

U.R.S.I.

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**IN MEMORIAM**

**HAI-SUP LEE**

**1924 - 1990**

Professor Hai-Sup Lee died on November 1, 1990. He was born in Shanghai, China, on September 22, 1924. He was well known for his research in aeronomy and ionospheric physics, particularly his work based on radio measurements using wave interaction techniques. He was a Professor of Electrical and Computer Engineering and a member of the Communications and Space Sciences Laboratory at Penn State University since 1962. He is survived by his wife Ok-Hi and three sons, Kyu-Wong, Kyo-Ho, and Kyu-Tae.

He was a Member of Commission G of URSI and a Senior Member of The Institution of Electrical and Electronic Engineers. He is greatly missed by his colleagues and the many students he has guided over the years.

**J.S. NISBET**

## URSI ACCOUNTS 1990

The Balance Sheet and the Income and Expenditure Accounts of URSI for the year ended 31 December 1990 are reproduced below. The original accounts have been audited by Van Poyer & Cie, Réviseurs d'Entreprises, Brussels, at the end of March 1991.

*The Treasurer of URSI comments the financial situation of URSI in the following terms :*

"At each General Assembly of URSI, the audited accounts of income and expenditure for the three-year period preceding the Assembly are submitted to the URSI Council for approval, and are subsequently published in the "Proceedings". On the other hand, in accordance with a recommendation made by the Finance Committee in 1975 and reaffirmed in 1981, the practice concerning the annual publication of the audited accounts in the "Information Bulletin" is being continued. The accounts of income and expenditure, as prepared by Maquet, Sambaere, Savoie & Ass., are reproduced on the following pages.

The assets held in Belgian francs have been converted to US dollars using the UNESCO rates of exchange. It is perhaps worth noting that since the General Assembly in 1987, the value of the US dollar relative to the Belgian franc has fallen from \$1 = BF 42 to \$1 = BF 31.20 on December 1990.

The excess of expenditure over income in 1990 is attributable to two main factors :

- a) the expenses in connection with the organization of the General Assembly in Prague and with the publication of the "Review of Radio Science", and
- b) the rather high expenses on administration, which can be accounted for by several non-recurring items, including the transfer of the URSI Secretariat to its new location.

The balance in hand at the end of 1990 is considered to be at a reasonable level and allows an increase, in comparison with the last triennium, of the amounts allocated to the Commissions for scientific activities.

In conclusion, it may be said that the finances of URSI are in a healthy position, and thanks should be expressed to Dr. H.J. Albrecht, past Treasurer, for the very careful way the finances of the Union have been managed and monitored over the last six years."

P. BAUER, Treasurer

**INTERNATIONAL UNION OF RADIO SCIENCE (URSI)  
BALANCE SHEET : 31 DECEMBER 1990**

|                       | <u>ASSETS</u>    |            |
|-----------------------|------------------|------------|
| <u>Dollars</u>        |                  | \$         |
| Banque Degroof        | 7,162.47         |            |
| Bank of America       | 84,065.44        |            |
| Alex Brown Inc.       | 1,669.45         |            |
| Merrill Lynch         | <u>60,732.65</u> |            |
|                       |                  | 153,630.01 |
| <br>                  |                  |            |
| <u>Belgian francs</u> |                  |            |
| Banque Degroof        | 7,803.46         |            |
| Générale de Banque    | <u>1,477.18</u>  |            |
|                       |                  | 9,280.64   |
| <br>                  |                  |            |
| <u>Investments</u>    |                  |            |
| Demeter Sicav shares  | 23,379.23        |            |
| Rorento Units         | 127,215.35       |            |
| Merrill Lynch Shares  | 86,891.24        |            |
| Brown Fund            | <u>10,000.00</u> |            |
|                       |                  | 247,485.82 |
| Petty cash            |                  | 867.47     |

Sundry Debtors

|               |  |                            |
|---------------|--|----------------------------|
| Deposit RTT   |  | 282.05                     |
| Other debtors |  | <u>1,000.00</u>            |
| Total Assets  |  | <u>412,545.99</u><br>===== |

Less creditors

|                                       |                  |                            |
|---------------------------------------|------------------|----------------------------|
| IUCAF (*)                             | 7,351.28         |                            |
| IUWDS (*)                             | <u>3,795.73</u>  |                            |
|                                       |                  | 11,147.01                  |
| Audit fees                            | 1,762.82         |                            |
| Balth van der Pol Medal Fund (*)      | 13,986.73        |                            |
| Cost printing Review of Radio Science | <u>56,602.00</u> |                            |
|                                       |                  | <u>72,351.55</u>           |
| NET TOTAL OF URSI ASSETS              |                  | <u>329,047.43</u><br>===== |

The net URSI Assets are represented by :

\$

Scientific Activities Fund :

|                               |                  |           |
|-------------------------------|------------------|-----------|
| Scientific Activities in 1991 | 55,000.00        |           |
| Young Scientists in 1991      | <u>10,000.00</u> |           |
|                               |                  | 65,000.00 |

XXIV General Assembly Fund 1993 :

|                          |                  |                     |
|--------------------------|------------------|---------------------|
| Scientific               | 90,000.00        |                     |
| Young Scientists         | 40,000.00        |                     |
| Organization             | <u>50,000.00</u> |                     |
|                          |                  | <u>180,000.00</u>   |
| Unallocated Reserve Fund |                  | 245,000.00          |
|                          |                  | <u>84,047.43</u>    |
|                          |                  | 329,047.43<br>===== |

**Statement of Income and Expenditure**  
**for the year ended 31 December 1990**

| <u>I. INCOME</u>                      |                   | \$               |
|---------------------------------------|-------------------|------------------|
| Grant from ICSU Fund                  |                   | 18,692.00        |
| Contributions from Member Committees  |                   | 183,198.67       |
| Special Contributions                 |                   | 16,025.64        |
| Special Grants/Contracts              |                   | 5,857.31         |
| Sales of Publications                 |                   | 1,413.07         |
| Bank Interest and Gain on Exchange    |                   | 27,932.66        |
| Other Income                          |                   | <u>50,125.81</u> |
|                                       | Total Income      | 303,245.16       |
|                                       |                   | =====            |
| <u>II. EXPENDITURE</u>                |                   |                  |
| <u>a) Scientific Activities</u>       |                   | 133,640.68       |
| General Assembly - Organization       | 11,455.06         |                  |
| General Assembly - Scientific         | 77,830.07         |                  |
| General Assembly - Young Scientists   | 19,292.09         |                  |
| Symposia/Colloquia/Working Groups     | 13,325.19         |                  |
| Representation at Scientific Meetings | 5,738.27          |                  |
| Grants to Organizations               | <u>6,000.00</u>   |                  |
| <u>b) Routine Meetings</u>            |                   |                  |
| Bureau/Executive Committee            |                   | 27,518.24        |
| <u>c) Publications</u>                |                   | 33,543.49        |
| <u>d) Administrative Expenses</u>     |                   | 199,386.19       |
| Salaries, Related Charges             | 166,302.98        |                  |
| General Office Expenses               | 14,876.54         |                  |
| Office Equipment                      | 1,090.45          |                  |
| Accounting and Audit Fees             | 11,402.95         |                  |
| Bank Charges and Loss on Exchange     | <u>5,713.27</u>   |                  |
| <u>e) ICSU Dues</u>                   |                   | <u>3,896.15</u>  |
|                                       | Total Expenditure | 397,984.75       |
|                                       |                   | =====            |

|   | \$                         |
|---|----------------------------|
| Excess of Expenditure over Income       | 94,739.59                  |
| Accumulated Balance at 1 January 1990   | <u>396,246.49</u>          |
| Balance at 31 December 1990             | 301,506.90                 |
| Appreciation of Belgian Franc           | <u>27,540.53</u>           |
| Accumulated Balance at 31 December 1990 | <u>329,047.43</u><br>===== |

Rates of exchange :

1 January 1990 : \$1 = 37,50 BF  
31 December 1990 : \$1 = 31,20 BF

Observation :

The accounts indicated with (\*) are constituted by :

- 50 % in US \$
- 50 % in Shares as indicated below :
  - DEMETER SICAV
  - RORENTO
  - MERRILL LYNCH

Appreciated value of investments on December 31, 1990 :

|                   |             |
|-------------------|-------------|
| - DEMETER SICAV : | 28,980.77   |
| - RORENTO :       | 230,031.92  |
| - MERRILL LYNCH   | Unavailable |



APPENDIX

Detail of Income and Expenditure

I. INCOME

\$

Special Contributions :

Ministère Education Nationale 4,807.69  
Special Contribution Belgium 11,217.95

16,025.64

Special Grants/Contracts :

To support URSI Young Scientists :

Commonwealth Science Council 1,904.48  
Royal Society of London 1,846.96  
Japanese Committee 2,105.87

5,857.31

Other Income :

Symposia : Reimb. IGARSS'89 5,000.00  
Reimb. ISSSE'89 6,482.82  
Reimb. IGARSS'90 5,000.00  
Profit on Sales Rorento 22,725.96  
Profit on Sales Philip Morris 7,831.64  
Trade Mark Rights 200.77  
Sales of Administrative Materials 2,884.62

50,125.81

II. EXPENDITURE

Symposia/Colloquia/Working Groups :

IEEE/IGARSS'90 5,000.00  
COSPAR 1,500.00  
EQUATORIAL AERONOMY 1,250.00  
BEACON SATELLITE 1,250.00  
CPEM 1,500.00  
EMC 1,500.00  
COMMISSION A 1,325.19

13,325.19

Grants to Organizations :

FAGS 1990 2,000.00  
SCOSTEP 1,000.00  
IUCAF 3,000.00

6,000.00

## NEWS FROM THE MEMBER COMMITTEES

- *The URSI Committee in the United Kingdom* will hold its 8th National Radio Science Colloquium on 10 and 11 July 1991 at the University of Leicester. It is hoped that contributions this year will range over all ten URSI Commissions including the new Commission in Electromagnetics in Biology and Medicine. The meeting will start at 10.30 on Wednesday 10 July and probably continue until 16.30 on Thursday 11 July.

Those who are interested in presenting a paper at the meeting should send a title plus an abstract of some 100 words to the address below. Please indicate the relevant URSI Commission.

Accommodation will be at Beaumont Hall, one the University Halls of Residence. Some places are available for Tuesday night and Thursday night for those people who have difficulty in travelling to Leicester. The registration fee of £50 includes a light lunch on both Wednesday and Thursday and tea and coffee on both days. For additional details, please contact : Mrs K. BOWERS, Ionospheric Physics Group, Department of Physics, University of Leicester, LEICESTER, LE1 7RH, U.K.

- *Le Comité URSI en France a organisé sa première Journée scientifique en avril, et son Secrétaire en décrit les activités comme suit :*

"La Première Journée des Sciences et Techniques Radio organisée par le CNFRS s'est tenue le Vendredi 12 avril dans les locaux de Télécom Paris.

Présidée par P. Bauer, elle a illustré le caractère pluridisciplinaire de l'URSI en permettant aux chercheurs et ingénieurs travaillant dans les différentes disciplines de la radioélectricité d'exposer des résultats récents dans leurs domaines respectifs. Elle a réuni près de 60 participants venant de laboratoires de

recherche publics et industriels. Trois exposés de synthèse et neuf exposés des commissions se sont succédés au cours de cette journée riche en information.

Le premier exposé de synthèse "Effets biologiques des émissions radioélectriques de faible puissance" par B. Veyret (Groupe de Bioélectromagnétisme, Bordeaux I, Talence) a permis de mieux situer les travaux qui sont menés dans le cadre de la nouvelle Commission K "Electromagnétisme en biologie et médecine". La définition de normes d'exposition aux rayonnements électromagnétiques variés créés par l'homme nécessite des recherches fondamentales sur leurs effets biologiques. Les résultats des études publiées ont permis d'établir des normes pour la santé publique et d'entrevoir des applications thérapeutiques. La tendance actuelle est de tenter de cerner les effets confirmés et d'en déterminer les mécanismes physico-chimiques et biologiques. Ces études, qui nécessitent des protocoles biologiques extrêmement rigoureux et une caractérisation précise des paramètres physiques d'exposition, ont permis d'établir l'existence d'effets dont certains peuvent être expliqués par la production localisée d'un échauffement même minime tandis que d'autres, très spécifiques, dépendent de la fréquence de l'onde incidente et correspondent à des fenêtres de la valeur de l'énergie incidente. Si les problèmes environnementaux liés aux radio-fréquences ne paraissent pas majeurs, des applications nombreuses en thérapie non-invasive peuvent être envisagées.

Le second exposé de synthèse "Radiodiffusion numérique à destination des récepteurs fixes ou mobiles" par J.F. Hélaré (CCETT, Cesson-Sévigné) a dressé un panorama des études menées actuellement au niveau européen dans le domaine de la radiodiffusion numérique (Digital Audio Broadcasting). Le programme EUREKA 147 vise à la radiodiffusion numérique d'un signal sonore de même qualité que le disque compact, à destination de récepteurs fixes ou mobiles. La présence d'obstacles, surtout en milieu urbain, entraîne une propagation par trajets multiples encore compliquée par sa variation en fonction du temps quand le récepteur est mobile. Le système doit être conçu pour profiter

de la multiplicité des trajets, qui constitue une forme de diversité, au lieu d'en souffrir. Il est avantageux d'employer des signaux à large bande car il est très improbable qu'un évanouissement profond affecte une bande de plus d'un mégahertz. Dans le système décrit, le signal transmis résulte en fait du multiplexage de plusieurs programmes, chaque source élémentaire tirant profit de la large bande du signal multiplex.

Le dernier exposé de synthèse, "Lasers à très haute stabilité en métrologie et en télécommunications" par P. Juncar (INM, Paris), I. Joindot et C. Boisrobert (CNET, Lannion), a présenté les résultats récents obtenus par l'asservissement de la fréquence émise par les lasers, sur des transitions atomiques ou moléculaires, qui permet, dans le domaine optique, d'obtenir des oscillateurs dont la stabilité, à long terme, est de même ordre, voire meilleure que celle rencontrée dans le domaine radiofréquence. La technique de battements de fréquences entre deux oscillateurs optiques asservis respectivement sur des transitions atomiques proches, permet l'étude de la variance d'Allan de ces lasers. On peut ainsi comparer leurs performances à celles obtenues par les oscillateurs RF asservis sur l'horloge à Césium. Ont également été passées en revue les techniques d'asservissement de ce type de sources sur des cavités interférométriques de haute stabilité qui permettent, quant à elles, de réduire le bruit de fréquence (ou de phase) à court terme. Les diodes laser asservies par rétroaction optique sur des cavités Fabry-Perot offrent, à ce titre, des performances particulièrement intéressantes sur le plan métrologique mais aussi en télécommunications.

L'exposé de la Commission A "Chronométrage des pulsars millisecondes en astronomie" par M. Lestrade (Observatoire de Meudon, département DERAD, Meudon) a mis l'accent sur les possibilités offertes par les pulsars dans la métrologie du temps. Les pulsars sont des étoiles à neutrons en rotation ayant un faisceau radio balayant la Terre à chaque tour. Le chronométrage d'un pulsar consiste à mesurer les temps d'arrivée de ces

impulsions radio à un télescope, à une fréquence donnée (aux alentours de 1 GHz), pendant plusieurs années. Les pulsars millisecondes découverts en 1982 tournent environ 1000 fois plus vite que les pulsars ordinaires et leurs périodes sont de l'ordre de 1 à 10 millisecondes seulement. La finesse de leurs impulsions (quelques dizaines de microsecondes) permet de les chronométrer de façon 1000 fois plus précise que les pulsars ordinaires. La particularité des pulsars millisecondes est leur extrême stabilité rotationnelle à long terme. Cette stabilité présente un défi technologique aux physiciens des horloges atomiques qui cherchent à réaliser une échelle de temps ayant des instabilités relatives inférieures à  $10^{-15}$  sur des intervalles de temps de plusieurs années. Des pulsars millisecondes sont régulièrement chronométrés à Arecibo (USA) depuis 7 ans et à Nançay (France) depuis 3 ans.

L'exposé de la Commission B "Méthodes probabilistes de conception et d'évaluation des grandes antennes réseaux à module actif" par S. Drabowitch (Thomson/CSF RADANT, Les Ulis) a montré les possibilités offertes par les méthodes probabilistes dans le domaine des antennes réseaux. A l'émission, les modules actifs fonctionnent dans des conditions de rendement maximum (classe B ou C) donc à niveau imposé. Il est par conséquent impossible de contrôler le niveau des lobes latéraux par pondération de l'amplitude d'illumination du réseau. On peut par contre pondérer la densité spatiale des éléments rayonnants. Une telle pondération peut utilement être effectuée par une méthode probabiliste qui permet de "gommer" les périodicités génératrices d'artefacts. Le nombre de modules et le degré de dispersion contrôlent la loi de probabilité du niveau des lobes latéraux. Le même type de méthode peut être utilisé pour évaluer la dégradation des performances due aux pannes de modules. L'introduction du hasard dans la conception d'un système complexe permet d'éviter les artefacts. Elle est la seule pertinente pour évaluer les performances et définir les spécifications d'un système ayant d'un grand nombre de degrés de liberté.

L'exposé de la Commission C "Radioélectricité et théorie de l'information" par G. Battail (ENST, Paris) a illustré les retombées de la théorie de l'information sur les communications radio. Cette théorie n'a longtemps proposé aux ingénieurs en communications que la connaissance de limites lointaines. Le progrès des recherches sur les codes et algorithmes d'une part, la disponibilité de moyens technologiques de leur réalisation d'autre part, lui permettent maintenant une interaction efficace avec les techniques radioélectriques. Cela ne va d'ailleurs pas sans remettre en question certains présupposés traditionnels au niveau de la largeur de bande en particulier.

L'exposé de la Commission D "Matériaux semiconducteurs à puits quantiques et applications dans le domaine du traitement du signal" par M. Pocholle (Thomson/CSF, Orsay) a montré comment l'avancée technologique des moyens modernes mis en œuvre pour la croissance de matériaux semi-conducteurs a donné naissance au concept de génie quantique qui a des applications multiples dans les domaines de l'électronique et de l'opto-électronique, plus spécialement pour des dispositifs de traitement du signal. Les structures à puits quantiques réalisées à partir de composés semi-conducteurs III-V permettent de fabriquer des matériaux artificiels aux propriétés électro-optiques non linéaires, adaptées pour réaliser des fonctions de traitement optique de l'information. Ces propriétés sont fondées sur l'existence de phénomènes fondamentaux liés à la structure des puits quantiques :

- forte interaction lumière-matière grâce à la présence d'effets excitoniques à température ambiante et à l'interaction coulombienne augmentée par le confinement des porteurs,
- effet électro-optique augmenté lui aussi grâce au confinement des porteurs qui permet d'appliquer de très forts champs électriques tout en conservant une force d'oscillateur importante,
- seuil des effets réduit (en optique non-linéaire ou pour atteindre le seuil de l'effet laser) grâce à la diminution du nombre d'états quantiques du système.

Enfin, l'exploitation des propriétés optiques liées aux transitions intra-bandes doit permettre l'émergence de nouveaux composants pour l'infrarouge à partir de composés III-V (GaAs/GaAlAs, InGaAs/InP, GaInAs/GaAlAs,...).

L'exposé de la Commission E "Caractérisation électromagnétique du foudroiement d'un aéronef. Modélisation numérique" par J.C. Alliot (ONERA, Meudon) était consacré aux impulsions électromagnétiques qui peuvent, par couplage vers l'intérieur d'un aéronef, engendrer des signaux parasites susceptibles de provoquer des pannes temporaires ou définitives sur des circuits électroniques critiques pour la mission du véhicule. L'utilisation d'équipements électroniques sophistiqués et travaillant à bas niveau pour le pilotage et les communications, ainsi que l'introduction récente de matériaux nouveaux dans la construction aéronautique (tels que les composites carbone, Kevlar, ...), a accru la susceptibilité des avions modernes aux parasites électromagnétiques. C'est pour ces raisons que de nombreux laboratoires, et en particulier l'ONERA, ont entrepris, depuis une dizaine d'années, des programmes de recherches destinés à analyser l'interaction électromagnétique entre un canal de foudre et un véhicule, et à développer les outils analytiques et numériques nécessaires pour la détermination théorique ou l'évaluation de cette interaction. Des mesures en vol effectuées en France et aux Etats-Unis ont montré que dans 90% des cas, le foudroiement d'un avion est initié par le véhicule lui-même, qui engendre un bi-leader, et que dans 10% des cas, l'avion est impacté par un leader descendant vers le sol.

L'exposé de la Commission F "Le système DORIS : détermination d'orbite et radio-positionnement intégré par satellite. Fonctionnement du système et corrections de propagation" par M. Dorrer (CNES, Toulouse) a décrit le système DORIS qui consiste en un récepteur Doppler embarqué sur satellite(s) et un réseau de quelques dizaines de stations au sol. Son but est double : déterminer avec une précision décimétrique l'altitude du satellite pour des projets d'altimétrie océanique (DORIS sur TOPEX-POSEIDON), et d'autre part localiser avec une

précision décimétrique, voire centimétrique en relatif, certaines des balises (DORIS sur SPOT).

Dans TOPEX-POSEIDON, DORIS est joint à des altimètres radar qui mesurent la distance satellite-océan à quelques centimètres près, et à un radiomètre microondes. A ce niveau de précision, les corrections de propagation, ionosphérique et troposphérique, sont particulièrement importantes. L'utilisation d'émissions bifréquences permet, non seulement de corriger les mesures DORIS, mais d'en déduire un modèle de contenu ionosphérique qui sera applicable à l'altimètre. Ces techniques sont en cours de validation avec les mesures du premier DORIS, fonctionnant sur SPOT2 depuis février 1990. L'erreur due à la propagation troposphérique est corrigée, pour DORIS, avec des mesures de capteurs météorologiques implantés au voisinage de chaque balise, et pour l'altimètre en combinant les modèles fournis par le Centre européen et les mesures du radiomètre embarqué.

L'exposé de la Commission G "Radar à diffusion incohérente au Spitzberg" par W. Kofman (CEPHAG, Grenoble) a présenté les objectifs scientifiques et le choix technique relatifs à l'étude du couplage entre l'ionosphère et la magnétosphère terrestre dans la zone de la calotte polaire qui est l'objectif majeur du nouveau radar à diffusion incohérente. Ce projet s'inscrit dans le cadre des grands projets internationaux (STEP, GEM, CLUSTER).

L'exposé de la Commission H "Emissions liées aux signes à haute tension, aux émetteurs TBF et à l'activité sismique" par F. Lefeuvre (LPCE-CNRS, Orléans) a fait le point sur les mécanismes qui sont, ou qui pourraient être, à l'origine de phénomènes observés et des effets qu'ils induisent dans la magnétosphère et l'ionosphère. Les mesures de champ électrique et magnétique effectuées aux fréquences EBF (1 Hz - 1 kHz) et TBF (1 - 20 kHz) dans la magnétosphère terrestre ont en effet mis en évidence, au milieu d'émissions ou bruits électromagnétiques "naturels" se propageant vers la Terre, la présence d'ondes provenant du sol et liées plus ou moins directement à l'activité humaine



(harmoniques élevées du 50 ou du 60 Hz des lignes électriques, émetteurs TBF de radio-navigation) ou à l'activité sismique (explosions au sol, tremblements de Terre).

L'exposé de la Commission J "La protection des bandes de fréquence attribuées à la radioastronomie" par E. Gérard (Observatoire de Meudon, département DERAD, Meudon) a permis d'exprimer la préoccupation des scientifiques, et plus particulièrement des radioastronomes, devant l'augmentation du nombre et de l'intensité des signaux émis par l'homme. Les observations scientifiques en bande étroite (raie) et en bande large couvrent le domaine des ondes radio de 3 MHz à 350 GHz. Le développement des systèmes hertziens, et plus particulièrement des systèmes de radiocommunications avec les mobiles dont les émissions couvrent une grande partie de la surface du globe, sont très préoccupants et la CAMR'92 (Conférence Administrative Mondiale des Radiocommunications) doit incorporer de nouvelles demandes d'attribution de fréquences. Il est clair que les intérêts des uns et des autres sont incompatibles à long terme et que la radioastronomie émigrera un jour ou l'autre sur la face cachée de la Lune. En attendant, il convient d'accroître la protection des sites de radioastronomie et d'étudier de nouvelles méthodes de compatibilité entre services.

Les questions posées à l'issue de chacun des exposés permirent à l'assistance de faire préciser certains points ainsi que d'exprimer des opinions parfois différentes de celles des orateurs par exemple pour la métrologie, le partage des bandes de fréquence ou encore les actions à engager dans le domaine du bioélectromagnétisme.

Le succès de cette première journée permet d'envisager l'organisation d'une seconde journée en 1992."

J.C. BIC

## PROFILE OF MEMBER COMMITTEES

*In this Section we intend to present, when the opportunity arises, some of the forty-odd Member Committees of URSI. Professor Gardiol, President of the Committee in Switzerland, has written the following lines to present his Committee.*

The Committee of URSI in Switzerland is formed by the present Swiss delegates to the Commissions A to J of URSI, together with a few additional members (former or future delegates). It is presently chaired by Professor Fred Gardiol (also Chairman of Commission B of URSI and former Chairman of the URSI Finance Committee), and very efficiently administered by Dr. Peter Kartaschoff of the Swiss PTT in Bern (both are at this time looking for successors...). The members are located at the Swiss Federal Institutes of Technology in Zürich and Lausanne, in several institutions in Bern (University, Federal Institute of Metrology) and at the two Meteorological Institutes in Locarno-Monti and Payerne. The Committee is officially part of the Swiss Academy of Natural Sciences, that supplies a nominal budget allowing the President to attend the General Assemblies of URSI, and takes care of the annual dues. As a rule, the Committee meets once a year to review the activities within the fields of URSI, at which time a technical visit of the host institution is organized. Informal discussion meetings are occasionally organized to discuss general policy and particular topics.

At the present time, the Swiss National Committee of URSI does not have scientific or technical activities of its own, because this would duplicate the many events already organized in Switzerland by other institutions, the most active ones being the Swiss Section of the IEEE, with several chapters, and the

Swiss Electrotechnical Association, with its Telecommunication Branch the ITG. The situation is periodically reviewed by the members, to determine whether the Committee should organize of support events in areas not yet covered by other institutions.

Most of the Committee Members are active in the organization of technical and scientific events sponsored by URSI. The most significant one is the Symposium on Electromagnetic Compatibility (EMC), organized every other year at the Swiss Federal Institute of Technology in Zürich by the Swiss delegate to Commission E. This event is now well established and internationally recognized as the leading one in its field, attracting more than a thousand participants in recent years. The Commission J delegate organized a workshop of the Committee of European Solar Radioastronomers (CESRA) in Braunwald on 21-25 August 1989, on the topic "Particle Beams in the Solar Atmosphere". The Commission F delegate participated in the organization of the symposia on Microwave Signatures in Remote Sensing, while the delegate to Commission B was traditionally associated with the series of European Microwave Conferences.

Delegates and other Committee Members from Switzerland are active in URSI General Assemblies, organizing sessions and presenting papers, more particularly on circuits, antennas and EMC. They are also active in the Symposia organized by the individual Commissions of URSI.

Every three years, the delegates collect information on the developments that took place within Switzerland in the fields covered by URSI Commissions, and send them to the Editors for the Review of Radio Science. The response to this considerable effort proved frustrating, because the data supplied is so drastically compressed that the meagre remnant appearing in print does not reflect accurately the activities carried out in Switzerland. To overcome this unfortunate situation, the Swiss National Committee had its own pamphlet printed in 1984 and 1987 for the General Assemblies in Florence and Tel Aviv, contributing in

this manner to the proliferation of papers that attendees are supposed to bring back home. It is increasingly felt, however, that this important effort has become redundant, since nowadays published scientific papers are much better referenced in data banks and abstract journals.

In conclusion, URSI is not particularly visible at the national Swiss level, where most needs are well covered by other technical institutions. On the other hand, URSI provides interesting possibilities for Swiss scientists to interact without any discrimination on the international arena, and in particular to establish ties with developing and former Eastern Block countries. In this respect, URSI is of great value and there is no equivalent substitute for it.

F. GARDIOL

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

*Professor Okoshi, Chairman of Commission D in 1987-1990, contributed the following comments :*

"Commission D organized one Tutorial Lecture, nine Scientific Sessions of sole sponsorship and five Joint Scientific Sessions of joint sponsorship with other Commissions for the 23rd General Assembly. Unfortunately one of the nine Scientific Sessions sponsored by Commission D, originally numbered D1 and entitled "Organic Semi-conductors in Electronics and Optoelectronics", was cancelled because of the difficulty in soliciting a sufficient number of papers.

The title and presenter of the Tutorial Lecture had been chosen by considering the increasing concern within URSI in the interdisciplinary area between radiowaves and biology. As the result, Dr. H. Inaba, Tohoku

University, Japan, now the Japanese Official Member for Commission D, was chosen and gave a comprehensive lecture entitled "New Bio-Information from Ultraweak Photon Emission in Life and Biological Bodies."

The lecture was well presented and well attended. Dr. Inaba reported the latest achievement in time-domain and two-dimensional photon-counting measurement of ultraweak light emission from plant tissues. The measurement results included interesting phenomena such as the periodical variation in the number of emitted photons with periodicity of typically three minutes, in synchronism with the variation of the surface potential of the plant tissue.

At the 23rd General Assembly, Commission D had endeavoured to offer in its Scientific Sessions the latest technical and scientific achievements in electronic and optoelectronic devices and applications, with special emphasis on basic research subjects. The result seems to be a success, the topics of all Scientific Sessions were of strong current interest, and all the Sessions had attendances of several tens to one hundred. Such numbers of attendants were almost twice the numbers in the preceding General Assembly. The lecture room used, Hall 7, was well equipped and large enough for all the Sessions. On the whole all the invited speakers made excellent presentations.

It is hoped that the Scientific Sessions of Commission D in the future General Assemblies will be further activated by the inclusion of contributed papers at the next General Assembly in Kyoto."

T. OKOSHI

*Professor H. Rishbeth, Chairman of Commission G in 1987-1990, wrote a report which consists of two parts. The first one describes the activities of his*

*Commission in that triennium, and includes thanks to the many colleagues who supported the Chairman's action :*

"Commission G has had a very active three years. The activity included the work of several G and G/H Working Groups, and the sponsorship of symposia in Modes "A and B". Of the Commission budget of US\$6,500, approximately \$3,800 (or about 60%) was used to support seven symposia. The remainder was used to support the attendance of participants at the Prague General Assembly. In retrospect, it would perhaps have been better to devote a larger proportion of the budget to symposia, because of the difficulty of knowing in advance whether people will actually come to the General Assembly.

The Working Groups G1-G4 and G/H1 have been active during the triennium. The sad death of J.A. Gledhill in 1988 left a vacancy in the chairmanship of INAG (G1). To avoid losing INAG's momentum, I asked P.J. Wilkinson to step into the breach, and I am pleased that the appointment received a massive vote of confidence in this year's election of officers, which INAG (in common with other working groups) was asked to hold. I would also like to thank R. Haggard, the retiring Secretary of INAG, for his services; and also R. Conkright, for his work in producing the INAG Bulletin. He now becomes the INAG Secretary. The INAG Bulletin, which is a valuable and informative publication and must rank as one of URSI's major productions, is assisted by WDC-A and by a special URSI subvention.

R. Leitinger continues in office as Chairman of G2, the Beacon Satellite Group, together with Vice-Chairmen J.A. Klobuchar and T.R. Tyagi. G2's activities included the Beacon Satellite symposia at Beijing and Tucuman. C.M. Rush led the ionospheric modelling activity of G3, which is now to be merged as a new G3 with the Ionospheric Informatics G4 Group of B.W. Reinisch. G4 has been particularly active in conducting specialized studies, producing reports and holding a workshop. Finally, the Incoherent Scatter Working Group G/H1 has

carried out a most useful task in coordinating the activities of the incoherent scatter network and acting as a useful channel for liaison, under the leadership of V.B. Wickwar and K. Schlegel. I would like to thank all the WG Officers for their activities, and to welcome J.M. Holt and P.J.S. Williams as the new officers of G/H1 and D. Anderson as the newly-elected Vice-Chairman of the new G3. Is there a place for an URSI Coordinating Group for the growing network of coherent scatter radars?

In order to bring some order into the rambling list of ionospheric topics in the triennial URSI Reviews of Radio Science, I initiated a complete rearrangement for the 1987-1989 Review. I am grateful to those National members who contributed material and references for this publication, and to M.J. Rycroft, R.L. Dowden and G. Hyde for their various parts in this massive task. I have also to thank my predecessors as Chairman of Commission G, Jules Aarons and Pierre Bauer, who were always ready with advice if I requested it, and Hiroshi Matsumoto, the Commission H Chairman, for the easy cooperation between G and H.

This brings me to the General Assembly at Prague, and the pleasant duty of thanking Pierre Bauer in his role as coordinator, the many Commission G Conveners who worked hard to give us a good programme, and Professor Zima and the Czechoslovak Organizing Committee who made the whole thing possible.

I may well have forgotten others whom I should mention, but I must congratulate Kristian Schlegel on becoming the new Commission Vice-Chairman. It remains for me to express my gratitude to Andrzej Wernik, the new Chairman, for the pleasure of working with him during the past three years. The help he has given me should be useful experience for his next three years as Commission Chairman.

I have enjoyed my six years' work as Commission Vice-Chairman and Chairman (or most of it!). Thank you all for your support."

H. RISHBETH

*Professor Rishbeth also had comments on the programme of his Commission in Prague.*

"The Commission organized Symposia G1 - G3 and took part in JS1 - JS9, in several of which (mentioned below) the Commission took the lead. The Commission Tutorial was given by P. Bauer with the subject "The Ionosphere from Space", and was enjoyed by the audience.

G1 and JS9, in particular, emphasized the Commission's interest in radar (coherent, incoherent scatter, and MST) and dealt with different aspects : techniques, results, and theoretical interpretation. G2 dealt with various aspects of ionospheric modelling, touching on the interests of several Commission G Working Groups (G1 - INAG, G3 - Ionospheric Modelling, and G4 - Informatics). JS2 was a large symposium, dealing with the traditional URSI subject of radio propagation. JS5 dealt with the difficult but important subject of the predictability of the solar-terrestrial environment (Sun/interplanetary medium/magnetosphere/ionosphere/atmosphere). The subject of the effects of high power radio waves on the ionosphere and magnetosphere, which is very much a "frontier subject", was dealt with by JS6. All these symposia attracted many poster papers as well as a full oral programme (except for JS9, which contained invited oral papers only). On the whole, the Commission's experience supports the view that the 20-min period is a suitable basic unit for URSI scheduling. Thanks are due to all the conveners for their hard work.

The Open Session G3 was personally convened by the Commission Chairman, to provide a place for papers on any ionospheric topic that might not



fit any of the specialized symposia. A basic 10-min unit was adopted, largely to encourage speakers to concentrate on the main points of their work. Most speakers rose to the challenge very well, though in the event it became possible to relax the schedule slightly. The Open Session's popularity led to the provision of a poster session, the oral papers being selected to provide a wide range of topics and author's nationalities. The flexibility of this "Open Session" approach could be helpful in accommodating young scientists' papers."

H. RISHBETH

## REPORTS ON URSI SPONSORED MEETINGS

### REGIONAL FACTORS IN PREDICTING RADIOWAVE ATTENUATION DUE TO RAIN

*URSI Commission F Open Symposium, Rio de Janeiro, 3-7 December 1990*

During the last decade, a number of methods have been produced for the prediction of cumulative distribution statistics of attenuation due to rain at frequencies above 10 GHz. For terrestrial paths, most methods start from the rainfall rate at a point for the given time percentage and the effective proportion of the path length over which that rainfall rate may be assumed to apply. For Earth-space paths, an additional factor has been used to give the effective height over which the rainfall rate may be assumed to exist. This effective height may be that of the 0°C isotherm at high latitudes, but it may be less than this height for lower latitudes. Due to the serious lack of measured path attenuation data from sufficiently widespread regions of the world, from which model improvements might be made, the methods have generally not been able to take numerical

account of known differences between regions, and the effective rain height has been assumed to be simply a function of latitude. This underlay the prediction procedure adopted at the meeting of CCIR Study Group 5 in late 1989.

During the CCIR Study Group 5 meeting, however, and the triennial Open Symposium of URSI Commission F which was held immediately previously, it became evident that a number of measurements in low-latitude regions were underway and likely to produce results in the near future, or were in advanced stages of preparation. The data from these experiments would be crucial for the development of the prediction procedures, particularly if these procedures were to attempt to incorporate regional factors. It was felt to be an ideal time, therefore, to hold a specialized URSI Commission F Open Symposium (\*), both to present any new data that had become available, and to bring together as many of the experimenters as possible who had made, or planned to make, measurements in low-latitude regions. Of particular importance, in this respect, was the incorporation of workshops into the Open Symposium schedule to promote a strong interaction between the participants, and to attempt to evolve a consensus on a number of important issues which related to rain attenuation measurements and prediction procedures.

There were nine sessions for the presentation of papers which concentrated on four main areas of concern to the theme of the symposium : (i) point measurements of rainfall rates (12 papers), (ii) horizontal distribution of rain (7 papers), (iii) vertical distribution of rain (13 papers), and (iv) radar and distrometer techniques (4 papers). Workshops were held to explore the relevant processes (or techniques) for the modelling of propagation and its prediction, namely : (i) horizontal structure of precipitation and the consequences for

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\* A copy of the symposium preprints may be obtained from : Professor M.S. Assis, Ministry of Infrastructure, National Secretariat of Communications, Rua Miguel Couto 105-21°andar, Rio de Janeiro, RJ 20070, Brazil.

prediction (Chaired by Dr. B. Segal and Professor M.S. Pontes), (ii) vertical structure of precipitation and the consequences for prediction (Chaired by Professor G.O. Ajayi and Professor R.K. Crane), (iii) measurement techniques, (Chaired by Dr. K.A. Hughes and Dr. D.V. Rogers) and (iv) the way forward (Chaired by Dr. J.E. Allnutt and Professor M.S. Assis). The overall chairman for the symposium was Mr. M.P.M. Hall.

Much of the workshop discussion naturally concentrated on path attenuation. There were problems with elevation-angle scaling due to the cellular structure of the intense rain, variation with elevation angle in the effective medium temperatures (as measured by radiometers), inconsistencies in rainfall rate measurements, choice of probability level for input parameters and choice of drop size distribution. Clouds were becoming increasingly important as Very Small Aperture Terminals (VSATs) operate with very limited fade margins, millimetre wave and optical communication systems required evaluation, and cloud data was likely to establish a basis for a better division of rain climatic zones. Statistics other than annual cumulative statistics were considered important, such as monthly statistics, event/risk statistics, event duration statistics and multiyear phenomena.

The 51 participants at the Open Symposium came from 15 countries : Australia, Austria, Brazil, Canada, China, France, Italy, Japan, Malaysia, Netherlands, Nigeria, Papua New Guinea, Switzerland, U.K. and USA. The symposium was hosted by EMBRATEL (under the organization of Professor M.S. Assis). It was arranged that the symposium was followed immediately by two concurrent meetings of those closely concerned with these issues in the CCIR : Interim Working Party (IWP) 5/2 (Tropospheric propagation data for planning space and point-to-point terrestrial telecommunications systems) (Chaired by Mr. M.P.M. Hall) and IWP 5/3 (Influence of the non-ionized regions of the atmosphere on wave propagation) (Chaired by Professor R.K. Crane). This enhanced the exchange of ideas and information on the theme of the

symposium between the URSI and CCIR communities. It may be expected that the topic of regional factors in the prediction of radio propagation effects will continue to have special relevance to URSI Commission F and CCIR Study Group 5 in the foreseeable future as data become available from a wide range of locations.

Martin P.M. HALL

### INTERNATIONAL ZURICH SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY

*A report on this cyclic Symposium, which is in its 9th edition, has been written by Dr. G.V. Meyer, Chairman of the Symposium and Official Member of Commission E in Switzerland.*

"The 9th International Zurich Symposium and Technical Exhibition on Electromagnetic Compatibility was held from March 12 to 14, 1991, at the Federal Institute of Technology in Zurich, Switzerland. The meeting was attended by 1052 participants from 33 countries despite the travel restrictions due to the situation in the Middle-East. The exhibition included 67 exhibitor booths. These numbers confirm again the growing importance of EMC and the high international standing of the Zurich EMC Symposia.

As a matter of fact, this biennial event ranges among the most important EMC conferences and - due to its international character - provides a review of the worldwide progress of EMC science and technology.

Like in the preceding years, the Symposium has been organized by the Institute of Communication Technology of the Federal Institute of Technology Zurich (ETHZ) under the auspices of R. Trachsel, President of the General

Directorate of the Swiss PTT. A number of international and national professional organizations cooperated, among other the EUREL, IEEE and URSI, the latter also sponsoring the participation of young scientists. Symposium President was Professor P. Leuthold (Zurich) and Chairman Dr. G. Meyer (Zurich). The Technical Programme Committee was chaired by Professor Dr. R.M. Showers (Philadelphia).

From a total of 204 submissions, 134 papers have been selected and presented in 18 sessions on : Noise and Reception, Transmission Lines, Conducted versus Radiated Tests, Layered Media, Line Transients and Coupling, Screening, Computer-aided Spectrum Engineering, Lightning, Emission Testing, Biological Effects, Lightning and Nuclear EMP, Product ESD and Immunity, Numerical Modeling in EMC, Power and Dateline Transients, Absorbers and Filters, Theory of EMC, Power Systems and System EMC. The sessions covered virtually all actual EMC topics and reviewed the current status as well as future trends of EMC technology. The 730-pages symposium proceedings contain the full text of all presentations.

An insight into the work of URSI Commission E was offered by its open meetings. The purpose of these meetings was to discuss progress in the seven working groups of URSI Commission E, and to outline outstanding topics and new lines for future research.

The programme did not exclusively address the specialist. An introduction to the EMC technology was offered by three tutorial lectures and four workshops. In a number of sessions overview papers and case studies have also been presented.

Strong response has been registered by the presentations on EMC standards (including the implementation of the European EMC-Directive), on biological effects, on new materials for EMC applications, on test methods and

on theoretical EMC models. In fact, the general trends in the field of EMC are dictated by the increasing number of mandatory standards, especially stimulating new developments in computer aided EMC analysis- and design-tools as well as the progress in new material technologies.

As usual, the Technical Exhibition has significantly contributed to the success of EMC Zurich'91, by demonstrating the fast conversion of theoretical advances into a state-of-the-art hardware and software.

A representative inquiry has shown that more than half of the participants also attended EMC Zurich'89. About 45% of the attendees visited at least one EMC symposium in 1990, but only 6.6% more than one symposium per year. It may be concluded that one half of the participants attend in a two-year rhythm while the other half participates annually. The paper standard was found good by 75%, excellent by 20% of the votes. Once again the inquiry confirmed that the main value of a symposium is its role as a platform for personal information exchange. Over 65% of the participants stated that they found solutions to actual problems during the symposium and as much as 84% have been able to establish valuable contacts.

The inquiry also brought interesting suggestions to be considered for the next EMC Zurich Symposium which is planned for March 9 to 11, 1993. The call for papers for the 10th International Zurich Symposium and Technical Exhibition on EMC is scheduled for February 1992. Further information is available from :

Dr. G.V. MEYER  
ETH-Zentrum IKT  
CH-8092 ZURICH  
"SWITZERLAND".

G.V. MEYER

**SEVENTH INTERNATIONAL CONFERENCE ON ANTENNAS AND  
PROPAGATION**

University of York, York, U.K., 15-18 April 1991

URSI has co-sponsored all the IEE International Conferences on Antennas and Propagation since the first in the series, which was held in 1978. This beneficial co-operation continued with this year's event (ICAP-91) which was held at the University of York from 15 to 18 April 1991, with Dr. Pat Foster as Chair of the Conference. She, and a strong organizing committee, had put together a wide ranging technical programme which followed the successful format of earlier ICAP's. This consists of a series of invited speakers addressing all the conference and not more than four parallel sessions. The result is a conference in which participants can follow their own particular technical interests and learn about related areas in a friendly atmosphere which encourages informal interaction. ICAP has always encouraged papers from a wide range of specialisations with the objective of bringing together experts in antenna, propagation and radio systems. At ICAP-91 about half the sessions fell within the scope of Commission B (Fields and Waves), about a third fell within the scope of Commission F (Wave Propagation and Remote Sensing) and the remainder under the scope of Commissions A, C and G. Sessions included Mobile antennas, Radar meteorology, Quasi-optic antennas, Rainscatter, Electromagnetic modelling, Propagation for personal communications, Remote sensing, Mobile satellite services, Near-field antenna measurements and Spectrum management.

Two innovations were an evening series of poster sessions and a special session devoted entirely to personal computer display papers. The poster sessions were held in conjunction with a buffet supper so that participants could

leisurely talk to poster authors. This was very popular and the authors obtained wider exposure for their papers than in the oral sessions. Discussions continued well into the night. A number of research topics which were particularly well-suited to the PC environment were on display in an "interactive" mode. The software developed for the project was on display on a PC and participants could talk with the presenter and also dynamically interact with the software (where it worked!). This was a great success and the room was packed with willing volunteers. It indicates the way some conference presentations might develop in the future.

Another original aspect in this year's programme was a number of visits to places of particular interest - both scenically and from a technical point of view: Fylingdales missile early warning radar; A high power TV transmitter; A microwaves and waveguide manufacturer; the National Museum of Photography and a steam train through the North Yorkshire Moors.

The list of Keynote Speakers for ICAP-91 was particularly impressive: Ray Steele from Southampton on Personal Communications and Urban Propagation; David Olver from London on Compact Antenna Test Ranges; Peter Watson from Bradford on the Modelling of propagation at millimetre-wavelengths for both communications and remote sensing; Bob Hansen from California on Superconducting Antennas; Kevin Hughes from Switzerland on technical co-operation between the CCIR and the ITU on worldwide propagation studies, and Stan Kubina from Montreal on Computer Modelling of Antennas.

Many international conferences in recent months have suffered severely from a combination of the Gulf War and the economic recession but ICAP-91 was able to overcome these obstacles. Over four hundred participants came from 29 countries and benefited from a most successful conference.

A.D. OLVER



## MEETING ANNOUNCEMENTS

- The Third International Symposium on Recent Advances in Microwave Technology (ISRAMT'91), originally scheduled in Reno, Nevada on May 22-25, has been rescheduled for August 18-21. The URSI representative is Professor M. Hamid, Electrical Engineering, University of South Alabama, EEB75, Mobile, AL 36688 (U.S.A.).

*Three important URSI-generated meetings must be brought to the attention of our readers. All three are held in 1992, but deserve an early preliminary announcement :*

- The first one is the MICROWAVE SIGNATURE CONFERENCE, to be held in Igls-Innsbruck (Austria), a well-known alpine resort, on July 1-3, 1992. The full title is "Terrestrial Remote Sensing with Microwaves : Signatures, Techniques and Systems". The sponsoring Commission is our Commission F, and the organization is in the hands of Dr. W. Keydel, Deutsche Forschungsanstalt für Luft- und Raumfahrt (DLR), Wessling, Germany, Chairman, and Dr. H. Rott, University of Innsbruck, Austria, Co-Chairman and local organizer.

### Scope and proposed topics :

- Aircraft and Satellite mounted Sensors
- Microwave Radiometry
- Radar (Systems)
- Snow and Ice
- Hydrology
- Altimetry
- Polarization Dependence of Signatures
- Forest-Foliage Signatures
- Oceanic Remote Sensing
- Emission and Scattering Models of Targets
- Tropospheric Propagation Effects in Signatures

The technical committee in consultation with the Radio Science editorial board is planning a "Special Issue" stemming from the conference papers and presentations.

Abstracts should be written on A4 sized white paper. The total length of the abstracts should not exceed a maximum of 3 pages. The text must include : the title of the proposed paper, author(s) name, affiliation, address, telephone and telefax numbers. It should provide sufficient detail to enable the technical committee to assess the contribution. Four copies of the abstracts should be submitted to Microwave Signature - 92 latest by 1 December 1991. The authors of selected papers will be requested, no later than 15 February 1992, to prepare a full typescript of not more than four camera ready pages. The final papers will be due on 1 May 1992.

Address for correspondence and further information :

Microwave Signature - 92  
DLR, Institut : HF - Technik  
D-8031 WESSLING  
GERMANY  
Fax (49) 8153-28-1135  
Telex 526 419 dlrop d

Contact persons : Dr. M. Chandra      Tel. (49) 8153-28-313  
R. Weppner/G. Bierl      Tel (49) 8153-28-380

The second meeting is a new edition in that most successful URSI Conference series, held by Commission B every third year, and initiated in the fifties. It is the 14th TRIENNIAL URSI INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC THEORY, to be held in Sydney, Australia, on 17-20 August 1992.

*We reproduce the Call for Papers, which has just been released :*

"Papers are now invited for the above Symposium. A list of suggested topics is given below. The topics listed are intended as suggestions only and

contributions concerning new methods and/or applications in all areas of electromagnetic theory will be considered.

Areas of particular interest for the application of electromagnetic theory (including topics of special relevance to Australia) are :

- radar
- radioastronomy
- remote sensing
- electromagnetic environmental effects
- geophysics
- industrial applications
- non-linear guided waves

From the initial response to the Symposium other topics of interest include :

*Propagation:* :

- in random media
- in fractal media
- in anisotropic media
- in the ionosphere
- for land mobile systems

*Waveguide and Transmission Lines:* :

- dielectric and optical waveguides
- open waveguides
- microstrip and planar waveguides
- tubular lines
- high Tc transmission lines
- discontinuities

*Antennas:*

- mobile antennas
- mutual coupling
- adaptive arrays
- microstrip antennas
- reflectors and feeds
- mm-wave antennas

*Scattering & Diffraction:*

- nverse scattering
- surface wave scattering
- ray methods
- uniform asymptotics

*Materials :*

- properties of microwave dielectrics
- hiral media
- non-reciprocal properties in magnetised semiconductors

*Miscellaneous :*

- theory of non-linear random fields
- non-linear electromagnetic waves
- mm-wave ferrite circulators
- wave packet /solitary waves in relativistic electrodynamics
- iterative methods
- mathematical techniques

Prospective authors should prepare a title and full page synopsis in English (references and/or figures can be included if desired) explaining clearly the content and relevance of the proposed contribution. All submissions must be received by 1 November 1991 (submissions after this date will not be considered) to the following fax or mailing address :

Dr. Graeme JAMES  
URSI EM Symposium  
CSIRO Division of Radiophysics  
P.O. Box 76  
Epping, NSW 2121  
AUSTRALIA  
Fax (61) 2-868 0400

Dr. James mentions that the Sydney Opera House (northern foyer overlooking the Harbour) has been booked for the reception on the Monday evening and the Powerhouse Museum of Applied Arts and Sciences has been booked for the Tuesday night. On the Wednesday night a Sydney Harbour Dinner Cruise is being arranged.

- The third meeting is the INTERNATIONAL SYMPOSIUM ON SIGNALS, SYSTEMS AND ELECTRONICS (ISSSE'92), to be held in Paris (France), on September 1-4, 1992. It is the second in a series launched in 1989 by our Commissions C and D. The general Chairperson is Dr. P. Bauer, and the

Vice-Chairpersons are Dr. J. Hénaff and Professor P. Matthews. 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. Sessions will include regular, invited and tutorial papers. English is the official language of the Symposium, which is open to all aspects of Signals, Systems and Electronics, particularly :

*Signal and Information Theory :*

- Coding and Information Theory
- Signal Analysis
- Modulation and Coding

*System Theory :*

- Adaptive Systems
- Nonlinear Systems
- Multidimensional Systems
- Neural Networks

*Communications Systems :*

- Speech and HiFi Sound Coding
- Recording Techniques
- Digital Image Processing
- Mobile Radio Systems
- Broadband Communications
- Spread Spectrum Communications

*Electronics :*

- DSP and ASIC Telecommunications
- Sensors, Transducers, and SAW-Devices
- Superconducting Devices and Circuits
- Microwave and Millimetre Wave Circuits
- Active Antennas
- Quantum Wells
- Interconnection Techniques

*Photonics :*

- Lasers, Fibers and Photodetectors
- Optical Amplifiers
- Integrated Optics
- Optical Communications Systems

*CAD for Devices and Circuits :*

- Device Modelling
- CAD for Integrated Circuits

*Education and Research in Signals, Systems, Electronics and Photonics.*

Prospective authors are invited to submit an extended summary of about 4 pages, suitable for a 20-minute presentation. The summary must clearly state:

- Author's name, address
- phone, fax and telex numbers
- title of the submitted paper and its relevant area
- Author's contribution, originality of the work and significant results obtained.

The deadline for submission of papers is 1 February 1992. By that time authors should have sent three copies of each paper to :

CNET-DIT-ASC  
38, rue du Général Leclerc  
F-92131 ISSY-LES-MOULINEAUX  
FRANCE  
Fax (33-1) 40-95-70-15

Time schedule : Submission of summary : 1 February 1992  
Notification of acceptance : 1 April 1992  
Submission of final manuscript : 15 May 1992

For further information please contact the Conference Secretary :

Mrs. Yela Stevanovitch  
ISSSE'92  
B.P. 2, Uccle 3  
B-1180 Bruxelles (Belgium)  
Phone and fax : (32) 2-358.1966

*Meetings organized by Member Committees*

- *Dr. A. Sihvola, Secretary of the Committee in Finland, announces the programme of its XVII National Radio Science meeting.*

"The conference will be held at the Åbo Akademi, in the medieval city of Turku in western Finland. This one-day meeting on 11 November, 1991, is seeking contributions on four themes :

- The life and work of Karl Ferdinand Lindman
- Electromagnetic theory and chiral materials
- Radio astronomy and space research
- Multiprocessor technology and its applications

The focus on the first, narrow topic of historical interest on this list may seem strange. However, Professor Karl Lindman (1874-1952) of the Abo Akademi was one of the pioneers in studying *chiral* materials at microwave frequency region at the beginning of this century. These materials, characterized by their lack of spatial mirror symmetry, have become targets of extremely intensive research during the latest years, owing to their potential applications in, for example, antenna design, microwave components like couplers, and shielding, anti-interference, and low-observable coatings for radio waves.

Those interested in this meeting may wish to contact the Chairman of the Organizing Committee, Professor Juhani Kurkijärvi at Åbo Akademi (Fax (358) 21-654 776). We anticipate a successful meeting that will not remain limited to national contributions."

- We have also received additional information on the Ninth National Radio Science Conference, organized in Cairo from 18 to 20 February 1992 by our

Egyptian Member Committee. The venue is the Military Technical College, and the Chairman is Professor Abdul El Samie Mostafa. Papers in the areas of our 10 Commissions are accepted. Prospective authors are invited to submit 3 copies of the complete manuscript of maximum 8 pages (typed single space) to :

NRSC'92  
Dr. Ibrahim A. Salem  
National Radio Science Committee  
International Unions Department  
Academy of Scientific Research and Technology  
101 Kasr El-Ainy Street  
Cairo, Egypt

Deadlines : Submission of manuscript : 14 September 1991  
Notification of acceptance and Authors Kits : 14 Nov. 1991  
Submission of Camera-Ready mats : 14 December 1991.

*As a reminder, here are some other forthcoming URSI-sponsored meetings :*

- Fifth workshop on Scientific and Technical Aspects of MST Radar, Aberystwyth, Wales, U.K., 6-9 Aug.
- International Symposium on Recent Advances in Microwave Technology, Reno, Nevada, U.S.A., 18-21 Aug.
- European Microwave Conference, Stuttgart, GERMANY, 9-12 Sept.
- European Conference on Optical Communication (ECOC'91), Paris, FRANCE, 9-12 Sept.
- Symposium on Artificial Modification of the Ionosphere, Suzdal, USSR, 9-13 Sept.

*Other meetings which have been brought to our attention :*

- International Signal Processing Workshop on Higher-order Statistics, 10-12 July 1991, La Béraugère-Chamrousse (France).



- IEEE (EMC) International Symposium on Electromagnetic Compatibility, 13-15 August 1991, Cherry Hill, New Jersey (U.S.A.).
- IFIP VLSI'91, 20-22 August 1991, Edinburgh (U.K.).
- BCAS International Conference on Solid State Devices and Materials, 28-30 August 1991, Yokohama (Japan).
- IEE 6th International Conference on Digital Processing of Signals in Communications, 2-6 September 1991, Loughborough (U.K.).
- SPIE Symposium on Microelectronic Interconnect and Integration Processing, 15-20 September 1991, San José, California (U.S.A.).
- ASPRS - ACSM Fall Technical Meeting (Mapping remote sensing), 17-21 September 1991, Portland, Oregon (U.S.A.).
- BCAS - SPIE International Symposium on Optical Memory, 1-4 October 1991, Hokkaido (Japan).
- SPIE Symposium on Advanced Optics and Imaging, 6-11 October 1991, Rochester, New York (U.S.A.).
- HUST 1st International Conference on Optical Fibre Sensors, 9-11 October 1991, Wuhan (Canada).
- IEEE (COM) Conference on Military Communications, 20-23 October, McLean, Virginia (U.S.A.).
- SPIE Symposium on Microelectronic Processing Integration, November 1991, West Coast (U.S.A.).
- OSA Annual Meeting and Exhibition, 3-8 November, San José, California (U.S.A.).
- IEEE (COM) International Conference on Telecommunications Energy, 5-8 November, Kyoto (Japan).
- SPIE Conference on Visual Communications and Image Processing, 10-13 November 1991, Boston, Massachusetts (U.S.A.).
- IEE Software Engineering for Telecommunication Systems and Services, 30 March - 1 April 1992, Congress Centre, Florence (Italy).

- IEE International Conference in Image Processing and its Applications, 7 - 9 April 1992, Maastricht (The Netherlands).
- IEE "Radar 92" International Conference, 12- 13 October 1992, Conference Centre, Brighton (U.K).

## COURSES AND LECTURES

### SECOND COLLEGE ON THEORETICAL AND EXPERIMENTAL RADIO PROPAGATION PHYSICS

This course was given in Trieste from 7 January to 1 February 1991. It was co-sponsored by ICTP (The International Centre for Theoretical Physics), and URSI. The Centre supported the travel and living expenses of the 55 participants, almost all of whom came from Developing Countries, and URSI did the same, whenever needed, for the 9 lecturers.

The course consisted of two parts : an Introduction (director : J. Van Bladel) and a Main Body (director : S.M. Radicella). The introduction, taught by S.C. Dutta Roy (India) and J. Van Bladel (Belgium), lasted seven full days, and was devoted in equal parts to Communications Theory and Electromagnetics.

The main part of the Course encompassed :

- Radiopropagation problems in tropical regions  
lecturer : Dr. B.M. Reddy (India)
- High frequency communication problems  
lecturer : Dr. P.A. Bradley (U.K.)
- Scintillation effects on transionospheric communications  
lecturer : Dr. R. Leitinger (Austria)
- Ionospheric time-delay effects on earth-space links  
lecturer : Dr. P. Spalla (Italy)
- Tropospheric propagation  
lecturer : Dr. F. Barbaliscia (Italy)
- Electromagnetic compatibility  
lecturer : Prof. P. Degauque (France)
- Radio-frequency spectrum management  
lecturer : Dr. R.G. Struzak (Poland)

The course was illustrated by computer exercises, in which the lecturers were joined by M. Zhang (China), B. Giannone and P. Masullo (Italy). Professor Radicella (Argentina) organized seminars at which some of the participants gave information on the research work they are engaged in.

The suggestions for future activities, drawn by staff and participants, can be summarized as follows :

1. The College, of four weeks duration, should be repeated in February 1993, asking again for URSI co-sponsorship and financial contribution.
2. The College should include :
  - a) An introductory course with fundamentals of radiopropagation physics and basic computer techniques;
  - b) Practical experiments with systems like the Olympus Satellite beacon receiver system to be installed by the Italian Istituto Superiore per le Poste e Telecomunicazioni at the Centre, and the ionospheric beacon satellite soft receiver system of the IROE already installed here;
  - c) Computer problems of higher level than those held in the Second College;
  - d) Topics of the same type as those given during the Second College.
3. A workshop, of two weeks duration, on "Scientific aspects of the Rural Communications in Developing Countries" should be carried out at the end of the College. This should be done in cooperation with the Special Autonomous CCITT/CCIR Group on Rural Telecommunications of the International Telecommunication Union. This group could provide experts for the Workshop activities.

## URSI PUBLICATIONS

- The Proceedings of the Eighth National Radio Science Conference, held in Cairo, February 19-21, 1991, have been received at the Secretariat. The list of Contents mentions two review papers :
  - On the Theory of Code-FED Omni-directional Arrays (S.E. El-Khamy)
  - High-Energy Accelerators in Research and Applications (M.E. Abdelaziz).There are, in addition, 68 papers, distributed over Commissions B (10), C (34), D (11), E (3), F (4), H (5) and K (1).
  
- Also at the Secretariat are the Kleinheubacher Berichte (Band 34), a 694 pages volume which contains the Proceedings of the yearly meeting of the German URSI Committee, held in Kleinheubach from 1 to 5 October 1990. The various disciplines of URSI were covered, with particular emphasis on (1) superconductivity at high-frequencies, (2) realization and reproduction of SI units, (3) neural networks in digital signal processors, (4) electromagnetic compatibility. The volume has been produced by the Deutsche Bundespost TELEKOM, Forschungsinstitut, Postfach 10 00 03, Am Kavalleriesand 3, 6100 Darmstadt, Germany.
  
- The Ionosonde Network Advisory Group (INAG) has published its Bulletin No 55, prepared by Dr. P. Wilkinson, in February 1991. The bulk of the bulletin addresses issues arising from the Prague General Assembly. It contains a report on the election of Officers (Chairman : Dr. Wilkinson, Secretary : Mr. R. Conkright), the activities of INAG as Working Group 1

of Commission G, the importance of keeping the INAG Bulletin active, the terms of reference of INAG, the International Geophysical Calendar 1991, and CD-ROMS containing Solar-terrestrial data.

Dr. Wilkinson's address is IPS Radio Space Services, P.O. Box 1548, Chatswood, NSW 2057 (Australia).

- Preparation of the Second Volume of the URSI Handbook on Radiopropagation Related to Satellite Communications in Tropical and Subtropical Regions.

The first volume, entitled "Handbook on Radio Propagation for Tropical and Subtropical Countries", was published in 1988 under the editorship of Dr. A.P. Mitra. It contained very valuable information, and was received with much interest by those concerned with propagation problems. A time schedule for the publication of the second volume has now been agreed upon by the three members of the URSI Committee on Developing Countries who will edit the volume :

- Professor Radicella (Chairman), who will do the overall coordination in addition to compiling inputs from the South American region. He will also explore the possibility of obtaining inputs from the African region in addition to the material collected by Dr. Reddy from Dr. Moupfouma.
- Dr. Reddy, who will take the responsibility for compiling inputs from the Indian region.
- Professor Feng, who will be responsible for inputs from China and neighbouring countries.

The target date for the publication of the volume is October 1992. The tentative list of contents mentions :

1. Absorption by atmospheric gases, including prediction models
2. Attenuation by rain and clouds, and rain rate statistics including prediction models

3. Ionospheric effects in space communications systems
4. Noise and interference in space communications systems
5. System design for point-to-point satellite services
6. System design for broadcasting satellite services
7. Design considerations for mobile satellite services
8. Coordination between space and terrestrial services to avoid interference.

- The Radioscientist :

*Professor Dowden, Editor of "The Radioscientist", asked us to make the following announcement :*

"Some copies are sent free to URSI Committees by surface mail. Even if you are on their mailing list, and while we continue to send free copies, you only get your copy about two months late. *By taking out a subscription, you get your personal copy flown to you within the first week of publication.* The following special rates, which include air delivery, are available only until September, 1991:

- 11 issues beginning January, 1991 for US\$20. The first two (January and April) will be flown to you immediately on receipt of your subscription request. This gets you all 1991 (Jan, Apr, July, Oct, Dec) and 1992 (Feb, Apr, Jun, Aug, Oct, Dec) from the first issue under URSI ownership, excluding only the prototype *Radioscientist* issued free at URSI XXIII at Prague (now out of print).
- 5 issues beginning January, 1991 for US\$10. Similar to the above but you get only 1991 (Jan - Dec).
- 10 issues beginning July, 1991 for US\$20 or 4 issues beginning July, 1991 for US\$10. These rates are for those who already have (or don't want) the January and April issues.

Payment - by cheque, bank-draft or debit of a credit card (VISA, Bankcard, Master Card) - should be made to :

The Radioscientist  
Physics Department  
University of Otago  
Dunedin, New Zealand  
FAX (64) 3 4790964  
email : [dowden@otago.ac.nz](mailto:dowden@otago.ac.nz)"

R.L. DOWDEN



**1990 : THE FIRST YEAR OF OPERATION OF THE ICTP  
BI-REGIONAL LATIN AMERICAN-AFRICAN NETWORK OF  
RADIOPROPAGATION RESEARCH GROUPS**

by Professor S.M. Radicella  
Chairman, Standing Committee on Developing Countries

The network receives strong support from the International Centre for Theoretical Physics in Trieste (ICTP). Its main activities, outlined in the original proposal, are :

1. To establish communication links to allow the fast exchange of data and scientific information among the groups in order to carry out coordinated experiments and studies.
2. To hold periodic workshops (every other year), to plan coordinated activities and to report results obtained.
3. To carry out coordinated and standardized measurements of radiopropagation parameters.
4. To exchange scientists among the groups to make possible a better use of human resources in the field in the two regions involved in the Network, both of which are in the developing world.

The Network was launched during the 2nd Bi-regional African-Latin American Conference on Radiopropagation and Spectrum Management held in Ilorin, Nigeria, in November 1989. The Groups integrated in the Network include two each from Argentina, Brazil and Nigeria.

At the time of the launching it was decided that the main effort during the first year should be the implementation of the Network Communications System (NCS) (Activity 1 above). The first stage was the study of the technical

aspects of the use of the intercommunication scheme developed by the Microprocessor Laboratory of the ICTP that will be used by the NCS. In the case of the Nigerian groups it was necessary to ask the intervention of official authorities of mother institutions of the Groups (Universities or Scientific Organizations) in order to get telephone links for the use of the System.

At present time the Group Terminal facilities for four of the six groups have been purchased, and the two remaining ones are already selected and ordered. It has been found that installation costs are in some cases larger than expected, but they will be converted with savings made in the budget, as mentioned below. During 1991 the NCS is expected to be operative.

As decided in the meeting held in Ilorin, Professor O. Ajayi, responsible for the Ile-Ife Group, visited Brazil to discuss cooperative work in the field of tropospheric radiopropagation with the Group of Rio de Janeiro (Activity 4 above). It must be noted that the trip was covered by economic support from the International Telecommunications Union. This contribution made possible the funds savings mentioned above.

It turned out that the Group of Ilorin had serious problems of operation of the ionosonde equipment there installed. As a result, the cooperation of an outside Agency, in casu the Istituto Nazionale di Geofisica (ING) of Rome, Italy, was requested as a contribution to the operation of the Network. The IPS-42 ionosonde of the University of Ilorin was sent to the ING, where it was completely repaired for normal operation, at no cost for the Network. The only expenditure are the transitory import and reshipment costs. It must be noted that the operation of the ionosonde in Ilorin is essential for the coordinated ionospheric measurements campaigns to be planned as part of the Network activities.

Four Group Terminal facilities have now been installed, at a cost of \$8,000. The installation of two additional facilities is in process, for a total additional cost of \$12,000, which includes the preliminary operative costs of the six terminals.

S.M. RADICELLA

### IUCAF REPORT TO URSI

*The importance to Radio Scientists of the forthcoming World Administrative Radio Conference (WARC) has already been mentioned in URSI Bulletin 255 (December 1990). Dr. Robinson, Chairman of IUCAF, has attended important meetings at the CCIR in March 1991, and submits the following text for our readers' consideration.*

### THE CCIR REPORT TO THE 1992 ITU WORLD ADMINISTRATIVE RADIO CONFERENCE

#### 1. The Scope of WARC 1992

The International Telecommunications Union (ITU) is to hold a "World Administrative Radio Conference" (WARC) in Malaga-Torremolinos from 3 February to 3 March 1992. This will be a treaty conference to re-allocate the radio frequency spectrum from 500 MHz to 3 GHz, to consider bands for Low-Earth-Orbit Mobile Satellites below 1 GHz, bands for High Definition TV Broadcasting above 12 GHz, and bands for new space applications above 20 GHz.

In the 500 MHz - 3 GHz frequency range, new allocations are needed for mobile satellite applications (communication and position determination), CD Quality sound broadcasting from satellites, public correspondence with aircraft and future public land-mobile telecommunications.

This agenda for WARC 1992 impinges seriously on the existing use of the radio spectrum for space research, radio astronomy, earth exploration and meteorology.

## 2. CCIR Preparations for WARC 1992

From October to December 1990 the many Study Groups of CCIR met around the globe to prepare the technical basis for the allocations to be made at WARC 1992. The meeting of CCIR Study Group 7 was reported in the December 1990 URSI Information Bulletin (pp 114-115). The other Study Groups met later and prepared their own reports in the many other applications of the radio spectrum.

Study Group 7 of CCIR met again in Geneva on 28 February and 1 March 1991 to edit its 70-page report in the light of the reports that had come from other Study Groups.

The many individual Study Group reports were assembled and discussed at a full CCIR meeting in Geneva from 4-15 March 1991. This was attended by delegations from 30 countries and 15 international agencies. IUCAF was represented by two of its URSI nominees - Dr. B.J. Robinson and ir. H.C. Kahlmann.

Achieving a consistent CCIR position from the disparate inputs of the individual Study Groups was a very demanding task. But the outcome was successful, merging 64 separate documents into one.

### 3. The CCIR Report to WARC 1992

The 203 page output document from the March 1991 CCIR meeting is entitled "Technical and Operational Bases for WARC 1992". It establishes the technical characteristics of each radio "service" and clearly specifies the criteria for sharing with other "services".

Overall, the position reached on scientific use of the radio spectrum is little changed from the Study Group 7 report produced in October 1990.

Areas where frequency allocations at WARC 1992 could put scientific applications in jeopardy are :

- Low Earth Orbit mobile satellite applications below 1 GHz.
- Low Earth Orbit mobile satellite applications near 1.6 GHz.
- Mobile satellite applications using geostationary satellites near 1.6 or 2.5 GHz.
- Direct sound broadcasting from satellites near 1.5 GHz.
- High-Definition TV broadcasting from satellites somewhere between 17 and 23 GHz.
- A considerable growth in many forms of mobile communications between 1.5 and 2.5 GHz.
- The Conference will also deal with the question of interference to Radio Astronomy in the Hydroxyl band 1610.6 to 1613.8 MHz from Radio Determination Satellites.
- The question of setting limits on spurious emissions from satellite transmitters. Out-of-band emissions from many types of satellite services

pose major problems to nearly passive research bands (earth-exploration, passive space research and radio astronomy).

Details of the CCIR position for Radio Astronomy are contained in IUCAF Document 380 while the position on Earth Exploration is contained in IUCAF Document 381.

#### 4. Proposals to WARC 1992

National administrations are now preparing their proposals for WARC 1992, to be submitted to the ITU by July 1991. Although the CCIR Report provides a technical framework, the national proposals for frequency allocations will be strongly influenced by national priorities, commercial interests and defence overtones. A major task of the 10 members and 34 correspondents of IUCAF during the coming months will be to keep national administrations aware of the needs and importance of scientific applications, both active and passive.

B.J. ROBINSON

### FROM THE ARCHIVES OF URSI

*Excerpts from the Bulletins of ten, twenty, thirty and forty years ago.*

The May-June 1951 issue contains details on the preparations made for the radio observations of the solar eclipse of February 25, 1952. They concern a general plan of ionospheric magnetic and solar observations, eclipse data and formulas, stations (and desirable sites) for the ionospheric network. The issue also contains a short report on URSI-CCIR collaboration :

"A small Committee of URSI met in Geneva during the Plenary Meeting of CCIR in order to consider the relations between the two organizations.

The Committee consisted of Messrs. J.H. Dellinger (Chairman), P. David, B. Decaux, P. Lejay, L. Sacco and R.L. Smith-Rose. Professor Dr. B. van der Pol assisted the committee as adviser.

Good working relations between the two organizations were advanced at this meeting. On the opening day, June 5, the URSI delegation had a meeting to consider its role. It was agreed that it should promote the policy of maximum aid by URSI to CCIR, particularly by study of the more scientific and basic phases of topics in which the CCIR is interested. The URSI in turn will receive the satisfaction of having its results along certain lines advanced to practical application through the work of the CCIR. It was agreed to promote URSI-CCIR coordination in the various committees working at the Plenary Assembly, and in particular to strive to secure clear distinction between URSI and CCIR activities on a given topic to avoid wasteful duplication."

The May-June 1961 issue mentions an important publication, the "URSI Handbook of Ionogram Interpretation and Reduction of the World Wide Soundings Committee", edited by W.R. Piggott and K. Rawer. The study of the ionosphere gained great impetus during the International Geophysical Year. Intensive research had also been stimulated by the development of rockets and satellites capable of penetrating the ionised zones. The Handbook was prepared by the World Wide Soundings Committee (WWSC) of the International Radio Scientific Union, in response to many requests.

The issue also contains an extensive report of IUCAF concerning the 1959 World Administrative Radio Conference (WARC). This Administrative Conference of the International Telecommunication Union was held in Geneva for the purpose of reviewing the regulations, codes of procedure and frequencies allotted to the conduct of telecommunications by the transmission or reception of radio waves. The conference was attended by upwards of 700 people, including

delegates from 87 member countries of the ITU, and representatives of international organizations including URSI, IAU, and COSPAR. Various recommendations adopted at the Conference were commented upon, such as #31 on the Protection of Standard Frequency Guard-Bands for use by Radioastronomy, or #36 relating to the desirability of a new WARC during which frequency bands for Space Communication purposes would be on the agenda.

The main item in the June 1971 issue is a report on the meetings, in Brussels, of the URSI Board and the Coordinating Committee (20-23 April, 1971). The main part of the agenda was devoted to the preparation of the Warsaw General Assembly, which was to be held in 1972. It may be of interest to quote the names of the Commissions in those days :

- I: Radio Measurements and Standards
- II: Radio and Non-Ionized Media
- III: Ionosphere
- IV: Magnetosphere
- V: Radio Astronomy
- VI: Radio Waves and Circuits
- VII: Radio Electronics
- VIII: Radio Noise of Terrestrial Origin

The recommendations concerning the reorganization of URSI, made by an ad hoc group, were submitted to the Chairmen and Vice-Chairmen of Commissions, together with the comments of the Member Committees.

Finally, the "Present status of IRI, the International Reference Ionosphere", was described by Dr. K. Rawer. The working group in charge was started in 1968.



The June 1981 issue contains an obituary of Mr. Bernard Decaux, (1899-1981), time-and-frequency expert, and former collaborator of General Ferrié, the first President of URSI. Mr. Decaux had been Chairman of our Commission I (measurements and standards), and Honorary President of our Union since 1966.

The Table of Contents of the issue also shows the publication of the accounts of the preceding year, a tradition started in June 1976, and an article on "URSI and the Bio-effects community", announcing an Open Symposium on the subject at the 1981 General Assembly in Washington, in cooperation with BEMS, the Bioelectromagnetics Society (founded in the U.S.A. in 1978).

### PERSONALIA

Nous sommes heureux d'annoncer que Madame Jeannine Hénaff, vice-présidente de la Commission D, a reçu les insignes de chevalier dans l'ordre de la Légion d'honneur le 27 mars 1991.

**LIST OF URSI OFFICERS AND OFFICERS OF  
MEMBER COMMITTEES : AMENDMENTS**

Amendments to the List published in No 255 (December 1990) of the *URSI Information Bulletin* are listed below. An alphabetical index of these amendments with names and addresses is given in Section 3 on page .

1. Member Committees

New Member :

The King Abdulaziz City for Science and Technology (Saudi Arabia) is a new member of our Union (Category 1). It is in the process of forming its Committee. Contact person : Dr. Saleh AL-ATHEL.

New Officials :

|                      |  |
|----------------------|--|
| CHINA SRS (Taipei) : | President : Mr. Ping Yao LEE                               |
| CZECHOSLOVAKIA :     | President : Dr. V. CIZEK<br>Secretary : Dr. T. ZAHRADKA    |
| DENMARK :            | President : Prof. E. UNGSTRUP                              |
| FINLAND :            | President : Prof. I.V. LINDELL                             |
| NEW ZEALAND :        | President : Prof. R.L. DOWDEN                              |
| U.S.A. :             | President : Prof. C.M. BUTLER<br>Secretary : Dr. C.M. RUSH |

2. Commissions

Commission A on Electromagnetic Metrology

CHINA CIE (Beijing) : Dr. X. YANG  
U.K. : Mr. R.W. YELL  
U.S.A. : Dr. M. KANDA

Commission B on Fields and Waves

CHINA CIE (Beijing) : Dr. Shiyong ZHOU  
CZECHOSLOVAKIA : Prof. J. VOKURKA  
GREECE : Prof. E. KRIEZIS  
U.K. : Dr. J.M. ARNOLD  
U.S.A. : Prof. R.E. KLEINMAN

Commission C on Signals and Systems

CHINA SRS (Taipei) : Prof. Lin-Shan LEE

CZECHOSLOVAKIA : Dr. R. VICH

U.S.A. : Dr. R. PICKHOLTZ

Commission D on Electronics and Photonics

ARGENTINA : Dr. M. GARAVAGLIA

CHINA CIE (Beijing) : Dr. Y. WANG

CZECHOSLOVAKIA : Dr. M. KARASEK

U.S.A. : Dr. J.W. MINK

Commission E on Electromagnetic Noise and Interference

CHINA SRS (Taipei) : Prof. Chi-Fu DEN

CZECHOSLOVAKIA : Dr. T. CESKY

U.K. : Dr. D.L. JONES

Commission F on Wave Propagation and Remote Sensing

CHINA SRS (Taipei) : Prof. Chao-Han LIU

GREECE : Prof. E. KRIEZIS

U.S.A. : Prof. J.H. RICHTER

Commission G on Ionospheric Radio and Propagation

CZECHOSLOVAKIA : Dr. F. BLAHAK

DENMARK : Dr. P. HØEG

U.S.A. : Dr. H. SOICHER

Commission H on Waves in Plasmas

CHINA SRS (Taipei) : Prof. Kuang-Chih HUANG

DENMARK : Prof. E. UNGSTRUP

Commission I on Radio Astronomy

ARGENTINA : Dr. E. BAJAJA

CHINA SRS (Taipei) : Prof. Wei-shin SUN

U.S.A. : Dr. J.M. MORAN

Commission K on Electromagnetics in Biology and Medicine

CHINA CIE (Beijing) : Dr. Ligao ZHOU

CHINA SRS (Taipei) : Dr. Wei-Kung WANG

CZECHOSLOVAKIA : Dr. J. MUSIL

DENMARK : Mr. P. RASKMARK

ITALY : Prof. P. BERNARDI

JAPAN : Prof. M. SAITO

NEW ZEALAND : Dr. P. BODGER

U.S.A. : Dr. J.C. LIN

3. Alphabetical List with addresses and change or addition of telephone and fax numbers

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BAJAJA, Dr. E., Inst. Arg. de Radioastronomia, CC. 5, 1894 Villa Elisa, BUENOS AIRES, ARGENTINA.

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BODGER, Dr. P.S., Electrical and Electronic Engineering Department, University of Canterbury, CHRISTCHURCH 1, NEW ZEALAND, Tel. (64) 3-667 001 ext. 7241, Fax (64) 3-642 761.

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CIZEK, Dr. V., Institute of Radioengineering & Electronics, Czechoslovak Academy of Sciences, Chaberska 57, 182 51 PRAHA 8, CZECHOSLOVAKIA, Tel. (42) 2-843741/253, Fax (42) 2-840609.

DEN, Prof. Chi-Fu, Department of Communication Engineering, National Chiao Tung University, HSIN-CHU, TAIWAN.

DE WAGTER, Dr. C. , Tel. (32) 91-40.30.14

DOWDEN, Prof., R.L., Tel., (64) 3-477 1640, Fax, (64) 3-479 0964, Telex NZ 5618 TELCODN, email : dowden@otago.ac.nz.

GARAVAGLIA, Dr. M., Centro de Investigaciones Opticas, CC24, 1900 La Plata, BUENOS AIRES, ARGENTINA.

HAMELIN, Dr. J., Post Office, Telecommunications and Space Ministry, Space Affairs Bureau, 20 Avenue de Ségur, F-75700 PARIS, FRANCE, Tel. (33-1) 4565 3951, Fax (33-1) 4306 4918.

HØEG, Dr. P., Danish Representative Commission G (URSI), Danish Meteorological Institute, Lyngbyvej 100, DK-2100 KØBENHAVN Ø, DENMARK, Tel. (45) 3129 2100.

HUANG, Prof. Kuang-Chih, National Sun Yat-Sen University, KAO-HSIUNG, TAIWAN.

JONES, Dr. D.L., Department of Physics, King's College, Strand, LONDON WC2R 2LS, UNITED KINGDOM.

KANDA, Dr. M., Electromagnetic Fields Division, National Inst. of Standards and Technology, 325 Broadway, BOULDER, CO 80303-3328, USA, Tel. (1-303) 497-5320, Fax (1-303) 497-6665.

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KLEINMAN, Prof. R.E., Department of Mathematics, University of Delaware, NEWARK, DE 19716, USA, Tel. (1-302) 451-2266, Fax (1-302) 451-8000, BITNET: KLEINMAN@MATH.UDELEDU.

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