E-mail: raimundo@cetuc.puc-rio.br
ICSSC 2000 18th AIAA International Communication Satellite Systems Conference	April 10-14, 2000	Oakland, CA, USA	Neil Helm Institute of Applied Space Research George Washington University EECS--IASR Suite 340 2033 K Street NW Washington, D. C., USA 20052 Tel: +1 202 994 5509 Fax: +1 202 994 5505 E-mail: helm@seas.gwu.edu

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Conference	Date	Place	Information
VTC 2000 Vehicular Technology Conference	May 15-18, 2000	Tokyo, Japan	Tadashi Matsumoto Secretary for VT2000 R&D Department, NTT DoCoMo Tel: +81 468 40 3552 Fax: +81 468 40 3790 E-mail: matsumoto@mlab.yrp.nttdocomo.co.jp
ICC 2000 International Conference on Communication	June 18-22, 2000	New Orleans, USA	Mr. Richard W. Miller Bell South Telecommunication Inc. Rm. 1050, 365 Canal St. New Orleans, LA 70130 Tel: +1 504 528 2553 Fax: +1 504 528 2387 E-mail: c.w.miller@ieee.org
ISIT 2000 International Symposium on Information Theory	June 25-30, 2000	Sorrento, Italy	Prof. Thomas Ericson Linkopins Universitet ISY, Datatransmission SE-581-83 Linkoping Sweden http://www.unisa.it/isit2000/
ISSTA 2000 International Symposium on Spread Spectrum Techniques & Applications	Sept. 6-8, 2000	North Jersey, USA	Prof. Y. Bar-Ness, Director Center for Communications & Signal Processing Research New Jersey Institute of Technology University Heights, Newark NJ, USA 07102-1982 Tel: +1 973 596 8474 Fax: +1 973 596 8473
PIMRC 2000 Personal, Indoor and Mobile Radio Communications	Sept. 18-21, 2000	London, England	Prof. A. H. Aghvami E-mail: hamid.aghvami@kcl.ac.uk http://www.pimrc2000.com

EDITORIAL / LETTERS TO THE EDITOR

This SSC newsletter is issued twice a year and is intended to bring you information on ICC, GLOBECOM and other SSC Committee activities. This letters to the editor section is your column for your ideas, program descriptions and other contributions. Please forward your letter to the Editor:

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To all SSC members:

If your postal or e-mail addresses, telephone or fax numbers have changed, please update them with the committee secretary (send e-mail to ron.p.smith@trw.com). You can review our current records on our web page at www.comsoc.org/socstr/techcom/ssc.

**Excerpt from: "An Overview of the Satellite and Space Communications Committee"
By Walter J. Ciesluk and Iwao Sasase, Chair and Vice-Chair of SSC, December 1998.**

The Satellite and Space Communications (SSC) Committee has provided a forum for technical interchange among those working in this field for nearly 40 years. It began in the early 1960's soon after it was recognized that the rocket capabilities demonstrated by the Soviet Union and United States in the late 1950's could readily be used to launch communications satellites.

From that time, the development and impact of satellite communications has been revolutionary. In the early days, the major activity was associated with the business, political and technical issues associated with the development and introduction of the first communications satellites. The technical community was occupied with the tradeoff studies associated with satellite orbits, frequency bands and link design. However, the first communications satellites came along quickly with low earth orbit launches of Telstar and Relay in 1962, the first synchronous orbit satellite, Syncom, in 1963, and the launch of INTELSAT 1 and MOLNIYA 1 in 1965. From that time, the field of satellite communications has continued to grow rapidly. Satellites became dramatically larger, capable of increased capacity, and employed rapidly developing light weight electronics technology, spacecraft control and power generation and storage devices. Significant development went into sophisticated space-borne regional and spot-beam dual polarized antennas at both C- and Ku-band to increase payload capacity through frequency reuse techniques. Next, Very Small Aperture Terminal (VSAT) networks and applications, and direct broadcast satellite systems and technology were introduced. Quickly, the exploitation of the Ka band frequencies for future growth became important topics within the satellite communications community. During the 70s and 80s, major engineering efforts were devoted to the development of higher power amplifiers, lighter weight and improved performance microwave filters and circuit switches, and electric power generation and storage devices which contributed to larger

communications satellite payloads that fit the launch constraints of available launch vehicles. Eventually, systems to provide communications services to mobile terminals, e.g., ships, land vehicles and aircraft were developed. These systems exploited one of the major attributes of communications satellites, that is the capability to offer wireless services over a large service area.

Today, communications satellites carry about one third of voice and essentially all international television traffic. Significant advances in video compression and data protocol enhancement technology have made new and many previously very expensive satellite communications services such as digital direct broadcast satellite (DBS), digital direct-to-home (DTH), and Internet Access available at lower cost. At the same time, we are entering a new and potentially revolutionary era in satellite communications. A large number of commercial systems are being planned and introduced to provide a wide array of voice, data, and video services that promise to radically change global telecommunications. These include narrow band systems, such as Ellipso, Globalstar, ICO, Iridium, and ECCO, which intend to provide cellular telephone-like services in L/S-band. There are also a host of wide band systems being planned for Ka-band, such as Astrolink, Spaceway and Teledesic, which intend to provide multimedia services to desktop computer-size terminals starting around 2000. Both the narrow band and wide band systems appear attractive because they offer much higher capacity and relatively low user costs compared to traditional systems. In the latter part of 1997, several companies announced proposals to build satellite systems in the Q and V bands to supplement the Ka-band wide band systems now in various stages of development.

[End of excerpt.]

For the full article, please visit our web page at <http://www.comsoc.org/socstr/techcom/ssc/> and select the link to SSC Overview.

SSC COMMITTEE MEMBERSHIP APPLICATION

You can participate in the SSC Committee as a member by attending the SSC Committee meeting which is held twice a year during ICC and GLOBECOM conferences or you can participate as an associate member by filling in and mailing the application form below (preferably send an e-mail with the same information). Please note there is no difference between a member and an associate member except that an associate member has never attended an SSC Committee meeting.

The members and associate members can receive various information through the SSC newsletter and on our web page at www.comsoc.org/socstr/techcom/ssc, and also may propose hot topics, workshops and tutorials as well as provide paper reviews for conferences and publications. The members and associate members may provide regional conference / workshop information to the Editor which may appear in the SSC newsletter and on our web page if it is applicable to the committee's charter.

Place
Stamp
Here

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Paper topics you would like to review (optional) _____

Please Note: Your contact information will appear on our web page unless requested otherwise.