

U.R.S.I.

TABLE DES MATIÈRES - CONTENTS

ISSN 0041-543X

In Memoriam .....	1
Academician Kiril Serafimov .....	1
Professor Jui Lin (Allen) Yen .....	2
Professor John G. Bolton .....	3
Dr. George Sinclair .....	4
XXIV General Assembly of URSI .....	6
Profile of Member Committees .....	13
Denmark .....	13
Reports on Scientific Sessions of Commissions at the Kyoto General Assembly .....	16
Commission B - Fields and Waves .....	16
Commission E - Electromagnetic Noise and Interference .....	19
Reports on URSI-Sponsored Meetings .....	28
Very High Angular Resolution Imaging .....	28
International Conference on Communications .....	29
Meeting Announcements .....	32
Climatic Parameters in Radiowave Propagation Prediction .....	32
International Symposium on Solar Terrestrial Physics .....	33
Conference on Precision Electromagnetic Measurements .....	34
International Geoscience and Remote Sensing Symposium - IGARSS'94 .....	35
International Seminar on Mathematical Methods in Electromagnetic Theory .....	38
International Conference on Computational Electromagnetics and its Applications .....	38

Journées Internationales de Nice sur les Antennes .....	39
Asia Pacific Microwave Conference .....	41
International Symposium on Future Telecommunications and the Electromagnetic Environment (COMMSPHERE).....	42
Other meetings which have been brought to our attention .....	43
Nouvelles de l'UIT .....	45
From the archives of URSI .....	47

**IN MEMORIAM**  
**ACADEMICIAN KIRIL SERAFIMOV**  
**1932-1993**

The separation with the great scientist, teacher and social figure - academician Kiril Serafimov - was sorrowful and painful. The Bulgarian Academy of Sciences lost a prominent member, a worthy representative of Bulgarian science whose scientific achievements are well known and acknowledged in the whole world.

Academician Serafimov was born on 24 May 1932 in Sofia and passed away there on 2 April 1993. In 1951 he graduated from the mechano-electrotechnical high school and later, in 1957, from the Higher Machine-Electrotechnical Institute. The same year he was appointed a researcher in the Research Institute of Communications. In 1961 he started work in the Geophysical Institute of the Bulgarian Academy of Sciences (BAS). In 1965 he became a senior researcher and in 1973 professor. In 1977 he became corresponding member of the Academy and in 1984 academician. Academician Serafimov occupied a series of key posts in the BAS : deputy director of the Earth's Sciences Centre (1972-1975), scientific secretary of the BAS (1973-1977), member of the BAS Presidium (1977-1988). In 1967 he became secretary of the National Committee for investigation and use of space environment, became its vice president in 1973, and from 1977 to 1986 its president. In 1969, together with academician Krastanov, he initiated the Group for space physics at the BAS Presidium which laid the foundation of the systematic research and direct participation in space projects and programmes. In 1974 this team developed into a Central laboratory for Space Research whose director he was until 1986. From 1979 up to 1982, and subsequently from 1989 up to his death, he was the director of the independent Section of Astronomy with the National Astronomical Observatory. In 1975 Academician Serafimov initiated the formation of the National Committee of Radio-science and became its president up to his demise. On the initiative of Academician Serafimov the publication of the "Space Research in Bulgaria" journal was started ; he was its chief editor up to 1986.

Academician Serafimov was an undeniable leader in the field of space environment science. He was one of the most productive Bulgarian scientists, being the author of more than 570 scientific works published both in Bulgarian journals and in well-known international publications.

Also to his credit are 9 inventions, 82 finished scientific-technical projects, 8 monographs, over 1950 scientific-organizational and popular science papers, commentaries and interviews and 4 popular books. He created a school of talented scientists and specialists in the field of space research who, together with him, raised the prestige of the Bulgarian contributions to the field of Space.

Academician Serafimov's authority was high among the international scientific community and he won a wide international recognition. In 1969 he was elected corresponding member of the International Academy of Astronautics in Paris, and became member in 1984. In the course of 11 years he was a member of the Committee of Space Research (COSPAR). For many years he was the Bulgarian representative in the Science-Technical subcommittee for Peaceful Use of Space at the United Nations, and was active in the International Astronomical Federation and URSI. He was the co-founder and vice president of the International Association "Space and Philosophy".

The creative work, ideas and scientific contributions of Academician K. Serafimov will remain significant in the areas of science and culture. There is no doubt that they will be acknowledged and quoted in the future.

D. MISHEV  
I. KUTIEV

## **PROFESSOR JUI LIN (ALLEN) YEN** **1925 - 1993**

It is with deep regret and sadness that we report the sudden death on Sunday, May 30, of University Professor Emeritus Allen Yen, of the Departments of Electrical and Computer Engineering and Astronomy.

Professor Yen was born in Canton, China, and graduated from Chiao Tung University, Shanghai, in 1948. His long association with the University of Toronto began in 1949 as a graduate student; he received the M.A.Sc. and Ph.D. degrees in the now vanished Department of Applied Physics in 1950 and 1953. He immediately joined the Department of Electrical Engineering as an instructor, becoming Professor in 1966 and University Professor in 1980. Beginning in the late 1950's he played a pivotal role in establishing radio astronomy research at the University of Toronto, which has continued to the present. From

1968 he was cross-appointed to the Department of Astronomy. He reached retirement age in 1991.

Allen Yen was a leading figure both in microwave engineering and its applications to satellite communications and in radio astronomy, where his pioneering work in long baseline interferometry was recognized by this being awarded, as a co-recipient, the Rumford Award of the American Academy of Arts and Sciences in 1971. He was a Fellow of the Royal Society of Canada, and was much sought after as an adviser to international scientific bodies, to the National Research Council and to industry. He was also a fine teacher who communicated his own deep understanding of both science and engineering to two generations of undergraduate and graduate students.

While Allen took both his students and his research very seriously, he never saw any reason to become solemn about either himself or the University. Colleagues showing signs of self-importance were always at risk of being gently deflated by a good-humoured but ironic aside. In Allen's view, only intellectual work and sailing were subjects to be approached seriously.

Allen was an outstanding scientist and engineer, a great teacher and a good friend. He will be greatly missed by his colleagues in this University and throughout the world.

H.W. SMITH  
University of Toronto

## **PROFESSOR JOHN G. BOLTON** **1922-1993**

John Bolton died in his sleep on 6th July. Until his retirement from CSIRO in 1981, John had a distinguished and pioneering career in radio astronomy.

In 1948, as a member of the Division of Radiophysics, John, Bruce Slee and Gordon Stanley used the famous 'sea interferometer' to provide the first identifications of radio sources with optical objects other than the sun with the Crab Nebula in our galaxy, and with other galaxies. Between 1955 and 1961, as Professor of Physics and Astronomy at California Institute of Technology, he established the Owens Valley Radio Observatory with its innovative two element radio interferometer. He was involved in the optical identification of the radio source 3C 295,

which turned out to be a galaxy with a redshift of 0.46, a record which stood for several years. He was involved in the identification of the radio source 3C 48 with a 16th magnitude star -- the first quasar.

Between 1961 and 1981, as a member of the Division of Radiophysics living in Parkes, he was Director of the Australian National Radio Astronomy Observatory until 1971, responsible (the "Dishmaster") for the commissioning and subsequent operation of the Parkes radio telescope. In 1962 he participated in the lunar occultations of 3C 273, which led to the discovery that quasars were luminous extragalactic objects. He initiated and developed projects involving the surveying, positioning and optical identification of southern radio sources. Between 1969 and 1973 he led the Parkes support of NASA's Apollo missions. He played a major role in decisions to build the 48-inch Schmidt telescope and the 4-m Anglo-Australian Telescope.

John received many awards, including Fellow of the Australian Academy of Science (1969), Fellow of the Royal Society (1973), Fellow of the Indian Academy of Science (1973), Vice-President of the International Astronomical Union (1976), Gold Medal of the Royal Astronomical Society (1977), Foreign Associate of the US National Academy of Sciences (1980), and commander of the Order of the British Empire (1981).

J. WHITEOAK  
ATNF

## **DR. GEORGE SINCLAIR**

### **1912-1993**

Dr. George Sinclair died on 16 August 1993, less than a month after the death of his wife, Helen. They were well known and friends to many in the URSI community and will surely be missed. They leave three daughters, Andrea, Valerie and Lissa, all of Toronto.

He was born on 5 November 1912 in Hamilton, Ontario, Canada. He moved to Alberta at an early age, and received the B.Sc. and M.Sc. Degrees from the University of Alberta in 1933 and 1935. He received the Ph.D. from the Ohio State University in 1946.

Dr. Sinclair first rose to prominence for his work during World War II at the Ohio State University on the theory and practice of scale model measurements for antennas and radar. He founded the Ohio State

University Antenna Laboratory (now Electro Science Laboratory). Subsequently, in Canada, he founded Sinclair Radio Laboratories Ltd., a company which to this day is known for the innovative and successful development of antennas and multicouplers. As a Professor at the University of Toronto he led in the establishment of Ph.D. - level studies in Electrical Engineering and started research in radio astronomy. He originated the concept of the complex vector effective length of an antenna and made fundamental contributions to the theory of slotted cylinder antennas and antennas mounted near elliptical cylinders.

In URSI he served on the Canadian National Committee and was the International Chairman of Commission VI. He organized and chaired the 1959 International Symposium on Electromagnetic Theory, held in Toronto. He chaired the Technical Program Committees for the 1967 URSI Spring Meeting in Ottawa and the 1969 URSI General Assembly in Ottawa. He was a member of the Board of Directors of the IEEE for eight years and served on many IEEE committees.

Dr. Sinclair was the recipient of many honours, being a Fellow of the IRE, the American Association for the Advancement of Science and the Royal Society of Canada. He received an Honorary Doctorate from the Ohio State University, the U.S. Army-Navy Certificate of Appreciation, the Canada Silver Jubilee Medal, the General A.G.L. Mc-Naughton Gold Medal of the IEEE Canadian Region, the Polish Electrical Society Gold Medal, the Julian C. Smith Medal of the Engineering Institute of Canada, the Ernest C. Manning Award of Merit, and the Distinguished Achievement Award of the Antenna Measurement Techniques Association.

At the university of Toronto he will be remembered as a lucid thinker and lecturer, a patient and skilful advisor of graduate students, and a greatly respected colleague.

KEITH G. BALMAIN  
University of Toronto

## XXIV GENERAL ASSEMBLY OF URSI

### SUMMARY ACCOUNT

The XXIV General Assembly of URSI was held at the International Conference Hall of Kyoto, Japan, from Wednesday 25 August to Thursday 2 September 1993, at the invitation of the URSI Committee in Japan.

The Assembly was attended by 1045 regular registrants and 201 student registrants (including 113 Young Scientists), who belonged to 44 different countries. Our Japanese hosts had set up a most impressive organizational structure, and the logistic and administrative details of the Assembly worked to a perfection. The key members of the LOC (Local Organizing Committee) were Professors S. Okamura (Honorary Chairperson), T. Okoshi (Chairperson), I. Kimura, T. Oguchi (Vice-Chairpersons) and F. Ikegami (Auditor). They were assisted by a large number of colleagues, and by two Executive Committees, one in Tokyo, chaired by Professor T. Oguchi, and one in Kyoto, chaired by Professor I. Kimura. Should also be mentioned the Advisory Committee (Secretary Professor K. Miyauchi), and the (crucial) Fund Raising Committee, chaired by Dr. S. Iwasaki. The URSI Secretariat worked particularly closely with Professors Kimura, Matsumoto and Dr. T. Sato. The unparalleled support provided by these colleagues made the task of the Secretariat exceptionally easy.

The scientific programme, coordinated by Professors J. B. Andersen and H. Matsumoto, included the now traditional General Lectures and Tutorials delivered by eminent specialists, and in addition 798 oral presentations and 314 poster papers. The ten Commissions have been asked to prepare a report on their scientific programme, to be published in the URSI Bulletin. The reader will notice that the present issue already contains the reports of Commissions B and E.

The abstracts of the invited and contributed papers were collected directly by the Japanese Organizing Committee, a method which worked out extremely well in practice. These abstracts were published in a 717 pages thick volume, details on which can be found on page 12.

The administrative part of the Assembly, which started already on 23 August, included meetings of the Board of Officers, the Coordinating Committee, the Council, the various Committees, and open meetings of the Commissions. The official texts of Resolutions and



Recommendations adopted by the Council will be published in a later issue of the URSI Bulletin, and in Volume XXIII of the Proceedings of URSI General Assemblies. A summarized account of the main decisions reached in Kyoto is given below for the information of the URSI Member Committees.

### *1. Newly elected Officers*

The Council elected the following officers for the period 1990-1993 :

#### **Board of Officers**

President : Dr. P. Bauer (France)  
Past President : Prof. E.V. Jull (Canada)  
Vice-Presidents : Prof. J. B. Andersen (Denmark)  
Prof. P.J.B. Clarricoats (U.K.) (Treasurer)  
Prof. T. Okoshi (Japan)  
Prof. T.B.A. Senior (U.S.A.)  
Secretary General : Prof. P. Lagasse (Belgium)

The incoming Board appointed Prof. P. Van Daele (Belgium) as Assistant Secretary General.

#### **Chairs and Vice-Chairs of Commissions**

Commission A : Electromagnetic Metrology

Chair : Dr. U. Stumper (Germany)

Vice-Chair : Dr. M. Kanda (U.S.A.)

Commission B : Fields and Waves

Chair : Prof. D. Olver (U.K.)

Vice-Chair : Prof. C.M. Butler (U.S.A.)

Commission C : Signals and Systems

Chair : Prof. P.H. Wittke (Canada)

Vice-Chair : Prof. B.G. Evans (U.K.)

Commission D : Electronics and Photonics

Chair : Dr. T. Itoh (U.S.A.)

Vice-Chair : Prof. R. Sorrentino (Italy)

Commission E : Electromagnetic Noise and Interference

Chair : Dr. V. Scuka (Sweden)

Vice-Chair : Prof. M. Hayakawa (Japan)

Commission F : Wave Propagation And Remote Sensing

Chair : Prof. R.K. Moore (U.S.A.)

Vice-Chair : Mr. M.P.M. Hall (U.K.)

Commission G : Ionospheric Radio and Propagation

Chair : Dr. K. Schlegel (Germany)

Vice-Chair : Dr. B.W. Reinisch (U.S.A.)

Commission H : Waves in Plasmas

Chair : Dr. F. Lefeuvre (France)

Vice-Chair : Dr. V. Fiala (Czechoslovakia)

Commission J : Radio Astronomy

Chair : Prof. Y.N. Parijsky (Russia)

Vice-Chair : Dr. R. Booth (Sweden)

Commission K : Electromagnetics in Biology & Medicine

Chair : Prof. P. Bernardi (Italy)

Vice-Chair : Dr. J.C. Lin (U.S.A.)

The coordinates of these officials, the membership of the various URSI Committees, and the names of the URSI representatives on other scientific organizations will appear in the December 1993 issue of the URSI Information Bulletin. The names will also be included in Volume XXIII of the Proceedings of URSI General Assemblies (scheduled to appear at the beginning of 1994).

## 2. *Finances*

The Council approved the accounts of the Union for the triennium 1990-2. It also decided to maintain the value of the unit contribution for 1994, 1995 and 1996 at the level of the past triennium, i.e. 30,000 Belgian francs.

The Council thanked Dr. Bauer for his handling of URSI's finances in 1990-3, and confirmed Professor K. Geher as Chair of the Standing Finance Committee.

## 3. *Admission of New Members*

Subject to meeting the criteria of the URSI Statutes, the applications of the following institutions were accepted. As regular Members :

- (a) the Academy of Sciences of Russia
- (b) the Academy of Sciences of the Ukraine
- (c) the Academy of Sciences of Uzbekistan
- (d) the Korean Advanced Institute of Science and Technology
- (e) the Scientific and Technical Research Council of Turkey

As Associate Members :

- (a) the Academy of Sciences of Chile
- (b) the Academy of Sciences of Belarus
- (c) the Academy of Sciences of Kazakhstan

The Associate status of the URSI Committee in Peru was extended.

#### *4. Statutes*

Three proposals had been made which, if approved, would have resulted in a change in the Statutes. They were :

- a proposal to increase the number of Vice-Chairs of Commissions to two (this proposal was later withdrawn)
- a proposal to create a new category paying one half the basic unit of contribution
- a proposal to allow Council to choose the venue of more than one General Assembly (instead of only that of the next one)

After hearing arguments pro and contra, the Council decided to refer the last two proposals to the appropriate Committees, for further study.

Proposals to create some sort of individual membership could also have required a change in the Statutes, but the solution which was eventually adopted, and which is described in a further section, made such a move unnecessary.

All in all, it may be concluded that the structures which were created at previous General Assemblies work satisfactorily, at least for the time being. It may be remarked that no new Commissions were created, and that the titles and terms of reference of the existing ones were left practically unchanged.

#### *5. Network of Correspondents*

The establishment of a Network of Correspondents in the past triennium has been described in the Bulletin of December 1992. In its present form, the Network consists of some 420 URSI officials, some 550 people designated by the various URSI Member Committees, and some 130 subscribers to the "Radioscientist". Further, the possibility (and desirability) of creating some sort of individual membership was discussed in the March 1993 Bulletin.

The whole problem was thoroughly investigated at the General Assembly, and the Membership Committee recommended not to pursue

the idea of individual membership in the next triennium, but to achieve the goal of increased contacts with the URSI Community through a slight modification of the originally-approved Network. The URSI Council approved this modification, which runs as follows :

- i any scientist attending a General Assembly or an URSI Symposium will become a Correspondent for the three-year period following the Assembly, financed by a special fee included in the registration fee;
- ii other scientists may seek inclusion in the Network of Correspondents for the same three-year period by applying directly to the URSI Secretariat and paying the special fee;
- iii on request, the Board may decide to waive the fee for a scientist in (ii);
- iv scientists participating in the Network will be issued a numbered card allowing reduced registration fees at certain URSI-sponsored symposia and conferences; and will receive the Radioscientist-Bulletin
- v Correspondents will have no voting rights, but will be allowed to express their views in the Commissions on matters of a scientific nature.

Details of the implementation of the network will be worked out by the Board of Officers. For example : Symposia under (i) are formal Symposia of URSI Commissions, any card issued during the 1994-96 triennium will be for that triennium, and a present member of the Network will be exempt from the special fee at a Symposium attended in that period.

## *6. The Young Scientist Programme*

Thanks to the generous support of the host Committee, which provided meals and accommodation in Kyoto, 113 Young Scientists, from both developing and industrialized countries, attended the Assembly as URSI awardees. Among these, 25 came from the former USSR, 8 from Eastern Europe, and 27 from Developing Countries. Transportation costs for the latter were generously supported by ICSU, the Commonwealth Secretariat, the Royal Society of London, COSTED and the Japanese Local Organizing Committee.

Instead of organizing special sessions for the Young Scientists in Kyoto, it was decided to try and incorporate their papers in the regular programme. This policy was difficult to implement, since selection of awardees and acceptance of papers happened at the same time, for a variety of reasons. It turned out, however, that the policy worked well,

and that practically all awardees were able to give an oral or poster presentation.

## *7. Publications*

The Standing Committee on Publications recommended to Council the merger of the Bulletin and Radioscientist under the joint editorship of Professors Dowden and Lagasse, who will be aided by Associate Editors. The Commissions will be encouraged to contribute through a specific statement printed in the preface of each issue.

The editorial policy will be such that material for the Radioscientist will be refereed, as at present, with the Editor executing the final responsibility for publication. The volume of material will be subject to such constraints as imposed by financial considerations. The publication will be circulated to URSI Member Academies for distribution to their existing lists of radioscientists, and also to the members of the Network of Correspondents.

The Committee looked at the "Review of Radio Science 1990-2" and "Modern Radio Science 1993", two volumes which had been distributed to the attendants at the General Assembly. The volumes had been professionally produced by Oxford University Press. The Committee extended warm thanks to the editors of these volumes, Dr. R.W. Stone and Professor H. Matsumoto, but noted that the work involved had been of such magnitude that measures should be taken to lighten the burden put on the editors. The Committee also recommended that a suggestion to merge the two volumes should not be pursued, and that the Review of Radio Science and Modern Radio Science should continue to be published separately rather than as a merged entity.

The Council approved these various recommendations. It noted that Dr. Stone agreed to continue as Editor of the Review of Radio Science, but asked the URSI Board to appoint an Assistant Editor to help Dr. Stone in his task, and in particular with the production of the diskette. Dr. Stone made arrangements with the Commissions to obtain the names of Commission editors. The Board will later appoint an Editor for MRS.

Professor Dowden proposed to produce an e-mail type of "URSI News". The Council asked him to investigate the practical feasibility of such a project.

### *8. Venue of the XXV General Assembly 1996*

As a result of the secret ballot taken on this issue, the Council accepted the invitation of the URSI Committee in France to hold the XXV General Assembly in Lille, France from 28 August to 5 September 1996. Professor H. Matsumoto and Dr. J. Hamelin accepted to act as Coordinator of the Scientific Programme and Associate Coordinator, respectively.

### *9. Future General Assemblies*

Two problems concerning General Assemblies were discussed extensively in Council, viz.

- (1) the best period in which to hold the Assembly  
The best bracket seems to be 15 June - 15 September, but narrowing the choice is difficult, given the often conflicting requirements in North America, Europe and other regions, and the desire to avoid clashes with existing Conferences.
- (2) the optimum length of the scientific part of the Assembly.  
Should the programme be compressed into a continuous sequence, say 5 or 6 days long, or should the present solution, with a weekend in the middle of the programme, be kept, given the special character of the Assembly as compared with more usual meetings?

The complexity of the problem, and the many factors involved, led the Council to conclude that a decision could not be reached without further study and collection of data. Our Union has a Standing Committee on Future General Assemblies, and the matter has been referred to that group for more specialized advice.

### *10. Book of Abstracts XXIV General Assembly 1993*

As already mentioned on page 6 of this Bulletin, the abstracts of papers presented at the General Assembly were published in a volume distributed to all participants in the Assembly. Supplementary copies are available, at the price of 12,000 Japanese Yen, from :

the Center for Academic Societies, Osaka  
14th floor, Senri Life Science Center Bldg.  
1-4-2 Shinsenri Higashi-machi  
Toyonaka, Osaka 565, Japan  
Tel. (81) 6-873-2301 / Fax (81) 6-873-2300

J. VAN BLADEL

## PROFILE OF MEMBER COMMITTEES

### DENMARK

At its meeting on 17 October 1930 the Royal Danish Academy of Sciences and Letters agreed to join URSI following a proposal by Professor P. O. Pedersen and Dr. Valdemar Poulsen. The Academy established the first national committee with Professor P. O. Pedersen as chairman at its meeting on 14 November 1930. Professor Pedersen continued as chairman until his death on 30 August 1941. During this period the Danish Member Committee hosted the URSI General Assembly in May-June 1931 and took part in the Second International Polar Year (1 September 1932 - 31 August 1933). Member of the Danish URSI Committee and Director of the Danish Meteorological Institute, Dan B. La Cour, made an important contribution as President of the Commission for this Polar Year.

During the thirties the Danish Member Committee took part in several international activities, but became dormant at the beginning of the Second World War. The Committee was revived in 1948 and, following an agreement with the Royal Danish Academy of Sciences and Letters, the responsibility for the Danish URSI Committee was transferred to the Academy of Technical Sciences. The reconstructed Committee had Professor Jørgen Rybner as Chairman.

The new Committee immediately resumed international cooperation and in 1948, following a proposal from Mr. J. Ratcliffe, made a detailed study of the Luxembourg-effect as observed in Denmark on English long wave transmissions. The following year it started observations of atmospheric radio noise in Greenland, following a proposal from Dr. R.F. Smith-Rose of the Department of Scientific and Industrial Research, Slough, England.

The next project was the establishment of an ionospheric sounder at Godhavn, Greenland, in cooperation with the Central Radio Propagation Laboratory of the U.S. National Bureau of Standards. This venture was stimulated by an URSI recommendation from 1948 to establish a chain of ionospheric observatories along the meridians 60°W and 20°E. It was also in agreement with a CCIR resolution that ionospheric observatories should be established at the Southern tip of Greenland, in the middle of the West Coast and in the Northwest corner of Greenland. The Godhavn ionosonde, established in 1951, was supported by the Danish Science

Research Council, and in 1952 was transferred to the Danish Meteorological Institute, where it was joined with the 25 year old magnetic observatory to form a geophysical observatory. The Danish URSI Committee, with Professor Rybner as Chairman, continued to be responsible for the technical and scientific sides of the ionospheric observations for several years.

The Danish URSI Committee continued to be deeply involved in ionospheric work in Greenland. In 1957 it took over the operation of the Narssarsuaq ionosonde near the Southern point of Greenland from the National Bureau of Standards, Boulder, Colorado. The Narssarsuaq ionosonde was operated on contract for the Central Radio Propagation Laboratory by the Committee until 1960 when the Danish Government took over the station, and transferred the administrative responsibilities to the Danish Meteorological Institute.

The Danish Member Committee was very active during the International Geophysical Year when it established VLF radio noise observations and riometer observations at the Geophysical Observatory in Godhavn, Greenland. The VLF observations in Godhavn were suggested by Professor M. G. Morgan as part of the US Whistlers East chain of stations. Later, in 1960, Professor Morgan proposed a conjugate pair of VLF receiving stations at Marion Island in the Prince Edward group (approximately 1000 km Southeast of South Africa and in Denmark). The Danish station was established on the island Saltholm 10 km Southeast of Copenhagen. The Marion Island station was operated by Professor N.D. Clarence of the University of Natal. The Saltholm - Marion Island stations were operated for two years. The VLF activities were funded by the Danish Science Research Council and supported by the US Air Research and Development Command.

In 1960 the Danish Member Committee was invited by the Norwegian and Swedish space committees to take part in a Scandinavian rocket programme to do ionospheric studies in the D-region of the ionosphere. The first Danish-Norwegian programme planned the launching of 5 Nike-Cajun rockets from a Norwegian base on Andoya in Northern Norway, starting in 1962. In 1961 funds were made available in Denmark for participation in the Scandinavian rocket programme and subsequently all activities of the Danish URSI Committee were collected under the umbrella of the Ionosphere Laboratory located at the Technical University of Denmark, where the staff soon increased to between 15 and 20 persons. This activity was funded by the Department of Education.



On 1 April 1963, the Ionosphere Laboratory was transferred to the Technical University of Denmark, which took over the administration, with Professor Rybner as Head of the Ionosphere Laboratory, and the URSI Committee as an advisory body for the research programme. Since then the URSI Committee has operated as an advisory and coordinating body for radio science in Denmark. A couple of symposia have been organized by the Committee, the first of which in celebration of the fiftieth anniversary of the Danish Member Committee of URSI in 1980.

In 1978 it was decided to group all the National Committees associated with the International Council of Scientific Unions under The Royal Danish Academy of Sciences and Letters, and consequently the Danish URSI Committee returned to the Academy by 1 January 1979.

Chairmen of the Danish National Committee of URSI :

Professor P. O. Pedersen	1930 - 1941
Professor Jørgen Rybner	1948 - 1967
Mr. Jens K. Olesen	1967 - 1974
Dr. Eigil Ungstrup	1974 - 1982
Professor J. Bach Andersen	1982 - 1984
Dr. T. Stockflet Jørgensen	1984 - 1990
Professor Eigil Ungstrup	1990 -

EIGIL UNGSTRUP

## REPORTS ON SCIENTIFIC SESSIONS OF COMMISSIONS AT THE KYOTO GENERAL ASSEMBLY

### COMMISSION B - FIELDS AND WAVES

Commission B organised eight sessions plus a poster session covering the theory, techniques and concepts of fields and waves. Commission B traditionally covers electromagnetic science by developing the mathematical and computational tools for analysis of electromagnetic problems. The practical uses of fields and waves are covered in both joint sessions and in many other regular conferences which URSI co-sponsors.

The Commission B Tutorial was given by Professor Y. Rahmat-Samii on "Modern Concepts in Analysis, Synthesis and Measurements of Antennas". He took as his theme the statement that antenna technology will remain a vibrant topic, rich in creative ideas through analysis and synthesis and measurement, as long as system demand persists. This was demonstrated with examples covering the spectrum of applications. Diffraction synthesis of reflector antennas for satellite communications has enabled highly efficient antennas to be built. Time domain methods are enabling the performance of complex hand-held antenna in personal communication systems. Hybrid techniques enable the scattering profile of antennas near large objects to be studied and finally advanced measurement techniques complement the ability to analyse and synthesise.

The invited papers in the session on Guided Waves (Convenors: A.H. Sihvola and R.E. Collin) concentrated on the modelling of exotic media, including bi-anisotropic and chiral media. All the other papers were well balanced. They ranged in subject from classical waveguide problems to special media effects in waveguide and confining structures (ferrites, plasmas, chiral media and bi-anisotropic media). They also ranged in frequency from static problems to optics. Five papers were given by Young Scientists and these were of a high standard.

The three invited papers in the Session on Planar Antennas (Convenors: A. Papiernik and T. Teshirogi) surveyed the present state of the art on aperture type antennas for millimetrewave applications, the effects of structures located in the vicinity of planar antennas and a review of

radial-line slot antennas. Other papers in the session dealt with planar phased array antennas and leaky-wave planar antennas.

In the session on Small Antennas (Convenors: H. Nakano and L. Shafai), three topics were addressed - the limitation of small antennas for impedance bandwidth; efficiency and antenna factor; computational aspects and performance enhancement. The computational aspects included a method of including the radiation from active devices to enable the modelling of active antennas and another discussed the difficulties in generating accurate computational data for very small antennas.

The session on Time Domain Techniques (Convenors: A. Tjihuis and R. Luebbers) was popular with considerable interest in the potential and limitations of the Finite Difference Time Domain (FDTD) technique. A comprehensive review on the work which had been done on the technique was presented by a Young Scientist Awardee. Other invited papers in the session reviewed the use of transient methods in geophysical exploration and the local spectral representations for modelling and processing of short pulses.

The largest session, Numerical Techniques (Convenors: D. Wilton and E. Yamashita), contained 22 papers and was in two parts. This reflects the large amount of work being done on computational electromagnetics throughout the world. There is growing interest in hybrid techniques which combine aspects of other techniques to solve problems which are not amenable to a single method of solution. Papers dealt with FDTD, finite element methods, integral methods, mode-matching techniques and iterative techniques. The range of computer power available is leading to the use of sophisticated methods on large computers as well as a range of simple methods for wide usage in education on PC's. The session opened with two invited papers reviewing finite element methods. One emphasised the large scale implementation and potential for the technique on computers with parallel architecture. The other showed how it could be used to solve many microwave and optical waveguide problems. Four Young Scientist Award papers were presented in the session. These covered a dual series approach to solve problems of cavity backed apertures, a mode-matching method for the analysis of dielectric resonators in rectangular waveguide, the use of FDTD for structures containing magnetised ferrites and the validation of a numerical finite integration code for scattering in two dimensions.

A session on Inverse Problems (Convenors : R. Stone and D. Lessellier) contained 18 papers covering both theory and applications. Papers reviewed diffraction tomographic inverse scattering with acoustic, elastic

and electromagnetic waves, inverse problems in electromagnetic non-destructive testing, non-linear inverse scattering, inverse problems and satellite ionosphere radio-sounding and radar holography and techniques for diffraction analysis. Inverse methods are being applied to both classical situations and sub-surface imaging. Some papers described applications and others dealt with the analytical or numerical solution to inverse problems.

In the session devoted to High Frequency Techniques (Convenors : O. Bucci and A. Nosich) an invited paper dealt with developments and problems in the subject with emphasis on GTD and its generalisations. A second invited paper was concerned with space-time geometrical optics and its possible applications. The contributed papers covered a variety of subjects, including the mathematical aspects of the asymptotic expansions of diffraction integrals, the use of Gabor expansions for the representation of high frequency fields and the comparison and validation of various asymptotic methods.

The final session on Wave propagation and Enhanced Backscattering in Random Media (Convenors : A. Ishimaru and V.I. Tatarskii) still attracted about 40 people and an active discussion was held. Among the 11 papers presented, 8 papers dealt with rough surface scattering, enhanced back-scattering and wave localizations. Also presented were papers dealing with the effects of random media on targets, the velocity of propagation, fractal media and enhanced scattering by gratings.

The papers in the Poster session (Convenors : F. Gardiol and A.D. Olver) covered the whole range of Commission B activities, including topics which were not presented in the oral sessions, such as aspects of the analysis and design of horn and reflector antenna systems. Most of the papers had been chosen to complement the oral sessions in cases where the material lent itself more to individual discussion between author and audience.

Commission B also participated in 6 joint sessions. In all cases the main organisation was done by the other Commissions. The joint sessions were:

Time domain metrology (Commissions A and B. Convenors : S. Riad and K. Itoh)

Antenna measurements (Commissions A and B. Convenors : S. Adachi and M. Kanda)

Propagation and modulation in personal radio communications (Commissions C, B, E and F. Convenors : L. Lopes, P.A. Watson, J. Shapira, J.C. Bic and T. Manabe)

Field propagation and coupling to structures (Commissions E and B. Convenors : M. Ianoz and F.M. Tesche)

Imaging with adaptive antennas and spatial signal processing (Commissions J and B. Convenors : T. Cornwell and B. Steinberg)

Computational electromagnetics in biology and medicine (Commissions K and B. Convenors : J.C. Lin and S. N. Hornsleth)

A.D. OLVER  
Chair, Commission B

## **COMMISSION E - ELECTROMAGNETIC NOISE AND INTERFERENCE**

Commission E organized 1 tutorial lecture, 7 individual sessions with 46 contributions, 7 joint sessions with 56 contributions. In total 103 oral presentations were given on behalf of Commission E and joint commission sessions. The total number of posters registered was 34, however only 10 were displayed.

Authors of 12 registered papers included into the GA Abstracts did not appear at their sessions and the corresponding papers were not presented orally.

The joint sessions have been organised with the following commissions : Commission A : Electromagnetic Metrology, Commission B : Fields and Waves, Commission C : Signals and Systems, Commission D : Electronics and Photonics, Commission F : Wave Propagation and Remote Sensing, Commission G : Ionospheric Radio and Propagation and Commission H : Waves in Plasma.

### *General Remarks*

It has been recognised that authors skilled in presentation technique and with the ambition to establish an active contact with the audience succeeded very well to create a lively follow-up discussion after their presentations. It would be interesting to have more presentations of a similar kind in the future.

In my opinion, every author performing an oral presentation should feel deeply obliged to do his best in conveying his message to the audience. Authors with some problem in doing so should choose a poster presentation where they may conduct a person-to-person discussion with interested scientists without following a tight time schedule as expected in oral presentations.

The convenors should be encouraged to direct questions to an author when no questions are raised from listeners. This could initiate a discussion and expose the items of general or specific interest.

The invited authors have demonstrated in their presentations and in the follow-up discussions profound knowledge in their specific field of research. This assessment includes the scientific level of invited young scientists who in the future General Assemblies should participate as integrated members of sessions, side-by-side with senior scientists.

### *E-Tutorial*

#### *Telecommunications At The Cross Roads ; R.D. Parlow, USA*

The session covered a number of key topics that are having a profound effect on the development of national, regional and international telecommunications which depend on the radio spectrum as well as guided systems. Here included among other things : digital technology and efficient modulation techniques, connection of computers - local area networks, LAN - and communication systems, mobile and wireless, low earth orbit satellites, LEOS, high definition TV, HDTV and national/international regulatory charges. The tutorial was well attended by over 90 people, the lecture room was actually too small. This suggests that the tutorial format provides a very efficient mean of communicating a broad range of ideas and of providing a survey on the status of key telecommunications developments. Tutorials provide a good platform for experts to put difficult and urgent topics into perspective for both the researchers and the engineers.

#### *E1 - Extra Terrestrial Meteorologico-Electric Environment ; H. Kikuchi, Japan*

Scientists from six countries participated as authors in this session with strong contributions from Russia and the Ukraine. Some 40 listeners attended the session.

The session was encouraged and organised by the newly established Working Group E7 on "Extraterrestrial and Terrestrial Meteorologico-Electric Environment with Noise and Chaos".

Phenomena involving cosmic, atmospheric, meteorological, and laboratory discharges, ionisation, and/or electrification containing charged dust grains or aerosols have been considered and described in terms of "dusty" or "dirty" plasmas applying a new gravito-electrodynamics, self-gravitational plasma dynamics, electrohydrodynamics, EHD, and/or electromagneto hydrodynamics, EMHD whose development just started and can not be described by the classical plasma theory.

A number of new observations and theories of dusty plasmas in extraterrestrial and terrestrial environments and in the laboratory were reported, including some basic common problems in mathematics and physics.

Interactions of large and small scales of spatio-temporal structures associated with noise, fluctuations, and chaos in turbulent dusty plasmas should be understood on the basis of new concepts of self-organisation and chaos, and described in terms of new statistical approaches to non-linear and turbulent processes.

A new term "Critical Kikuchi Velocity" was introduced for the understanding of the origin of charge in field vortices.

### *E2 - Terrestrial Electromagnetic Environment ; M. Hayakawa, Japan*

Scientists from eight countries participated as authors in this session. The session was encouraged and organised by Working Group E4 on "Terrestrial and Planetary Electromagnetic Noise". Some 40 listeners attended the session.

Different kinds of terrestrial electromagnetic noise were treated extensively. A summary of observed characteristics on "winter lightning" in Japan was presented, showing the extreme vulnerability of electric power systems to these lightnings and indicating special meteorological conditions which generate these lightnings. An experimental approach of triggering lightning by laser beams from high towers was displayed and a lively follow-up discussion was initiated by this presentation.

The terrestrial VLF and ELF radio noise environments were discussed by several authors. Stanford Radiometer measurements have provided significant contributions to the statistical evaluation of the global

distribution of the VLF and ELF noise environment. Strong ELF evening emission events were observed by Russian scientists. A new method of using the "tweek sferic" to determine the propagation length and calculate the ionospheric height was proposed and direction finding of "tweek sferics" was described. An extensive summary of power line harmonic radiation has been given, indicating the importance of the power line harmonic radiation on the ionosphere and the magnetosphere. A new method of identifying structured emissions is proposed using the basis of neural networks. Two resonant modes of the lower ionosphere were reported. They could be due to the acoustic excitation of the ionosphere arising from volcanoes or by passing large space craft through the ionosphere.

It was stressed that certain frequency bands should be preserved for scientific studies in the ELF/VLF range, if studies of natural noise background are to remain feasible in the future.

*E3 - Planetary Lightning and Related Phenomena ; W.J. Borucki, USA*

Scientists from three countries, with strong dominance from the USA, participated as authors in this session.

The session was encouraged and organised by Working Group E1 on "Spectrum Management and Utilisation". Approximately 60 people attended this session with a reasonable number of questions and exchange of views resulting from the presentations.

This session provided an overview of technical, regulatory and scientific subjects concerned with management and utilisation of the radio spectrum. It provided an opportunity for exchange of views between scientific and national regulatory authorities.

The topic, "Spectrum management and utilisation" should be embedded in all next General Assemblies.

The requirement of today's society to achieve highly mobile information services - both terrestrial and satellite will become a serious challenge to spectrum managers.



*E5 - High Power Electromagnetics ; R.L. Gardner, USA*

Scientists from three countries participated as authors in this session. The session was encouraged and organised by Working Group E3 on "High Power Electromagnetics".

Six papers were presented in this session covering different aspects of high power electromagnetics. An attempt was made to develop the theory for non-linear phenomena associated with the impact of high power electromagnetic impulses on a conductive target. A high power narrow beam antenna design and fundamental theory were displayed. A theoretical consideration of beam dispersion and energy absorption of high power electromagnetic impulse transmission through the ionosphere were reviewed with an attempt for possible application in transmission of energy from space based solar energy generating stations. A concept of using a microwave transmit-receive tube as a HPM-protective device was experimentally justified.

*E6 - Electromagnetic Topology for Electro-Magnetic Interference Analysis and Control ; C. Baum, USA*

Scientists from four countries participated as authors in this session. The session was encouraged and organised by Working Group E5 on "Interaction with and protection of complex electrical systems".

The principles of electromagnetic topology and different levels of modelling of complex interaction in electrical systems have been outlined and illustrated by several application examples. The advantages of topological formalism was clearly displayed. It was stressed that recently issued standards for transient protection do not specify the transient properties of components such as filters, waveguides, and shielding materials and it is not possible to evaluate their transient responses from narrow-band insertion loss data. So a transient response of barrier elements is needed. The state of the art in the field of analytical treatment of non-uniform multiconductor transmission lines, NMTLs with the intention to incorporate these models in the electromagnetic topology models has been displayed. It has been shown that it is possible to extend the BLT equation (Baum - Lin - Tesche 1991) to the case of NMTLs and thereby allowing the analytic treatment of realistic electronic systems.

*E7 - Coupling To Multiwire Cables ; F.G. Canavero, Italy*

The session was encouraged and organised by Working Group E5 on "Interaction with and Protection of Complex Electrical Systems".

Scientists from six countries participated as authors in this session. The session was encouraged and organised by Working Group E4 on "Terrestrial and Planetary Electromagnetic Noise".

Different aspects of electromagnetic coupling to multiconductor lines, telecommunication cables, cable bundles and to microwave integrated circuits using transmission line modelling method and also some simplified formalistic procedures. The papers were of high quality, however the time schedule was very tight. In spite of it the discussion was very lively.

*EA - Electromagnetic Metrology Applied To EMC ; E : P. Degauque, France ; A : M. Kanda, USA and K. Astani, Japan*

Scientists from five countries participated as authors in this session. The session was encouraged and organised by Commission A and the Working Group E5 on "Interaction with and Protection of Complex Electrical Systems". Eight papers were presented in this session, which was attended by about 30 to 40 persons. The quality of the papers was reasonably good, except two. The main problem of the session was the disagreement between the title of the session and the content of the contributions. Only four papers were in the area of "metrology". It may be recommended for the future to avoid session structures with three convenors.

Application of the Time Domain Reflectometry (TDR) for accurate measurement of material constants like permittivity and permeability, non-linear filter characteristics and local impedance variations have been proposed. Measurement techniques of the transfer impedance of multiwire shielded cables at frequencies up to 1 GHz have been discussed. Measurement accuracy of electric fields from multiple-source, multiple-frequency antennas used in telecommunications were described and different disturbing parameters analysed. The shielding effectiveness for transient interference has been studied and a 1  $\mu$ s wide impulse with controlled rise and fall times was proposed for this type of measurements. The use of electrically small loops and dipole antennas is proposed. A review of practical engineering measures for a systematic control of interference in high voltage laboratories was presented.

*EB - Field Propagation and Coupling to Structures ; E : M. Ianoz, Switzerland ; B : F.M. Tesche, USA*

Scientists from six countries participated as authors in this session, which was encouraged and organized by Commission B and the Working Group E5 on "Interaction with and Protection of Complex Electrical Systems".

Nine invited papers were presented in the oral session and one contributed paper was displayed as a poster. The papers were of good quality. A new model of calculating the electromagnetic induction from lightning in overhead lines using the horizontal component of the electric field was presented and a comparative evaluation of different calculation methods was made. Numerical modelling of a lightning protection system of a building was demonstrated. The method is based on a general field approach. The current distribution and solution of the integral equation was calculated with the help of the method of moments. An approach procedure based on transmission-line theory is introduced for calculation of induced over voltages on a transmission line in complex configuration. A new set of coupling equations with only magnetic excitation field was discussed. Only magnetic field measurements were needed to evaluate the induction voltages. Time and frequency domain wave splitting approach to transmission along a non-uniform LCRG-line was described using wave splitting formalism. A theoretical model on scattering of incident plane waves by buried objects was described where dispersion of the incident radiation can be used to identify the existence of buried objects in the soil. A study of the susceptibility of high voltage multiconductor lines to fast transient electromagnetic impulses was presented with the aim to identify the most harmful effects to EM-induction.

*ED - Susceptibility of Electronic Devices to Electrical Transients and Their Response under Extreme Operation Conditions ; E : V. Scuka, Sweden and B. Demoulin, France ; D : T. Itoh, USA*

The session was encouraged and organized by Commission D and the Working Group E6 on "Effects of Transients on Equipment".

Scientists from seven countries participated as authors in this session. Nine invited papers were presented in the session. The papers were of good quality. Twenty to thirty people attended the session and the discussion was limited by the available time frame. A new method of experimental study of charge carriers in semiconductor power devices was presented. The method allows sub- $\mu$ s and sub- $\mu$ m resolution in time

and space. A two-dimensional theoretical description of numerical simulation of electrothermal effects of ESD-transients on semiconductor devices was given and disturbing effects of transients on digital integrated circuits were experimentally investigated. High speed logic has been found to be less sensitive than low speed logic, however the supply current impulse during the switching operation contributes to the generation of an additional disturbance. The dynamic output resistance of the device must be known to solve the equations of the semiconductor junctions in non-linear regions to obtain the response of the device. A simple method by which the identification of transient susceptible components in a device can be performed was described. The circuit board is mapped using a radio frequency transmitter loop antenna of small dimensions to identify the sensitive component which has to be replaced and improved.

The antenna re-radiation effects of passive earthed metallic constructions, such as metallic rods, have been investigated theoretically and experimentally to determine the unwanted interference with active antennas on structures. The interference problems originating from the effects of space environmental electrostatic charging of satellites and their components have been described. It is expected that the use of VLSI circuits in the future will enhance these problems. The session ended with a very interesting report on modelling of sub-micrometer devices for very high frequencies. The topic may in some way reflect the problems displayed in the earlier report on simulation of thermal effects in semiconductor components.

*EF - Radio Noise Above 50 MHz ; E : E.K. Smith, USA ; F : E.R. Westwater, USA*

The session was encouraged and organised by Commission F and the Working Group E4 on "Terrestrial and Planetary EM Noise".

Eight invited papers from the USA were presented in this session. The papers were of very good quality. The speakers were all good, well prepared, and competent in the English language. About 77 people attended the session.

The World Administrative Radio Conference, WARC-92, made available for mobile satellite services and other services a number of frequency allocations in the band above 50 MHz. Difficulties and complexities associated with developing the frequency allocation procedures and criteria have been described. Active and passive microwave remote sensing of precipitation using airborne multi-

frequency radiometry and dual-polarisation radar was described. Vertical hydrometer profiles were compared against those determined from the coincident CP-2 radar observations. The hybrid model demonstrated reasonable agreement with the radar-derived surface rain rate. Thermal emission from atmospheric water vapour disturbs sensitive remote sensing of the earth surface from satellite based instrumentation. Temporal power spectra have been presented to illustrate the differences between clear and cloudy conditions. A limited ground based network of radiometers at 20.6 (water vapour) and 31.65 GHz (liquid water in the cloud) with separations ranging between 50 and 190 km was used for these observations.

The interference problems with the 404 MHz wind profile radars constituting a network of thirty units in central USA were described. These two types of equipment are an excellent complementary tools for investigation of the oceans surfaces.

Numerical radiative transfer (RT) models are essential to the development of atmospheric and surface passive remote sensing techniques. Investigations using an iterative planar-stratified RT model applicable from 1 to 1000 GHz are described.

*CBEF - Propagation and Modulation in Personal Radio Communication ; C : L. Lopes and P.A. Watson, UK ; B : J. Shapira, Israel ; E : J.C. Bic, France ; F : T. Manabe, Japan*

The attendance at the session was about 60 people at the beginning, but later dropped to about 45. All papers were well timed, which allowed 2 to 3 questions to be asked. The quality of the papers was good. In the poster session two out of seven registered papers were presented. These papers were also of good quality and the interest for the papers was good. The session treated different aspects of communication problems related to personal communications such as GHz wave propagation into urban buildings, the use of antenna diversity in wireless communication systems, multi-path interference modelling and 3D wave propagation modelling.

V. SCUKA  
Chair, Commission E

## REPORTS ON URSI-SPONSORED MEETINGS

### VERY HIGH ANGULAR RESOLUTION IMAGING

*11-15 January 1993, Sydney, Australia*

This IAU Symposium, co-sponsored by URSI, was held at the University of Sydney with the Scientific Organising Committee co-chaired by J. Davis and R.D. Ekers and the Local Organising Committee chaired by W.J. Tango. The meeting, which attracted 207 participants from 16 countries, was opened by the Chancellor of the University of Sydney.

In recent years several meetings have been held to discuss very high angular resolution imaging but these have generally been confined to a limited region of the electromagnetic spectrum. This meeting was the first specifically intended to bring together specialists in the field of high angular resolution interferometry and imaging, from radio to optical wavelengths, and to provide them with a forum for discussing instrumentation, techniques and problems. In particular, the aim was to promote the cross-fertilisation of ideas across the spectrum. Only time will tell how successful the meeting was in achieving this aim but there was certainly a good representation of researchers from the optical, infrared, millimetre, and radio domains. From several papers presented at the symposium it was clear that optical and infrared interferometry is making rapid progress. Imaging at these wavelengths with separated apertures, as distinct from aperture mask interferometry on large telescopes, is close to being demonstrated with the aid of techniques developed in the radio regime.

To ensure that the major areas and topics were covered, the program of the meeting was arranged around 40 invited talks - these were divided between the whole days on Monday and Friday and the mornings of Tuesday to Thursday inclusive. The sessions each had a theme and these included : Radio/Optical Comparisons ; Transfer of Techniques ; Imaging Techniques ; Radio Array Instruments ; Optical-IR Interferometers and Arrays ; Impact of Technology I : Radio and mm ; Impact of Technology II : Optical and IR ; Adaptive Optics ; Aperture Distributions ; Astronomy ; Frontier Techniques ; and Future Prospects. There were 94 contributed papers which were presented as posters. These were divided into two groups. The first group included mostly papers on instruments and techniques, which were displayed for the first two days of the Symposium, and the second group included mostly papers on seeing, adaptive optics and results of high angular resolution

imaging, which were displayed on the third and fourth days. A half day was devoted to each group of poster papers to allow time for viewing and for the presentation of summaries by appointed reporters. The SOC selected some 9 of the contributed papers to be presented as short oral reports as well as posters. A discussion session was held on detectors for the optical and infrared regions and the meeting concluded with a discussion session in which a number of issues were addressed by a panel made up of J.E. Baldwin, T.J. Cornwell, R.D. Ekers and C.H. Townes and chaired by V. Radhakrishnan.

The social aspects of the meeting were not neglected and included a reception with a performance by an aboriginal dance group (who managed to get several participants to perform with them !), a mid-conference afternoon cruise on Sydney Harbour, a night at the Sydney Opera House for a performance of *La Bohème*, a Public Lecture by Nobel Laureate C.H. Townes and a symposium dinner at the 1000ft high Centre Point Tower restaurant with views of Sydney and its magnificent harbour.

Additional sponsorship for the meeting was provided by the Australia Telescope National Facility, the Science Foundation for Physics within the University of Sydney, the Astronomical Society of Australia, the Donovan Trust, and the Australian Government Department of Industry, Technology and Commerce.

The proceedings, edited by J.G. Robertson and W.J. Tango, will be published by Kluwer.

J. DAVIS

## INTERNATIONAL CONFERENCE ON COMMUNICATIONS

*23-26 May 1993, Geneva, Switzerland*

"Communications - Technology that Unites Nations" was the theme of this IEEE Communication Society meeting, co-sponsored by URSI, and held in the International Conference Centre in Geneva (Switzerland). This theme corresponded very well with the meeting place where many United Nations agencies and other international organizations usually arrange their gatherings. The General Chairman was Professor P. Leuthold (ETH Zurich) and the Technical Program Committee was chaired by Professor J. Massey (ETH Zurich).

The conference program covered the whole spectrum of modern communications :

- communication software
- communication switching
- communication systems engineering
- communication theory
- computer communications
- data communications systems
- interconnection within high speed digital systems
- multimedia services and terminals
- network operations and management
- optical communications
- quality assurance management
- radio communications
- satellite and space communications
- signal processing and communication electronics
- signal processing for recording
- transmission systems

The program featured about 360 contributions selected from more than 800 offers submitted. The papers were presented at four parallel technical sessions, 54 in total. The keynote address : "Mobile Satellites and the Shrinking Planet" was offered by Mr. O. Lundberg (Director General INMARSAT). "The Benefits of Coding in Space and Everyday Communications" was the title of Professor J. Hagenauer (German Aerospace Research Establishment) speech at the Awards Lucheon. Dr. P. Tarjanne (Secretary General, ITU) gave a talk on "Communications Technology and the United Nations" at the Conference Banquet.

The following tutorials and workshops, offered on 27 May, complemented the conference program :

- adaptive antennas and equalization in wireless systems
- advances in satellite and space technologies
- all-optical networks : challenges
- ATM technology : compatibility for local and wide area metropolitan networks
- error performance specifications for digital transmission systems
- fiber to the home
- global system for mobile communications (GSM)
- high-speed data communications over the local cable networks
- intelligent and integrated management of messaging networks
- intelligent networks
- ITU standards : processes for standards approval
- modelling and simulation of wireless communications



- radiowave propagation measurements and modelling for personal communications
- telecommunication management network (TMN) and subnetwork management

An exhibition organized during the conference gathered 22 communication firms, editors and other entities interested in communications. A social program included a wide choice of attractions like boat cruise on the lake or excursion to the heart of the Swiss Alps.

With a total of about 1.400 participants registered, this was a quite successful conference with regard to the current economic situation. About 500 persons came from the United States, 200 from the Far East countries like Japan, China and South Korea. The participation from Europe was modest (200 from Switzerland, 100 from Germany, few from East European countries). URSI supported the participation of two young scientists, from Turkey and the USA.

A limited number of copies of the Conference Proceedings of the ICC'93 are still available for SFr. 120 plus SFr 34.50 packing and surface mail cost (SFr. 97.50 air mail). The proceedings comprise 3 volumes, about 600 pages each, but do not include the material presented at the tutorials and workshops. The proceedings can be ordered from :

Mr. J. Kemper, Institut für Kommunikationstechnik, ETH Zentrum, 8092 Zurich, Switzerland, Fax +41 1 262 09 43

R.G. STRUZAK

## MEETING ANNOUNCEMENTS

### CLIMATIC PARAMETERS IN RADIOWAVE PROPAGATION PREDICTION

*31 May - 3 June 1994, Moscow, Russia*

The purpose of this URSI-sponsored meeting is to use presentation sessions and workshop sessions to exchange ideas and information between three scientific communities :

- Those conducting radiowave propagation measurements and/or related ground-based remote sensing of the atmosphere (e.g. of precipitation, precipitable water, cloud liquid water, refractive index, etc.) and concerned with preparing climatic maps of parameters relevant to the prediction of radiowave propagation characteristics, notably through the Radiocommunications Sector of the ITU, ITU-R and URSI.
- Those performing research in atmospheric physics using numerical techniques relevant to precipitation, cloud physics, mesoscale modelling, global circulation models (GCMs), hydrology, climatology, etc. notably through the WMO's World Climate Programme (WCP), GEWEX, Global Precipitation Climatology Project (GPCP), International Decade for Natural Disaster Reduction (IDNDR), etc.
- Those concerned with related space-borne remote sensing of the atmosphere using both active and passive instruments.

The meeting is to be held at the Russian Institute for Radiowave (NIIR) in Moscow, and presentations and workshops are expected to be in three main areas :

#### *Clear air*

- Modelling and climatic parameters needed
- Data available, measurements still needed and instruments available

#### *Precipitation*

- Data available, measurements still needed and instruments available
- Modelling and climatic parameters needed

#### *Mapping processes*

Copies of synopsis of contributions offered should be mailed/faxed to be received before 31 December at the address below. They should cover no more than one sheet of A4 paper, but give sufficient information to enable an objective assessment to be made by referees. Synopses should indicate the appropriate topic, as indicated above. First-stage Registration forms are available for those seeking further information. The meeting and papers will be in English.

For further information, contact :

Mr. M.P.M. Hall  
CLIMPARA'94  
Rutherford Appleton Laboratory  
Chilton, Didcot, Oxon  
OX11 0QX  
United Kingdom  
Phone (44) 235 446 650  
Fax (44) 235 446140  
E-mail : mpmh@ib.rl.ac.uk

## **INTERNATIONAL SYMPOSIUM ON SOLAR TERRESTRIAL PHYSICS**

*5-10 June, 1994, Sendai, Japan*

The international science programme STEP (Solar Terrestrial Energy Programme) has now entered its active phase. Intense research activity in solar physics centering around FLARES 22 and SOLERS 22 and massive international collaborative studies of the middle atmosphere and thermosphere featuring ground based networks of instruments and the UARS satellite are now well under way. In addition, with Akebono, Yohkoh and Geotail now in orbit, and the launch of important probes such as Freja, Interball, Wind and Polar being imminent, a great deal of data pertaining to the solar-terrestrial interaction and magnetosphere-ionosphere coupling may be expected over the next two years. Together with the coordinated ground based, rocket and balloon measurements planned over the next little while, it is clear that space measurements will lead to data acquisition and interpretation which will lead to great progress over the next couple of years. It is just this exciting period which leads up to the Eighth Quadrennial STP Symposium dedicated to STEP, to be held in Sendai, Japan from June 5-10, 1994. The programme

of the Symposium consists of seven components of activity corresponding to STEP. :

- (i) The sun as a source of energy and disturbance
- (ii) Energy and mass transfer through the interplanetary medium and the magnetosphere ionosphere system
- (iii) Ionosphere thermosphere coupling and response to energy and momentum inputs
- (iv) Middle atmosphere response to forcing from above and below
- (v) Solar variability effects in the human environment
- (vi) Informatics
- (vii) Data handling, modeling and simulation

The five day conference consists of invited and contributed oral presentations as well as contributed poster papers for the whole field of the STEP related solar terrestrial physics.

The deadline for submission of abstracts is 20 February 1994.

For additional information, please contact

Professor H. OYA  
Department of Astronomy and Geophysics  
Tohoku University  
Aoba, Aramaki  
Sendai 980  
Japan

## **CONFERENCE ON PRECISION ELECTROMAGNETIC MEASUREMENTS**

*27 June - 1 July, 1994, Boulder, Co. USA*

The purpose of the biennial meetings of CPEM is to exchange information on a wide range of topics on precise electromagnetic measurements. These topics include :

- Advanced instrumentation including new sensors and measurement methods
- Automated measurement methods
- Dielectric and antenna measurements
- Direct current and low-frequency measurements
- Fundamental constants and special standards
- Laser, optical fiber, and optical electronic measurements
- RF, microwave, and millimeter-wave measurements

- Superconducting and other low-temperature measurements
- Time and frequency measurements

The Conference chairman is Donald B. Sullivan, and the chairman of the Technical Program Committee is Allen C. Newell. Both are with the National Institute of Standards and Technology, 325 Broadway, Boulder.

CPEM'94 will be extended to five days to provide for added special sessions on the fundamental constants. The CODATA Task Group on Fundamental Constants plans to carry out the next least-squares adjustment of the fundamental constants in 1995 with a cutoff date for input data that is shortly after CPEM'94. Thus, CPEM'94 provides a particularly timely forum for discussion of results important to the 1995 adjustment.

The conference language will be English. Authors are requested to submit an abstract and summary by 18 January 1994. Please request an author kit which describes the format for the abstract and summary. If the paper is accepted, the author will be notified and encouraged to prepare a full paper for the IEEE Transactions on Instrumentation and Measurement.

The meeting is co-sponsored by URSI through its Commission A. For further information, please contact :

Gwen E. Bennett, Conf. Secretary  
Natl. Inst. of Standards & Technology  
325 Broadway  
Boulder, Colorado, USA  
Telephone : (01) 303-497-3295  
Telefax : (01) 303-497-6421

## **INTERNATIONAL GEOSCIENCE AND REMOTE SENSING SYMPOSIUM - IGARSS'94**

*8-12 August, 1994, Pasadena, CA, USA*

The IEEE 1994 International Geoscience and Remote Sensing Symposium (IGARSS'94) will be held jointly with the Optical Society of America (OSA) and URSI at the California Institute of Technology, Pasadena, California, USA.

IGARSS'94, the fourteenth of its kind, will provide extensive forums for technical presentations on modeling, instrumentation, experimentation and interpretation. The theme of IGARSS'94 recognizes recent progress in development of coupled land-ocean-atmosphere models to represent the geophysical and human processes shaping our planet, and the need for remote sensing instruments and techniques to provide data for such models, in addition to the traditional roles of remote sensing in environmental research, resources, and monitoring.

The technical sessions will be coordinated to provide a comprehensive, well-balanced program of contributed and invited papers, covering topics of general and special interest. Plenary and special sessions will be organized to focus on the symposium theme. A special working session called "User's Guide to Data" is also being organized. Authors are encouraged to submit papers on all subjects of interest to the IEEE Geoscience and Remote Sensing Society, URSI Commission F, and OSA. The general topics listed below are intended as a guide. Suggestions for special sessions on topics of particular interest, such as field experiments, geophysical events, new areas of research or technology, etc., are encouraged, and should be submitted to the attention of the Technical Program Chairman (IGARSS Business Office) for consideration prior to October 1, 1993.

#### SUGGESTED TOPICS FOR IGARSS'94

- Remote sensing in earth system modelling & applicators
  - Model requirements for remotely sensed data
  - Parameters & indices for environmental monitoring
  - Spatial & temporal sampling requirements
  
- Application of remote sensing & modeling to earth system science, environmental monitoring & planetary studies
  - Ocean & ice dynamics
  - Atmospheric processes & dynamics
  - Earth radiation budget
  - Terrestrial surface moisture & energy balance
  - Marine biogeochemistry
  - Terrestrial ecosystems
  - Tectonics and geophysics
  - Topography/surficial processes
  - Land cover change
  
- Research in electromagnetic & remote sensing techniques
  - Theoretical models & prediction

- Atmospheric sounding
  - Modeling & measurement of propagation effects
  - Propagation through random media
  - Rough surface & volume scattering
  - Surface sensing & inversion
  - Inverse problems in atmospheric profiling
  - Scattering & emission from ocean & land surfaces
  - Surface imaging & classification
  - Radio meteorology & oceanography
  - SAR Interferometry & polarimetry
  - Optical/infrared imaging spectrometry
  - Lidar techniques
  - Telecommunications studies
- Integration of surface & atmospheric remote sensing
    - Coupled land surface-atmosphere models
    - Air-Sea Interaction Models
    - Synergistic use of remotely sensed data
  - Calibration, information extraction, & analysis techniques
    - Sensor calibration & performance verification
    - Retrieval & estimation methods, neural networks
    - Visualization & interactive data analysis
    - Geographic information systems
    - Information management & data extraction
  - Spaceborne & airborne missions, programs, instruments, & field experiments

Papers should be submitted to the

IGARSS Business Office  
2610 Lakeway Drive  
Seabrook TX 77586-1587 - USA  
Telephone : 713.291.9222 Facsimile : 713.291.9224  
E-mail : stein@star.harc.edu

Deadline : 10 December 1993

Limited funding is available for partial support of the travel expenses of student authors. To qualify for Student Travel Stipends, the applicant must be the first author and a full-time student. *The student must be a member of GRSS, OSA, or URSI, or have a letter of endorsement from a member of one of these societies.*

## **INTERNATIONAL SEMINAR ON MATHEMATICAL METHODS IN ELECTROMAGNETIC THEORY**

*7-10 September 1994, Kharkov, Ukraine*

The fifth MMET is sponsored and organized by the Institute of Radiophysics and Electronics of the Ukrainian Academy of Sciences and is co-sponsored by URSI through its Commission B.

The Conference will be chaired by Dr. Eldar Veliev, co-chairman will be Professor Oleg Tretyakov and Dr. Vladimir Veremey. The working language is English. Suggested topics are :

- Scattering and Diffraction : Numerical Methods, Asymptotic Methods, Inverse Scattering, Diffraction Gratings and Periodic Structures, Canonical Problems, Frequency-Selective Surfaces.
- Antennas : Theory and Design, Reflector Antennas, Millimetre-Wave Antennas.
- Waveguides : Theory and Design, Open Waveguides

Typed summaries of original papers related to one of the suggested topics must be sent in three copies to :

MMET-94  
Institute of Radiophysics and Electronics  
Ukrainian Academy of Sciences  
12 ac. Proskura st.  
Kharkov 310085  
Ukraine

Deadline for Submission of Summaries : 30 November 1993.

## **INTERNATIONAL CONFERENCE ON COMPUTATIONAL ELECTROMAGNETICS AND ITS APPLICATIONS**

*1-4 November 1994, Beijing, China*

Sponsored by the Chinese Institute of Electronics, and co-sponsored by URSI, the ICCEA '94 will be chaired by Professor Weigan LIN, with Professor Shizi LI as Programme Chairman.



The conference provides an opportunity to present new ideas and exchange current work on a wide variety of topics :

Methods of Computational EM : Moment Method, Finite Element Method, FDTD Method, TLM Method, GTD/UTD/PO Analysis, Other Methods.

EM Theory and Wave propagation : Theoretical EM, Nonlinear EM Waves, EM Fields in Complex Media, Rough Surfaces, Superconductivity, Chirality.

Applications : Low-Frequency Techniques, High-Frequency Techniques, Bioelectromagnetics, EMC/EMI, CAD/CAE, MIC/MMIC, Mobile Communications, RCS Calculations, Superconductor and Chiral Materials, Antennas, Optical Fibers, Subsurface Radar.

The Programme Committee invites original papers addressing any of the above areas. Please submit three copies of a 400-500 word summary to :

Professor Shizhi LI  
Chairman TPC  
Department of Electronic Engineering  
Beijing Institute of Technology  
P.O. Box 327  
Beijing 100081  
P.R. China  
Tel. (86-1) 841-6688/2613  
Fax (86-1) 841-2889

Deadline for submissions of summaries : 31 December 1993.

## **JOURNÉES INTERNATIONALES DE NICE SUR LES ANTENNES - JINA 94**

*8-10 November 1994, Nice, France*

The working languages of this Conference, which is co-sponsored by URSI, are French and English. Suggested topics are :

- EM theory
- Analytic and numerical techniques
- Scattering and inverse scattering problems
- Interaction and coupling
- CAD and expert systems

- Antenna synthesis and optimization
- Reflector antennas
- Radiating elements and associated circuits
- Frequency selective surfaces
- Multifrequency and/or wideband antennas
- Millimeterwave antennas
- Array antennas
- Beamforming
- Adaptive and signal processing antennas
- Active and integrated antennas
- Microstrip antennas
- Satellite antennas
- Earth station antennas
- Antennas for mobiles
- Industrial applications
- Medical applications
- Measurements and instrumentation

Special topics :

- Radar cross-section
- Nonlinear effects in antennas

Typed summaries of original papers related to one to the suggested topics must be sent in three copies by March 1, 1994 to Secretariat JINA 94, at the address

Secrétariat JINA 94  
CNET - PAB Centre de la Turbie  
06320 LA TURBIE - France  
Téléfax +33 93 41 02 29  
Télex 470159 F

Summaries (2-3 pages) in French or English must include the title and authors' names and complete addresses. If several names are mentioned, please underline the name of the main author, to whom all correspondence will be addressed.

Summaries must contain sufficient information (motivation, goals, originality, methods used, realizations, validation, etc.) to enable an objective and rapid assessment by the Program Committee.

Authors whose summaries are accepted will be notified by the end of May 1994. At this time, they will receive authors' kits with full instructions for the final typescript. Completed papers must be received by the Secretariat before, July 15, 1994.

## ASIA PACIFIC MICROWAVE CONFERENCE

*6-9 December 1994, Tokyo, Japan*

The fifth APMC will be held at the Nippon Convention Center (Makuhari Messe). It is co-sponsored by URSI. The main Conference topics are :

1. Solide state devices and circuits
2. GaAs FET, HEMT, HBT and other devices
3. Low-noise devices and techniques
4. High-power devices and techniques
5. Microwave and millimeter wave monolithic circuits
6. High-speed digital circuits
7. Microwave measurement for gigabit devices
8. Opto-electronic techniques
9. Microwave and millimeter wave packaging
10. Passive devices and circuits
11. Microwave superconductivity
12. Electromagnetic field theory
13. Ferrite devices
14. Microwave acoustics
15. Millimeter wave and submillimeter wave techniques
16. EMC/EMI
17. Scattering and propagation
18. Microstrip antennas
19. Measurement theory and techniques
20. Computer aided design
21. Microwave and millimeter wave systems
22. Microwave terrestrial, satellite and mobile communication systems
23. Microwave industrial applications
24. Microwave medical/biological applications
25. Phased and active array techniques
26. Remote sensing

Paper summaries must be received by 10 June, 1994. Notice of acceptance or rejection will be mailed by 10 August, 1994. Manuscripts should be submitted to :

Prof. Masami Akaike  
Chairperson, Technical Program Committee  
c/o REALIZE INC.  
2-16-13 Yushima, Bunkyo-ku  
Tokyo 113, Japan  
Tel. (81) 3-3815-8590  
Fax (81) 3-2815-8939

For further information, please contact :

Prof. Shizuo Mizushina  
Chairperson, Steering Committee  
c/o REALIZE INC.  
2-16-13 Yushima, Bunkyo-ku  
Tokyo 113, Japan  
Tel. (81) 3-3815-8590  
Fax (81) 3-3815-8939

## **INTERNATIONAL SYMPOSIUM ON FUTURE TELECOMMUNICATIONS AND THE ELECTROMAGNETIC ENVIRONMENT (COMMSPHERE)**

*12 - 15 December 1994, Eilat, Israel*

COMMSPHERE is an international forum of concerned leading scientists, experts and administrators for discussion of the future of telecommunications and other Electromagnetic radiation usages in view of the growing congestion of the spectrum.

The conference is structured for three days of plenary sessions and discussions, half a day multiple workshops, and a summary plenary session. Extended summaries will be published at the symposium. Workshops and discussions summaries will be published three months later.

Suggested topics :

Integrated wireless access networks

- Services and networks
- Air interface trade-offs

Spectral efficiency, cost commensurate with the service, power levels and interference, cell size vs. infrastructure

- Network architecture

MSS and LEO communication satellites - systems, interference and coordination.

- Systems and services
- Interference, regulations and coordination

Communication for the developing countries - needs, accumulated experience and opportunities.

- Survey of communication needs in developing countries
- Experience accumulated - case studies
- Future plans and opportunities

Radio astronomy and the EM environment

- Tutorial of Radio Astronomy science and tools
- Radio astronomy coordination with communications and other EM activity

Spectrum management policies and the future of telecommunications

- Spectral allocations policies and their impacts
- Spectral coordination and monitoring

Chairman : Joseph Shapira

Organizing committee: Les Barclay, Paul Delogne, Joseph Shapira

Venue: Eilat is located on the tip of the Eilat / Akaba (Eastern) finger of the Red Sea. The city, which has its own airport, borders Egypt and Jordan, and is close to Saudi- Arabia. It is one of the best places for scuba diving. The surrounding is an imposing granite and sand stone desert. December is high season in Eilat.

For details, contact

Dr. Joseph Shapira  
President, Qualcomm Israel  
73 Hanitah Street, Suite 6  
32446 Haifa, Israel  
Tel. 972-4-327372, 225592=20  
Fax 972-4-225592  
Residence phone 972-4-251653

## **OTHER MEETINGS WHICH HAVE BEEN BROUGHT TO OUR ATTENTION**

- International Seminar on Electrodynamics of Chiral and Bianisotropic Media  
12-14 October 1993, Gomel, Belarus

- International Astronautical Congress  
16-22 October 1993, Graz, Austria  
For information, contact :  
W. Riedler  
Space Research Institute, Austrian Academy of Sciences  
Inffeldgasse 12, A-8010 GRAZ, Austria  
Tel. (43) 316.465721, Tel. (43) 316.463697
  
- Advanced Technologies in Instrumentation and Measurement  
(IMTC94), 10-12 May, 1994, Hamamatsu, Shizuoka, Japan  
For information, contact :  
Research Institute of Electronics  
Shizuoka University, 3-5-1 Johoku  
Hamamatsu 423, Japan  
Tel. (81) 53-471-1171  
Fax (81) 53-474-0630
  
- Symposium on VLSI Technology (7-9 June, 1994) and VLSI  
Circuits , (9-11 June, 1994), Honolulu, Hawaii  
For information, contact :  
Secretariat (USA)  
Widerkehr and Associates  
Suite 610, 1545 18th Street, NW  
Washington, DC 20036 USA  
Tel. : +1-202-986-1137  
Fax : +1-202-986-1139  
  
Secretariat (Japan)  
c/o Business Center for Academic Societies Japan,  
Conference Dept.  
5-16-9 Honkomagome, Bunkyo-ku  
Tokyo 113, Japan  
Tel. : +81-3-5814-5800  
Fax : +81-3-5814-5823
  
- International Symposium on Electromagnetic Compatibility  
13-16 September 1994, Rome, Italy  
For information, contact :  
EMC'94 ROMA - Prof. Mauro Feliziani  
Department of Electrical Engineering  
University of Rome "La Sapienza"  
Via Eudossiana 18 - 00184 Rome (Italy)  
Tel. : +39 6 44585.809/4825380  
Fax : +39 6 4883235

## NOUVELLES DE L'UIT

### *Message de la Journée Mondiale de la Normalisation*

14 octobre 1993

Management de l'information - plus vite et mieux grâce aux normes mondiales par MM. John A. Hinds, Président de l'International Standardization Organization ; Hans Gissel, Président de la Commission Electro-technique Internationale et Pekka Tarjanne, Secrétaire général de l'UIT

La circulation de l'information, comme les courants commerciaux, rencontre de moins en moins d'obstacles politiques. L'ISO, la CEI et l'UIT prêtent leur concours pour empêcher que ces derniers ne soient remplacés par d'autres d'ordre technique. Souscrivant aux développements intervenus dans des accords commerciaux pour des échanges multilatéraux, les trois organisations offrent le cadre idoine pour des normes agréées mondialement dans le domaine des technologies de l'information.

Grâce à l'élaboration proactive de Normes internationales par l'ISO, la CEI et l'UIT, les conditions sont réunies pour assurer la compatibilité de produits et services de différentes provenances dans le monde, encourageant une interopérabilité universelle des systèmes de management de l'information. En conséquence, du fait des normes mondiales des technologies de l'information, la communication et le commerce sont facilités et plus ouverts au plan international.

Des réalisations antérieures, telles que l'interconnexion des systèmes ouverts (OSI), les travaux actuels et futurs sur des aspects des technologies de l'information, tels que l'échange de données informatisé et le codage des images animées et du son associé (MPEG), prouvent que l'ISO, la CEI et l'UIT sont très à l'écoute des besoins du marché d'aujourd'hui.

Les mondes de l'informatique et des télécommunications poursuivant leur fusion, les utilisateurs actuels veulent être en mesure de combiner et d'assortir librement des produits informatiques de différents fournisseurs, au moment même où les progrès en technologies numériques nous propulsent à la veille d'une nouvelle génération de produits et services multimédia.

Personne ne peut, sans se tromper, prédire toutes les incidences que des machines combinant le téléphone, la télévision, la télécopie, l'ordinateur, le photocopieur et la caméra vidéo auront sur nos activités et nos loisirs.

Par contre, nous pouvons affirmer avec certitude qu'il en résultera une jungle électronique, à moins de canaliser, de manière productive, cette mutation extraordinaire à l'aide de Normes internationales.

Gestion de réseaux et interopérabilité sont parmi les principales exigences du marché actuel des technologies de l'information. Les Normes internationales élaborées par l'ISO, la CEI et l'UIT répondent à ces exigences en favorisant un consensus mondial sur des aspects tels que les architectures, les protocoles et les vocabulaires, ce qui permet à des produits de différents fournisseurs et pays de "dialoguer" et contribue à assurer une compatibilité future.

Grâce aux Normes internationales, le fabricant et le consommateur sont dans une position de gagnant. Le fabricant voit baisser le coût de la recherche en vue de satisfaire aux exigences de différents marchés nationaux et se profiler à sa portée l'assise d'une clientèle internationale potentielle. Le consommateur, en revanche, dispose d'un plus grand choix de produits compatibles et tire profit de la concurrence entre des fabricants qui cherchent à répondre à ses besoins.

Ce cocktail vertigineux de choix est maintenant possible grâce aux progrès réalisés dans des domaines tels que la microélectronique, l'informatique et la photonique qui multiplient par deux le puissance de traitement et la rapidité du transfert de données tous les 12 à 18 mois.

Mais les ressources offertes par de telles prouesses resteront largement inexploitées sans une gestion efficace. Cela signifie non seulement "plus" - en offrant plus d'informations au plus grand nombre - mais aussi "plus vite en mieux" : en rendant l'accès facile et rapide à des données spécifiques demandées par l'utilisateur, selon ses désirs.

Les Normes internationales élaborées par l'ISO, la CEI et l'UIT donnent les moyens de gérer l'explosion de l'information et de maîtriser son potentiel de façon harmonieuse et efficace.



## FROM THE ARCHIVES OF URSI

*The Bulletins of September 1953, November 1953 and September 1983 contain only routine information. The same is not true of those of September 1963 and 1973, from which we shall quote liberally.*

### **Bulletin of September 1963**

This Bulletin contains the text of the resolutions adopted at the 1963 Tokyo General Assembly. It is not realistic to reproduce them in their entirety. Three items, however, are of potential interest to the reader, even thirty years later :

- (1) Commission III's name was changed to "on the ionosphere" (from "an ionospheric radio")
- (2) Commission IV's name was changed to "on the Magnetosphere" (from "on radio noise of terrestrial origin")
- (3) the organization of solar-terrestrial research within ICSU was discussed as follows :

"The ad hoc Committee appointed to advise the Executive Committee on the future organization of U.R.S.I. reports as follows :

1. Both in U.R.S.I. and I.U.G.G. there have grown up groups of active young workers concerned with closely related subjects such as aeronomy, the ionosphere, upper atmospheric physics, geomagnetism, solar physics and the like, which now form a unified and rapidly growing field of science which is here called solar-terrestrial physics. Separate parts of these subjects tend, at present, to be dealt with not only by U.R.S.I. and I.U.G.G. but also by I.A.U., I.U.C.I. (the Inter-Union Committee on Solar and Terrestrial Relations), I.U.P.A.P. (the International Union on Pure and Applied Physics, through its Cosmic Ray Commission), and COSPAR. All these bodies come under I.C.S.U.  
Solutions to problems of radio wave propagation depend on the whole of this branch of science.
2. The workers in solar and terrestrial physics feel themselves to constitute a coherent group, and if this rapidly developing field of science is to develop properly they feel the need for a more unified home in the I.C.S.U. organization. Evidence of this need is contained in a resolution of I.U.C.I. and a letter from the Chairman of I.U.C.S.T.R. The Committee is informed that one or more Commissions of U.R.S.I. will pass similar resolutions at the General Assembly. Likewise the General Assembly of I.A.G.A.

(International Association of Geomagnetism and Aeronomy, an Association of I.U.G.G.) drafted the following Resolution which has similar implications : " The Association of Geomagnetism and Aeronomy requests its Executive Committee to appoint a committee to study and discuss with other bodies within the framework of the I.C.S.U. the most appropriate and suitable organization of the broad and rapidly developing field of Solar and Terrestrial Physics".

3. If U.R.S.I. acts promptly it can play some part in determining how the necessary re-organization is made. A solution of the problem is so urgent that if U.R.S.I. takes no action now the necessary re-organization will almost certainly take place, without reference to U.R.S.I.
4. The necessary re-organization could come about through the transfer of the appropriate subjects of study to
  - (a) an organization closely allied to U.R.S.I., or
  - (b) a new Union.
5. The Executive Committee recommends that the General Assembly of U.R.S.I. be asked to pass the following Resolutions :
  - (i) The General Assembly of U.R.S.I. *recognising* the need to provide, within the structure of I.C.S.U., an organization which will bring together the closely allied subjects of ionospheric physics and aeronomy, geomagnetism, solar physics and the like (solar-terrestrial physics for short), *authorizes* the Board of Officers to establish a Committee charged with the following terms of reference :
    - (a) to investigate how to establish, within the structure of I.C.S.U., an Organization which will bring together the closely allied subjects of ionospheric physics and aeronomy, geomagnetism, solar physics and the like, and will provide the most efficient means for development, discussion and exchange of information, data and research,
    - (b) to consider the achievement of this objective through the possibility of a continuing organization closely linked with U.R.S.I.,
    - (c) to report within one year.
  - (ii) The General Assembly of U.R.S.I. *authorizes* the President, when he has received the report of the Committee mentioned in Resolution (i), to call an extraordinary meeting of the Executive Committee and the General Assembly as may be necessary.

- (iii) The General Assembly of U.R.S.I.  
*recognising* the need to unify the international discussions of solar-terrestrial physics, even before any organizational changes can take place in the structure of the Unions involved,  
*resolves* that it will approach other I.C.S.U. organizations to establish the principle that scientific discussions on solar-terrestrial physics will be held only in collaboration and at joint meetings.
- (iv) The General Assembly of U.R.S.I.  
*recognising* in the spirit of resolution (iii), that the next General Assembly of U.R.S.I. should be associated with a Scientific Symposium on topics in solar-terrestrial physics, and that this Symposium should be conducted by U.R.S.I. jointly with one or more other international bodies,  
*intends* that the next General Assembly should be associated with a scientific symposium on some aspect of solar-terrestrial physics run in conjunction with some other international body. "

Finally, the 1963 Bulletin contains a note announcing that the Van der Pol medal has been awarded for the first time. The beneficiary was Professor Martin Ryle, radio astronomer from Cambridge University. Exceptionally, a second medal had also been awarded, in casu to Mr. E. Herbays (for services rendered to URSI).

### **Bulletin of September 1973**

This Bulletin contains an interesting note on a planned reorganization of URSI. The text runs as follows :

#### " 1. — Introduction

At the General Assembly of URSI in August 1972, the Board of Officers was authorised to examine the internal structure of the Union and to recommend modifications designed to stimulate its scientific activities, and also to ensure a proper balance between the different aspects of these activities. During the last year, the Board has discussed these questions at two meetings and by correspondence. It has also been considered what action could be taken to coordinate the activities of URSI Commissions III, IV and VIII and those of IUGG with particular reference to the branches of geophysics in which both URSI and IUGG have a common interest.

The purpose of this document is to report on the progress made during the past year and to invite comments from the Member Committees of URSI, and from individuals who are interested in any branch of radio science.

## 2. — General Assembly 1972

For many years URSI has been active in several branches of geophysics : namely investigations of the magnetosphere and the neutral and ionized components of the upper atmosphere. Since these subjects are also of interest to IUGG, the Union having the principal responsibility for geophysics, the problem of coordinating the activities of the two Unions has given rise to much discussion. In an attempt to resolve this problem, a proposal was made for the creation, under the joint auspices of URSI and IUGG., of a Union on the Earth's Environment ; this Union was intended to incorporate radio science, as in URSI, and also all the branches of geodesy and geophysics, as in IUGG.

This proposal was unanimously rejected by the General Assembly in 1972 because it was considered that scientists concerned with radio science and communication science, with which URSI has always been concerned above all, would not enjoy full freedom of action in a Union primarily responsible for geophysics.

The Assembly decided instead that URSI should retain its status as an independent Union and, therefore, its freedom to decide how to divide its activities between, on one hand, the fundamental aspects of radio wave propagation and telecommunications and, on the other, the applications of radio methods in astronomy, geophysics, biology, etc. The Assembly recognised, however, that there was a need to give a fresh stimulus to the scientific activities of the Union and it asked the Board of Officers to examine how this could be achieved by making internal changes in the structure of the Union.

## 3. — Scientific Activities of URSI

In March 1973 the Board made preliminary examination of the activities of Commissions III, IV and VIII and Prof. Booker reported on the exchanges of views he had had with the Chairmen of these Commissions. It seemed clear that, for various reasons, it would be difficult to make any decisions concerning the future role of these Commissions considered in isolation. In view of this the members of the Board are now giving increasing attention to plans for the reorganisation of the scientific activities of URSI as a whole, and not to those of individual Commissions. In parallel with the discussions between Prof. Booker and the Chairmen of Commissions III, IV and VIII, Prof.

Migulin has been asked to consult the Chairmen of the other five Commissions which are not concerned with upper atmospheric physics.

It is worth noting in passing that, for historical reasons, Commission VIII deals with certain aspects of the magnetosphere (whistlers) and with radio noise (its characteristics and its effects on communication systems). When the activities of Commissions III, IV and VIII are grouped together in the context of this document, the radio noise activities of Commission VIII should be excluded.

In any consideration of the future role of URSI, two separate but related questions require consideration :

- (1) what branches of radio science and communication science should, in future, be included in the scientific programme of URSI, and is it desirable to extend URSI's traditional field of radio waves to cover also optical and acoustic waves and their use in telecommunications and remote sensing ?
- (2) what is the optimum distribution of effort and resources in URSI between, on the one hand, the science underlying the generation and propagation of electromagnetic waves and their use in telecommunications and, on the other, the applications of radio science in astronomy, geophysics, biology, etc. ?

Neither of these questions has yet been answered in detail. However, Prof. Booker and M. Voge have independently, and at different times, submitted for discussion tentative outline plans for URSI's future field of activity. It is interesting to note that these plans are completely consistent with each other. Taken together, they appear to provide a useful basis for further discussion on how to answer the two questions posed above.

#### 4. — Distribution of effort

Opinions tend to be divided over the role that URSI itself should play in the exploitation of radio methods in other branches of science and especially in the applications of remote sensing techniques.

Experiments on the propagation of radio waves through an ionized or a non-ionized medium can be used to provide information about :

- (a) the way in which the wave is modified in its passage through the medium (attenuation, scattering, scintillations, etc.), and
- (b) the physics of the medium itself (structure, composition, dynamics, etc.)

The first type of information is primarily the concern of the radio scientist and it has important applications in communication science. The second type of information is important to the geophysicist who will

often employ not only radio but other methods in compiling data about the medium he wishes to study.

The URSI Board tends to feel that URSI should, as far as possible, concentrate on questions related to the propagation of radiation and that studies of the physics of the medium should be the responsibility of IUGG (for upper and lower atmospheric physics) or of IAU (for astronomical media). This division of responsibilities has been successfully achieved by URSI Commission II and IUGG (IAMAP) in work on the lower atmosphere, and also by URSI Commission V and IAU in radio astronomy. There are difficulties in making a satisfactory division of this kind when dealing with the ionosphere/magnetosphere complex and some thought is being given to the creation of inter-Union Working Groups equally responsible to URSI (Commissions III, IV and VIII) and to IAGA.

The past contributions of radio scientists to research in astronomy and in the physics of the upper and lower atmosphere have been very important. However, it is essential to remember that these had their origin in research on the more fundamental aspects of radio science : generation, propagation and detection of electromagnetic waves, theory and design of antennas, development of new electronic devices, etc. At the last General Assembly, the Finance Committee commented on the fact that expenditure on basic radio science (Commissions I, VI and VII) during the period 1969-71 was only a quarter of the expenditure on activities relating to the ionosphere and magnetosphere (Commissions III, IV and VIII). A similar distribution of funds has emerged for the first allocations that have been made for the period 1973-75.

Warsaw Recommendations C.4 referred to the desirability of ensuring a proper balance between the different aspects of the scientific activities of URSI and of introducing some new activities. The Board has agreed to make financial provision for new topics but finds it difficult to decide what criteria should be used to define a proper balance between the various activities. Opinions are divided between two approaches to this problem which are based on different point of view, outlined below :

- (1) The vitality of URSI must depend on the emergence of new ideas in basic radio science which may later be applied either in disciplines that are the concern of other Unions (astronomy, geophysics, biology, etc.) or in communication science, which has been the concern of URSI since its foundation. It is concluded that insufficient support is begin given at present to basic radio science (11%) as compared to geophysics (70%) and that steps should be taken to expand and develop URSI's activities in radio science and communication science.

- (2) Much of the activity in URSI at present is centred on the physics of the ionosphere and the magnetosphere and the present high level of activity in these fields should be supported and maintained. In dealing with these regions, an overlap between the activities of URSI and IAGA is inevitable but steps should be taken to minimise the resulting problems as far as possible. The comparatively small expenditure incurred by the Commissions concerned with basic radio science is due to the relative lack of interest in these fields, and hence a lower level of activity, and it is not due to the higher expenditure on geophysics.

## 5. — Activities of Commissions

The URSI Working Group on Reorganisation (1970) recommended that consideration be given to the controlled admission of individual scientists as members of URSI, in addition to the Member Committees. Since then, this possibility has been discussed by the URSI Council in 1972 and by the Board in March 1973.

The principal reason in favour of the admission of individuals is that it would encourage a greater sense of personal participation, in the affairs of the Union, on the part of individuals and especially of the younger scientists. They would have the opportunity of participating in the activities of one or two Commissions or Working Groups concerned with topics in which they have a personal interest.

At present an URSI Commission covers a very wide range of subjects and it would be difficult or impossible for an individual to take an active interest in all of these. It is for this reason that the Board is considering the creating of a larger number of Commissions. The Statutes permit the establishment of small Working Groups, with selected membership, within Commissions and these already allow concentrated attention to be given to particular tasks or problems in several Commissions.

No proposals have yet been made as to the number of Commissions that should be created in 1975. It has often been asserted that the present Commission structure is too rigid and that the objectives of the Commissions themselves are often too diffuse and ill-defined. These criticisms would no longer be valid if there were a larger number of Commissions, each having a series of fairly well-defined objectives, and subject to review at every General Assembly. The Council has the power to create and abolish Commissions and to decide on their terms of reference but has not made use of it since 1966 in view of the discussions on reorganisation which were initiated in 1969.

In conclusion, it is worth recalling that the most constructive initial approach to the internal reorganisation of URSI appears to be a careful study of the various branches of radio science and the selection of those that seem to be most appropriate to the future activities of the Union. The choice of subjects should not be restricted or influenced by the field covered by the present Commissions."

The text shows that the problem of individual membership, mentioned repeatedly in the most recent issues of this Bulletin (and again on p. 9-10 of this issue), was already on the agenda of URSI twenty years ago. The September 1973 Bulletin also presents the position of the Union on another recurrent topic, co-sponsorship of scientific meetings. The text runs as follows :

- "(1) For each meeting, an international Programme Committee shall be established comprising representatives of the country or the organisation that issues the invitation, and also of URSI and other interested organisations.
- (2) The Programme Committee will be responsible for planning the scientific programme, for selecting the speakers and for ensuring that the quality of the scientific programme is worthy of sponsorship by a scientific Union.
- (3) The Committee must avoid the choice of topics that have recently been discussed at other international meetings or that will be discussed at such meetings in the near future.
- (4) Adequate financial support for the main expenses of the meeting must be available from national resources. In cases where a supplementary grant is made by URSI, the amount will be decided by the Board of Officers.
- (5) In view of the undesirably large numbers of isolated and inaccessible volumes containing papers presented at symposia etc., it is recommended that the papers be published (on the initiative of the individual authors) in existing scientific periodicals or (following the completion of arrangements between the organising committee and a publisher) in a special issue of a periodical.
- (6) It is considered desirable to stimulate interest in science in developing countries by holding meetings in them, provided that this is practicable and that attention is given to the problems of overall cost and foreign exchange."