U.R.S.I.

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OBITUARIES

MARIO BOELLA

1905-1989

As sadly announced in the March 1989 issue of the Bulletin, Professor Mario Boella, Vice-President of URSI from 1966 to 1969 and President of the Italian URSI Committee for many years, died on 16 February 1989 at Loranze Canavese, near Ivrea, Piedmont. He was born in Genoa on 31 January 1905.

It is worthwhile to recall, for the benefit of the readers of the Bulletin, his long and keen association with URSI, because in this Union he saw an outstanding collection of the best scientists operating all over the world, particularly of experimental researchers in the "radio" field. In this context, he also solicited many of us - in his town and all around Italy - to take an active part in the work of URSI and to take advantage of the enlargement of the scientific domain as decided by the Union over the years, especially after the Second World War.

The name of Professor Boella appeared for the first time inside URSI at the VIth General Assembly, Venice 1938, when Sir Edward Appleton,President of URSI, at the beginning of the conference, numbered him among other distinguished scientists of the Italian school of radio science, and again at the end of the same conference, during the session held at the CNR headquarters in Rome.

Afterwards he attended many General Assemblies, such as Stockholm 1948, Zurich 1950, Sydney 1952, The Hague 1954, London 1960, Tokyo 1963, and participated in general sessions and special meetings in the fields of propagation and measurements. He was a member of the Special Committee for the International Geophysical Year (first meeting in Brussels, June/July 1953) and also of the URSI Committee for the IGY, established in The Hague in 1954. Various URSI documents on specific research topics were signed by him, starting with Stockholm 1948.

Having graduated in 1927 in industrial engineering (electrotechnical branch) at the Politecnico of Turin, in 1929 he was engaged as a researcher in Livorno at the IERT (Institu-

to Elettrotecnico e Radiotelegrafico della Marina) founded in 1916 by G. Vallauri and already internationally known for its scientific work. Vallauri himself was his master: together with other distinguished scientists, such as Carrara and Vecchiacchi, Boella accomplished his basic scienrific training, together with a solid technical preparation, favoured by his outstanding experimental ability.

In 1930 he began his work on quartz crystals, a subject on which he worked later with particular success: by means of two papers published in "L'Electtrotecnica", he explained the behaviour of Pierce's two schemes and described a new scheme. These papers were integrally reproduced in the Proc. IRE in 1931 and the latter paper was also particularly quoted by F.E. Terman in his "Radio Engineer's Handbook" (1943).

In 1932, the review "Alta Frequenza" was founded in Turin and its founder, Prof. Vallauri, invited Boella to take part in the Drafting Committee: he therefore began a new onerous, but useful, activity whereby he enlarged and improved his culture in the broad scientific domain covered by the new review.

In 1933 he obtained the so-called "libera docenza" in radiocommunications and also began his university teaching activity.

Among various technical and scientific activities, we note an interesting work on the behaviour of high resistances at high frequencies. Due to its originality, on the initiative of a group of British researchers, particularly of Dr. O.S. Puckle, in 1935 the name of "Boella effect" was given to this phenomenon. Incidentally, this effect is still quoted in a reference contained in the last URSI "Review of Radio Science", printed in 1987 (Huang, 1986).

In 1935 he concluded another important work on the direct measurement of the h.f. loss conductance of condensers, later favourably commented on in the review "Electronics" and in other foreign publications. Another paper on the measurement of the equivalent resistance of oscillatory circuits was published in 1935 in "Alta Frequenza": it also contained an ingenious device to obtain an adequate stability to overcome the rather imperfect instrumentation available at that time.

In April 1938 he published another paper in the Proc. IRE on the loss conductance of condensers at high frequencies; this was a new and improved method developed from that of 1935.

Meanwhile, he designed and built metric wave naval transmitters and receivers, for short distance radio links.

In June 1938, as Italian delegate, he took part in the IEC Plenary Meeting held at Torquay, England, where the confirmation of the Giorgi System was declared. However, his main activity was devoted to the design and construction of an apparatus for high-precision frequency generation and measurement and to the development of new very high-stability piezoelectric standards.

The former awakened much interest among the eminent scientists convened in Venice for the above mentioned VIth URSI General Assembly and was in fact completed at the end of this same year. Due to the war, the paper describing the apparatus was published only in 1945 in "Alta Frequenza", after ascertaining that, in spite of the time elapsed, it was still new: this is probably the best scientific result obtained by Boella. Of course, he applied to the generation of standard frequencies the same decadic concept so well known in the voltage and resistance fields, obtaining both high accuracy and sure and easy recognition of the frequency line selected each time. Similar instruments existed but were typically uncertain in their use. Now we can speak of it as the first example of a precision frequency synthesizer. An improved version of this apparatus, utilizing four identical panels in cascade to produce the selected output frequency was later published as Doc.186, at the IXth General Assembly of URSI, held in Zurich in 1950. The output frequency approximated the standard input frequency within 2×10^{-8}.

Other papers followed on the subject of standard oscillators: the principle of neutralizing the quartz capacity in piezooscillators anticipated another contribution by W.P. Mason and L.E. Fair and the relative paper is quoted by Cady in his book on "Piezoelectricity", 1946.

Meanwhile he tutored various young researchers at the IENGF, founded in 1934 by Prof. Vallauri, and was himself later transferred to this Institute. Then, he shared his time between teaching activity at the Politecnico of Turin and his consulting position at the Communications Department of the IENGF. Concerning the former, he held two courses, on "Propagation and Antennas" and on "Radio Transmitters" respectively.

Then he began to advise and assist students with their theses and, in 1945, he became Head of the IENGF Communications

Department, which was at that time engaged in applied research on r.f. heating.

Meanwhile, resuming his activity on frequency standards, he installed a new standard of excellent stability at the IENGF in 1946. In this way, he also observed an interesting phenomenon of frequency fluctuation in the received carriers of the WWV signals, referred to during the URSI Stockholm General Assembly (doc. N°172) in 1948.

The main activity of the group led by him during that period concerned the generation, broadcasting and measurement of standard frequency and time signals, in cooperation with URSI and the CCIR. In May 1951, the first Italian frequency and time standard experimental 5MHz station was opened. Its power was later increased and its broadcasting time extended (IBF), operating in the same frequency band as the other five stations active at the time and recorded by the CCIR. The same year, as preannounced in Zurich, 1950 (Doc. N°155), under his leadership the research group at the IENGF, in liaison with the laboratories concerned and their leading scientists (namely Dr. J.H. Dellinger of the RCA, Dr. Newbern Smith, W.D. George and E.L. Hall of the NBS, Dr. R.L. Smith-Rose, Dr. L. Essen and J. McA. Steele of the NPL, Dr J.J. Vormer and L.R.M. Vos de Wael of the Dutch PTT and Dr. B. Decaux of the LNR), for the first time measured the time delay of standard time signals along the transatlantic round trip Turin-Beltsville/Washington D.C. (about 6700 km) on 5 and 10 MHz. The WWV standard signals, received in Turin on such frequencies, were retransmitted with a short and calibrated delay and the overall time was measured in the USA. Interesting results were obtained, not only for the time measurements carried out with an unhoped for accuracy, but also for the unexpected number of hops along the ionospheric path. Afterwards, Boella wrote me a letter from Sydney (URSI, 1952), saying that these results were particularly welcome, because there was a general lack of similar experimental information on long and very long paths. This coincided with the request of Dr. P. Lejay, a well-known specialist in the ionosphere who later became President of URSI. A short report was published as URSI Doc. N°326 at Sydney, 1952, a more extended version as CCIR Doc. N° 176 in London, 1953, and later on in extenso a paper in the review "Alta Frequenza".

Meanwhile, at the end of 1948, on the unanimous proposal of the Engineering Faculty at the Politecnico of Turin, he was assigned to the Chair of Electrical Communications (including

Radio Engineering).

In 1949 Boella was also entrusted with the direction of a new Television Centre, founded by the CNR at the IEN, which - although small - gave just at the beginning a noticeable contribution to the choice of monochrome television system to be established in Italy.

From this time on, he shared his activity between teaching at the Politecnico of Turin and research, firstly at the IENGF and later on at the Politecnico itself.

In 1962, he opened the degree course in electronic engineering, one year before the same course opened in other Italian universities. He directed the Electronics Department until his retirement in 1975, calling on many distinguished young graduates, now professors in the various electronics fields. This degree course now has a student population amounting to about 30/40% of the overall population attending the Faculty of Engineering.

At his request, on 1 November 1962, Professor Boella was transferred to the Chair of "E.M. Fields and Circuits", following the research domain that he had chosen in the meantime.

He was active both as researcher and as Director, until the end of 1975, of the CNR Centre founded by him in 1958 and called CESPA (Study Centre for Propagation and Antennas).

In this position, as a teacher he was particularly involved in the organization of the courses on electromagnetic theory and its applications (such as antennas, microwaves, wave propagation and so on). In research, his main interest concerned antenna problems, mainly of the types involved in the new and advancing field of satellite communications.

Professor Mario Boella, at the beginning of his long scientific career, can be considered to belong to the third generation of Italian radio scientists, the first being that of Guglielmo Marconi and the second, the generation of Giancarlo Vallauri.

With the progress of time, Boella dedicated his energies to bringing on young and promising people, so as to cover all the possible branches of the rapidly growing electronics domain.

Over thirty years or so, he promoted international

scientific cooperation and stimulated his collaborators to attend the relevant international meetings and to spend adequate periods of time in foreign laboratories, in order to coordinate common initiatives, to improve their preparation and to reach the best possible knowledge and evaluation of themselves in relation to others.

For all this we are all deeply indebted to him and mourn over the death of a Master and a Friend.

Turin, April 1989 Prof, C. EGIDI

HAROLD EVERARD MONTEAGLE BARLOW, F.R.S.

1899-1989

It is with great regret that we record the death on 20 April 1989 of Professor Harold Barlow. Harold Barlow was a pioneer in many aspects of microwave engineering, and built up an exceptionally strong research school at University College London. His links with radio go back to the Fleming era, since it was Fleming who gave him his first academic post at UCL. He carried out research using radio techniques very early in his career, and in particular studied Ohm's law at very high current densities in this way, at a time when the techniques were in their infancy. During the 1939-45 war, Barlow was recruited to the Royal Aircraft Establishment in Hampshire, where his interest in microwaves was aroused. By the end of the war, he had risen to be Head of the Radio Department, and so had little time for direct involvement in the scientific details of the work. It was a great pleasure to him on his return to UCL to have once more the opportunity to research and to teach in an academic environment again, and to develop fully his interest in microwaves. At last he could devote time to personal research, and through this to lead and inspire the research school mentioned earlier. He was always very conscious of the value of the radio frequency spectrum, and recognised

it as a scarce resource, to be used when necessary but not squandered. For this reason, he strongly advocated the use of guided waves for point-to-point transmission and led a major research programme on low-loss circular electric mode waveguide transmission. In parallel with this he carried out extensive researches on surface waves. These researches were recognised by URSI through the award to Barlow in 1969 of the J.H. Dellinger Gold Medal, recognition which must have given him immense pleasure. Apart from these two aspects of his work, he always had an interest in measurements, and his research included methods of measuring microwave power by various means, including radiation pressure, radiation torque, and Hall effect. His growing reputation led to his involvement in many external activities, and one of those closest to his heart was URSI. He was a member of the UK Member Committee of URSI, and became widely known in the URSI community, especially after the highly successful 1960 General Assembly which was held in London at University College, and which was exceedingly fruitful. He was appointed Chairman of the UK Member Committee of URSI in 1968. His interest in research never waned, and it was entirely characteristic of him that when waveguide was overtaken by optical fibre he at once took up this new line of research with equal enthusiasm, and continued working at it and publishing papers long after his retirement in 1967.

He was a frequent attender at URSI General Assemblies and Electromagnetic Wave Symposia, and his informal but beautifully clear style of lecturing was greatly appreciated. Always approachable, he thoroughly enjoyed discussing microwave matters, and retained his enthusiasm to the end. He had the most attractive characteristic of regarding staff and students alike as friends and colleagues in the pursuit of knowledge. He is survived by his wife Janet, whose attendance at URSI events will be warmly remembered, and by three sons and a daughter. To them all we extend our deepest sympathy. Harold Barlow will be sadly missed as a great engineer and a perfect gentleman.

A.L. CULLEN

XXIII General Assembly of URSI
28 August - 5 September 1990

Provisional Scientific Programme

The organization of the scientific programme of the General Assembly as a whole is the responsibility of the Coordinator and the Associate Coordinator.Each URSI Commission will hold scientific symposia dealing with those topics within its scope that are of special current interest. In addition, as in the past, joint symposia will be organized by two or more Commissions on selected important topics of common interest. The programme will also include Tutorial Lectures, one in each of the Commissions, and three General Lectures of interest to the broad URSI community. A Symposium on the Interaction of Electromagnetic Fields with Biological Systems is being jointly organized by URSI and the Bioelectromagnetics Society (BEMS).

GENERAL LECTURES

- Electromagnetic Fields and the Essence of Living Systems, W. Ross Adey (USA);
- Scientific and Technological Research from Manned Space Platforms, O.K. Garriott (USA);
- Revealing the Invisible Universe, R.D. Ekers (Australia).

TUTORIALS

Commission A: Electromagnetic Quantities, Units and Standards in a Changing SI, B. Kibble (UK);
Commission B: Solution Techniques in Electromagnetic Field Problems, S. Ström (Sweden);
Commission C: Nonlinear Networks and Chaos, L. Chua (USA);
Commission D: Biophoton: New Bio-information from Ultraweak Photon Emission in Life and Biological Activities, H. Inaba (Japan);
Commission E: What is the Scientific Approach to EMC Control and Vulnerability? C. Baum (USA) and D. Hansen (FRG);
Commission F: URSI and the International Geosphere-Biosphere Programme, W.E. Gordon (USA);

Commission G: The Ionosphere from Space, P. Bauer (France);
Commission H: Simulation Technology for Plasma Wave Research, J.W. Eastwood (UK);
Commission J: Polarisation, V. Radhakrishnan (India).

URSI-BEMS SYMPOSIUM ON THE INTERACTION OF ELECTROMAGNETIC FIELDS WITH BIOLOGICAL SYSTEMS

This Symposium will be held on 28-31 August 1990 as part of the URSI General Assembly. Participation in the Symposium is open to any interested scientist.

The programme is being planned in cooperation with the Bioelectromagnetics Society (BEMS), the WHO Collaborating Centre for the NIR, the Czech Technical University and the J.E. Purkyne Czechoslovak Medical Society, through its Biomedical Engineering and Industrial Medicine Societies.

The Steering Committee is composed of J. Musil (Czechoslovakia), Chairman of the Programme Committee, K. Hansson-Mild (Sweden), Vice-Chairman of the Programme Committee, and J. Bach Andersen (Denmark), URSI-BEMS Coordinator.

The Programme Committee includes scientists from Argentina, Bulgaria, Canada, Czechoslovakia, Denmark, France, F.R. of Germany, German D.R., Hungary, Italy, Japan, Poland, Sweden, United Kingdom, USA and USSR.

The programme will consist of invited papers (oral presentation) and contributed papers (poster sessions predominantly).

J. Musil, J. Bach Andersen, K. Hansson-Mild

See Call for Papers on p. 17.

JOINT SYMPOSIA

These Symposia include one or more half-day sessions organized by two or more Commissions on a topic of common interest.

Please note that letters in parentheses indicate the participating Commissions, and underlined letters the organizing Commission. The Joint Symposia for which contributed papers are solicited are marked (*) and those for which poster papers

are solicited are marked (**). For further information, consult the Call for Papers and Symposia Description section on p. 18.

Deadline for submission of abstracts: 15 February 1990.

JS.1(*)(**) Wave and turbulence analysis techniques (C,G,H,J)
Convenors: F. Lefeuvre (France), W. Kofman (France), P. Thomasson (UK), S. Basu (USA).

JS.2(**) Radio propagation in the ionosphere and magnetosphere: theory and application (G,H)
Convenors: K.C. Yeh (USA), I. Kimura (Japan).

JS.3(**) Theory and computer experiments of plasma processes (G,H)
Convenors: B. Lembège (France), S.L. Ossakow (USA).

JS.4(*)(**) VLF triggered emissions (G,H)
Convenors: Y. Omura (Japan), D. Nunn (UK).

JS.5(*)(**) Predictability of solar-terrestrial weather and its ionospheric impact (G,H)
Convenor: E.P. Szuszczewicz (USA).

JS.6(*)(**) Effects of high power radio waves in the ionosphere and magnetosphere (G,H)
Convenors: M.T. Rietveld (Norway), P. Bernhardt (FRG).

JS.7(**) The radio planets (G,H,J)
Convenors: D. Jones (UK), D.O. Muhleman (USA), I. Hanacz (Poland).

JS.8(*)(**) Magnetospheric and ionospheric effects of lightning (G,H)
Convenors: U.S. Inan (USA), H.G. Strangeway (UK).

JS.9 MST radar studies in the middle atmosphere and lower ionosphere (F,G)
Convenor: S. Fukao (Japan).

JS.10 Attenuation and noise due to clouds (E,F)
Convenor: E.K. Smith (USA).

JS.11 Communications in the presence of noise (C,E)
Convenor: A.D. Spaulding (USA).

JS.12 Lasting effects of transients on electronic equipment (D,E)
Convenors: V. Scuka (Sweden), T. Itoh (USA).

JS.13 Spectrum management and advanced radio communication technology (C,E,J)
Convenors: R.D. Parlow (USA), G.H. Hagn (USA), B.J. Robinson (Australia).

JS.14 Electromagnetic coupling to systems in the presence of ground (B,E,F)
Convenor: P. Degauque (France).

JS.15 Measurement of man-made noise (A,E)
Convenor: F.L.H.M. Stumpers (Netherlands).

JS.16 Radio noise associated with Earthquakes (E,H)
Convenors: T. Yoshino (Japan), M. Gokhberg (USSR).

JS.17 Characterization of terrestrial and power line sources (E,H)
Convenors: A. Hayakawa (Japan), K. Bullough (UK).

JS.18 Nonlinear electromagnetics in radio science (A,B,E)
Convenors: A. Hasegawa (Japan), H. Kikuchi (Japan).

JS.19(*) Optical and microwave interaction (B,D)
Convenors: T. Berceli (Hungary), P.R.Herczfeld (USA).

JS.20 Coherent optical communications (C,D)
Convenors: M.J. O'Mahony (UK), H.J. Grallert (FRG).

JS.21 Antennas: measurements of properties (A,J)
O.C. Jones (UK), D.H. Russell

JS.22 Time domain metrology (A,B)
N.S. Nahman (USA), T. Sarkar (USA).

JS.23 Metrological problems in EM compatibility and in EM pollution (A,E)
Convenor: E. Nano (Italy).

JS.24(**) Pulsar-timing properties and problems (A,J)

JS.25(*) Scattering from random media and rough surfaces (B,F)
Convenors: A. Ishimaru (USA), V.I. Tatarskij (USSR).

COMMISSION SYMPOSIA

These Symposia are organized by the individual Commissions and include one or more half-day sessions.

Please note that the Symposia for which contributed papers are solicited are marked (*) and those for which poster papers are solicited are marked (**). For further information, consult the Call for Papers and Symposia Description section on p. 28.

Deadline for submission of abstracts: 15 February 1990.

Commission A on Electromagnetic Metrology

A.1(*) Optical fibres
Convenors: R.L. Gallawa (USA), P. Di Vita (Italy).

A.2 Time/frequency standards
Convenor: C. Audouin (France).

A.3 Spectral purity
Convenor: V.F. Kroupa (Czechoslovakia).

A.4 Microwave standards
Convenor: R.F. Clark (Canada).

A.5(*) Millimetre standards
Convenor: V. Stumper (FRG).

A.6 Measurements on cryogenic materials
Convenors: P. Gutmann (FRG), H.Seppo (Finland).

A.7 EM measurements on board communication satellites
Convenor: G. Hyde (USA).

A.8 I.S.O.N. - Measurement problems for digital communications
Convenor: G. Hyde (USA).

Commission B on Fields and Waves

B.1(*) Reflector antennas
Convenors: Y. Rahmat-Samii (USA), A.D. Olver (UK).

B.2 unscheduled yet

B.3(*) Time domain fields
Convenors: E. Heyman (Israel), L.B. Felsen (USA).

B.4(*) Numerical solution techniques in scattering
Convenors: D.G. Dudley (USA), P.M. van den Berg (Netherlands).

B.5(*) Analytical and asymptotic techniques
Convenors: T.B.A. Senior (USA),P.Ya. Ufimtsev (USSR).

B.6(*) Microstrip antennas
Convenors: F.E. Gardiol (Switzerland), M.Ando (Japan).

B.7(*) Electromagnetic inverse scattering
Convenors: K.J. Langenberg (FRG), P.C. Sabatier (France)

B.8(*) New developments in electromagnetics
Convenors: D.L. Jaggard (USA), I.V. Lindell (Finland).

Commission C on Signals and Systems

C.1 Digital communication systems and technology
Convenor: C. Kurth (USA).

C.2 Mobile communication systems
Convenor: P. Matthews (UK).

C.3 Information theory and coding
Convenor: not yet confirmed.

C.4 Speech and image coding
Convenors: D. Wolf (FRG), H.G. Musmann (FRG).

C.5 Digital signal processing
Convenors: C. Babić (Yugoslavia), W. Schüssler (FRG).

C.6 Spread spectrum techniques
Convenor: W. Baier (FRG).

C.7 Neural networks
Convenor: not yet confirmed.

C.8 Infinite networks
Convenor: not yet confirmed.

C.9 SC-networks
Convenor: G. Moschytz (Switzerland).

C.10 VLSI - Circuit design
Convenor: E. Kuh (USA).

Commission D on Electronic and Optical Devices and Applications

D.1 Organic semiconductors in electronics and optoelectronics
Convenor: M. Schott (France).

D.2 Optical digital information processing
Convenor: S. Ishihara (Japan).

D.3 High-frequency and high-speed integrated circuits
Convenor: T. Itoh (USA).

D.4 Optical amplification and switching in telecommunications
Convenor: R.D. Hall (UK).

D.5 Highly coherent lasers and their applications
Convenor: M. Ohtsu (Japan).

D.6 Superconducting devices and circuits for microwaves
Convenor: E.F. Belohoubeck (USA).

D.7 Biophotonics and bioelectronics
H. Inaba (Japan).

D.8 Interconnections in VLSI, computers and networks
Convenors: J.-Y. Le Tallec (France), Van Tran N'Guyen (France).

D.9 Ultrafast phenomena and new effects in semiconductors
(Convenor: B. Deveaud (France).

Commission E on Electromagnetic Noise and Interference

E.1 EMC in electronic circuit
Convenor: J. Perini (USA)

E.2 Lightning: predischarge processes, associated radiation and modelling
Convenor: E.P. Krider (USA)

E.3 High power electromagnetics
Convenor: R.L. Gardner (USA)

E.4 Satellite observation of lightning
Convenor: V. Scuka (Sweden)

E.5 Lightning interaction with aircraft
Convenor: J.E. Nanevicz (USA)

E.6 Scientific basis of noise and interference control
Convenor: C.E. Baum (USA)

E.7 Spacecraft charging and electromagnetic environment
Convenor: J. Hamelin (France)

E.8 EMC modelling
M. Ianoz (Switzerland)

E.9 Planetary lightning and noise environment
Convenors: H. Kikuchi (Japan), E.K. Smith (USA)

E.10 Atmospherics (sferics)
Convenor: H. Volland (FRG)

E.11 The composite noise and interference environment
Convenor: E.F. Vance (USA).

Commission F on Radio Propagation and Remote Sensing

F.1 Statistical models and prediction techniques
Convenor: P.A. Watson (UK)

F.2 Interference
Convenor: M.P.M. Hall (UK)

F.3 Propagation in an urban and suburban environment
Convenor: J. Goldhirsch (USA)

F.4 Millimetre and submillimetre wave propagation
Convenor: C. Gibbins (UK)

F.5 Remote sensing of clouds and precipitation
Convenor: L.P. Ligthart (Netherlands)

F.6 Remote sensing of the Earth's surface
Convenor: R.K. Moore (USA)

F.7 Attenuation and depolarisation
Convenor: D.V. Rogers (USA)

F.8 Model-oriented measurements and model testing
Convenor: not nominated yet.

Commission G on Ionospheric Radio and Propagation

G.1(*)(**) Coherent and incoherent scatter radars - Techniques and achievements
Convenor: T. Hagfors (USA)

G.2(*)(**) Ionospheric modelling
Convenor: B.W. Reinisch (USA)

G.3(*) Open session and latest results
Convenor: H. Rishbeth (UK)

Commission H on Waves in Plasmas

H.1(**) Waves in plasmas
Convenor: H. Matsumoto (Japan)

Commission J on Radio Astronomy

J.1(*) Signals and images in radio astronomy
Convenor: J. O'Sullivan (Australia)

J.2(*) Interferometers
Convenor: R.D. Ekers (Australia)

J.3 VLBI tape recorder technology
Convenor: K. Johnston (USA)

J.4 Solar radio astronomy
Convenor: J. Schmelz (USA)

J.5(*) Reports from Observatories I
Convenors:W.Miller Goss (USA) and M.Morimoto (Japan)

J.6(*) Reports from Observatories II
Convenors: W. Miller Goss (USA) and M.Morimoto(Japan)

J.7(*) Progress in submillimetre receivers
Convenor: R. Hills (UK)

J.8(*) Feed arrays and active optics for radio telescopes
Convenor: P.J. Napier (USA)

J.9(*) Reports from Observatories III
Convenors: W.Miller Goss (USA), M. Morimoto (Japan)

J.10 Space VLBI
Convenors: R. Schilizzi (Netherlands),
N.S. Kardashev (USSR)

J.11(*) Polarisation
Convenor: R. Wielebinski (FRG).

CALLS FOR PAPERS AND SYMPOSIA DESCRIPTIONS

Please note that the deadline for submission of abstracts is 15 February 1990. Abstracts should be typed on the form enclosed in the First Announcement which is being widely distributed by the Czechoslovak Organizing Committee.

URSI-BEMS Symposium on the Interaction of Electromagnetic Fields with Biological Systems

CALL FOR PAPERS

Contributed papers may be within any of the following areas of interest:

- New directions in bioelectromagnetics
- Mechanisms of interactions of electromagnetic fields with biological processes or model of these processes
- Biological effects as response to electromagnetic environment
- Quantization of exposures to electromagnetic energy and protection guides
- Medical applications of electromagnetic fields influences.

Convenors: Dr. J. Musil
Laboratory of EMF
Institute of Hygiene and Epidemiology
Srobarova 48
100 42 Prague 10, Czechoslovakia.

Prof. J. Bach Andersen (Denmark),
Dr. K. Hansson-Mild (Sweden).

JS.1(*)(**) Wave and Turbulence Analysis (G,H,J)

CALL FOR PAPERS

This Symposium will concentrate on concepts in signal theory which may find an application in the analysis of plasma waves and/or in the diagnostic of turbulence in plasmas. Topics will include observational techniques, multidimensional processing, signal and pattern recognition and enhancement, high-order spectra. Oral and poster contributions are encouraged particularly on ways of inferring turbulence properties of the media which affect geophysics and radio astronomy.

Convenors: Dr. F. Lefeuvre
CNRS/LPCE
3 A avenue de la Recherche Scientifique
F-45071 Orléans Cedex 02, France.

Phone: (33) 3851 5284
Fax : (33) 3863 1234

Dr. Sunanda Basu (USA), Dr.P. Thomasson (UK),
Dr. W. Kofman (France).

JS.2(**) Radio Propagation in the Ionosphere and Magnetosphere: Theory and Application (G,H)

CALL FOR PAPERS

The ionosphere and magnetosphere are dispersive, inhomogeneous and anisotropic media for radio propagation. The small-scale irregulations of ionization require a stochastic description. Three-dimensional ray tracing in hot plasmas have contributed much to understanding. Both electromagnetic and electrostatic modes are important, and factors such as plasma temperature, inhomogeneities, ducts and troughs, plasma

bubbles and nonlinear effects are involved. Papers dealing with the theory and applications of radio propagation on this complex medium are solicited. A half-day poster session for contributed papers and a half-day invited paper session will be arranged.

Convenors: Prof. K.C. Yeh
University of Illinois
1406 West Green Street
Urbana, IL 61801, USA.

Phone: (1) 217-333 2930
Fax : (1) 217-244 5624.

Prof. I. Kimura (Japan).

JS.3(**) Theory and Computer Experiments in Plasma Processes (G,H)

CALL FOR PAPERS

These sessions will be devoted to theory and computer experiments of plasma processes in the space plasma environment with application to ionosphere, magnetosphere, solar, cometary, and planetary physics. Specific topics include ionospheric irregularities, magnetosphere-ionosphere coupling, double layers, shock plasma dynamics, magnetic reconnection, auroral acceleration and global MHD modelling. Recent developments in these areas should be emphasized. Emphasis will also be given to relating theories to numerical experiments, i.e. highlighting of observed differences and explanations relating to these differences. Comparisons with experimental observations should be included. The sessions will include a half-day poster session for contributed papers and two oral invited sessions.

Convenors: Dr. B. Lembège
CRPE/CNET
38 rue du Général Leclerc
F-92131 Issy-les-Moulineaux, France.

Phone: (33) 1-4529 4011
Fax : (33) 1-4529 6052.

Dr. S.L. Ossakow (USA).

JS.4(*)(**) VLF Triggered Emissions (G,H)

CALL FOR PAPERS

VLF triggered emissions have been studied extensively by experiments, theories, and simulations in the past two decades. However, the experiments have given puzzling and fascinating results that challenge the theoreticians. As to the theories and simulations of triggered emissions, no universal agreement has been established. This symposium is planned to gather experimental, theoretical and simulational papers to discuss existing theories and models in detail. Some papers will be invited as oral presentations. A half-day poster session and a half-day oral session will be arranged.

Convenors: Dr. Y. Omura
Radio Atmospheric Science Centre
Kyoto University
Kyoto 611, Japan.

Phone: (81) 774-33 2532
Fax : (81) 774-31 8463.

Dr. D. Nunn (UK).

JS.5(*)(**) Predictability of Solar-Terrestrial Weather and its Ionospheric Impact (G,H)

CALL FOR PAPERS

The status of accumulated data on the solar-terrestrial system, improvements in our understanding of the associated cause-effect relationships, and the development of powerful numerical models treating each of the domains and their associated coupling processes enable us to address the issue of prediction. Recognizing that the ionosphere represents the culmination of aeronomical and plasma physical processes which start at the sun and make their way through the interplanetary and magnetospheric domains, we can assemble the accumulated scientific foundations and develop a predictive capability for solar-terrestrial weather and its impact on communications. The focus of the invited talks will be on the predictability of phenomena at the sun; in the interplanetary medium, and the magnetosphere, thermosphere or mesosphere that directly impact the ionosphere. A half-day oral session and a half-day poster session for contributed papers will be arranged.

Convenor: Dr. E.P. Szuszczewicz
Plasma Physics Division 157
Science Applications Int. Corp.
1710 Goodridge Drive
McLean, VA 22102, USA.

Phone: (1) 703-734 5516
Fax : (1) 703-821 1134.

JS.6(*)(**) Effects of High Power Radio Waves on the Ionosphere and Magnetosphere (G,H)

CALL FOR PAPERS

Ionospheric modification studies are conducted using high power electromagnetic waves transmitted from ground level facilities at Arecibo, Puerto Rico; Tromsø, Norway; Fairbanks, Alaska, and several locations in the USSR. Both experimental and theoretical results from these experiments will be presented. The experimental results include cyclotron-wave heating, ohmic heating, and acoustic or Langmuir wave excitation by parametric instabilities for both vertical and oblique HF heating. Radars, ionosondes, scintillation receivers, optional detectors and other instruments provide data on the heated volume. Generation of VLF by the modulated heaters may be reported. The theory of parametric instabilities, thermal and ponderomotive effects, solitons or cavitons will be discussed. The two half-day sessions will include invited, contributed and poster papers.

Convenors: Dr. M.T. Rietveld
EISCAT
Ramfjoranoer
N-9027 Ramfjordbotn, Norway.

Phone: (47) 83-92166
Fax : (47) 83-92380.

Dr. P.A. Bernhardt (USA).

JS.7(**) The Radio Planets (G,H,J)

CALL FOR PAPERS

At the time of the next General Assembly, it will be known whether Neptune is another radio planet to be added to Earth, Jupiter, Saturn and Venus. In the meantime there will un-

doubtedly be a considerable amount of new work done on the analysis of radio emission data from the four known radio planets and on the theories for their generation mechanisms. Although all types of plasma waves and radio emissions could be induced it may be best to concentrate on the latter which would include Jovian decimetric, decametric and hectometric radiations; terrestrial, Saturnian and Jovian kilometric radiations and non-thermal continuum: wave emissions of various kinds most of which are as yet unidentified as regards source locations, etc. and hopefully, the as yet undiscovered Neptunian radiations. Two half-day sessions, one of which will be reserved for invited oral reviews and the other for contributed poster papers.

Convenors: Dr. D. Jones
British Antarctic Survey
High Cross Madingley Road
Cambridge CB3 0ET, United Kingdom.

Phone: (44) 223-61188
Fax : (44) 223-62616.

Dr. D.O. Muhleman (USA), Dr. I. Hanacz (Poland).

JS.8(*)(**) Magnetospheric and Ionospheric Effects of Lightning (G,H)

CALL FOR PAPERS

Recent results involving wave-induced particle precipitation and associated ionospheric effects have raised fundamental questions concerning the role of lightning and thunderstorms in controlling the dynamics of energetic radiation belt particles. Ionospheric effects of lightning (directly) and lightning-induced electron precipitation are now known to be a significant and regularly detectable feature of the nighttime ionosphere at altitudes of 50-100 km. New evidence has been found of possible triggering of lightning from the magnetosphere. Both experimental and theoretical papers will be presented. A half-day oral session including invited papers and a half-day poster session will be arranged.

Convenors: Prof. U.S. Inan
STAR Laboratory
Department of Electrical Engineering/SEL
Stanford University
Stanford, CA 94305, USA.

Phone: (1) 415-723 4994
Fax : (1) 415-723 0010.

Dr. H.J. Strangeway (UK).

JS.9 MST Radar Studies of the Middle Atmosphere and Lower Ionosphere (F,G)

DESCRIPTION

Since the first detection of coherent echoes from the middle atmosphere by Woodman and Guillen in 1974, the MST (mesosphere/stratosphere/troposphere) radar technique has been extensively developed. This session will summarize fifteen years of middle atmosphere observations, discuss applications of the technique to improved meteorological prediction, and describe new technologies based on the MST radar technique. The session will consist of invited oral papers only.

Convenor: Prof. S. Fukao (Japan).

JS.10 Attenuation and Noise due to Clouds (E,F)

DESCRIPTION

The range of frequencies for electromagnetic waves which are reflected, scattered, absorbed or emitted by clouds will be confined to above 20 GHz to study their fine structures and properties in a centi-milli-metre wave range in relation to wave propagation.

Convenor: Dr. E.K. Smith (USA).

JS.11 Communications in the Presence of Noise (C,E)

DESCRIPTION

In contrast to conventional analyses of communication systems, based on the additive Gaussian noise channel, non-Gaussian impulsive noise will be discussed together with communication systems performance.

Convenor: Prof. A.D. Spaulding (USA).

JS.12 Lasting Effects of Transients on Electronic Equipment (D,E)

DESCRIPTION

The objective of this Symposium is to identify, review and specify the complex mechanisms, initiated and caused by electrical transients, which are involved into the performance degradation of integrated semiconductor circuits and systems. It is also hoped to bring recommendations for the creation of international data bases on related lightning parameters and on critical levels of electrical surges in different circuits.

Convenors: Prof.V. Scuka (Sweden), Prof. T. Itoh (USA).

JS.13 Spectrum Management and Advanced Radio Communication Technology (C,E,J)

DESCRIPTION

The session will concentrate on particular developments in a radio service such as land mobile, satellite services, space communications, radio astronomy, aeronautical (space/terrestrial), etc.

Convenors: Prof. R.D. Parlow (USA), Mr. G.H. Hagn (USA), Dr. B.J. Robinson (Australia).

JS.14 Electromagnetic Coupling to Systems in the Presence of Ground (B,E,F)

DESCRIPTION

The effects of ground with finite conductivity on the coupling of incoming electromagnetic waves or pulses to man-made systems will be discussed theoretically and experimentally for power, telecommunication lines, etc.

Convenor: Prof. P. Degauque (France).

JS.15 Measurement of Man-made Noise (A,E)

DESCRIPTION

Reviewing trends in the interference potential due to the proliferation of electronic devices, characteristics and

effects of noise will be discussed for a variety of man-made sources such as for automotive ignition, power lines, etc.

Convenor: Prof. F.L.H.M. Stumpers (Netherlands).

JS.16 Radio Noise Associated with Earthquakes (E,H)

DESCRIPTION

Interest in apparent association of VLF radio emissions with earthquakes is continuing. The session is intended to increase observational evidence, based on new measurements by means of improved multistation networks and correlation analyses.

Convenors: Prof. T. Yoshino (Japan), Dr. M. Gokhberg (USSR).

JS.17 Characterization of Terrestrial and Power Line Sources (E,H)

DESCRIPTION

Identification and characterization of terrestrial radio noise sources will be discussed including power line harmonic radiation from various points of view of measurement method, remote and in situ such as direction finding and satellite observations, data analysis, and magnetospheric plasma physics.

Convenors: Prof. M. Hayakawa (Japan), Dr. K. Bullough (UK).

JS.18 Nonlinear Electromagnetics in Radio Science (A,B,E)

DESCRIPTION

In view of a growing interest in the problem of large amplitude electromagnetic waves and pulses in relation to lightning and nuclear electromagnetic pulses (LEMPS AND NEMP), optical fibre communication, nerve impulse propagation and so on, the session is intended to bring together those who are interested in the problem of nonlinear waves in radio science, such as shocks and solitons, and to highlight the state-of-the art.

Convenors: Prof. A. Hasegawa (Japan), Prof. H. Kikuchi (Japan).

JS.19(*) Optical and Microwave Interaction (B,D)

CALL FOR PAPERS

The topics covered are the physical nature of the interaction in materials, and its use for the control of microwave devices and in signal processing.

Convenors: Prof. T. Berceli
Research Institute for Telecommunications
Jabor Aron 65
H-1026 Budapest, Hungary.

Phone: (36) 1-152 247
Fax : (36) 1-355 560

Prof. P.R. Herczfeld (USA).

JS.20 Coherent Optical Communications (C,D)

DESCRIPTION

The research and development of coherent optical communications have already their history of one decade; applications in practical systems will be seen in near future. The objective of this Symposium is to review the present state-of-the-art in both the device and system technologies, and speculate the future direction of the progress.

Convenors: Dr. M.J. O'Mahony (UK), Dr. H.J. Grallert (FRG).

JS.21 Antennas: Measurements of Properties (A,J)

Convenors: Dr. O.C. Jones (UK), Dr. D.H. Russell (USA).

JS.22(*) Time Domain Metrology (A,B)

CALL FOR PAPERS

This Symposium is organized by the Inter-Commission Working Group on Time Domain Waveform Measurements. The emphasis is on deconvolution techniques and new measurement tools such as electro-optics and the superconducting oscilloscope.

Convenors: Dr. W.S. Nahman
Picosecond Pulse Laboratories
P.O. Box 44
Boulder, CO 80306, USA.

Phone: (1) 303-443 1249
Fax : (1) 303-447 2236.

Dr. T.K. Sarkar (USA).

JS.23 Metrological Problems in EM Compatibility and in EM Pollution (A,E)

Convenor: Dr. E. Nano (Italy).

JS.24(*)(**) Pulsar-timing (A,J)

CALL FOR PAPERS

Millisecond pulsars are neutron stars spinning at close to their break-up speed. They have narrow, well-defined pulses, stable structure and weak magnetic fields which cause them to lose energy and spin down very slowly. Thus they have a clear potential for use as clocks.

We propose a session devoted to work concerned with the recent astronomy of pulsars and particularly to work relating to their use as clocks. It would, for instance, contain papers concerned with searches for such objects and their origin and distribution in the Galaxy, with their rotational stability and neutron star internal structure, and with the structure of the radio beam which is responsible for the radio pulses. We propose that in one session there be about three invited contributions of about 30 minutes and four or five 15-minute contributed papers, these times including about 5 minutes for discussion.

Convenor: Dr. A. Lyne
Nuffield Radio Astronomy Laboratories
Jodrell Bank
Macclesfield, Cheshire SK11 9PL, United Kingdom.

Phone: (44) 477-71321
Fax : (44) 477-71618
Telex: 36149.

JS.25(*) Scattering from Random Media and Rough Surfaces (B,F)

CALL FOR PAPERS

The session is concerned with new developments in theoretical and experimental studies of scattering in a random distribution of discrete scatterers; and scattering from rough surfaces with particular emphasis on backscatter enhancement, the statistics of the scattered field, and very rough surfaces.

Convenors: Prof. A. Ishimaru
Department of Electrical Engineering FT-10
University of Washington
Seattle, WA 98195, USA.

Phone: (1) 206-543 2169
Fax : (1) 206-543 9285.

Dr. V.I. Tatarskij (USSR).

A.1(*) Optical Fibres

Convenors: Dr. R.L. Gallawa
National Institute for Science and Technology
Boulder, CO 80302, USA.

Phone: (1) 303-497 3761
Fax : (1) 303-497 3225.

Dr. P. Di Vita (Italy).

A.2 Time/Frequency Standards

Convenor: Dr. C. Audouin (France)

A.3 Spectral Purity

Convenor Dr. V.F. Kroupa (Czechoslovakia)

A.4 Microwave Standards

Convenor: Dr. R.F. Clark (Canada)

A.5(*) Millimetre Standards

Convenor: Dr. V. Stumper
Physikalisch-Technische Bundesanstalt
Bundesalee 100
Postfach 3345
D-3300 Braunschweig, Fed.Rep. of Germany.

Phone: (49) 531 5920
Fax : (49) 531 5927614
Telex: 952822.

A.6 Measurements on Cryogenic Materials

Convenors: Dr; P. Gutmann (FRG) and H. Seppo (Finland)

A.7 EM Measurements on Board Communication Satellites

Convenor: Dr. G. Hyde (USA)

A.8 I.S.O.N. - Measurement Problems for Digital Communications

Convenor: Dr. G. Hyde (USA).

B.1(*) Reflector Antennas

CALL FOR PAPERS

The emphasis is on diffraction synthesis (beyond that provided by geometrical optics) and on the design of reflector antennas for space applications.

Convenors: Dr. Y. Rahmat-Samii
Electrical Sciences and Engineering Department
UCLA
7732 Boelter Hall
Los Angeles, CA 90024, USA.

Phone: (1) 213-206 3847
Fax : (1) 213-206 8495.

Dr. A.D. Olver (UK).

B.2 unscheduled (may be used for a poster session or mini-symposium)

B.3(*) Time Domain Fields

CALL FOR PAPERS

The session is devoted to direct time domain methods, analytical and numerical, including complex space-time techniques and pulsed focussed energy.

Convenors: Prof. E. Heyman
Faculty of Engineering
Tel Aviv University
Tel Aviv, Israel.

Phone: (972) 3-545 0765

Prof. L.B. Felsen (USA).

B.4(*) Numerical Solution Techniques in Scattering

CALL FOR PAPERS

An assessment and comparison of solution techniques such as CG/FFT, FD/FE, MOM, special iterative, hybrid MOM/GTD and hybrid FE/MOM.

Convenors: Prof. D.G. Dudley
ECE Department, Building 104
University of Arizona
Tucson, AZ 85721, USA.

Phone: (1) 602-621 6169
Fax : (1) 602-621 8076

Prof. P.M. van den Berg (Netherlands).

B.5(*) Analytical and Asymptotic Techniques

CALL FOR PAPERS

New analytical techniques in scattering, e.g. the development and use of generalized boundary conditions for simulating material properties, and uniform asymptotic theories for scattering by edged bodies.

Convenors: Prof. T.B.A. Senior
Department of Electrical Engineering and Computer Science
University of Michigan
Ann Arbor, MI 48109-2122, USA.

Phone: (1) 313-764 0500
Fax : (1) 313-763 1503

Dr. P. Ya. Ufimtsev (USSR).

B.6(*) Microstrip Antennas

CALL FOR PAPERS

New developments taking into account surface waves, the design of feed structures, phased and active arrays, and circular polarization.

Convenors: Prof. F.E. Gardiol
LEMA, Ecole Polytechnique Fédérale de Lausanne
El-Ecublens
CH-1015 Lausanne, Switzerland.

Phone: (41) 21-693 2670
Fax : (41) 21-693 4660

Dr. M. Ando (Japan).

B.7(*) Electromagnetic Inverse Scattering

CALL FOR PAPERS

Organized by the Working Group on Inverse Scattering. The focus will be on exact and almost exact methods, and on non-scalar diffraction tomography.

Convenors: Prof. K.J. Langenberg
Gesamthochschule Kassel
Fachbereich 16, Elektrotechnik
Wilhelmshöher Allee 71
D-3500 Kassel, Fed. Rep. of Germany.

Phone: (49) 561-804 6425
Fax : (49) 561-804 6327

Prof. P.C. Sabatier (France).

B.8(*) New Developments in Electromagnetics

CALL FOR PAPERS

The emphasis is on new developments of a fundamental nature, including the interaction of electromagnetic waves with fractal and chiral media.

Convenors: Prof. D.L. Jaggard
Department of Electrical Engineering
University of Pennsylvania
200 South 23rd Street
Philadelphia, PA 19104-6390, USA.

Phone: (1) 215-898 4411
Fax : (1) 215-898 1130

Prof. I.V. Lindell (Finland).

C.1 Digital Communications Systems and Technology

Convenor: Dr. C. Kurth (USA).

C.2 Mobile Communication Systems

Convenor: Prof. P. Matthews (UK).

C.3 Information Theory and Coding

Convenor: to be confirmed.

C.4 Speech and Image Coding

Convenors: Dr. D. Wolf and Dr. H.G. Musmann (FRG).

C.5 Digital Signal Processing

Convenors: Prof. C. Babić (Yugoslavia) and Dr. W. Schüssler (FRG).

C.6 Spread Spectrum Techniques

Convenor: Dr. W. Baier (FRG).

C.7 Neural Networks

Convenor: to be confirmed.

C.8 Infinite Networks

Convenor: to be confirmed.

C.9 SC-Networks

Convenor: Dr. G. Moschytz (Switzerland).

C.10 VLSI - Circuit Design

Convenor: Dr. E. Kuh (USA).

D.1 Organic Semiconductors in Electronics and Opto-electronics

DESCRIPTION

Use of organic materials as active elements in electronics and optoelectronics is still very limited, but understanding of their properties, prospects and limitations is progressing

rapidly. This Symposium will provide a discussion, aimed at the general URSI audience, of several avenues of development in that field: optical processing using molecular solids and conjugated polymers; preparation and properties of organized thin film organic structure; present status of organic semiconducting materials and simple devices preparation and properties; long-range prospects of molecular electronics.

Convenor: Dr. Michel Schott (France).

D.2 Optical Digital Information Processing

DESCRIPTION

Optical information processing or computing has some potential advantages over conventional means, i.e. potential high speed, massive parallelism and connectivity, and immunity to electromagnetic interference (EMI). This Symposium is intended to review new ideas and results, and discuss the future trends in research and development of digital information processing by optical means. The subjects to be covered include nonlinear optical phenomena and materials, active and passive devices such as multi-quantum well (MQW) devices, optoelectronic integrated circuits (OEIC), spatial light modulators, algorithm, architecture, parallel processing systems, and various applications.

Convenor: Dr. S. Ishihara (Japan).

D.3 High-Frequency and High-Speed Integrated Circuits

DESCRIPTION

To bring together experts and review the most recent progress in the area related to high-frequency and high-speed integrated circuits. Particular emphasis is placed on the emerging technologies such as monolithic integrated circuits and devices, new circuit configurations, and analysis, design and characterizations of these structures. Accomplishments and future directions will be discussed.

Convenor: Prof: T. Itoh (USA).

D.4 Optical Amplification and Switching in Telecommunications

DESCRIPTION

To bring together experts and review the recent progress in optical amplification and switching techniques for telecommunications. The subjects to be discussed are semiconductor laser amplifiers for coherent optical communications (both the preamplifier-type and repeater-type), fiber Raman amplifiers including nonlinear effects, optical switching devices, and optical switching systems of time-division and frequency-division types.

Convenor: Dr. R.D. Hall (UK).

D.5 Highly Coherent Lasers and their Applications

DESCRIPTION

The demand for highly coherent and frequency-stabilized lasers has increased in recent years for the use in various interferometric measurements and coherent optical communications. The objective of this Symposium is to review the state-of-the-art and discuss the essential limitation as well as the future prospect of the technology.

Convenor: Prof. M. Ohtsu (Japan).

D.6 Superconducting Devices and Circuits for Microwaves

DESCRIPTION

High-Tc superconducting materials promise to have great impact on many technologies. Some of the earliest practical applications are in passive microwave circuits where high-Tc films permit the development of components with better performance and greatly reduced size. Active devices also are expected to show enhanced performance in the near future. This Symposium will explore the latest state-of-the-art of superconducting active and passive microwave components.

Convenor: Dr. E.F. Belohoubeck (USA).

D.7 Biophotonics and Bioelectronics

DESCRIPTION

This Symposium intends to review and discuss recent advances in challenging and attractive subjects in the fields of biophotonics and bioelectronics, such as new correlation studies between biophotonic and bioelectronic phenomena in biological tissues and materials, interaction and migration of coherent laser beam with tissues and cells, biostimulation effects of low-power laser light, biophotonic and bioelectronic studies on photodynamic therapy of cancers, basic studies on brain and nerve systems through bioelectric measurements, and synergetic analysis of cooperative phenomena in brain and mind activities.

Convenor: Prof. H. Inaba (Japan).

D.8 Interconnections in VLSI, Computers and Networks

DESCRIPTION

Due to the increase of speed and complexity of advanced ICs, an important research is conducted to improve existing packaging and interconnect technology. New materials that solve existing power dissipation, new concepts using optical interconnects and new architectures will be discussed.

Convenors: Dr. N'Guyen Van Tran (France) and Dr. J.-Y.Le Traon (France).

D.9 Ultrafast Phenomena and New Effects in Semiconductors

DESCRIPTION

This field is in very fast expansion since the appearance of superlattices and femtosecond optical pulses. As main topics we may quote the temporal characterization of tunnel effect, solid state physics at 10 fs, carrier-carrier and carrier phonon interactions, ultrafast optical, characterization of electronic devices, nonlinear phenomena.

Convenor: Dr. B. Deveaud (France).

E.1 EMC in Electronic Circuit

DESCRIPTION

The session will be concerned with printed circuit board EMC, unintentional crosstalk in cable bundles and lands on printed circuit board and countermeasures for its reduction as well as modelling for evaluation which may permit an insight into the coupling mechanism. Time and frequency domain notions as well as the effectiveness of twisting and shielding will be discussed.

Convenor: Dr. J. Perini (USA)

E.2 Lightning: Predischarge Processes, Associated Radiation, and Modelling

DESCRIPTION

The session is intended to deal with basic processes, physics and modelling of lightning, based upon precise measurements by advanced electronic and optical techniques, covering natural and triggered lightning and laboratory discharges.

Convenor: Dr. E.P. Krider (USA)

E.3 High Power Electromagnetics

DESCRIPTION

The session is intended to discuss high power electromagnetics, particularly associated with nuclear electromagnetic pulse, such as its production mechanism, analysis and system testing methodologies, and practical system hardening concepts.

Convenor: Dr. R.L. Gardner (USA).

E.4 Satellite Observation of Lightning

DESCRIPTION

The topics will cover scientific evaluation of lightning flash data from a geostationary satellite, their use in the field of atmospheric electricity, geo- and space physics, and the problems of communication, data packeting and distribution.

Convenor: Prof. V. Scuka (Sweden).

E.5 Lightning Interaction with Aircraft

DESCRIPTION

The session will discuss the electromagnetic fields produced on an aircraft structure, characterization measurements, standard test procedures, ground simulation, and assessment of analysis approaches.

Convenor: Dr. J.E. Nanevicz (USA).

E.6 Scientific Basis of Noise and Interference Control

DESCRIPTION

The session will treat the problems of EM topology, norms, developments of methods for controlling system design in order to foresee the macroscopic electromagnetic interaction.

Convenor: Dr. C.E. Baum (USA).

E.7 Spacecraft Charging and Electromagnetic Environment

DESCRIPTION

The session is intended to discuss the problem of spacecraft charging, natural and artificial, its electromagnetic environment and EMC, particularly on natural charging of satellites and space shuttle charge neutralization.

Convenor: Dr. J. Hamelin (France).

E.8 EMC Modelling

DESCRIPTION

The session will be devoted to computer and simulation approach to various EMC problems, namely integral and differential modelling, numerical approach to the field-to-conductor coupling problem, simulation of printed board circuit design and its support by an expert system.

Convenor: Dr. M. Ianoz (Switzerland).

E.9 Planetary Lightning and Noise Environment

DESCRIPTION

In view of recent observations of lightning on Jupiter from spacecraft, planetary lightning and noise will be reviewed and compared for various planets and their laboratory simulation.

Convenor: Prof. H. Kikuchi (Japan) and Dr. E.K. Smith (USA).

E.10 Atmospherics (Sferics)

DESCRIPTION

Atmospherics emitted from electric discharges in the terrestrial and planetary atmospheres are produced by thunderstorms, typhoons, volcanic eruptions, polar fronts, jet streams, and nuclear explosions and propagate in various ways which will be reviewed in the session from the aspects of ducted and nonducted propagation, including Schuman resonances.

Convenor: Dr. H. Volland (FRG).

E.11 The Composite Noise and Interference Environment

DESCRIPTION

The topics will cover statistical models of composite noise environments of various natural, man-made or mixed noise sources, observations and measurements methods of the composite natural and man-made noise environment. This includes solar, cosmic, lightning discharge, atmospheric noise and man-made noise (interference).

Convenor: Dr. E.F. Vance (USA).

F.1 Statistical Models and Prediction Techniques

DESCRIPTION

The development of models of atmospheric propagation for application in the prediction of signal impairments in radiocommunication systems. The estimation of statistical parameters using independent radiometeorological information. Techniques for the prediction of system parameters from (quasi) physical

models.

Convenor: Prof. P.A. Watson (UK).

F.2 Interference

DESCRIPTION

Modelling of propagation mechanisms causing interference in radio systems. Ducting, transhorizon propagation, multipath, diffraction over obstacles, rain scatter and rain depolarisation. The development of procedures to estimate interference parameters for system design. Measurement of interference signals and study of radiometeorological parameters determining interference behaviour. Development of interference reduction techniques (site shielding, adaptive antenna patters, spread spectrum and coding techniques).

Convenor: Dr. M.P.M. Hall (UK).

F.3 Propagation in an Urban and Suburban Environment

DESCRIPTION

Modelling and measurement of propagation phenomena in urban and suburban environments for application in the design of radio location, paging and communication systems. (cellular radio, satellite sound broadcasting, mobile-satellite systems, wireless LAN).

Convenor: Dr. J. Goldhirsch (USA).

F.4 Millimetre and Submillimetre Wave Propagation

DESCRIPTION

Modelling of atmospheric propagation of millimetre and submillimetre waves for application to communication and remote sensing systems. Atmospheric profiling for meteorological purposes; correction of atmospheric contributions to remote sensing of the Earth's surface; application to mobile/personal (satellite) communication systems.

Convenor: Dr. C. Gibbins (UK).

F.5 Remote Sensing of Clouds and Precipitation

DESCRIPTION

Observations of clouds and precipitation using passive (radiometers) and active (multiparameter radar) sensors. Modelling of the microstructure of clouds (ice/melting layer/water). Macroscopic structure of raincells.

Convenor: Prof. L.P. Ligthart (Netherlands).

F.6 Remote Sensing of the Earth's Surface

DESCRIPTION

Modelling and measurements of microwave signatures of the Earth's surface. Inversion techniques for extraction of physical parameters from radio data. Remote sensing of oceans and ice from spaceborne platforms. New developments in active and passive sensor systems.

Convenor: Prof. R.K. Moore (USA).

F.7 Attenuation and Depolarisation

DESCRIPTION

Models for attenuation and depolarisation by the atmosphere, based on radiometeorological and physical parameters. Dynamic behaviour of attenuation and depolarisation events in radio signals. Adaptive techniques for fading and depolarisation compensation in low-margin communication systems.

Convenor: Dr. D.V. Rogers (USA).

F.8 Model-Oriented Measurements and Model Testing

DESCRIPTION

Measurements of statistical and physical model parameters in atmospheric radio propagation. Requirements and standards for model-oriented data analysis. Comparison of results of statistical prediction models. Evaluation of accuracy of propagation prediction methods using available measurements (CCIR). New research in active satellite beacon measurements (e.g. Olympus, ACTS).

Convenor: not nominated yet.

G.1(*)(**) Coherent and Incoherent Scatter Radars - Techniques and Achievements

CALL FOR PAPERS

The two sessions of this Symposium will deal both with theoretical and practical aspects of the radar techniques, and with representative results. In addition to invited papers, there will be contributed oral and poster papers, offers of which should reach the Convenor by 15 February 1990.

Convenor: Prof: T. Hagfors
c/o Max-Planck-Institut für Aeronomie
Postfach 20
D-3411 Katlenburg-Lindau, Fed.Rep. of Germany.

G.2(*)(**) Ionospheric Modelling

CALL FOR PAPERS

This Symposium will place particular emphasis on the accurate determination of N(h) profiles (electron density versus real height) from ionograms, and on the E/F region "valley" of electron density. Invited, contributed and poster papers may be included. Offers of papers on these topics,or associated subjects, should reach the Convenor by 15 February 1990.

Convenor: Prof. B.W. Reinisch
Centre for Atmospheric Research
University of Lowell
450 Aiken Street
Lowell, Mass. 01854, USA.

Phone: (1) 508-458 2504
Fax : (1) 508-453 6586.

G.3(*) Open Session and Latest Results

Convenor: H. Rishbeth
Rutherford Appleton Laboratories
Chilton, Didcot
Oxfordshire OX11 0QX, United Kingdom.

Phone: (44) 235-446 496
(44) 703-592 073
Fax : (44) 703-585 813
Telex: 83159 Ruthlab G attn H. Rishbeth.

H.1(**) - Waves in Plasmas

CALL FOR PAPERS

To present contributions in the broad field which do not fit the specific symposia of Commission H. Papers concerning Active Space Experiments will also be included in this session. Some papers will be invited to be given as oral presentations. A half-day poster session and a half-day oral session will be arranged.

Convenor: Prof. H. Matsumoto
Radio Atmospheric Science Centre
Kyoto University
Kyoto 611, Japan.

Phone: (81) 774-33 2532
Fax : (81) 774-31 8463.

J.1(*) - Signals and Images in Radio Astronomy

CALL FOR PAPERS

The session will address key developments in signal processing in the radio astronomy field. In particular, recent developments in algorithms for the detection of pulsars, including hardware implementations, recent work on correlator systems, developments in map processing to achieve high dynamic range and VLSI developments of interest in the field will be included.

Convenor: Dr. John O'Sullivan
CSIRO Division of Radiophysics
P.O.Box 76
Epping, N.S.W. 2121
Australia.

Phone: (61) 2-868 0397
Fax : (61) 2-868 0457
Telex: 26230 ASTRO.

J.2(*) - Interferometers

CALL FOR PAPERS

In this session we will explore the forefront of technical developments in radio astronomical interferometry. The following topics will be included. Radio astronomical seeing; its implications for observational limits, impact on telescope design and imaging algorithms. Precise phase stabilization using cables, fibres, microwave links and relay satellites, interferometric imaging problems at very high and very low frequencies. Very short baseline interferometers and very wide field imaging.

Convenor: Dr. R.D. Ekers
Australia Telescope National Facility
P.O.Box 76
Epping, N.S.W. 2121
Australia.

Phone: (61) 2-868 0300
Fax : (61) 2-868 0457
Telex: 26230 ASTRO.

J.3 - VLBI Tape Recorder Technology

DESCRIPTION

This session will be a workshop on the development of tape recorder technology for VLBI, and related issues involving the ground links necessary for space VLBI. It will include status reports on development in Japan, Europe, USA, Canada and other countries. Progress on the development of an interchangeable VLBI recording format will be discussed. Contributions will be accepted at the workshop.

Convenor: Dr. Ken Johnston (USA).

J.4 - Solar Radio Astronomy

DESCRIPTION

New observational results, theory, and hardware upgrades for solar radio astronomy will be presented by various (relatively) young scientists in the field. The topics covered include the Coronal Magnetic Structures Observing Campaign (CoMstOC), a collaboration involving microwave and soft X-ray images of quiescent active regions used to measure the magnetic field in the solar corona; these results are compared with computer extrapolations of the photospheric field into the corona. New results on the active Sun from the VLA will also be presented; these data were taken during International Solar Month (September 1988) and the first Max'91 campaign in June 1989. Upgrades to the Owens Valley Radio Observatory are in progress; this dedicated solar radio array will consist of the two present 27m dishes and three new 6m dishes (the 40m could be used some of the time). New results in solar radio theory will also be discussed; these results and other topics will depend on the actual speakers scheduled.

Convenor: Dr. Joan Schmelz (USA).

J.5, J.6, J.9(*) - Reports from Observatories I, II, III

CALL FOR PAPERS

This session will cover three half days and will review recent developments in instruments and techniques and some key astronomical results. The first two lectures in each segment will be invited and will be addressed to a wider audience.

Convenors: Dr. W. Miller Goss
NRAO
P.O.Box 0
Socorro, NM 87801-0387, USA.

Phone: (1) 505-835 7000
Fax : (1) 505-835 7027
Telex: 910 9881710

and

Prof. M. Morimoto
Nobeyama Radio Observatory
Minamisaku
Nagano 384-13, Japan.

Phone: (81) 267 98 2831
Fax : (81) 267 98 2884
Telex: (72) 03329005.

J.7(*) - Progress in Submillimetre Receivers

CALL FOR PAPERS

A number of large antennas have recently become available for radio astronomy at frequencies between 300 and 800 GHz. Observations at still higher frequencies are possible from aircraft and balloons and a number of submillimetre space programmes are under development. Receiver technology for such frequencies is advancing rapidly but still has some way to go to reach fundamental limits on performance and to achieve satisfactory levels of reliability and become reasonably easy to maintain. Progress towards achieving these goals will be reviewed. Topics to be discussed include Schottky and SIS mixers, local oscillators and array detectors. These techniques are also extremely relevant to the area of remote sensing of the Earth's atmosphere.

Convenor: Dr. Richard Hills
Mullard Radio Astronomy Observatory
Cavendish Laboratory
Madingley Road
Cambridge, United Kingdom.

Phone: (44) 223-337 300
Fax : (44) 223-63263
Telex: 91292.

J.8(*) - Feed Arrays and Active Optics for Radio Telescopes

CALL FOR PAPERS

This session will be concerned with the general topic of enhancing the performance of large reflector radio telescopes using feed array or active optics. Examples of suitable topics include, but are not limited to, the following: use of multiple

feeds to increase the field of view or mapping speed of a telescope; beam switching between multiple feeds to remove atmospheric effects; use of feed arrays to correct for surface profile errors or other aberrations; use of specially machined secondary or tertiary reflectors or lenses to remove residual path length errors; use of actuators on primary, secondary or tertiary reflectors to dynamically correct for gravitational or other environmental effects.

Convenor: Dr. Peter J. Napier
National Radio Astronomy Observatory
P.O.Box 0
Socorro, NM, USA.

Phone: (1) 503-835 7000
Fax : (1) 505-835 5664
Telex: 910-988 1710.

J.10 - Space VLBI

DESCRIPTION

This session will consist of invited papers from participants in space missions proposed by the USSR, USA, European an Japanese groups. It will provide an outline of the principles and programmes of the missions and look at the techniques for antennas, feeds and receivers for space use and the approaches to be used for data and phase transfer links.

Convenors: Dr. R. Schilizzi (Netherlands) and
Prof. N.S. Kardashev (USSR).

J.11(*) - Polarisation

CALL FOR PAPERS

The session will deal with polarisation observing methods as a technique of tracing magnetic fields in astronomy. The methods of observations will be surveyed. The observational results with the various techniques will show recent progress in our understanding of the importance of magnetic fields in the Universe. In particular the interrelation between optical and radio observations of the same objects will be discussed.

Convenor: Dr. R. Wielebinski
Max-Planck-Institut für Radioastronomie
Auf dem Hügel 69
D-5300 Bonn 1, Fed. Rep. of Germany.

Phone: (49) 228-525 300
Fax : (49) 228-525 229
Telex: 886440 MPI FRD.

X X X X X

WORKSHOP ON COORDINATED ROCKET AND RADAR STUDIES OF HIGH LATITUDE E-REGION PLASMA INSTABILITIES

In 1988 and 1989 the ERRRIS and ROSE campaigns were performed in order to explore the auroral E-region plasma instabilities by means of coordinated radar and rocket experiments. The aim of this workshop is to get an overview of the variety of experimental data obtained, to discuss these results, to address the most important questions in this field, and to further coordinate the data evaluation. Also theoreticians working on this subject are most welcome to join the workshop.

The Workshop will be held on Friday 31 August. The Convenors are:

Dr. R. Pfaff
Electrodyn. Branch
Goddard Space Flight Centre
Greenbelt, MD 20771
USA.

(for USA, Canada)

Dr. K. Schlegel
MPI für Aeronomie
Postfach 20
D-3411 Katlenburg 3
Fed. Rep. of Germany.

(for Europe).

URSI Accounts

In accordance with the recommendations of the URSI Standing Finance Committee, the practice of publishing the accounts of the Union annually in *URSI Information Bulletin* is being continued.

The Balance Sheet and the Income and Expenditure Accounts of URSI for the year ended 31 December 1988 are reproduced below. The original accounts have been audited by Van Poyer & Co, Réviseurs d'Entreprises, Brussels, at the end of March 1989.

The assets held in Belgian francs have been converted to US dollars using the UNESCO exchange rate valid at 31 December 1988 ($1 = BF 36.10).

INTERNATIONAL UNION OF RADIO SCIENCE (U.R.S.I.)

BALANCE SHEET : DECEMBER 31, 1988

ASSETS

	$	$
Dollars		
Banque Degroof (restricted)	13,256.95	
Banque Degroof (free)	2,500.00	
Bank of America	58,868.12	
		74,625.07
Belgian Francs		
Banque Degroof	6,244.07	
Générale de Banque	728.14	
		6,972.21
Investments :		
Merrill Lynch (1)	81,972.33	
Merrill Lynch (2)	24,882.78	
Philip Morris shares	20,618.14	
Demeter Sicav shares	20,205.87	
Rorento Units	140,623.99	
Merrill Lynch Shares	60,000.00	
Bank deposits	6,925.21	
		355,228.32
Petty Cash and Stamps :		
Petty Cash	162.16	
Stamps	79.28	
		241.44
Sundry Debtors		
Deposit RTT		243.77
Total Assets		437,310.81
Less creditors		
IUCAF (*)	2,874.27	
IUWDS (*)	5,358.71	
		8,232.98
Other creditors (*)	7,470.53	
Pension Fund (*)	6,891.27	
Audit fees	1,385.04	
ICSU dues 1988	4,110.00	
Balth van der Pol Medal Fund (*)	12,488.11	
		32,344.95
NET TOTAL OF URSI ASSETS		396,732.88

INTERNATIONAL UNION OF RADIO SCIENCE (U.R.S.I.)

BALANCE SHEET : DECEMBER 31, 1988

The net URSI Assets are represented by	$	$
Allocated Reserve Fund :		
General	25,000.00	
Closure of Secretariat	100,000.00	
		125,000.00
Scientific Activities Fund :		
Scientific Activities in 1989	42,500.00	
Young scientists in 1989	4,000.00	
		46,500.00
XXII Général Assembly Fund 1990		
Scientific	60,000.00	
Organization	40,000.00	
		100,000.00
		271,500.00
Unallocated Reserve Fund		125,232.88
		396,732.88

INTERNATIONAL UNION OF RADIO SCIENCE (U.R.S.I.)

BALANCE SHEET : DECEMBER 31, 1988

Statement of Income and Expenditure for the year ended December 31, 1988

	$	$
I. INCOME		
Grant from ICSU Fund		18,309.00
Unesco Contracts		300.00
Contributions from Member Committees		164,391.08
Special Contributions		4,155.12
Special Grants/contacts		2,500.00
Sales of publications		373.22
Bank interest and gain on exchange		19,259.84
Other income		3,957.90
		213,246.16
II. EXPENDITURE		
a. Scientific Activities		39,466.33
Général Assembly (XXII)	2,197.10	
Symposia/Colloquia/Working Groups	24,079.34	
Representation at scientific meetings	6,189.89	
Grants to Organizations	7,000.00	
b. Routine Meetings		
Bureau		18,201.40
c. Publications		49,539.92
d. Administrative Expenses		106,622.80
Salaries, Related Charges	84,111.94	
Général Office Expenses	8,971.02	
Office Equipment	1,731.58	
Accounting and Audit Fees	8,174.89	
Bank charges and Loss on Exchange	3,633.37	
e. ICSU Dues		4,110.00
total Expenditure		217,940.45
Excess of Expenditure over Income		(4,694.29)
Accumulated Balance at January 1, 1988		387,496.21
Balance at December 31, 1988		382,801.92
Appreciation of Belgian Franc		13,930.96
Accumulated Balance at December 31, 1988		396,732.88

INTERNATIONAL UNION OF RADIO SCIENCE (U.R.S.I.)

Rates of exchange :

January 1, 1988 : $ 1 = 34.70 BF
December 31, 1988 : $ 1 = 36.10 BF

Observation :

The accounts indicated with (*) are constituted by :

- 50% in shares as indicated below;
- 50 % in US $.

Appreciation in value of investments on december 31, 1988 :

- RORENTO UNITS :	248,853.19
- DEMETER SICAV SHARES :	24,184.16
- PHILIP MORRIS SHARES :	25,297.27

NEWS FROM MEMBER COMMITTEES

XIV CONVENTION ON RADIO SCIENCE IN FINLAND

The URSI Committee in Finland has organized a two-day Convention on Radio Science on 17 and 18 October 1988. The Chairman of the Organizing Committee was Prof. I. Lindell. The meeting, the 14th of a regular series, was held in Otaniemi. After changing the original form from triennial to annual Convention in 1986, due to the increasing number of submitted papers, the Convention has been limited to different topics each year. In 1988, topics chosen, with the number of papers submitted, were:

- Electromagnetics (18)
- Metrology (12)
- Space engineering (11)
- Integrated circuits (39)

under which sessions for oral and poster presentation were arranged. Together with two invited papers, the total number of submitted papers amounted to 82. In contrast to recent years the present Convention was not purely national, since contributions from the neighbouring countries have been included.

The book of abstracts is available as Report 32 of the Electromagnetics Laboratory of the Helsinki University of Technology, Otakaari 5A, SF-02150 Espoo, Finland.

Working Group on Interaction of Electromagnetic Fields with Biological Systems and Related Measurements

Following the untimely death of Professor Saul Rosenthal, Chairman of the Working Group, Prof. C. Romero-Sierra, Vice-Chairman representing Commission A, has kindly accepted the invitation of Prof. S. Leschiutta, Chairman of Commission A, to take over the chairmanship of the Group.

The Officers of the Working Group are now as follows:

Chairman: Prof. C. Romero-Sierra
Vice-Chairman representing Commission A: Dr. A.J. Bernardi
Vice-Chairman representing Commissions B and E: Prof. J. Bach Andersen.

All URSI Member Committees have been invited by Prof. Leschiutta (letter dated 29 January 1989) to propose the names of one or two scientists having expertise in the field covered by the Working Group and willing to cooperate. Prof. Romero-Sierra, in consultation with the two Vice-Chairmen, will form the Group from the proposed roster. Member Committees which have not yet responded to Prof. Leschiutta's request are invited to do so, as soon as convenient, by writing direct to Prof. Romero-Sierra, with copy to Prof. Leschiutta. The address of Prof. Romero-Sierra is as follows:

Professor Cesar Romero-Sierra
Department of Anatomy
Queen's College
Kingston, Ontario
Canada K7L 3N6.

WAVE INDUCED PARTICLE PRECIPITATION AND WAVE PARTICLE INTERACTIONS (URSI-WIPP'89)

This meeting was held in Dunedin, New Zealand, from 5 to 10 February. It was organized by R.L. Dowden, H. Matsumoto and U.S. Inan. There were 37 participants, representing 13 countries, 2 Young Scientists and 5 students.

There were 30 invited (oral) papers and 19 contributed (poster) papers. The latter were presented in groups of six in three viewing sessions of 90 minutes with each session preceded by a 30-minute Poster Preview given by Drs A.J. Smith, B. Tsurutani and W.I. Axford respectively. Being a specialist meeting, there were no concurrent sessions.

In addition to two Young Scientists, three invited speakers were supported by URSI funds. Of the 13 countries represented only New Zealand and USA had a higher representation than USSR.

All of the papers concerned wave particle interactions or were ancilliary to those that did. Most papers directly concerned wave induced electron and proton precipitation. Ground-based and satellite measurements had about equal representation in these. A new feature of ground-based techniques is the recent setting up of networks for remote sensing of lightning-induced electron precipitation in the USA, in Antarctica and in Australasia. The Soviet satellite experiment AKTIVNY was the subject of several papers and much discussion. This involves, for the first time, a high power ($\sim$1 kW) VLF and ELF transmitter in orbit. This was to have been in orbit by now but may not be launched until early 1990.

Social events included an "Ice Breaker" Reception, which included official welcomes by the Mayor of Dunedin (Sir Clifford Skeggs) and the Vice-Chancellor of the University of Otago (Sir Robin Irvine), a trip on a restored historic train along the spectacular Taieri Gorge, a Banquet and a Farewell Buffet.

R.L. DOWDEN

College on Theoretical and Experimental Radio Propagation Physics

This College was held in Trieste, Italy, from 2 to 24 February 1989. It was organized by the International Centre for Theoretical Physics (ICTP) and sponsored by the Italian Direzione Generale per la Cooperazione allo Sviluppo. The College followed the Course on Basic Telecommunication Science held at the Centre from 9 January to 3 February 1989 (see March issue of the *URSI Information Bulletin*). The topics covered by the last two weeks of the Course were introductory to those covered by the College, and 39 of the participants of the Course attended also the activity reported here.

The programme of the College included the subjects and lecturers listed below.

1. Ionospheric Physics
   - 1.1 Upper ionosphere and magnetospheric-ionospheric coupling (J.R. Manzano, Tucuman, Argentina)
   - 1.2 Physics of the ionized and neutral middle atmosphere (S.M. Radicella, Buenos Aires, Argentina)
   - 1.3 Low latitudes ionospheric phenomena (J.O. Oyinloye, Ilorin, Nigeria)

2. Theory of Ionospheric Radio Propagation (P.A. Bradley, Didcot, United Kingdom)

3. Measurement Techniques and Analysis of Ionospheric Parameters
   - 3.1 Vertical ionospheric soundings, including ionogram scaling (B. Zolesi and C. Bianchi, Rome, Italy)
   - 3.2 Beacon satellite measurements, including Faraday effect, amplitude and phase scintillation and group delay (P. Spalla, Florence, Italy, and R. Leitinger, Graz, Austria)
   - 3.3 Ionospheric absorption measurement techniques (K. Serafimov, Sofia, Bulgaria)
   - 3.4 Statistical analysis of ionospheric parameters including correlation studies with other geophysical and solar data (A. Giraldez, Buenos Aires, Argentina and V. Popov, Moscow, USSR)

4. Physics of the Tropospheric Radio Propagation
(G.O. Ajayi, Ile-Ife, Nigeria)

5. Measurement Techniques of Tropospheric Radio Propagation Parameters
(F. Barbaliscia and V. Speziale, Rome, Italy)

6. Radio Noise Theory and Measurements
(M. Hayakawa, Toyokawa, Japan).

A series of special lectures on topics related to the main subjects were given by F. Mariani (Italy), D. Bilitza (F. R. of Germany), H. Rishbeth (United Kingdom), B.M. Reddy (India), T. Gulyaeva (USSR) and R.G. Strużak (Poland).

Points 3.1, 3.2 and 5 of the programme included laboratory demonstrations with actual ionosonde and beacon satellite receiver, and UHF satellite receiver simulator. Point 3.4 was strongly centered on computer exercises.

Professors S.M. Radicella and F. Mariani co-directed the College. The first of the two was also the local organizer. He was assisted very efficiently by Ms Ave Lusenti, scientific secretary of the Centre.

Of the total number of 65 participants, 27 were from Asia, 19 from Latin America, 17 from Africa, and 2 from Europe.

It must be noted that the interaction among lecturers and participants was such that several lines of cooperative research, involving scientists from developed and developing countries, were identified and some preliminary research work was already started during the period of the College.

The successful outcome of the College and the preceding Course, and the efficient administrative and technical facilities available at the Centre, have convinced the scientific organizers about the convenience of proposing to the ICTP a new edition of these activities for the year 1991. The programme would include several experimental exercises with the active intervention of participants.

S. RADICELLA

ANNOUNCEMENTS OF MEETINGS AND SYMPOSIA

COMMISSION F OPEN SYMPOSIUM ON WAVE PROPAGATION: REMOTE SENSING AND COMMUNICATION

Scope of the Meeting

An Open Symposium on Wave Propagation: Remote Sensing and Communication is organised by Commission F of URSI at La Londe-les-Maures (France) during the week of 11 to 15 September 1989.

Papers have been accepted which cover all the topics of the work of the Commission. Included are sessions on the remote sensing of the atmosphere, land surfaces and the ocean surface, propagation through rain and through the clear atmosphere, propagation at millimeter and optical wavelengths, modelling of wave propagation through inhomogeneous media.

chedule of Sessions

Monday	AM	11 Sept.	Attenuation by rain
	PM		Radar studies
Tuesday	AM	12 Sept.	Propagation on terrestrial paths
	PM		Remote sensing of the atmosphere
Wednesday	AM	13 Sept.	Applications to systems
	PM		Special tour to Porquerolles and Port Cros Islands
Thursday	AM	14 Sept.	Slant path propagation
	PM		Modelling of wave propagation
Friday	AM	15 Sept.	Radiometeorology.

A business meeting of Commission F will also be scheduled on one evening.

Registration

Conference registration will take place at IRET (La Londe-les-Maures) on Sunday 10 Sept. from 4.00 to 8.00 PM and on Monday

from 8.00 to 10.00 AM. The registration fee after 30 June 1989 will be FF 900.00 and includes attendance at all sessions, break refreshments, the welcome cocktail, the reception and the banquet, the tour to islands and the preprint volume.

Preprint Volume

A preprint volume of 4-page summaries of the papers to be presented at the meeting will be distributed at registration. Additional copies will be available at the meeting at the cost of FF 300.00. After the meeting, contact Prof. J.P. Mon for preprint volumes at the following address:

CNET/CRPE
38-40 rue du Général Leclerc
F-92131 Issy-les-Moulineaux
France.

Accommodation

Accommodation is available at IRET La Londe at the following prices, which include room, breakfast and two meals:

FF 260 per person for single room
FF 310 per person for single occupancy of a double room
FF 500 for double occupancy of a double room.

Recreational Facilities

The beach on the Mediterranean sea is 300 meters from IRET. (Remember that September is a very pleasant season on that part of France and that you can swim in a very warm sea water!). Courts for handball, basketball and tennis are free for conference attendants and accompanying persons.

Further information available from:

Mrs Nicole ADANE
URSI Comm. F Symposium
CNET/CRPE
38-40 rue du Général Leclerc
F-92131 Issy-les-Moulineaux
France.

URSI INTERNATIONAL SYMPOSIUM ON SIGNALS, SYSTEMS AND ELECTRONICS (ISSSE'89)

18-20 September 1989

The Advance Programme for ISSSE'89, the first of a series of triennial international symposia promoted and organized by URSI Commission C on Signals and Systems and Commission D on Electronic and Optical Devices and Applications has recently been published and circulated.

The aim of the Symposium is to cover all fields of activities of the two Commissions and to promote the exchange of research results between scientists and engineers working in these multidisciplinary fields. A chance is provided to learn about recent progress by contributed papers and to get an over view about different fields in plenary sessions and with tutorial papers.

The Symposium will take place at the new campus of the Engineering Department (Technische Fakultät) of the University of Erlangen-Nürnberg, the facilities of which are extremely well suited for such events. There is a total of 27 sessions grouped into the following six fields:

A. Signal and Information Theory

1. Detection and estimation
2. Modulation and coding
3. Coding and information theory
4. Signal analysis

B. System Theory

1. Adaptive systems
2. Special systems
3. Spread spectrum systems
4. Nonlinear systems
5. Multidimensional systems

C. Communications Systems

1. Communications Circuits
2. Low bit rate speech coding
3. Image coding
4. Mobile radio systems

5. Packetized satellite communications

D. Electronic Devices and Applications

1. Silicon transistors and circuits
2. Switched-capacitor filters
3. III-V transistors and circuits
4. A/D- and D/A-converters
5. Sensors, transducers, and SAW-devices
6. Superconducting devices and circuits
7. Integrated digital signal processors

E. Optical Devices and Applications

1. Fibers and fiber components
2. Optical communications systems
3. Lasers and photo detectors
4. Integrated optics and optoelectronics ICs

F. CAD for Devices and Circuits

1. Device modelling
2. CAD for integrated circuits.

As a special feature, the Symposium will have ple· ary sessions and, in addition, a large number of tutorial papers, presented either by the Chairman or by another distinguished expert in that particular field.

An exhibition of products out of related fields will be arranged in the foyer of the lecture-halls for the duration of the conference.

The conference language will be English.

For further information please contact:

Conference Secretariat
Mrs U. Arnold - ISSSE'89
Lehrstuhl für Nachrichtentechnik
Universität Erlangen-Nürnberg
Cauerstrasse 7
D - 8520 Erlangen, FR of Germany.

Telephone: (49) 9131 85 7101.

CONFERENCE ON PRECISION ELECTROMAGNETIC MEASUREMENTS

(CPEM'90)

The 1990 International Conference on Precision Electromagnetic Measurements and related fundamental constants will be held from 11 to 14 June 1990 in Ottawa, Canada. It is co-sponsored by the IEEE Instrum. and Meas. Society, the National Research Council of Canada, URSI and the US National Institute of Standards and Technology. The Chairman of the Conference is Dr. J. Vanier, Vice-Chairman of URSI Commission A.

All papers concerned with precision electromagnetic measurements and related fundamental constants will be considered. Papers in the following fields are regarded as particularly appropriate for this conference:

- Direct current and low frequency
- Fundamental constants and special standards
- Time, time interval and frequency
- RF, microwaves and millimetre waves
- Lasers
- Cryoelectronics
- Dielectrics and antennas
- Advanced instrumentation including new sensors, automated instrumentation and novel measurement techniques.

First Call for Papers

Original papers that have not been published previously are solicited. Authors should request an author's kit for the preparation of a summary, by applying to

H. Lacoste
Conference Services
National Research Council Canada
Ottawa K1A 0R6
Canada.

Since papers are selected on the basis of the summary (500-1000 words, and abstract, 50 words), the summary must describe clearly the new and significant results and their importance. The summaries of all accepted papers will be published in the meeting digest. Summaries must be forwarded

no later than 8 January 1990 to the Conference Secretary, H. Lacoste.

Authors will be notified of the acceptance (or rejection) of their papers and of the type of session to which they have been assigned by mid-April 1990. The notification will be sent to the first author unless otherwise requested by the authors. All papers accepted must be presented at the conference either orally or in poster sessions.

Papers presented at CPEM'90 will be considered for publication in a special issue of the IEEE Transactions on Instrumentation and Measurement.

The conference language will be English.

10th INTERNATIONAL WROCŁAW SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY

This Symposium will be held at the Technical University of Wrocław from 26 to 29 June 1990. The Wrocław EMC Symposium is organized since 1972 as a biennial event open to all scientists and engineers throughout the world. Two languages, English and Russian, with simultaneous translation, create special opportunities for easy contacts.

CALL FOR PAPERS

Prospective authors are invited to submit original, unpublished papers concerning all aspects of EMC. Suggested topics include:

1. Antennas and propagation, EMC aspects
2. Biological effects of EM radiation
3. EMC in computers and PCBs
4. EMC in power engineering
5. EMC in wire communications
6. EMC management
7. EMC coupling paths
8. EMI measurements

9. EMI prediction and analysis
10. EMI reduction techniques
11. EMI sources
12. ESD, lightning, EMP
13. Filters and filtering techniques in EMC
14. Grounding and shielding
15. Immunity of electronic systems and devices
16. Natural EM Earth fields
17. Regulations and standards in EMC
18. Spectrum management and utilization
19. Spectrum monitoring
20. Susceptibility and vulnerability.

Papers concerning EMC problems in cellular radio networks and cable television are especially welcome at the 10th Wrocław Symposium.

Authors should submit 6 copies of a 50-75 word abstract and a 500-756 word summary in English together with the preliminary application form. It should explain clearly the contribution, its originality and relevance to the EMC. The author's name, complete return address, phone and, if possible, telex number should appear on the summary. In case of several authors, the name for contact should be indicated. The language in which the full paper will be delivered should be declared (English or Russian).

Authors' schedule:

- Abstract and summary mailed by 15 July 1989
- Notification of acceptance and author's kit mailed by 30 September 1989
- Camera-ready manuscripts mailed by 15 February 1989.

Five copies of the abstracts and summary should be sent to:

EMC Symposium
Box 2141
51 645 Wrocław 12
Poland.

One copy should be sent to the Chairman of the Scientific Programme Committee:

Professor F.L.H.M. Stumpers
Elzentlaan 11
561 1LG Eindhoven
Netherlands.

40th INTERNATIONAL ASTRONAUTICAL CONGRESS

The 40th International Astronautical Congress of the International Astronautical Federation will be held in Beijing, China, from 7 to 13 October 1989. The theme of the Congress will be "The Next 40 Years in Space".

The programme will consist of symposia and sessions, some of which are of interest to the URSI community. We quote, in particular, the Symposium on Earth Observations which includes seven sessions as follows: International remote sensing coordination activities; Future remote sensing satellite and space station missions; Remote sensing systems; Remote sensing data processing, distribution and analysis; Land applications of satellite remote sensing; Ocean and atmospheric applications of satellite remote sensing; Earth observation for Global Change.

For further information, contact:

The Secretariat of 40th IAF Congress
China International Conference Centre for
Science and Technology
Friendship Hotel
Beijing 100086, China.

Telephone: 8313172
Telex: 222337 ICCST CN
Telefax: 898116.

TIME-DOMAIN MEASUREMENTS

A Symposium devoted to Time-Domain Metrology was held in Tel Aviv, in 1987, as part of the URSI General Assembly. A collection of papers presented at that Symposium has now been published as Vol.9, No 1 of *Electromagnetics*. The Guest Editor is T.K. Sarkar. The list of contents is reproduced below:

Electromagnetics is a periodical published by the Hemi-sphere Corp., 79 Madison Avenue, Suite 1110, New York, N.Y. 10016-7892.

Books Published by URSI Personalities

J.A.G. MALHERBE, former Official Member of Commission B representing the South African URSI Committee.

Microwave Transmission Line Filters

published by Artech Books, 3rd printing 1986,
340 pages, Order Book D01045.

Microwave Transmission Line Couplers

published by Artech Books, September 1988,
225 pages, Order Book D01300.

List of URSI Officers and Officers of Member Committees: Amendments

Amendments to the List published in N°247 (December) of the *URSI Information Bulletin* are listed below.

1. Member Committees

FINLAND

Secretary: Dr. Ari Sihvola, Helsinki University of Technology, Electromagnetics Laboratory, Otakaari 5 A, SF-02150 Espoo, Finland.

2. Commissions

Commission A on Electromagnetic Metrology

USA: Dr. E.K. Miller, Rockwell International Science Centre, 1049 Camino dos Rios, Thousand Oaks, CA 91360, USA.

Commission B on Fields and Waves

Portugal: Prof. Dr. Alonso Manuel Santos Barbosa, Instituto Superiore Tecnico de Lisboa, Lisboa, Portugal.

USA: Prof. R.S. Elliott, Department of Electrical Sciences, UCLA, Westwood, Los Angeles, CA 90024, USA.

Commission C on Signals and Systems

Portugal: Prof. Dr. José Nunes Leitao, Instituto Superior Tecnico de Lisboa, Lisboa, Portugal.

USA: Dr. A.D. Wyner, AT&T Bell Laboratories, 600 Mountain Avenue, Murray Hill, NJ 07974, USA.

Commission D on Electronic and Optical Devices and Applications

Netherlands: Dr. Th.G. van de Roer, T.U. Eindhoven, Afd. Electrotechniek, Postbus 513, NL-5600 MB Eindhoven, Netherlands.

Portugal: Prof. Dr. Francisco de Oliveira Restivo, Faculty of Engineering, University of Oporto, Monte da Virgem, Portugal.

USA: Dr. T. Itoh, Department of Electrical and Computer Engineering, Building ENS 634, University of Texas, 24th and Speedway, Austin, TX 78712, USA.

Commission E on Electromagnetic Noise and Interference

Portugal: Mr. Tito Manuel Escada Manilha, National Institute of Meteorology and Geophysics, Lisboa, Portugal.

USA: Dr. J.R. Herman, GTE Corporation, Strategic Systems Division, Mail Stop 31, One Research Drive, Westborough, MA 01581, USA.

Commission F on Radio Propagation and Remote Sensing

USA: Prof. C.T. Swift, University of Massachusetts, Department of Electrical and Computer Engineering, Marcus Hall, Room 8, Amherst, MA 01003, USA.

Commission G on Ionospheric Radio and Propagation

USA: Dr. C.M. Rush, National Telecommunications and Information Administration, Institute for Telecommunication Science, 325 Broadway, Boulder, CO 80303, USA.

Commission H on Waves in Plasmas

USA: Dr. M.G. Grossi, Smithsonian Institution, Astrophysical Observatory, 60 Garden Street, Cambridge, MA 02138, USA.

Commission J on Radio Astronomy

USA: Dr. J.R. Fisher, National Radio Astronomy Observatory, P.O.Box 2, Green Bank, WV 24944, USA.

3. Change and addition of telephone and telefax numbers

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Telefax : (45) 8-915 6740

Dr. P. Bauer - Telephone: (33) 1-6447 4276

Prof. W.A. Gambling - Telephone: (44) 703-593373

Prof. E.V. Jull - Telefax: (1) 604-228 5949

Dr. H. Rishbeth - Southampton University Telephone: (44)
Telephone: (44) 703-592073

Rutherford Appleton Laboratory
Telephone: (44) 235-446496

Prof. R. Saal - Telefax: (49) 89-2105 2000.

4. Addition to the List

BERNARDI, Dr. A.J., Facolta d'Ingegneria, Universita di Roma,
Via Eudossiana 18, Roma, Italy.