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XXIII GENERAL ASSEMBLY OF URSI

SUMMARY ACCOUNT

INTRODUCTION

The XXIII General Assembly of URSI was held at the Czech Technical University in Prague, from 28 August to 5 September 1990, at the invitation of the Czechoslovak URSI Committee. The attendance was the highest ever recorded: some 1,500 participants from 47 countries, accompanied by more than 400 persons. The Local Organizing Committee was chaired jointly by Prof. V. Zima, on behalf of the Czechoslovak Academy of Sciences, and Prof. J. Prokop, on behalf of the Czech Technical University. The organization of a major event, such as an URSI General Assembly, requires an enormous amount of work, and it may be said that the efforts made by the members of the Organizing Committee did prove entirely successful. The arrangements made for the scientific and administrative sessions were excellent, and the Czechoslovak hosts have been exceptionally generous in organizing a very rich social and cultural programme.

The Scientific Programme, coordinated by Dr. P. Bauer and Prof. J. Bach Andersen, included the now traditional General Lectures and Tutorials delivered by eminent specialists, in addition to about 100 symposia with more than 1,200 oral and poster papers. The URSI/BEMS Symposium on the Interaction of Electromagnetic Fields with Biological Systems covered four full days. It is worth noting that, for the first time, the abstracts of the invited and contributed papers had been collected directly by the Local Organizing Committee, which established also a most useful data base. The abstracts were published in two volumes, totalling more than 750 pages, and distributed to all registered participants (see announcement on page 8). Another factor to be noted is that there is a definite move, by the Commissions, toward opening the symposia and issuing Calls for papers.

The administrative part of the Assembly, which started already on 25 August, included meetings of the Board of Officers, the Coordinating Committee, the Council, the various Committees, and business sessions of the Commissions. The official texts of the Resolutions and Recommendations adopted by the Council will be published in the December issue of the *URSI Information Bulletin*, and in Volume XXII of the

Proceedings of URSI General Assemblies. A summarized account of the main decisions reached in Prague is given below for the information of URSI Member Committees.

THE YOUNG SCIENTISTS PROGRAMME

On this occasion, URSI was able to increase its Young Scientists Programme by a factor of two. Thanks to the generous support of the host Committee, which provided meals and accommodation in Prague, and to the financial assistance of ICSU and several other organizations, a hundred Young Scientists, from both developing and industrialized countries, attended the Assembly as URSI awardees. Papers submitted by the Young Scientists were included either in the regular sessions of the Commissions, or in the special sessions reserved for the presentations by Young Scientists.

The Council considered that an effort should be made to further expand this programme and, with this objective in mind, it resolved to set up a new Committee on Young Scientists, under the chairmanship of the incoming President of URSI, Prof. E.V. Jull.

NEWLY ELECTED OFFICERS

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

Board of Officers

President: Prof. E.V. Jull (Canada)
Past President: Prof. A.L. Cullen (UK)
Vice-Presidents: Prof. J. Bach Andersen (Denmark)
Dr. P. Bauer (France)
Prof. R.L. Dowden (New Zealand)
Prof. T. Okoshi (Japan)
Secretary General: Prof. J. Van Bladel (Belgium)

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

Chairmen and Vice-Chairmen of Commissions

Commission A on Electromagnetic Metrology

Chairman : Dr. J. Vanier (Canada)
Vice-Chairman: Dr. P.I. Somlo (Australia)

Commission B on Fields and Waves

Chairman : Prof. F.E. Gardiol (Switzerland)
Vice-Chairman: Prof. A.D. Olver (UK)

Commission C on Signals and Systems

Chairman : Prof. P.A. Matthews (UK)
Vice-Chairman: Dr. A.D. Wyner (USA)

Commission D on Electronics and Photonics

Chairman : Dr. J. Hénaff (France)
Vice-Chairman: Dr. T. Itoh (USA)

Commission E on Electromagnetic Noise and Interference

Chairman : Dr. J. Hamelin (France)
Vice-Chairman: Dr. V. Scuka (Sweden)

Commission F on Wave Propagation and Remote Sensing

Chairman : Prof. G. Brussaard (Netherlands)
Vice-Chairman: Prof. R.K. Moore (USA)

Commission G on Ionospheric Radio and Propagation

Chairman : Dr. A.W. Wernik (Poland)
Vice-Chairman: Dr. K. Schlegel (FRG)

Commission H on Waves in Plasmas

Chairman : Dr. R.F. Benson (USA)
Vice-Chairman: Dr. F. Lefeuvre (France)

Commission J on Radio Astronomy

Chairman : Dr. R.D. Ekers (Australia)
Vice-Chairman: Dr. Y.N. Pariskij (USSR).

Honorary Presidents

The Council resolved unanimously to confer the title of Honorary President of the Union upon

Prof. W.E. Gordon (USA)
Prof. F.L.H.M. Stumpers (Netherlands).

The membership of the various URSI Committees and the names of the URSI representatives on other scientific organizations will appear in the December issue of the *URSI Information Bulletin* and in Volume XXII of the *Proceedings of URSI*

General Assemblies.

ADMISSION OF NEW MEMBERS

Subject to meeting the criteria of the URSI Statutes, the applications of the following institutions were accepted:

- a) King Abdulaziz City for Science and Technology in Saudi Arabia, in the category of full Members;
- b) the Scientific Research Council of Jamaica, the National Science and Technology Council in Grenada and the Scientific and Technical Research of Turkey, in the category of Associate Members.

CREATION OF A NETWORK OF CORRESPONDENTS

Following discussions on the desirability of introducing in URSI an individual membership category, the Standing Committee on Membership recommended the creation of a network of correspondents, which was approved by the Council. A mechanism will be set up whereby:

- a) any scientist attending a General Assembly will have the opportunity to register as correspondent for a three-year period by paying an extra fee when registering for the Assembly;
- b) individual scientists not able to attend a General Assembly will be given the possibility of being included in the network of correspondents by applying direct to the URSI Secretariat and by paying the extra fee;
- c) a special scheme will be devised for allowing scientists from developing countries to participate in the network without any charge.

The correspondents would receive announcements for the General Assembly and Calls for papers for symposia organized or supported by URSI. They will have no voting rights in the Union, but would be allowed to express their views in the Commissions on matters of a scientific nature.

NEW VERSION OF URSI STATUTES

The Council agreed to the proposed modifications to the URSI Statutes, which had been widely circulated ahead of the Assembly, and adopted unanimously the French and English

versions. These are reproduced on pp. 9-36 of the present issue of the Bulletin.

FINANCES

On recommendation of the Standing Finance Committee, the Council resolved that URSI should adopt the Belgian franc, or a currency closely related to it, such as the European Currency Unit (ECU), instead of the US dollar, for defining the annual unit contribution. Indeed, most of the expenditure on administration is incurred in Belgian francs, and the continuous fluctuations in the ratio US dollar/ Belgian franc since 1968 did create a standing problem implying reinterpretation of the current budgets of the Union. The change refers only to the definition of the dues, and the Member Committees will still be able to make actual payments in any convertible currency. The shift from the US dollar to the new reference currency will take place gradually over the next three years. The Council decided further to adopt a constant dues unit of \$860, based on the conversion rate \$1 = 35 BF for the next triennium.

It was decided that all Scientific Commissions would receive a global financial allocation of the order of \$8,000 for the whole period 1990-1993, including the XXIV General Assembly.

The Council resolved to place on record its appreciation of the way Dr. H.J. Albrecht, Past Treasurer, handled the URSI finances in the last triennium. Prof. K. Géher was appointed Chairman of the Standing Finance Committee for the period 1990-1993.

CREATION OF A NEW COMMISSION UNDER THE PROVISIONAL TITLE OF "ELECTROMAGNETICS IN BIOLOGY AND MEDICINE"

At the beginning of the Assembly, an ad hoc group was formed to consider the status of Commission A Working Group on Interactions of Electromagnetic Fields with Biological Systems and Related Measurements, which had been operating under Commission A, and the future involvement of URSI in the biological/medical area. There was a general consensus that it was time for URSI to provide an international forum for this community. The Council resolved to create a new Commission K under the provisional title "Electromagnetics in Biology and Medicine". The precise terms of reference of the new Commission are still to be defined, but will include the study of interactions

between electromagnetic radiation and living systems from essentially zero to optical frequencies, as well as certain medical applications. Prof. J. Bach Andersen and Dr. M. Stuchly were appointed Chairman and Vice-Chairman respectively for the interim period leading up to the formation of the Commission. Member Committees will be invited to designate their Official Members to the new Commission.

CREATION OF A SCIENTIFIC COMMITTEE ON TELECOMMUNICATIONS

On the recommendation of the ad hoc group appointed to consider the future of the URSI/CCIR/CCITT Liaison Committee, and also the role of URSI in the advancement of telecommunications in general, the Council decided to establish a Scientific Committee on Telecommunications, the task of which would not be limited to cooperation with the ITU technical bodies. The objectives of the Committee will be to facilitate the cooperation between URSI Commissions and with the CCIR and CCITT Study Groups for the study of scientific questions related to telecommunications problems. In addition, the Committee will be responsible for identifying the areas which may influence the evolution of telecommunications in the long term, and for keeping the URSI Commissions informed on specific problems raised by such evolution; The Council appointed Dr. L Barclay as Chairman and Prof. P. Delogne as Vice-Chairman of the new Scientific Committee.

PUBLICATIONS

The Standing Committee on Publications devoted particular attention to the triennial *Review of Radio Science*. After consultation with the Officers of the Commissions, it recommended to the Council that the 1993 edition of the Review should take the form of (a) a number of review papers from each Commission and (b) a comprehensive bibliography on diskette. The Council accepted this recommendation and appointed Dr. W.R. Stone as General Editor for the 1993 edition. The Commissions will be invited to designate sub-editors, who will be responsible for selecting the topics and authors of the review papers, for supervising the contributions from their Commission, and for collecting the references to be made available on diskettes. The Council expressed its gratitude to Dr. G. Hyde, who had produced the 1987 and 1990 editions of the Review. It decided that an approach should be made to a professional firm with a view to that firm taking over the responsibility for publishing

and distributing the *Review of Radio Science*, including the diskette. It was also suggested that *Modern Radio Science* might be subsumed into the new publication with a number of tutorial papers supplementing the review papers referred to above.

The Council accepted also the recommendation of the Standing Publications Committee that the newsletter entitled *The Radioscientist* should be published by URSI using a non-profit making company to be established in Belgium, and that the URSI logo should be used to identify it as an URSI publication. Prof. Dowden was invited to continue as editor of the newsletter.

DEVELOPING COUNTRIES

The Council, considering that the efforts in favour of developing countries should be pursued, resolved to maintain the Standing Committee on Developing Countries, under the chairmanship of Prof. S. Radicella. The programme of the Committee for the next triennium includes the publication of the *URSI Handbook on Earth-Space Propagation in the Tropics*, and the organization of two Colleges on Radio Propagation, to be held in Trieste, Italy, with the assistance of the International Centre for Theoretical Physics.

COMMITTEE ON THE FUTURE OF URSI

During the General Assembly, many comments and suggestions were made concerning possible changes in the structure and organization of the Union. These referred, for example, to the membership of the Union and the possibility of extending it to industrial firms, to the relations of URSI with other international and professional organizations, and to the representation of the Commissions in the Council. All these questions need to be examined in depth and some long-range planning for the future set up of URSI was considered to be of vital importance. In consequence, the Council resolved to form a new Committee on the Future of URSI, to be chaired by the incoming President, Prof. E.V. Jull.

VENUE OF THE XXIV GENERAL ASSEMBLY 1993

As a result of the secret ballot taken on this issue, the Council accepted the invitation of the URSI Committee in Japan

to hold the XXIV General Assembly in Kyoto, Japan, from 25 August to 2 September 1993. Prof. J. Bach Andersen and Prof. H. Matsumoto accepted to act as Coordinator of the Scientific Programme and Associate Coordinator respectively.

YSt.

BOOKS OF ABSTRACTS

XXIII General Assembly 1990

As already mentioned on page 1 of the Bulletin, the abstracts of papers presented at the General Assembly were published in two volumes, and distributed to all participants in the Assembly. Supplementary copies are available, at the price of US\$20.00, from

Ms Alena BIDLOVA
Institute of Radioengineering and
Electronics
Lumumbova 1
182 51 Prague 8
Czechoslovakia.

Volume 1 (301 pp. + XVII) contains the abstracts of papers of the Symposium on the Interaction of Electromagnetic Waves with Biological Systems, organized jointly by BEMS and URSI, and of the Joint Symposia. Volume 2 (457 pp. + XVII) includes abstracts of papers given in the Commission Symposia.

STATUTS DE L'URSI

Note: Les modifications aux Statuts de l'URSI ont été approuvées par le Conseil au cours de la XXIII^e Assemblée Générale à Prague. Les Statuts sont entrés en vigueur le 6 septembre 1990; le texte intégral en est reproduit ci-dessous.

BUTS

Art. 1 - L'Union Radio-Scientifique Internationale a pour but de stimuler et de coordonner, à l'échelle internationale, les études dans les domaines des sciences de la radioélectricité, des télécommunications et de l'électronique et, plus particulièrement:

- a) de promouvoir et d'organiser les recherches exigeant une coopération internationale, ainsi que la discussion et la diffusion des résultats de ces recherches;
- b) d'encourager l'adoption de méthodes de mesure communes, ainsi que la comparaison et l'étalonnage des instruments de mesure utilisés dans les travaux scientifiques;
- c) de stimuler et de coordonner les études portant sur
 - les aspects scientifiques des télécommunications utilisant les ondes électromagnétiques guidées et non guidées,
 - la production et la détection de ces ondes, ainsi que le traitement des signaux dont elles sont porteuses.

MEMBRES

Art. 2 - Les Membres de l'Union sont les Comités dont les demandes d'admission ont été acceptées au cours d'une Assemblée générale ordinaire.

Art. 3 - Un Comité Membre est créé dans un territoire donné, par l'Académie des Sciences ou le Conseil de la Recherche, ou bien par une institution ou association d'institutions analogues.

Art. 4 - L'Union peut admettre comme membre tout Comité qui, dans un territoire donné, développe une activité dans le domaine de la radioélectricité scientifique.

Art. 5 - Dans leurs territoires respectifs, les Comités Membres ont les mêmes buts que l'Union; entière liberté leur est laissée quant à leur organisation interne.

Art. 6 - Chaque Comité Membre désigne un Représentant au Conseil (voit Art. 21) et un Membre officiel au sein de chacune des Commissions (voir Art. 30). Un même Membre officiel peut représenter son Comité au sein de deux ou plusieurs Commissions. Les membres du Bureau ne peuvent pas représenter un Comité Membre au Conseil.

Art. 7 - Lors de leur adhésion à l'Union, les Comités Membres choisissent la Catégorie dans laquelle ils se proposent d'être classés. Le nombre des unités de contribution annuelle dues à l'Union ainsi que le nombre de voix qui leur est attribué au sein du Conseil sont déterminés par la Catégorie choisie et sont spécifiés ci-dessous:

Catégorie.....	1	2	3	4	5	5A	6
Nombre de voix.....	2	4	6	8	10	11	12
Nombre d'unités de contribution	1	2	4	8	16	24	32

Le montant de l'unité de contribution est fixé par le Conseil.

Art. 8 - Les Comités Membres peuvent passer à une Catégorie supérieure au début de l'année financière. Ils peuvent passer à une Catégorie inférieure soit au cours d'une Assemblée générale ordinaire, soit dans la période de trois mois qui suit la fin de l'Assemblée. Tout transfert d'une catégorie à une autre entre en vigueur au début de l'année financière suivante.

Art. 9 - A moins d'une décision contraire du Conseil, tout Comité Membre qui n'aura pas versé sa contribution annuelle à deux reprises est considéré comme cessant de faire partie de l'Union. Ce Comité pourra néanmoins demander à être admis dans la catégorie des Membres associés.

Art. 10 - Les Comités Membres peuvent quitter l'Union en signifiant leur intention par écrit au Secrétaire général. En cas de démission, ils sont tenus de payer leur contribution annuelle pour l'année en cours.

Art. 11 - Les Comités Membres qui quittent l'Union, ou qui sont considérés comme ayant cessé d'en faire partie en vertu de l'Art. 9, perdent tous droits à l'actif de l'Union.

Art. 12 - En cas de dissolution de l'Union, le Conseil dispose des avoirs de l'Union; ceux-ci ne seront pas répartis entre les

Membres.

MEMBRES ASSOCIES

Art. 13 - La catégorie des Membres associés est réservée, à titre d'option, a) aux Comités qui sont créés en vertu des Arts 3, 4 et 5, mais qui ne réunissent pas encore toutes les conditions pour solliciter leur adhésion en tant que Membres, et b) aux Comités Membres de l'Union qui, pour des raisons d'ordre financier, souhaitent passer temporairement à la catégorie de Membres associés. Le statut de chacun des Membres associés sera réexaminé lors de chaque Assemblée générale.

Art. 14 - Les Membres associés de l'Union sont les Comités dont les demandes d'admission dans cette catégorie ont été acceptées au cours d'une Assemblée générale ordinaire.

Art. 15 - Les Comités Membres associés ne versent pas de contribution annuelle à l'Union. Ils n'ont pas droit de vote au Conseil et dans les Commission, et n'ont aucun droit à l'actif de l'Union.

Art. 16 - Chaque Comité Membre associé désigne un observateur au Conseil et un observateur au sein de chacune des Commissions. Un même observateur peut représenter son Comité au sein du Conseil et de plusieurs Commissions.

ADMINISTRATION ET ORGANISATION

Le Bureau

Art. 17 - La direction des affaires de l'Union et l'organisation de ses activités sont confiées au Bureau qui agit en conformité avec les résolutions et les lignes de conduite générale formulées par le Conseil.

Art. 18 - Le Bureau est composé du Président, du Président sortant, de quatre Vice-Présidents et du Secrétaire général. Le Président peut inviter les Présidents d'honneur à assister aux séances du Bureau à titre consultatif.

Art. 19 - Le Bureau se réunit au cours et dans l'intervalle des Assemblées générales, à l'initiative du Président ou de deux de ses membres.

Art. 20 - Dans l'intervalle des Assemblées générales, le Bureau, agissant au nom de l'Union, est autorisé à prendre des décisions sur les affaires urgentes à condition que ces décisions

ne soient pas en contradiction avec les résolutions et les lignes de conduite générale formulées par le Conseil. Les décisions ainsi prises sont reconsidérées lors de l'Assemblée générale ordinaire suivante.

Le Conseil

Art. 21 - Le Conseil est composé du Président de l'Union et des Représentants des Comités Membres. Chaque Comité Membre ayant rempli ses obligations statutaires désigne un Représentant au Conseil de l'Union.

Art. 22 - Le Conseil se réunit pendant les Assemblées générales de l'Union pour examiner les points figurant à l'ordre du jour cité à l'Art. 65 ou 72.

Art. 23 - Dans le cas où le Représentant d'un Comité Membre serait empêché d'assister à une séance du Conseil, le Comité qu'il représente, ou la Délégation de ce Comité, peut désigner un suppléant pour cette séance. Cette désignation doit être signifiée au Président ou au Secrétaire général avant le début de la séance.

Art. 24 - Dans le cas où un Comité Membre ne pourrait envoyer aucun délégué à l'Assemblée générale, il peut adresser son vote par écrit au Président sur toutes questions figurant à l'ordre du jour, qui est diffusé conformément à l'Art. 65. Pour être valable, ce vote doit être reçu avant le dépouillement du scrutin.

Art. 25 - Le Président invite les membres du Bureau et, lorsque les délibérations portent sur des questions scientifiques, les Présidents des Commissions intéressées à assister aux séances du Conseil à titre consultatif. Il peut inviter les Présidents d'honneur au même titre.

Les Commissions scientifiques

Art. 26 - La réalisation des buts de l'Union dans les différents domaines de la radioélectricité scientifique incombe aux Commissions scientifiques, qui sont établies par le Conseil. Les Comités scientifiques sont établis par le Conseil pour étudier les questions présentant un intérêt commun à plusieurs Commissions.

Art. 27 - Les Commissions ont pour fonctions

a) de se tenir au courant des progrès réalisés dans la mise en

- oeuvre des buts définis à l'Art. 1;
- b) d'assurer la présentation et la discussion d'exposés relatant ces progrès au cours des Assemblées générales ordinaires;
 - c) de préparer les programmes de travail, résolutions et recommandations à soumettre au Conseil en conformité avec l'Art. 29;
 - d) de former des Groupes de travail pour l'étude de sujets scientifiques déterminés;
 - e) d'organiser, dans l'intervalle des Assemblées générales, les colloques scientifiques ainsi que les réunions des Groupes de travail qui ont reçu l'approbation du Bureau.

Art. 28 - Les Commissions se réunissent pendant les Assemblées générales ordinaires. Dans des circonstances particulières et avec l'approbation du Bureau, les Présidents des Commissions peuvent convoquer des réunions de leur Commission en tout autre moment.

Art. 29: a) Pour toutes questions se rapportant à l'administration de l'Union ou ayant des implications financières, les Commissions présentent leurs vues et opinions sous forme de recommandations.

b) Pour toutes questions ressortissant à leurs mandats respectifs, et ne tombant pas sous a) ci-dessus, les Commissions peuvent adopter des résolutions. Celles-ci sont présentées au Conseil pour information.

Art. 30 - Chaque Commission est composée d'un Président, d'un Vice-Président et des Membres officiels désignés par les Comités Membres, à raison d'un Membre officiel par Comité Membre.

Art. 31 - Dans le cas où un Membre officiel serait empêché d'assister à une séance de sa Commission, il peut soit désigner un suppléant parmi les membres de sa délégation, soit adresser son vote par écrit au Président de la Commission, sur toute question à l'ordre du jour. Dans la deuxième éventualité, ce vote, pour être valable, doit être reçu avant le dépouillement du scrutin.

Art. 32 - La mise en oeuvre des programmes recommandés par les Commissions ou les Comités scientifiques incombe aux Comités Membres qui acceptent d'y prendre part.

Art. 33 - Chaque Groupe de travail formé en vertu de l'Art. 27 d) est dissous à la fin de l'Assemblée générale ordinaire qui suit celle de sa création. Le Groupe de travail dont la

tâche n'est pas terminée au moment de l'Assemblée générale peut être reconstitué par la Commission-mère.

Art. 34 - Les Présidents et les membres des Groupes de travail sont désignés par le Président de la Commission-mère après consultation des Membres officiels, si besoin par correspondance.

Art. 35 - Chaque Groupe de travail prépare un rapport d'activité comprenant ses conclusions et recommandations; la date de la présentation de ce rapport est fixée par le Président de la Commission-mère.

Le Comité de Coordination

Art. 36 - Le Comité de Coordination est composé des Présidents des Commissions et des Comités scientifiques, et des membres du Bureau. Dans le cas où le Président d'une Commission serait empêché d'assister à une réunion du Comité de Coordination, il peut se faire représenter par le Vice-Président de sa Commission.

Art. 37 - Le Comité de Coordination a pour tâche

- a) de coordonner les activités scientifiques des Commissions, particulièrement dans les domaines où l'action conjointe de deux ou plusieurs Commissions paraît souhaitable,
- b) de préparer le programme scientifique des Assemblées générales.

Art. 38 - Le Comité de Coordination se réunit au moins un an avant chaque Assemblée générale ordinaire pour en établir le programme scientifique. Le Président convoque des réunions du Comité de Coordination pendant l'Assemblée générale.

Divers

Art. 39 - Le Président de l'Union préside les séances du Bureau, du Conseil et du Comité de Coordination. En cas d'absence ou d'empêchement, il est remplacé par le Président sortant.

Art. 40 - Le Bureau désigne l'un des Vice-Présidents comme Trésorier de l'Union. Le Trésorier gère les fonds de l'Union en conformité avec les directives du Conseil. Il est tenu de déléguer au Secrétaire général les pouvoirs nécessaires à la conduite des affaires financières courantes.

Art. 41 - a) Le Secrétaire général assure la gestion des affai-

res de l'Union et l'organisation de ses activités en conformité avec les directives du Bureau. Il est chargé, en particulier, de la mise en oeuvre des résolutions adoptées au cours des Assemblées générales, du maintien des relations avec les Comités Membres, les Comités Membres associés, les Commissions et autres organes de l'Union, ainsi que des publications de l'Union.

b) Le Bureau a pouvoir de désigner, sur proposition du Secrétaire général, un Secrétaire général adjoint qui restera en fonction de la date de sa nomination jusqu'à la fin de l'Assemblée générale ordinaire suivante. Le Secrétaire général peut déléguer certaines des tâches qui lui incombent au Secrétaire général adjoint.

Art. 42 - Tous les actes qui engagent l'Union et ont été approuvés par le Bureau sont signés par deux membres du Bureau dont l'un doit être soit le Président soit le Secrétaire général.

Art. 43 - Le Bureau peut donner pouvoir à l'un de ses membres pour ester en justice.

ELECTIONS

Art. 44 - L'admission officielle de nouveaux Comités Membres par le Conseil ne peut s'effectuer qu'au cours d'une Assemblée générale ordinaire. L'admission provisoire de ces Comités, sans droit de vote, peut être autorisée par le Bureau à partir de la date de paiement de la première contribution annuelle à l'Union.

Art. 45 - L'admission officielle de nouveaux Comités Membres associés par le Conseil ne peut s'effectuer qu'au cours d'une Assemblée générale ordinaire. L'admission provisoire de Membres associés peut être autorisée par le Bureau.

Art. 46 - Les membres du Bureau sont élus par le Conseil au cours de l'Assemblée générale ordinaire. Leur mandat entre en vigueur à l'issue de l'Assemblée qui a prononcé leur élection et prend fin à l'issue de l'Assemblée générale ordinaire suivante.

Art. 47 - Les candidats aux fonctions de membre du Bureau sont présentés par les Comités Membres. Les candidats ne sont éligibles que moyennant les conditions suivantes:

a) soit leur candidature est présentée par au moins deux Comités, soit elle est présentée par un seul Comité et

- appuyée ultérieurement par au moins un autre Comité;
- b) ils doivent confirmer au Secrétaire général qu'ils acceptent de prendre part aux élections.

Art. 48 - La liste définitive des candidats éligibles est établie selon la procédure suivante:

- a) Au plus tard six mois avant l'ouverture de l'Assemblée générale ordinaire, le Secrétaire général invite tous les Comités Membres à présenter leurs candidats, à raison d'un candidat à chacun des postes suivants: Président, quatre Vice-Présidents, Secrétaire général.
- b) Sur la base de ces propositions, qui doivent lui parvenir au plus tard cinq mois avant l'Assemblée, le Secrétaire général diffuse aux Comités Membres deux listes provisoires indiquant les noms des candidats et les Comités proposant:
- Liste A: candidats présentés par au moins deux Comités,
Liste B: candidats présentés par un seul Comité.
- c) Tout Comité peut appuyer les candidatures figurant dans la liste B, à raison d'une candidature pour chacun des postes cités en a). Notification en est donnée au Secrétaire général au plus tard trois mois avant l'Assemblée.
- d) La liste définitive des candidats éligibles est diffusée aux Comités Membres au plus tard deux mois avant l'Assemblée.

Art. 49 - Dans le cas où le Secrétaire général ne serait pas réélu, le Bureau veille à prendre toutes les dispositions utiles pour que les responsabilités soient transférées au nouveau Secrétaire général au plus tard six mois après la fin de l'Assemblée générale.

Art. 50 - Le Président n'est pas rééligible. Les Vice-Présidents peuvent être réélus une fois.

Art. 51 - Après consultation des membres du Bureau et des Comités Membres, le Président peut pourvoir aux vacances intervenant au sein du Bureau. Tout membre ainsi nommé assume ses fonctions jusqu'à la fin de l'Assemblée générale ordinaire suivante; il peut être élu pour le terme suivant même dans le cas où le membre du Bureau qu'il a été appelé à remplacer n'est pas rééligible.

Art. 52 - Le Conseil peut conférer le titre de Président d'honneur à un ancien membre du Bureau ou à un ancien Président de Commissions qui a apporté une contribution particulière à la réalisation des buts de l'Union; le nombre des Présidents d'honneur n'excédera pas cinq.

Art. 53 - Les Présidents et les Vice-Présidents des Commissions sont élus par le Conseil sur recommandation des Commissions respectives. Les Présidents entrent en fonction à la fin de l'Assemblée qui a prononcé leur élection et leur mandat expire à la fin de l'Assemblée générale ordinaire suivante. Sauf circonstances exceptionnelles ou abolition de la Commission, les Vice-Présidents succèdent automatiquement aux Présidents.

Art. 54 - Les Présidents de Commission qui sont en même temps Membres officiels au sein de leur propre Commission sont tenus de désigner un autre membre de leur délégation comme Membre officiel pour la durée de l'Assemblée générale.

Art. 55 - Chaque Commission peut élire un secrétaire de langue française et un secrétaire de langue anglaise parmi les délégués présents à l'Assemblée générale.

Art. 56 - Les Présidents des Comités scientifiques sont élus par le Conseil sur recommandation du Bureau.

Art. 57 - Les représentants de l'Union auprès d'autres organisations internationales sont élus par le Conseil sur recommandation du Bureau.

L'ASSEMBLEE GENERALE ORDINAIRE

Art. 58 - L'Union se réunit normalement tous les trois ans en Assemblée générale ordinaire. Au cours de l'Assemblée ont lieu:

- a) des séances du Conseil, du Comité de Coordination et du Bureau,
- b) des séances administratives des Commissions,
- c) des séances plénières réunissant tous les délégués désignés par les Comités Membres et les observateurs,
- d) des séances scientifiques des Commissions et des colloques,
- e) des séances des groupes de travail établis par les Commissions.

Art. 59 - A l'Assemblée générale ordinaire assistent:

- a) les membres du Bureau,
- b) les Présidents et Vice-Présidents des Commissions,
- c) les Présidents des Comités scientifiques,
- d) les délégations des Comités Membres comprenant chacune le Représentant au Conseil, les Membres officiels des Commissions et des délégués ordinaires,
- e) les délégations des Comités Membres associés comprenant chacune l'observateur au Conseil, les observateurs au sein

- des Commissions et des délégués ordinaires,
f) les Présidents d'honneur et anciens Présidents de l'Union,
g) les représentants invités en vertu de l'Art. 61.

Art. 60 - Les séances scientifiques des Commissions et les colloques sont ouverts à tous les scientifiques (y compris les étudiants) inscrits comme participants au début de l'Assemblée générale. Le nombre total des participants pourrait être limité par le Comité Membre qui organise l'Assemblée générale en fonction des possibilités locales.

Art. 61 - Le Président de l'Union peut inviter les représentants désignés par des organisations internationales à assister à l'Assemblée générale en qualité d'observateurs.

Art. 62 - La date et le lieu de l'Assemblée générale sont communiqués par le Secrétaire général aux Comités Membres et aux Comités Membres associés au moins six mois avant l'ouverture de l'Assemblée.

Art. 63 - L'ordre du jour des séances du Conseil est établi sur la base des propositions présentées par le Comités Membres, le Bureau, le Comité de Coordination, les Commissions et les Comités scientifiques de l'Union.

Art. 64 - Les questions à inclure à l'ordre du jour du Conseil doivent parvenir au Secrétaire général au moins quatre mois avant l'ouverture de l'Assemblée générale. Toute question présentée ultérieurement n'est prise en considération qu'avec l'assentiment préalable d'au moins la moitié des voix émises par les membres présents à la séance.

Art. 65 - L'ordre du jour des séances du Conseil est préparé par le Secrétaire général et communiqué aux Comités Membres et aux Comités Membres associés au moins trois mois avant l'ouverture de l'Assemblée.

Art. 66 - Pour chaque Assemblée générale ordinaire, le Secrétaire général prépare:

- a) à l'intention du Conseil, un rapport circonstancié sur les affaires de l'Union, y compris un état des recettes et des dépenses, depuis la dernière Assemblée générale ordinaire ainsi qu'un projet de prévisions budgétaires pour le triennat suivant,
- b) à l'intention de tous les délégués, un rapport général sur les activités de l'Union depuis la dernière Assemblée générale ordinaire.

Art. 67 - Le Conseil a pleins pouvoirs pour décider de toutes les activités découlant pour l'Union des buts définis à l'Art. 1.

Il a pour attributions particulières:

- a) d'examiner les mesures prises par le Bureau depuis l'Assemblée générale ordinaire précédente relativement aux affaires de l'Union;
- b) d'élire
 - (i) les membres du Bureau,
 - (ii) les Présidents et Vice-Présidents des Commissions,
 - (iii) les Présidents des Comités scientifiques,
 - (iv) les représentants de l'Union auprès d'autres organisations internationales;
- c) de créer et d'abolir les Commissions et les Comités scientifiques et d'en déterminer les titres et mandats;
- d) d'examiner et, si jugé opportun, d'approuver les programmes de travail, résolutions et recommandations présentés par les Commissions et les Comités scientifiques de l'Union;
- e) sur proposition du Bureau, d'examiner les demandes d'admission à l'Union et, si jugé opportun, d'accepter ces demandes;
- f) sur proposition du Bureau, d'examiner les demandes d'admission à l'Union dans la catégorie des Membres associés et, si jugé opportun, d'accepter ces demandes;
- g) de fixer l'année et le lieu de l'Assemblée générale ordinaire suivante;
- h) de désigner un Comité des finances permanent chargé:
 - (i) de préparer un rapport sur les comptes de l'Union depuis la dernière Assemblée générale ordinaire et sur les prévisions budgétaires pour la période allant jusqu'à l'Assemblée générale ordinaire suivante,
 - (ii) de présenter ses recommandations concernant les finances de l'Union,
 - (iii) d'aider le Trésorier, à sa demande, à faire le point sur les affaires financières de l'Union pendant la période allant jusqu'à l'Assemblée générale ordinaire suivante;
- i) sur proposition du Comité des finances, d'approuver les comptes et les prévisions budgétaires et de considérer les recommandations formulées par ce Comité;
- j) de déterminer le montant de l'unité de contribution définie à l'Art. 7;
- k) sur proposition du Bureau, d'approuver les amendements aux

Statuts;

- 1) de prendre des décisions sur toutes autres questions touchant les activités de l'Union.

Art. 68 - Les résolutions adoptées par le Conseil et les Commissions au cours de l'Assemblée générale sont présentées pour information à la séance plénière de clôture de l'Assemblée à laquelle assistent tous les délégués et observateurs.

Art. 69 - A défaut de prescriptions pertinentes dans les Statuts, ou bien dans des circonstances exceptionnelles, le Conseil est autorisé:

- a) à prendre des décisions sur toutes les questions relatives aux activités de l'Union;
- b) à établir des règles pour la conduite des travaux de l'Assemblée générale.

Ces décisions et règles ne peuvent contenir de prescriptions qui seraient en contradiction avec les termes des Statuts.

L'ASSEMBLEE GENERALE EXTRAORDINAIRE

Art. 70 - Dans des circonstances particulières et avec approbation de la majorité des voix des Comités Membres, le Président peut convoquer une Assemblée générale extraordinaire. Il est tenu de le faire lorsqu'il en est requis par un tiers au moins des voix de tous les Comités Membres.

Art. 71 - Le Conseil, tel que défini à l'Art. 21, siège au cours de l'Assemblée générale extraordinaire. Le Président peut inviter les membres du Bureau, les Présidents d'honneur et les Présidents des Commissions à assister aux séances à titre consultatif.

Art. 72 - L'ordre du jour, la date et le lieu de l'Assemblée générale extraordinaire sont communiqués aux Comités Membres par le Secrétaire général au moins trois mois avant l'ouverture de l'Assemblée.

PROCEDURE DE VOTE

Art. 73 -

- a) Au sein du Conseil, seuls les Représentants des Comités Membres ont droit de vote. Le nombre des voix attribuées à

chacun des Représentants est déterminé par la Catégorie de son Comité, suivant le barème figurant à l'Art. 7.

Toutes les résolutions du Conseil sont adoptées à la majorité simple des voix, exception faite de celles portant modification des Statuts, pour lesquelles la majorité des deux tiers est requise.

- b) Au sein des Commissions, chaque Membre officiel présent, ou votant en vertu de l'Art. 31, ou bien son suppléant, a une voix.
- c) Au sein du Bureau, du Comité de Coordination et des Comités, chaque membre présent a une voix. Un membre du Bureau qui est rémunéré pour ses services à l'Union n'a pas droit de vote.
- d) Au sein du Bureau, du Conseil, du Comité de Coordination, des Commissions et des Comités, les décisions sont prises en tenant compte du nombre des votes positifs et des votes négatifs émis par les membres présents et prenant part au scrutin. En cas d'égalité des voix, la décision appartient au Président. Les votes adressés par écrit en vertu des Arts 24 et 31 ne sont admis que dans les séances du Conseil et des Commissions.

QUORUM

Art. 74 - Dans les séances du Bureau et du Conseil, le quorum est atteint par la moitié du nombre des membres. Dans les séances du Comité de Coordination, il est constitué par la moitié du nombre des membres du Bureau et les représentants de la moitié du nombre des Commissions.

Art. 75 - Dans le cas où le quorum ne serait pas atteint par le nombre des membres présents au Conseil, le Président peut convoquer une séance extraordinaire; celle-ci n'aura pas lieu avant expiration d'un délai de 24 heures. Dans ces conditions, si le nombre des membres présents n'est pas inférieur à douze, le quorum sera atteint nonobstant l'Art. 74.

FINANCES

Art. 76 - Les recettes de l'Union proviennent

- a) des contributions annuelles payées par les Comités Membres en vertu de l'Art. 7,
- b) de donations et de subsides des Comités Membres,

c) de donations et de subsides provenant d'autres sources et acceptés avec l'assentiment du Conseil.

Art. 77 - Les fonds provenant de donations et de subsides sont utilisés selon les désirs exprimés par les donateurs. Tous les autres fonds sont consacrés à couvrir les dépenses faites par l'Union en vue de la réalisation de ses buts.

Art. 78 - Les dépenses ordinaires de l'Union comprennent:

- a) les frais de voyage des membres du Bureau, des Présidents et Vice-Présidents des Commissions et des membres du Secrétariat se déplaçant pour les besoins de l'Union,
- b) les frais de rédaction et d'impression des publications de l'Union,
- c) les frais d'administration,
- d) toutes autres dépenses autorisées par le Conseil.

Art. 79 - Au cours de l'année financière, le Trésorier peut autoriser des dépenses supplémentaires ne dépassant pas le tiers du solde du Fonds pour Cas Speciaux à la fin de la dernière Assemblée générale ordinaire. Toutes les dépenses excédant ce montant doivent être autorisées par le Bureau.

Art. 80 - L'année financière de l'Union commence le 1er janvier et prend fin le 31 décembre.

DIVERS

Art. 81 - Les langues officielles de l'Union sont le français et l'anglais. Tous les documents administratifs sont publiés dans les deux langues.

Art. 82 - En cas de contestation, le texte français des Statuts fait foi.

URSI STATUTES

Note: The revised URSI Statutes were approved by the Council during the XXIII General Assembly in Prague, and came into force on 6 September 1990. They are reproduced below.

OBJECTS

Art. 1 - The object of the International Union of Radio Science (Union Radio-Scientifique Internationale) is to stimulate and to coordinate, on an international basis, studies in the fields of radio, telecommunication and electronic sciences and, within these fields:

- (a) to promote and organise research requiring international cooperation, and the discussion and dissemination of the results of this research;
- (b) to encourage the adoption of common methods of measurement, and the intercomparison and standardisation of the measuring instruments used in scientific work;
- (c) to stimulate and coordinate studies of
 - the scientific aspects of telecommunications using electromagnetic waves, guided and unguided;
 - the generation and detection of these waves, and the processing of the signals embedded in them.

MEMBERS

Art. 2 - The Members of the Union are the Committees whose applications for membership have been accepted at an Ordinary General Assembly.

Art. 3 - A Member Committee is established in a territory by the Academy of Sciences or the Research Council, or by a similar institution or association of institutions.

Art. 4 - The Union can admit to membership a Committee in any territory in which there is an interest in radio science.

Art. 5 - Member Committees, within their respective territories, have the same objects as the Union; they have complete freedom in matters relating to their internal organisation.

Art. 6 - Each Member Committee appoints a Representative to the Council (see Art.21) and one Official Member to each Commission (see Art.30). The same Official Member can represent his Committee on more than one Commission. A Member of the URSI Board of Officers cannot be appointed as Representative to the Council.

Art. 7 - Each Member Committee is free to choose the Category in which it will adhere to the Union. The number of units of contribution payable annually to the Union by a Member Committee and the number of votes allocated to it in meetings of the Council are determined by the Category chosen and are as follows:

Category.....	1	2	3	4	5	5A	6
Number of votes.....	2	4	6	8	10	11	12
Number of units of contribution..	1	2	4	8	16	24	32

The value of the unit of contribution is fixed by the Council.

Art. 8 - A Member Committee can transfer to a higher Category at the beginning of any financial year. A transfer to a lower Category can be made during an Ordinary General Assembly or during the three-month period after the end of an Assembly. The transfer takes effect from the beginning of the next financial year.

Art. 9 - Unless the Council decides otherwise, a Member Committee which has not paid its annual contribution for two years is considered to have resigned from the Union. The Committee may, however, apply for Associate Membership.

Art. 10 - A Member Committee can resign from the Union by giving notice in writing to the Secretary General. In the event of resignation, the Member Committee is liable to pay its annual contribution for the current year.

Art. 11 - A Member Committee which resigns from the Union, or which is considered as having resigned in accordance with Art.9, loses all rights to the assets of the Union.

Art. 12 - In the event of the dissolution of the Union, the Council decides on the disposal of the assets of the Union. The assets may not be distributed among the Members.

ASSOCIATE MEMBERSHIP

Art. 13 - Associate Membership is reserved, as an option, for a) Committees which are established in accordance with Arts 3, 4 and 5, but are not yet ready for full membership; and b) Committees which, being already Members of the Union, wish to transfer temporarily to Associate Membership for financial reasons. Every Associate Membership will be reviewed at each General Assembly.

Art. 14 - Associate Member Committees are admitted to the Union at an Ordinary General Assembly.

Art. 15 - Associate Member Committees are not required to pay an annual contribution to the Union. They have no voting rights in the Council and in the Commissions, and have no rights to the assets of the Union.

Art. 16 - Each Associate Member Committee appoints one observer to the Council, and one observer to each Commission. The same observer can represent his Committee on the Council and on more than one Commission.

ADMINISTRATION AND ORGANISATION

Board of Officers

Art. 17 - The direction of the affairs of the Union and the organisation of its work are the responsibilities of the Board of Officers which acts in accordance with the resolutions and general guidance of the Council.

Art. 18 - The Board of Officers comprises the President, the immediate Past President, four Vice-Presidents and the Secretary General. The President can invite Honorary Presidents to attend meetings of the Board in an advisory capacity.

Art. 19 - The Board of Officers meets during and between General Assemblies at the request of the President or of two of its members.

Art. 20 - During the interval between General Assemblies, the Board of Officers, acting in the name of the Union, can make decisions relating to urgent matters provided that these decisions do not conflict with the resolutions and general guidance of the Council. Decisions made in this way are subject to review at the next Ordinary General Assembly.

Council

Art. 21 - The Council comprises the President of the Union and Representatives of Member Committees. Each Member Committee which has complied with its statutory obligations appoints one Representative to the Council of the Union.

Art. 22 - The Council meets during General Assemblies of the Union to consider the agenda referred to in Art.65 or 72. Resolutions of the Council are adopted in the name of the Union.

Art. 23 - If the Representative of a Member Committee is unable to be present at a meeting of the Council, the Committee that he represents or the Delegation of this Committee can appoint a substitute for that meeting. Notice of such a substitution must be given to the President or the Secretary General before the beginning of the meeting.

Art. 24 - If a Member Committee is unable to send any delegate to a General Assembly, the Committee can submit its vote in writing to the President on any item which appears in the agenda circulated in accordance with Art. 65 . Such a vote is valid only if it is received before the counting of the votes.

Art. 25 - The President invites the members of the Board of Officers and, when scientific matters are discussed, the appropriate Chairmen of Commissions to attend meetings of the Council in an advisory capacity. He can invite Honorary Presidents in the same capacity.

Scientific Commissions

Art. 26 - The achievement of the objects of the Union within particular parts of the field of radio science is the responsibility of the scientific Commissions which are established by the Council to deal with matters which are of interest to several Commissions.

Art. 27 - The functions of a Commission are

- (a) to keep under review the progress made in the achievement of the objects referred to in Art. 1;
- (b) to arrange for the presentation and discussion of surveys of progress during Ordinary General Assemblies;
- (c) to prepare programmes of work, resolutions and recommendations for submission to the Council in accordance with Art. 29;

- (d) to form Working Groups for the study of particular scientific subjects;
- (e) to organise, between General Assemblies, scientific symposia and meetings of Working Groups that have been approved by the Board of Officers.

Art. 28 - The Commissions meet during Ordinary General Assemblies. In special circumstances and with the approval of the Board of Officers, the Chairman of a Commission can convene a meeting of his Commission at any time.

Art. 29 - (a) The opinion of a Commission on any matter which relates to the administration of the Union or which has financial implications is submitted to the Council in the form of a recommendation.

(b) A Commission can adopt resolutions on matters within its terms of reference other than those specified in (a). Such resolutions are submitted to the Council for information.

Art. 30 - Each Commission comprises a Chairman, a Vice-Chairman and the Official Members; one Official Member is appointed by each of the Member Committees.

Art. 31 - If an Official Member of a Commission is unable to be present at a meeting of the Commission, he may nominate a member of his delegation to represent him, or he may submit his vote on any item in writing to the Chairman of the Commission. In the latter case his vote will be valid only if it is received before the counting of the votes.

Art. 32 - The execution of programmes recommended by the Commissions or the scientific Committees is the responsibility of the Member Committees which agree to participate in them.

Art. 33 - Each Working Group formed in accordance with Art. 27 (d) is dissolved at the end of the General Assembly following that of its creation. A Working Group which has not completed its task by the date of the General Assembly can be reconstituted by the parent Commission.

Art. 34 - The Chairman and the members of a Working Group are chosen by the Chairman of the parent Commission after consultation with the Official Members, if necessary by correspondence.

Art. 35 - Each Working Group prepares a report on its work including conclusions and recommendations; the date for the submission of this report is fixed by the Chairman of the parent Commission.

Coordinating Committee

Art. 36 - The Coordinating Committee comprises the Chairmen of the Commissions and of the scientific Committees and the members of the Board of Officers. If a Chairman is unable to be present at a meeting of the Coordinating Committee, he can authorise the Vice-Chairman of his Commission to represent him.

Art. 37 - The Coordinating Committee is responsible for

- (a) the coordination of the scientific activities of the Commissions, especially where joint action by two or more Commissions is desirable;
- (b) the planning of the scientific programme of General Assemblies.

Art. 38 - The Coordinating Committee meets at least one year before each Ordinary General Assembly to define the scientific programme for the Assembly. The President convenes meetings of the Coordinating Committee during a General Assembly.

Miscellaneous

Art. 39 - The President of the Union presides at meetings of the Board of Officers, the Council and the Coordinating Committee. If he is absent or unable to preside, the Immediate Past President presides.

Art. 40 - The Board of Officers nominates one of the Vice-Presidents as Treasurer of the Union. The Treasurer manages the finances of the Union in accordance with the directives issued by the Council. The Treasurer must delegate to the Secretary General the powers necessary to enable him to deal with day-to-day financial matters.

Art. 41 - (a) The Secretary General is responsible for the management of the affairs of the Union and for the organisation of its work under the direction of the Board of Officers. In particular he is responsible for the implementation of the Resolutions adopted during General Assemblies, for maintaining contact with the Member Committees, the Associate Member Committees, the Commissions and other organs of the Union, and for the publications of the Union.

(b) The Board is empowered to appoint, on nomination by the Secretary General, an Assistant Secretary General, who will serve from the date of his appointment until the end of

the next Ordinary General Assembly. The Secretary General may delegate some of his duties to the Assistant Secretary General.

Art. 42 - All documents that are formally binding on the Union and that have been approved by the Board of Officers are signed by two members of the Board, one of whom must be the President or the Secretary General.

Art. 43 - The Board of Officers can nominate one of its members to act for the Union in legal proceedings.

ELECTIONS

Art. 44 - The formal admission of new Member Committees by the Council takes place only at an Ordinary General Assembly. Provisional membership, without voting rights, can be authorised by the Board of Officers from the date of payment of the first annual contribution to the Union.

Art. 45 - The formal admission of new Associate Member Committees by the Council takes place at an Ordinary General Assembly. Provisional admission to Associate Membership can be authorised by the Board.

Art. 46 - The Members of the Board of Officers are elected by the Council during an Ordinary General Assembly. Each member holds office from the end of the Assembly at which he is elected until the end of the next Ordinary General Assembly.

Art. 47 - Candidates for membership of the Board of Officers are nominated by the Member Committees. A candidate is not eligible for election unless:

- (a) either he has been nominated by two or more Committees, or he has been nominated by one Committee and has later been supported by at least one other Committee;
- (b) he has confirmed to the Secretary General that he is willing to stand for election.

Art. 48 - The final list of eligible candidates is prepared in accordance with the following procedure:

- (a) Not later than six months before the beginning of an Ordinary General Assembly, the Secretary General invites every Member Committee to nominate one candidate for each of the following offices: President, four Vice-Presidents, Secretary General.

(b) On the basis of the nominations he receives not later than five months before the Assembly, the Secretary General sends to Member Committees two provisional lists showing the names of the candidates and the Committees which nominated them:

List A, candidates nominated by two or more Committees;
List B, candidates nominated by one Committee only.

(c) Any Committee can support one of the candidates in List B for each of the offices mentioned in (a) by notifying the Secretary General not later than three months before the Assembly.

(d) The final list of eligible candidates is sent to Member Committees not later than two months before the Assembly.

Art. 49 - If the Secretary General is not reelected, the Board of Officers is responsible for making all the necessary arrangements for the transfer of responsibilities from the outgoing to the incoming Secretary General within a period not exceeding six months after the end of the General Assembly.

Art. 50 - The President can not be elected for a second term, but the Vice-Presidents can be reelected for a second term.

Art. 51 - A vacancy which occurs in the Board of Officers can be filled by the President after consultation with the Board of Officers and the Member Committees. An Officer appointed in this way holds office until the end of the next Ordinary General Assembly; he can then be elected to the Board even if the Officer whom he replaced was not eligible for reelection.

Art. 52 - The Council can confer the title of Honorary President on not more than five former members of the Board of Officers or former Chairmen of Commissions who have made notable contributions to the achievement of the objects of the Union.

Art. 53 - The Chairmen and Vice-Chairmen of Commissions are elected by the Council on the recommendation of the respective Commissions. Each Chairman assumes his responsibilities at the end of the Assembly at which he is elected and serves until the end of the next Ordinary General Assembly. Except in unusual circumstances, the Vice-Chairman succeeds automatically as Chairman unless his Commission has been abolished.

Art. 54 - A Chairman of Commission who is also an Official Member for the same Commission must nominate another member of

his Delegation to act as Official Member during a General Assembly.

Art. 55 - Each Commission may elect one French-speaking and one English-speaking Secretary from the delegates present at a General Assembly.

Art. 56 - The Chairmen of Scientific Committees are elected by the Council on the recommendation of the Board of Officers.

Art. 57 - The representatives of the Union on other international bodies are elected by the Council on the recommendation of the Board of Officers.

ORDINARY GENERAL ASSEMBLY

Art. 58 - The Union holds an Ordinary General Assembly normally at intervals of three years. At each Ordinary Assembly there are:

- (a) Meetings of the Council, the Coordinating Committee and the Board of Officers,
- (b) Business Meetings of the Commissions,
- (c) Plenary Meetings attended by all Delegates appointed by Member Committees and Observers,
- (d) Scientific Meetings of the Commissions, and Symposia,
- (e) Meetings of Working Groups established by the Commissions.

Art. 59 - The Ordinary General Assembly is attended by

- (a) Members of the Board of Officers,
- (b) Chairmen and Vice-Chairmen of Commissions,
- (c) Chairmen of Scientific Committees,
- (d) Delegations of Member Committees, each of which comprises the Council Representative, Official Members of Commissions and ordinary delegates,
- (e) Delegation of Associate Member Committees, each of which comprises the Observer to the Council, Observers to the Commissions, and ordinary delegates,
- (f) Honorary and past Presidents of the Union,
- (g) Representatives invited in accordance with Art. 61.

Art. 60 - Scientific Meetings of Commissions, and Symposia, are open to all scientists (including students) who have registered as participants at the beginning of the General Assembly. The total number of registrants may be restricted by the host Committee so that the meeting can be accommodated within the facilities available.

Art. 61 - The President of the Union can invite representatives nominated by international organisations to attend the General Assembly as observers.

Art. 62 - The date and place of the General Assembly are communicated by the Secretary General to Member Committees and Associate Member Committees not less than six months before the beginning of the Assembly.

Art. 63 - The agenda for the meetings of the Council are based on the proposals submitted by the Member Committees, the Board of Officers, the Coordinating Committee, the scientific Commissions and Committees of the Union.

Art. 64 - Items for inclusion in the agenda for the meetings of the Council must be received by the Secretary General not later than four months before the beginning of the General Assembly. Items received after this date can be added to the agenda only if approval is given by at least half of the votes of those present at the meeting.

Art. 65 - The Secretary General prepares the agenda for the meetings of the Council and communicates them to the Member Committees and Associate Member Committees not less than three months before the beginning of the Assembly.

Art. 66 - For each Ordinary General Assembly, the Secretary General prepares

- (a) for the Council, a detailed report on the affairs of the Union, including the accounts of income and expenditure since the previous Ordinary General Assembly, and the budgetary estimates for the three years following the Assembly;
- (b) for all Delegates, a general report on the activities of the Union since the previous Ordinary General Assembly.

Art. 67 - The Council has full power to make decisions on any activity of the Union relating to the objects defined in Art. 1.

In particular, it has the following powers and obligations:

- (a) to review the direction of the affairs of the Union by the Board of Officers since the previous Ordinary General Assembly;
- (b) to elect
 - (i) the members of the Board of Officers,
 - (ii) the Chairmen and Vice-Chairmen of Commissions,
 - (iii) the Chairmen of scientific Committees,

- (iv) the representatives of the Union on other international bodies;
- (c) to create and abolish Commissions and scientific Committees and to decide the titles and the terms of reference of these bodies;
- (d) to consider and, if thought fit, to approve programmes of work, resolutions and recommendations submitted by the Commissions and scientific Committees of the Union;
- (e) on the proposal of the Board of Officers, to examine and, if thought fit, to accept applications for membership of the Union;
- (f) on the proposal of the Board of Officers, to examine and, if thought fit, to accept applications for Associate Membership of the Union;
- (g) to decide the year and place of the next Ordinary General Assembly;
- (h) to appoint a Standing Finance Committee charged with
 - (i) the preparation of a report on the accounts for the period since the last Ordinary General Assembly and the budget for the period until the next Ordinary General Assembly,
 - (ii) the submission of recommendations concerning the finances of the Union,
 - (iii) the provision of assistance to the Treasurer, when so requested by him, to review the financial affairs of the Union during the period until the next Ordinary General Assembly,
- (i) to approve the accounts and the budget, on the proposal of the Finance Committee, and to consider recommendations made by the Committee;
- (j) to decide the unit of contribution defined in Art. 7;
- (k) on the proposal of the Board of Officers, to approve proposed amendments to the Statutes;
- (l) to take action on any other matter affecting the activities of the Union.

Art. 68 - Resolutions adopted by the Council and the Commissions during a General Assembly are submitted to the closing plenary meeting of all delegates and observers for information only.

Art. 69 - In the absence of any relevant provisions in the Statutes, or in extraordinary circumstances, the Council is authorised:

- (a) to make decisions on all matters relating to the activities

- of the Union,
(b) to make rules for the conduct of the work of the General Assembly.

These decisions and rules must not contain provisions contrary to the terms of the Statutes.

EXTRAORDINARY GENERAL ASSEMBLY

Art. 70 - In special circumstances and with the approval of the majority of the votes of the Member Committees, the President can convene an Extraordinary General Assembly. He must do so on receipt of a request supported by at least one third of the votes of all Member Committees.

Art. 71 - At an Extraordinary General Assembly there are meetings of the Council as defined in Art. 21, to which the President can invite members of the Board of Officers, Honorary Presidents and Chairmen of Commissions in an advisory capacity.

Art. 72 - The agenda, the date and the place of an Extraordinary General Assembly are communicated to the Member Committees by the Secretary General not less than three months before the beginning of the Assembly.

VOTING PROCEDURE

Art. 73 -

- (a) In meetings of the Council, only the Representatives of Member Committees can vote. The number of votes allocated to each Representative is determined by the Category of his Committee in accordance with the schedule given in Art. 7.
Resolutions of the Council are adopted by a simple majority of votes, with the exception of those relating to modifications of the Statutes for which a two-thirds majority is required.
- (b) In meetings of Commissions, each Official Member present, or voting in accordance with Art. 31, or his representative, has one vote.
- (c) In meetings of the Board of Officers, the Coordinating Committee and Committees, each member present has one vote. A member of the Board of Officers who receives remuneration for his services to the Union has no vote.

(d) In meetings of the Board of Officers, the Council, the Coordinating Committee, Commissions and Committees, decisions are based on the affirmative and negative votes of those present and taking part in the vote. In the case of equal numbers of affirmative and negative votes, the Chairman of the meeting decides. Votes submitted in writing in accordance with Arts 24 and 31 are admissible only in meetings of the Council and of the Commissions.

QUORUM

Art. 74 - In meetings of the Board of Officers and of the Council, half the membership constitutes a quorum. In meetings of the Coordinating Committee, half the members of the Board and the representatives of half the number of the Commissions constitute a quorum.

Art. 75 - If the members present at a meeting of the Council do not constitute a quorum, the President can convene an extraordinary meeting timed to begin not less than 24 hours later. Under these circumstances twelve members will constitute a quorum notwithstanding Art. 74.

FINANCES

Art. 76 - The income of the Union is derived from

- (a) annual contributions received from Member Committees in accordance with Art. 7,
- (b) donations and grants made by Member Committees,
- (c) donations and grants from other sources accepted with the consent of the Council.

Art. 77 - Funds derived from donations and grants are used in accordance with the wishes expressed by the donors. All other funds are used to meet the expenses of the Union incurred in accordance with its objects.

Art. 78 - The ordinary expenses of the Union include

- (a) expenses relating to travel, on business of the Union, of the Officers of the Union, Chairmen and Vice-Chairmen of Commissions, and members of the Secretariat,
- (b) the cost of editing and printing the publications of the Union,
- (c) administrative expenses,
- (d) other expenses authorised by the Council.

Art. 79 - In any financial year the Treasurer may authorise additional expenditure not exceeding one third of the balance in the Special Needs Fund at the end of the preceding Ordinary General Assembly. Expenditure in excess of this amount must be authorised by the Board of Officers.

Art. 80 - The financial year of the Union begins on 1 January and ends on 31 December.

MISCELLANEOUS

Art. 81 - The official languages of the Union are French and English. All administrative documents are issued in both languages.

Art. 82 - In any question relating to the interpretation of these Statutes, the French text is regarded as authoritative.

URSI COMMISSION G ON IONOSPHERIC RADIO
AND PROPAGATION

REPORT ON ACTIVITIES 1987-1990

by Prof. H. Rishbeth

Commission G has had a very active three years. The activity included the work of several G and GH Working Groups, and the sponsorship of Symposia in URSI "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 G.1-G.4 and GH.1 have been active during the triennium (see Reports on pp.39-45). The sad death of J.A. Gledhill in 1988 left a vacancy in the chairmanship of the Ionosphere Network Advisory Group (INAG, G.1). To avoid losing INAG's momentum, I asked P.J. Wilkinson to step into the breach, and 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 G.2, the Beacon Satellite Group, together with Vice-Chairmen J.A. Klobuchar and T.R. Tyagi. G.2's activities included the Beacon Satellite Symposia at Beijing and Tucuman. C.M. Rush led the ionospheric modelling activity of G.3, which is now to be merged as a new G.3 with the Ionospheric Informatics G.4 Group of B.W. Reinisch. G.4 has been particularly active in conducting specialized studies, producing reports and holding a workshop. Finally, the Incoherent Scatter Working Group GH.1 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 GH.1 and D. Anderson as the newly-elected Vice-Chairman of the new G.3 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 "Review of Radio Science", I initiated a complete rearrangement for the 1987-1989 edition. 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 Commissions 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 Convenors who worked hard to give us a good programme, and Prof. 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.

REPORTS OF WORKING GROUPS OF COMMISSION G IONOSPHERIC RADIO AND PROPAGATION

submitted for the URSI General Assembly, 1990

WORKING GROUP G.1

IONOSONDE NETWORK ADVISORY GROUP (INAG)

by Dr. Phil Wilkinson, Chairman-designate

The last three years have not been kind ones for Working Group G.1, INAG. Professor Gledhill, the Chairman-elect, died on 19 June 1988 and with his passing much of the working group's momentum was lost. This is reflected in a reduced number of bulletins being produced; only four in the last three years (February and December 1988 and June and November 1989) and, since the last URSI General Assembly, there has only been one INAG meeting, at Exeter, during the IAGA meeting in 1989.

I was asked by Prof. Rishbeth to chair INAG in the interim period leading up to the Prague General Assembly and during my period as Chairman, I have looked at the issues INAG faces. In my first comment as Chairman, I outlined the areas I felt were important with the most important one being: participation. I believe that INAG cannot be effective unless it has a broader, more vocal membership. The INAG mailing list is the first area to seek serious members and the recent mail voting for INAG offices has reinforced the impression that the revised mailing list for INAG is now an effective core body of interested people. This, I believe, is the most significant development in the past three years and I hope to build on it in the next three years.

Another area addressed in some detail both in the Bulletin (No 54) and at the only INAG meeting is the issue of ionosonde data. INAG has a major task ahead of it if it is to offer good advice on how networks are to handle their past records and how they should plan for the future. This was approached in two ways. One was to update the current ionosonde network master list in order to know where the data are being obtained. Although there have been a number of revisions, there are still stations which only report data occasionally and which are not in the master list. Second, comments were sought on the prospect of establishing baseline stations. No comments were

returned on this issue although verbal reactions were positive. I have yet to convert people's words into print.

At the last URSI General Assembly, INAG proposed one Resolution regarding the operation of the worldwide ionosonde network. It contained three parts, regarding the closure of the New Zealand ionosonde network, the De Bilt ionosonde and the possibility of opening an ionosonde at Easter Island. It is hard to measure the impact of resolutions, but it is a pleasure to acknowledge that Professor W.J. Baggaley, of the University of Canterbury Physics Department in Christchurch, New Zealand, in cooperation with IPS Radio and Space Services in Australia, has continued the collection and distribution of data from Christchurch and the collection of ionograms from Scott Base to support research projects. However, the ionosonde at De Bilt did close, and while many agree Easter Island is a good site, nobody has yet placed an ionosonde there.

The next three years will be critical for INAG. This last three years has seen a further reduction in the number of articles offered for bulletins but, hopefully, this trend can now be reversed.

WORKING GROUP G.2

STUDIES OF THE IONOSPHERE USING BEACON SATELLITES

by Prof. R. Leitinger, Chairman

In the years 1987-1990 the Beacon Satellite Group (Chairman: R. Leitinger, Austria; co-Chairmen: J.A. Klobuchar USA, T.R. Tyagi, India) fulfilled tasks by having two international symposia sponsored by URSI and by giving advice and issuing recommendations on all important matters related to the activities of the members of the Group.

The Group maintains a comparatively large mailing list with open access instead of applying rules for formal membership. In this way we reach all scientists who are interested to exchange information and to get news about satellite beacon activities. Formal Business Meetings are held during the Symposia. The Group is interdisciplinary and comprises members who are primarily interested in ionospheric physics as well as members who are interested in the application of trans-

ionospheric propagation of radio waves in areas which range from communication engineering to space geodesy and radio astronomy.

Beacon satellite activities are not evenly distributed: larger regional groups of scientists involved in beacon satellite observations exist in the USA, in India, in China, in Australia. There are some hopes of increased activities in South America in the near future. Unfortunately no satellite beacons are observed in Africa where only a few ionospheric stations exist. Contacts to interested scientists have been established for many years but up to now no observation plans could be carried out because of financial problems.

Very good relations exist between the Beacon Satellite Group and the IAG organizations dealing with atmospheric effects in Space Geodesy: the Chairman of the Beacon Satellite Group is a member of the joint IAG Commission VIII/COSPAR "CSTG" (International Coordination of Space Techniques for Geodesy and Geodynamics) and of the IAG Special Study Group 4.93 "Wave Propagation in Refractive Media".

The exchange of information was done partly by means of Circular Letters issued by the Chairman, and partly by various other means of communication when the information was of interest to individual members only or to regional groups of members.

The Beacon Satellite Symposium 1988 was held in Beijing, China, from 18 to 21 April on the invitation of the China Research Institute of Radio Wave Propagation and of the Chinese Institute of Electronics (CIE) in parallel with the International Symposium on Radio Propagation. There were 22 participants from 12 countries and 11 participants from the People's Republic of China. About 15 scientists (5 from abroad, 10 from China) who had registered for the Radio Propagation Symposium attended some of the sessions of the Beacon Satellite Symposium. 37 papers were presented in 5 scientific sessions. Proceedings appeared with International Academic Publishers (distributors: Pergamon Press). A detailed report appeared in the "URSI Information Bulletin".

The Beacon Satellite Symposium 1990 was held in Tucuman, Argentina, from 27 to 30 March, on the invitation of the Universidad Nacional de Tucuman. There were 20 participants from 10 countries and 12 from Argentina. 44 scientific papers were presented in 8 sessions. Proceedings are in print. A detailed

report has appeared in the "URSI Information Bulletin".

The Beacon Satellite Symposium 1992 is in the planning stage: it will be held in or near Boston, Massachusetts, USA and will be organized by Dr. Min-Chang Lee (MIT) probably for a time after the end of the US academic year.

WORKING GROUP G.3

IONOSPHERIC MAPPING AND MODELLING

by Dr. C.M. Rush, Chairman

Working Group G.3 was formed in Tel Aviv, and combined some of the activities of the International Reference Ionosphere and the Working Group on Ionospheric Mapping chaired by Ken Davies. It viewed itself as having a broader charter than just ionospheric mapping. Specific areas of work that were committed at least initially, were:

1. Physically based ionospheric modelling;
2. Data bases required and necessary to verify models;
3. Improved mapping techniques; and
4. Irregularity modelling.

Most of these activities have been addressed, although much more as the result of individual efforts than a coordinated working group activity. Dr. David Anderson (USA) has produced a series of reports and papers describing electron density parameters that are based upon varying degrees of complex theoretical calculations. Dr. Dieter Bilitza has put together a report describing a worldwide data base of ionospheric measurements. This effort by Dr. Bilitza in fact superseded the group's original plan to develop a more propagation-oriented data base. Efforts were undertaken to develop a high latitude ionospheric irregularity model, and a report describing the model will be available very soon, authored by Dr. Elkins (USA). The model is based on HF auroral backscatter data. A paper describing a new set of ionospheric mapping coefficients was published in 1989; these coefficients were slightly improved over those reported by Ken Davies in 1987 at Tel Aviv. No further improvements on ionospheric mapping were undertaken.

Much of the work of Working Group G.3 complements the interests and the activity of Working Group G.4 - Informatics - under the leadership of Dr. Bodo Reinisch (USA); Working Group G.4 has made tremendous progress. In light of the need to assure high coordination of efforts, particularly considering the fact that most scientists around the world have limited time and resources, consideration should be given to merging Working Groups G.3 and G.4. It should be pointed out that there is considerable interest in ionospheric mapping/modelling on the part of representatives from India, South Africa, and Japan, as well as by the individuals mentioned above.

WORKING GROUP G.4

IONOSPHERIC INFORMATICS

by Dr. B.W. Reinisch, Chairman

The Ionospheric Informatics Working Group was formed during the URSI General Assembly in Tel Aviv, 1987, with the task to promote the application of information technology to the acquisition, processing, archiving and distribution of ionospheric data. During the first Business Meeting at Tel Aviv the members specified three tasks for the 1987-1990 period: (1) ionogram data formats for data archiving, (2) electron density profiles with emphasis on the E-F valley problem, and (3) oblique HF propagation studies. The Ionospheric Informatics Working Group held Business Meetings in September 1987 (URSI, Tel Aviv, Israel), July 1988 (COSPAR, Helsinki, Finland), August 1988 (Geophysics Informatics Workshop, Moscow, USSR), January 1989 (US URSI, Boulder, CO, USA), July 1989 (IAGA, Exeter, UK), August 1989 (IRI Workshop, Abingdon, UK) and January 1990 (US URSI, Boulder, CO, USA). In July 1989, the Working Group conducted a Workshop on "Digital Ionogram Formats for World Data Center Archiving" in Lowell, MA, USA. A half-day Symposium on "Electron Density Profiles and the E-F Valley Problem" has been organized for the URSI General Assembly in Prague, Czechoslovakia, September 1990.

The Ionospheric Informatics Working Group has produced four papers published in *Advances in Space Research*, Vol. 10, No 8, Chapter 7, 1990:

1. "N(h) Profile Data at World Data Centers", by Allen et al.
2. "Discussion of the Valley Problem in N(h) Analysis of Ionograms", by Gulyaeva et al.
3. "Digital Ionogram Data", by Reinisch et al.
4. "Oblique Propagation Studies", by Bradley.

An important breakthrough was achieved at the Lowell Workshop. A new format for tabulated monthly ionogram characteristics was unanimously approved by the Workshop participants for recommendation to URSI as the new URSI standard. This format allows the economical archiving of non-time uniform data. World Data Center A at Boulder plans to use this format for the ionogram characteristics on CD ROM. A report on this new format has been widely circulated.

WORKING GROUP GH.1

INCOHERENT SCATTER

by Dr. V.B. Wickwar, Chairman

The major effort of the Working Group during the past three years has been scheduling the Incoherent-scatter Coordinated World Day Calendar each year. (These periods appear on the International Geophysical Calendar, issued by the World Data Center). Some of these periods last for 1 day; others last for 2 to 6 days.

The scheduling process has become more complex than in the past. A major reason is that these longer periods have become the observational focus for many experiments performed under the US CEDAR programme and the international WITS and, now, STEP programmes. As a consequence, it is necessary to coordinate with numerous scientific groups, in addition to the organizations running the radars, and to satisfy their needs. The process normally starts with letters in the late Spring, followed by consultations at the Spring AGU meeting in May and CEDAR Workshop in June, followed by another round of letters and then consultations at an international meeting in June or July.

In addition to the continued good support of the World Days by the groups running Sondrestrom, EISCAT, Millstone Hill, Arecibo and Jicamarca, there is good news from Prof. Fukao

that the MU radar is operating on most World Days and from Prof. Taran of the Kharkov Polytechnical Institute that his radar is operating on some of the World Days.

In relation to coordination of scheduling, we had meetings at the CEDAR Workshops in 1988 and 1989. We also had a meeting at the Helsinki COSPAR Meeting immediately after the IST Symposium. A final meeting is to be held at Prague at the 1990 General Assembly.

Another scheduling matter considered during the last three years is a quick response by the incoherent-scatter radars to a magnetic storm. At Helsinki and in communications thereafter, it was established that considerable scientific interest exists for such a response and that the organizations operating the first five radars named above are willing, under appropriate conditions, to do so. On the agenda for the Prague meeting is to work out the mechanisms for alerting the radar organizations about the possibility of a quick turn on, and for making the decision to turn on and to operate in a particular mode.

One of the problems facing the community is quick and convenient communications. This is true for the coordinated World Days, for quick-response operation, and for informing a wide range of scientists about when the individual radars are planning to operate. An approach is to set up an internationally accessible electronic bulletin board. A possibility being pursued is to take advantage of the bulletin-board system being established for STEP by its Informatics Division. Its problems are similar, its scope is international, and its prototype is about to be tested.

This Working Group is supposed to look into the possibility of establishing a southern-hemisphere incoherent-scatter radar. Because of the considerable activity during the past three years in our community to establish new radars on the equator and in the Northern Hemisphere, there has been no activity in this direction. However, it should be noted that new northern-hemisphere radars could give rise to an interesting conjugate location for a future radar.

URSI SYMPOSIUM ON ENVIRONMENTAL AND SPACE ELECTROMAGNETICS

SUMMARY REPORT

The URSI International Symposium on Environmental and Space Electromagnetics was held in Tokyo on 4-6 September 1989 with good success. It was sponsored by the International Union of Radio Science (URSI) as an activity preceding the URSI General Assembly in Prague, Czechoslovakia in 1990. The topics covered were broadened and its scale was larger than the URSI Commission E Workshop "Nonlinear and Environmental Electromagnetics" held in Tokyo in 1984 (Proceedings published by Elsevier, 1985). Although the subject was centered on URSI activities on natural and man-made radio noise, the present Symposium incorporated related interdisciplinary and multidisciplinary topics such as atmospheric, terrestrial, extraterrestrial, and cosmic noise and plasmas in geo-astro-physics. Thus, the aim was to bring together a broad area of radio, atmospheric, and space scientists and engineers with different backgrounds to exchange information and views on timely new subjects with growing interest freely in a rather informal and enjoyable atmosphere, thus highlighting the state-of-the-art in radio science and interdisciplinary working areas.

The Symposium consisted of 17 sessions on the topics of new unconventional problems besides more conventional or traditional ones. Many of them have never been discussed in an open forum, and offer quite new or novel topics such as spacecraft EM environment; terrestrial and extraterrestrial noise environment; planetary lightning and emissions including the results from Voyager-Neptune flyby; lightning and nuclear electromagnetic pulse; triggered and ball lightning; extraterrestrial noise and plasmas; seismoelectric emissions; meteoroelectric phenomena and EHD (electrohydrodynamics) including atmospheric plasma vortex phenomena which have drawn a worldwide public interest quite recently. Several other sessions were concerned with more conventional and traditional subjects such as man-made radio noise environment and EMC; space communication, measurement and frequency management; noise and communication statistics; geomagnetic induction and radio-plasma noise; lightning; atmospheric whistlers and emissions; VLF/ELF EM environment. Seventy papers were presented, 38 from abroad and 32 from Japan, and participants were more than one

hundred from fifteen countries.

The Proceedings are going to be published by Springer Verlag.

H. KIKUCHI
Chairman and Organizer
URSI Tokyo Symposium.

30/7/1990

URSI SECOND INTERNATIONAL SYMPOSIUM
ON SIGNALS, SYSTEMS AND ELECTRONICS (ISSSE'92)
Paris, September 1-4 1992

FIRST ANNOUNCEMENT

The International Symposium on Signals, Systems and Electronics is the second of a series of triennial international symposia promoted and organized by URSI Commission C "Signals and Systems" and Commission D "Electronic and Optical Devices and Applications". Its aim 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 multi-disciplinary fields. Sessions will include regular, invited and tutorial papers. English is the official language of the Symposium. The Symposium is open to all aspects of Signals, Systems and Electronics, particularly:

SIGNAL AND INFORMATION THEORY

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

SYSTEM THEORY

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

COMMUNICATIONS SYSTEMS

- Low Bit Rate Speech Coding
- Mobile Radio Systems
- Digital Image Processing
- Communications Circuits
- Spread Spectrum Communications

ELECTRONIC DEVICES AND APPLICATIONS

- Silicon Transistors and Circuits
- III-V Transistors and Circuits
- Sensors, Transducers, and SAW-Devices
- Superconducting Devices and Circuits
- Microwave Circuits
- Switched Capacitor Filters
- A/D and D/A-Converters
- Integrated Digital Signal Processors

OPTICAL DEVICES AND APPLICATIONS

- Lasers and Photo Detectors
- Fibers and Fiber Components
- Integrated Optics
- Optical Communications Systems

CAD FOR DEVICES AND CIRCUITS

- Devices Modelling
- CAD for Integrated Circuits

Prospective authors are encouraged to submit papers to the conference secretariat after the "First Call for Papers" planned for March 1991. Accepted papers will be published in the conference proceedings.

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the December issue of the Bulletin
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DEUXIÈME SYMPOSIUM INTERNATIONAL DE L'URSI
SUR LES SIGNAUX, LES SYSTÈMES ET L'ELECTRONIQUE
(ISSSE'92)

Paris, 1-4 septembre 1992

PREMIERE ANNONCE

Les Commissions (C) "Signaux et systèmes" et (D) "Dispositifs électroniques et optiques et applications" de l'URSI ont décidé d'organiser une série de conférences internationales triennales. Le deuxième Symposium International sur les Signaux, les Systèmes et l'Electronique a pour but de couvrir toutes les activités des deux Commissions et de favoriser l'échange des résultats de recherche entre les ingénieurs et les chercheurs travaillant dans ces domaines pluridisciplinaires. Les sessions comprendront des communications invitées ou acceptées par le comité scientifique ainsi que des exposés pédagogiques. La langue de travail sera l'anglais. Le Symposium abordera tous les thèmes intéressant les Signaux, les Systèmes et l'Electronique:

THEORIE DE L'INFORMATION
THEORIE DU SIGNAL

- théorie de l'information et du codage
- analyse du signal
- détection et estimation
- modulation et codage

THEORIE DES SYSTEMES

- systèmes adaptatifs
- systèmes non linéaires
- systèmes multidimensionnels
- réseaux neuronaux

SYSTEMES DE COMMUNICATION

- codage de parole à débit réduit
- traitement numérique des images
- circuits de communication
- communications avec les mobiles
- communications à spectre étalé

DISPOSITIFS ELECTRONIQUES ET APPLICATIONS

- transistors et circuits silicium
- transistors et circuits III-V
- capteurs, transducteurs et dispositifs à OES (SAW)
- circuits et dispositifs supraconducteurs
- circuits hyperfréquences
- filtres à capacités commutées
- convertisseurs A/N et N/A
- Processeurs intégrés de signal numérique

DISPOSITIFS OPTIQUES ET APPLICATIONS

- lasers et photodétecteurs
- fibres et composants associés
- optique intégrée
- systèmes de communication optiques

CAO DES CIRCUITS ET DES DISPOSITIFS

- modélisation de dispositifs
- CAO des circuits intégrés

Le "premier appel à communications" sera diffusé en mars 1991. Les résumés des communications proposées devront être adressés au secrétariat de la Conférence. Les textes complets des communications acceptées seront publiés dans les actes de la conférence.

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Fax: (33) 1 40 95 70 15.

ANNOUNCEMENTS OF MEETINGS AND SYMPOSIA

1991 REUNION RADIO SCIENTIFIQUE NORD AMERICAINE ET SYMPOSIUM INTERNATIONAL DE LA SOCIETE ANTENNES ET PROPAGATION DE L'IEEE

Premier Appel de Communications

La Réunion radio scientifique nord-américaine 1991, commanditée par les Comités Membres de l'URSI aux Etats-Unis et au Canada, et le Symposium international IEEE AP-S, commandité par la Société Antennes et Propagation de l'IEEE, se dérouleront conjointement à la Faculté des sciences sociales de la University of Western Ontario à London, en Ontario, du 24 au 28 juin 1991. Les séances techniques de la Réunion radio-scientifique nord-américaine et du Symposium international de la Société AP-S seront coordonnées de manière à présenter un programme complet bien équilibré. La liste des sujets suggérés est reproduite ci-dessous:

Sujets suggérés pour l'AP-S

1. Antennes adaptives et de traitement des signaux
2. Métrologie et mesures d'antennes
3. Théorie des antennes
4. Applications biomédicales
5. Antennes multifréquences et large bande
6. Conception d'antennes assistée par ordinateur
7. Théorie électromagnétique
8. Eléments d'alimentation et rayonnants
9. Surfaces sélectives en fréquence
10. Radars imageurs
11. Méthodes inverses
12. Antennes microruban
13. Composants micro-ondes
14. Applications des matériaux micro-ondes aux antennes
15. Ondes millimétriques et sub-millimétriques
16. Antennes à ondes millimétriques
17. Techniques à réseaux actifs monolithiques
18. Antennes multifaisceaux
19. Théorie et mesure dans le champ proche
20. Méthodes numériques
21. Antennes réseaux à commande de phase

- 22. Polarimétrie
- 23. Propagation
- 24. Antennes réflectrices
- 25. Télédétection
- 26. Diffusion et diffraction
- 27. Méthodes dans le domaine temps
- 28. Autres.

Sujets suggérés pour l'URSI

Commission A (Métrologie électromagnétique)

- A1 Mesures et normes dans la plage des micro-ondes aux ondes submillimétriques
- A2 Métrologie quantique et constantes fondamentales
- A3 Temps et fréquence
- A4 Supraconducteurs à T_c élevé en hautes fréquences
- A5 Métrologie dans le domaine temps
- A6 Problèmes métrologiques liés à la pollution CEM et EM
- A7 Bruit
- A8 Matériaux
- A9 Radar à impulsions
- A10 Effets biologiques et applications médicales

Commission B (Champs et ondes)

- B1 Radar, section efficace et reconnaissance des cibles
- B2 Diffusion par objets complexes et milieux aléatoires
- B3 Théorie électromagnétique et calculs en électromagnétisme
- B4 Diffusion inverse
- B5 Champs transitoires
- B6 Techniques analytiques et asymptotiques

Commission C (Signaux et systèmes)

- C1 Codage et modulation
- C2 Systèmes à étalement du spectre
- C3 Codes de correction d'erreurs
- C4 Traitement des signaux en télécommunications

Commission D (Dispositifs optiques et électroniques et applications)

- D1 Techniques, détecteurs et matériaux opto-électroniques
- D2 Supraconductivité
- D3 Fibres optiques
- D4 Mesures laser
- D5 Dispositifs et circuits hautes fréquences et haute vitesse

D6 Matériaux de pointe et traitement

Commission E (Bruit et brouillage électromagnétiques)

- E1 Bruit spectral et impulsif naturel
- E2 Environnement électromagnétique artificiel

Commission F (Propagation des ondes et télé-détection)

- F1 Radar côtier et cartographie de la mer et des glaces
- F2 Radar imageur spatial (ERS-1, Radarsat)
- F3 Signatures de diffusion micro-ondes en télé-détection
- F4 Propagation micro-ondes dans l'air pur
- F5 Effets de la pluie
- F6 Modélisation des canaux radio mobiles et intérieurs
- F7 Radar MST
- F8 Radiométéorologie et radio-océanographie

Commission G (Ondes radio ionosphériques et propagation)

- G1 Etudes radar de l'ionosphère aurorale
- G2 Modélisation ionosphérique et propagation
- G3 Couplage dans les régions atmosphériques supérieures

Commission H (Ondes dans les plasmas)

- H1 Non-linéarités dans l'ionosphère et la magnétosphère
- H2 Ondes dans les plasmas en laboratoire et dans l'ionosphère
- H3 Faisceau électronique et injection de masse dans l'ionosphère
- H4 Conformation de faisceau électromagnétique dans l'ionosphère

Commission J (Radioastronomie)

- J1 Récepteurs sub-millimétriques
- J2 Réseaux dans le plan focal
- J3 Interférométrie spatiale à longue ligne de base
- J4 Méthodes à ouverture synthétique
- J5 Traitement des signaux et VLSI
- J6 Limites des calculs en astronomie
- J7 Mesures précises et brouillage
- J8 Propriétés de temporisation des pulsars et problèmes
- J9 Résultats des satellites Magellan et COBE.

La date limite pour la réception des résumés et sommaires est le 4 janvier 1991.

Toute demande de renseignements généraux sur la conférence

est à adresser à: Mad. D. RUEST (Programme URSI ou AP-S)
Services des conférences
Conseil national de recherches
Ottawa, Ontario
Canada K1A 0R6
Téléphone: (1) 613-998 2230
Télécopieur: (1) 613-957 9828.

Adresser toute demande portant sur le programme technique au Dr. S.J. Kubina (AP-S), (1) 514-848 3093 ou au Dr. H.G. James (URSI), (1) 613-998 2230.

Des prix seront attribués pour les trois meilleurs communications rédigées par des étudiants de deuxième ou de troisième cycle à l'occasion de la Réunion radio-scientifique nord-américaine. Ces prix seront fournis par les Comités Membres de l'URSI aux Etats-Unis et au Canada. Toute question concernant le Concours pour la meilleure communication rédigée par un étudiant doit être adressée au

Prof. David C. Chang
Department of Electrical and Computer Eng.
University of Colorado
Boulder, CO 80309-0425
USA.

Note: If available, the English text of the Announcement and Call for Papers will be published in the December 1990 issue of the "URSI Information Bulletin".

20TH GENERAL ASSEMBLY OF THE INTERNATIONAL
UNION OF GEODESY AND GEOPHYSICS (IUGG)

The 20th General Assembly of IUGG will be held in Vienna, Austria, from 11 to 24 August 1991. On this occasion a series of Symposia will be organized, several of which may be of interest to scientists associated with URSI.

Active participation of URSI has been invited for the following symposia:

Non-linear dynamics and predictability of critical geophysical phenomena (duration: 4 half days)

The goal of this Symposium is to establish the understanding and, hopefully, cooperation between geophysicists and specialists in non-linear dynamics working in different areas of science and mathematics. Non-linear dynamics is applied for the last 30 years to the study of atmosphere and ocean as well as to magnetic dynamo of the Earth's core and convection in the Earth's mantle. Recently it found promising applications also to the lithosphere of the Earth which presented additional challenge connected with complicated hierarchical structure, absence of fundamental constitutive equations and impossibility of direct measurements of parameters.

The scope of the Symposium is by no means limited to the study of the Earth. The experience in predictability of critical phenomena in any other field would be very much welcome.

The ground rules established by IUGG require to provide to the speakers 20 to 40 minutes plus 10 to 15 minutes for questions and discussions.

There will be also ample space for poster presentations which will be considered as full-fledged contributions. At least 2 hours are allocated for general discussion at the end of the Symposium.

Scientists wishing to present a paper should send an abstract, before 1 December 1990 to the Convener of the Symposium:

Dr. Andrei Gabrielov
International Centre for Earth and
Environmental Sciences (ICE)
POB 586, Galileo Guesthouse, Via Beirut 7
I-34100 Trieste, Italy.
Phone: (3940) 2240337
Fax : (3940) 224604
Telex: 460392 ICTP I.

Water and ice as geophysical agents

(duration: 4 half days)

This Symposium is planned to cover various aspects of the geophysical action of water and ice on the Earth and on other solar system bodies.

Prof. J. Klinger, Convener of the Symposium, would greatly appreciate all suggestions that could facilitate the organisation of the meeting. Prof. Klinger's address is as follows:

Prof. J. Klinger
CNRS, Laboratoire de Glaciologie et
Géophysique de l'Environnement
54 rue Molière
Domaine Universitaire
BP 56
F-38402 St-Martin-d'Hères Cedex
France.

Phone: (33) 76 42 58 72
Fax : (33) 76 51 32 48
Telex: 980 131 LGGE.

INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY

The 1992 International Symposium on Electromagnetic Compatibility will be held in Beijing, China, from 25-27 May. It will provide excellent opportunities for EMC researchers and engineers to present the latest research results and exchange their views and experience. Prospective authors are invited to submit papers, especially original, unpublished ones, on the current state of EMC technology. Suggested topics include:

EMI sources; Lightning surge, EMP and ESD; EMI coupling and crosstalk; EM wave propagation and fading in EMC aspects; EM environment; EMC measurements; EM sensor, probe and antenna; Shielding and grounding/technique and material; EM energy absorber, anechoic material; Filter, transformer and isolater; Immunity and susceptibility/System, device and component; EMI prediction, analysis and reduction technique; Spectrum manage-

ment and monitoring; Biological effects of radiation; Seismo-electromagnetic phenomena; EMC education; EMC in computer and PCBS; EMC in power engineering; EMC in communication system; EMC in automation system; EMC in microelectronics; Standards, regulations in EMC; Others.

The deadline for the submission of abstracts is 15 May 1991.

Further information available from:

EMC'92/BEIJING
c/o Prof. Zhang, Linchang
EMC Research Section
Northern Jiaotong University
Beijing 100044, China.

CONFERENCE ON PRECISION ELECTROMAGNETIC MEASUREMENTS

(CPEM'92)

CPEM'92 will be held in Paris, France, from 9 to 12 June 1992. It is being organized by the Société des Electriciens et des Electroniciens and the Bureau National de Métrologie, and sponsored by the IEEE Instrum. & Meas. Society, the International Union of Radio Science, the US National Institute of Standards and Technology, the Bureau National de Métrologie, the AFCIQ, Section Métrologie, the Comité National Français de Radioélectricité Scientifique and the Centre National d'Etudes des Télécommunications.

The Chairman of the Conference Committee is M. J. Blouet, and the Secretary is:

Ms G. BONAMI
SEE
48, rue de la Procession
F-75724 Paris Cedex 15, France.

Phone: (33) 1 45 67 07 70
Fax : (33) 1 40 65 92 29.

1992 IEEE-APS/URSI/NEM SYMPOSIA
Preliminary Information

The IEEE-APS International Symposium, the URSI Radio Science Meeting and the Nuclear EMP Meeting will be held at the Hyatt Regency Chicago Hotel from 18 to 25 July 1992. The URSI Member Committee in the USA will participate with Commissions A, B, D and E.

The First Announcement and Call for papers will be issued in May 1991. Additional information available from:

Prof. P.L.E. Uslenghi
1992 IEEE-APS/URSI/NEM Symposium Chair
Dept. of EECS (m/c 154)
The University of Illinois at Chicago
Box 4348, Chicago, IL 60680, USA.

Phones: (1) 312-996 5487 (direct)
(1) 312-996 3422/3 (dept.)
Fax : (1) 312-413 0024.

XXVIII COSPAR PLENARY MEETING

RECOMMENDATIONS

The Recommendations reproduced below were adopted at the Joint Final Session of the Executive Council and Plenary on 6 July 1990.

Decision No 1/90, proposed by ISC B

COSPAR,

recognizing that secular changes in the magnetic field of Jupiter may hold the key to important aspects of

- (a) the dynamics and structure of the deep interior of the planet, and
- (b) certain aspects of the plasmasphere and the magnetosphere of the planet, and that

important data has been obtained from spacecraft observations, but ground-based radio observations, if conducted over a sufficiently long period of time, may also be important to produce accurate results,

stresses the importance of long term systematic observations of Jupiter at decametric and decimetric wavelengths, and

recommends that such observations should be carried out on a long term basis.

Decision No 2/90, proposed by ISC C and modified by the COSPAR Bureau

COSPAR,

recognizing the importance of both in situ space studies and appropriate support for them by adequate programmes of ground based monitoring at sites well distributed over the globe,

noting that ongoing changes in countries of Middle and Eastern Europe and other parts of the world may require reorganization of their research activities,

expresses the hope that existing valuable activities in in situ space studies and supporting ground based programmes will be promoted, and

recommends that special care be taken to continue and maintain such activities at an adequate scientific and technical level.

Decision No 3/90, proposed by ISC F

COSPAR,

noting

(1) the increasing interest of many nations and space agencies in explorative missions beyond the Earth's magnetosphere, such as to the Moon and Mars, and

(2) the plans to explore Mars by manned missions, and

recognizing that for this space scenario sufficient guidelines for radiation protection do not exist,

recommends that ICSU consider the possibility of initiating a comprehensive, collaborative, scientific study of radiation risks that would involve representatives of all disciplines.

INTERNATIONAL GEOPHYSICAL CALENDAR 1991

The International Ursigram and World Days Service (IUWDS) is a permanent scientific service of the International Union of Radio Science (URSI), with the participation of the International Astronomical Union (IAU) and the International Union of Geodesy and Geophysics (IUGG). IUWDS adheres to the Federation of Astronomical and Geophysical Data Analysis Services (FAGS) of the International Council of Scientific Unions (ICSU). The IUWDS coordinates the international aspects of the world days programme and rapid data interchange.

EXPLANATIONS

The Calendar reproduced on pp.70-71 continues the series begun for the IGY years 1957-58, and is issued annually to recommend dates for solar and geophysical observations which cannot be carried out continuously. Thus, the amount of observational data in existence tends to be larger on Calendar days. The recommendations on data reduction and especially the flow of data to World Data Centres (WDCs) in many instances emphasize Calendar days. The Calendar is prepared by the IUWDS with the advice of spokesmen for the various scientific disciplines. For some programmes, greater detail concerning recommendations appears from time to time published in *IAGA News*, *IUGG Chronicle*, *URSI Information Bulletin* or other scientific journals or newsletters.

The definitions of the designated days remain as described on previous Calendars. Universal Time (UT) is the standard time for all world days. Regular Geophysical Days (RGD) are each Wednesday. Regular World Days (RWD) are three consecutive days each month (always Tuesday, Wednesday, Thursday near the middle of the month). Priority Regular World Days (PRWD) are the RWD which fall on Wednesdays. Quarterly World Days (QWD) are one day each quarter and are the PRWD which fall in the World Geophysical Intervals (WGI). The WGI are fourteen consecutive days in each season, beginning on Monday of the selected month, and normally shift from year to year. In 1991 the WGI will be February, May, August and November.

The Solar Eclipses are:

a) 15-16 January 1991 (annular) begins at S30 E109, crosses southwestern Australia, Tasmania and New Zealand and ends in the Pacific Ocean on the equator (S00 W114); duration 9 minutes.

b) 11 July 1991 (total) begins at N13 W175, crosses Hawaii, Pacific Ocean, Mexico, Central and South America; maximum path width 161 miles; maximum duration 6 minutes 54 seconds; ends at S13 W46.

Meteor Showers (selected by P.M. Millman, Ottawa) include important visual showers and also unusual showers observable mainly by radio and radar techniques. The dates for Northern Hemisphere meteor showers are: Jan 3, 4; Apr 22-23; May 4-5; Jun 8-12; Jul 28-29; Aug 10-14; Oct 21-22; Nov 2-3, 17-18; Dec 12-16, 22-23, 1991; and Jan 3-4, 1992. The dates for Southern Hemisphere meteor showers are: May 4-5; Jun 8-12; Jul 27-30; Oct 21-22; Nov 2-3, 17-18; and Dec 5-7, 12-16, 1991.

The occurrence of unusual solar or geophysical conditions is announced or forecast by the IUWDS through various types of geophysical "ALERTS" (which are widely distributed by telegram and radio broadcast on a current schedule). Stratospheric warmings (STRATWARM) are also designated. The meteorological telecommunications network coordinated by WMO carries these worldwide Alerts once daily soon after 0400 UT. For definitions of Alerts see IUWDS *Synoptic Codes for Solar and Geophysical Data*, Third Revised Edition 1973, and its amendments. Retrospective World Intervals are selected and announced by MONSEE and elsewhere to provide additional analyzed data for particular events studied in the ICSU Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) programmes.

RECOMMENDED SCIENTIFIC PROGRAMMES

OPERATIONAL EDITION

The following material was reviewed in 1990 by spokesmen of IAGA, WMO and URSI as suitable for coordinated geophysical programmes in 1991.

Airglow and Aurora Phenomena. Airglow and auroral observatories operate with their full capacity around the New Moon periods. However, for progress in understanding the mechanism of many phenomena, such as low latitude aurora, the coordinated use of all available techniques, optical and radio, from the ground and in space is required. Thus, for the airglow and

aurora 7-day periods on the Calendar, ionosonde, incoherent scatter, special satellite or balloon observations, etc.... are especially encouraged. Periods of approximately one week's duration centered on the New Moon are proposed for high resolution of ionospheric, auroral and magnetospheric observations at high latitudes during northern winter.

Atmospheric Electricity. Non-continuous measurements and data reduction for continuous measurements of atmospheric electric current density, field, conductivities, space charges, ion number densities, ionosphere potentials, condensation nuclei, etc.; both at ground as well as with radiosondes, aircraft, rockets; should be done with first priority on the RGD each Wednesday, beginning on 2 January 1991 at 0000 UT, 9 January at 0600 UT, 16 January at 1200 UT, 23 January at 1800 UT, etc.(beginning hour shifts six hours each week, but is always on Wednesday). Minimum programme is at the same time on PRWD beginning with 16 January at 1200 UT. Data reduction for continuous measurements should be extended, if possible, to cover at least the full RGD including, in addition, at least 6 hours prior to indicated beginning time. Measurements prohibited by bad weather should be done 24 hours later. Results on sferics and ELF are wanted with first priority for the same hours, short-period measurements centered around the minutes 35-50 of the hours indicated. Priority Weeks are the weeks which contain a PRWD; minimum priority weeks are the ones with a QWD. The World Data Centre for Atmospheric Electricity, 7 Karbysheva, Leningrad 194018, USSR, is the collection point for data and information on measurements.

Geomagnetic Phenomena. It has always been a leading principle for geomagnetic observatories that operations should be as continuous as possible and the great majority of stations undertake the same programme without regard to the Calendar.

Stations equipped for making magnetic observations, but which cannot carry out such observations and reductions on a continuous schedule are encouraged to carry out such work at least on RWD (and during times of MAGSTORM Alert).

Ionospheric Phenomena. Special attention is continuing on particular events which cannot be forecast in advance with reasonable certainty. These will be identified by Retrospective World Intervals. The importance of obtaining full observational coverage is therefore stressed even if it is possible to analyze the detailed data only for the chosen events. In the case of vertical incidence sounding, the need to obtain quarter-

hourly ionograms at as many stations as possible is particularly stressed and takes priority over recommendation (a) below when both are not practical.

For the vertical incidence (VI) sounding programme, the summary recommendations are: (a) all stations should make sound soundings on the hour and every quarter hour; (b) on RWDs, ionogram soundings should be made at least every quarter hour and preferably every five minutes or more frequently, particularly at high latitudes; (c) all stations are encouraged to make f-plots on RWDs; f-plots should be made for high latitude stations, and for so-called "representative" stations at lower latitudes for all days (i.e., including RWDs and WGIs) (Continuous records of ionospheric parameters are acceptable in place of f-plots at temperate and low latitude stations); (d) copies of hourly ionograms with appropriate scales for QWDs are to be sent to WDCs; (e) stations in the eclipse zone and its conjugate area should take continuous observations on solar eclipse days and special observations on adjacent days. See also recommendations under Airglow and Aurora Phenomena.

For the incoherent scatter observation programme, every effort should be made to obtain measurements at least on the Incoherent Scatter Coordinated Observation Days, and intensive series should be attempted whenever possible on WGIs or the Airglow and Aurora Periods. The need for collateral VI observations with not more than quarter-hourly spacing at least during all observation periods is stressed. Special programmes: Dr. V. Wickwar, Utah State University, Centre for Atmospheric and Space Sciences, Logan, UT 84322-4405 USA, URSI Working Group GH.1. Phone: (801) 750 3641.

For the ionospheric drift or wind measurement by the various radio techniques, observations are recommended to be concentrated on the weeks including RWDs.

For travelling ionosphere disturbances, propose special periods for coordinated measurements of gravity waves induced by magnetospheric activity, probably on selected PRWD and RWD.

For the ionospheric absorption programme half-hourly observations are made at least on all RWDs and half-hourly tabulations sent to WDCs. Observations should be continuous on solar eclipse days for stations in eclipse zone and in its conjugate area. Special efforts should be made to obtain daily absorption measurements at temperate latitude stations during the period of Absorption Winter Anomaly, particularly on days

of abnormally high or abnormally low absorption (approximately October-March, Northern Hemisphere; April-September, Southern Hemisphere).

For back-scatter and forward-scatter programmes, observations should be made and analyzed on all RWDs at least.

For synoptic observations of mesospheric (D region) electron densities, several groups have agreed on using the RGD for the hours around noon.

For ELF noise measurements involving the earth-ionosphere cavity resonances any special effort should be concentrated during the WGIs.

It is recommended that more intensive observations in all programmes be considered on days of unusual meteor activity.

Meteorology. Particular efforts should be made to carry out an intensified programme on the RGD -- each Wednesday, UT. A desirable goal would be the scheduling of meteorological rocketsondes, ozone sondes and radiometer sondes on these days, together with maximum-altitude rawinsonde ascents at both 0000 and 1200 UT.

During WGI and STRATWARM Alert Intervals, intensified programmes are also desirable, preferably by the implementation of RGD-type programmes (see above) on Mondays and Fridays, as well as on Wednesdays.

Solar Phenomena. Observatories making specialized studies of solar phenomena, particularly using new or complex techniques, such that continuous observation or reporting is impractical, are requested to make special efforts to provide to WDCs data for solar eclipse days, RWDs and during PROTON/FLARE Alerts. The attention of those recording solar noise spectra, solar magnetic fields and doing specialized optical studies is particularly drawn to this recommendation.

FLARES22 (FLARE RESEARCH at maximum of solar cycle 22). 1990-1995 worldwide Solar-Terrestrial Energy Programme (STEP) project. Aimed at understanding basic physical processes of transient solar activity and its coupling with the solar-terrestrial environment, including times of the various solar ALERTS. Coordinates satellite and ground-based observations. Observational campaigns are driven by specific scientific objectives rather than observations per se. Satellites include SOLAR-A, GRO, CORONAS, WIND, GEOTAIL, ULYSSES, etc. Programme will focus on international collaboration of data analyses and

theoretical work via electronic mail and workshops. For more information, contact Dr. M. Machado, Department of Physics, The University of Alabama in Huntsville, Huntsville, AL 35899, USA. Phone: (205) 895 6676; FAX number is (205) 895 6790; SPAN e-mail address is SSL::MACHADO or SOLAR::MMACHADO.

SOLTIP (Solar connection with Transient Interplanetary Processes). Proposed programme within the SCOSTEP STEP (Solar-Terrestrial Energy Programme) project: 1990-1995. It will focus on remote and in situ observations and analyses of solar-generated phenomena and their propagation throughout the heliosphere, including times following the various solar ALERTS. Desired goals include: (1) interplanetary scintillation observation of remote radio galaxies as well as telemetry signals to/from interplanetary spacecraft; (2) coordination of Earth-orbiting spacecraft such as IMP-8 in the solar wind and solar-orbiting spacecraft such as ICE, GIOTTO, SAKIGAKE, VOYAGER 1/2, PIONEER 10/11, ULYSSES, RELICT, WIND, and SOHO. Contact is Dr. M. Dryer, NOAA R/E/SE, 325 Broadway, Boulder, CO 80303, USA. Phone: (303) 497 3978; FAX number is (303) 497 3645; SPAN e-mail address is SELVAX::MDRYER.

Space Research, Interplanetary Phenomena, Cosmic Rays, Aeronomy. Experimenters should take into account that observational effort in other disciplines tends to be intensified on the dates marked on the Calendar, and schedule balloon and rocket experiments accordingly if there are no other geophysical reasons for choice. In particular it is desirable to make rocket measurements of ionospheric characteristics on the same day at as many locations as possible; where feasible, experimenters should endeavour to launch rockets to monitor at least normal conditions on the Quarterly World Days (QWD) or on RWDs, since these are also days when there will be maximum support from ground observations. Also, special efforts should be made to assure recording of telemetry on QWD and Airglow and Aurora Periods of experiments on satellites and of experiments on spacecraft in orbit around the Sun.

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This Calendar for 1991 has been drawn up by H.E. Coffey, of the IUWDS Steering Committee, in association with spokesmen for the various disciplines in SCOSTEP, IAGA and URSI and other ICSU organizations. Similar Calendars are issued annually beginning with the IGY, 1957-58, and are published in various widely available scientific publications.

Additional copies are available upon request to IUWDS Chairman, Dr. R. Thompson, IPS Radio and Space Services, Department of Administrative Services, P.O.Box 1548, Chatswood, NSW 2057, Australia (FAX number (61) (2)414 8331; e-mail address is richard@ipso.ips.oz.au), or IUWDS Secretary for World Days, Miss H.E. Coffey, WDC-A for Solar-Terrestrial Physics, NOAA E/GC2, 325 Broadway, Boulder, CO 80303, USA (FAX number (303) 497 6513; e-mail address is hcoffey%9555.ames.arc.nasa.gov).

International Geophysical Calendar 1991

(See other side for Information on use of this Calendar)

	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
			1	2	3	4	5		1	2	3	4	5	6	
	6	7	8	9	10	11 ⁺	12 ⁺	7	8	9	10 ⁺⁺	11 ⁺⁺	12	13	JULY
JANUARY	13	14	15 [*]	16 [*]	17	18	19	14	15	16	17	18	19	20	
	20	21	22	23	24	25	26	21	22	23	24	25	26	27	
	27	28	29	30	31	1	2	28	29	30	31	1	2	3	
	3	4	5	6	7	8	9	4	5	6	7	8	9	10	AUGUST
FEBRUARY	10	11	12 [*]	13 [*]	14	15	16	11	12	13 [*]	14 [*]	15	16	17	
	17	18	19	20	21	22	23	18	19	20	21	22	23	24	
	24	25	26	27	28	1	2	25	26	27	28	29	30	31	
	3	4	5	6	7	8	9	1	2	3	4	5	6	7	
MARCH	10	11	12 [*]	13 [*]	14 ⁺	15 ⁺	16 ⁺	8	9	10 ⁺	11 ⁺	12	13	14	SEPTEMBER
	17 ⁺	18 ⁺	19 ⁺	20 ⁺	21	22	23	15	16	17	18	19	20	21	
	24	25	26	27	28	29	30	22	23	24	25	26	27	28	
	31	1	2	3	4	5	6	29	30	1	2	3	4	5	
	7	8	9 ⁺	10 ⁺	11	12	13	6	7 ⁺	8 ⁺	9 ⁺⁺	10	11	12	OCTOBER
APRIL	14	15	16 [*]	17 [*]	18	19	20	13	14	15	16	17	18	19	
	21	22	23	24	25	26	27	20	21	22	23	24	25	26	
	28	29	30	1	2	3	4	27	28	29	30	31	1	2	
	5	6	7	8	9	10	11	3	4	5	6	7	8	9	NOVEMBER
MAY	12	13	14 [*]	15 [*]	16	17	18	10	11	12 [*]	13 [*]	14	15	16	
	19	20	21	22	23	24	25	17	18	19	20	21	22	23	
	26	27	28	29	30	31	1	24	25	26	27	28	29	30	

15 Regular World Day (RWD)

16 Priority Regular World Day (PRWD)

13 Quarterly World Day (QWD)
also a PRWD and RWD

2 Regular Geophysical Day (RGD)

11 12 World Geophysical Interval (WGI)

11+ Incoherent Scatter Coordinated
Observation Day

12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27+	28+	29+	30	31	
S	M	T	W	T	F	S

11 Day of Solar Eclipse

10 11 Airglow and Aurora Period

15* Dark Moon Geophysical Day (DMGD)

NOTES on other dates and programs of interest:

- Days with unusual meteor shower activity are: Northern Hemisphere Jan 3-4; Apr 22-23; May 4-5; Jun 8-12; Jul 28-29; Aug 10-14; Oct 21-22; Nov 2-3, 17-18; Dec 12-16, 22-23, 1991; Jan 3-4, 1992. Southern Hemisphere May 4-5; Jun 8-12; Jul 26-30; Oct 21-22; Nov 2-3, 17-18; Dec 5-7, 12-16, 1991.
- SOLTIP (Solar connection with Transient Interplanetary Processes). Observing Program 1990-1995: solar-generated phenomena and their propagation throughout the heliosphere. (See Explanations.)
- FLARES22 (FLAre RESearch at solar cycle 22 max). Observing Program 1990-1995: basic physical processes of transient solar activity and its coupling with solar-terrestrial environment. (See Explanations.)
- Day intervals that IMP 8 satellite is in the solar wind (begin and end days are generally partial days): 29 Dec 1990-5 Jan 1991; 10-18 Jan; 23-31 Jan; 5-13 Feb; 17-25 Feb; 2-10 Mar; 14-22 Mar; 27 Mar-3 Apr; 9-16 Apr; 21-28 Apr; 4-11 May; 17-24 May; 30 May-5 Jun; 11-17 Jun; 24-30 Jun; 6-12 Jul; 19-25 Jul; 31 Jul-7 Aug; 13-20 Aug; 25 Aug-1 Sep; 7-14 Sep; 20-27 Sep; 3-9 Oct; 15-22 Oct; 27 Oct-3 Nov; 9-16 Nov; 21-29 Nov; 4-11 Dec; 16-24 Dec; 29 Dec 1991-6 Jan 1992. Note that there will not necessarily be total IMP 8 data monitoring coverage during these intervals. (Information kindly provided by the WDC-A for Rockets and Satellites, NASA GSFC, Greenbelt, MD 20771 U.S.A.).
- + Incoherent Scatter Coordinated Observations Days (see Explanations) starting at 1600 UT on the first day of the intervals indicated, and ending at 1600 UT on the last day of the intervals: 11-12 Jan; 14-20 Mar CADITS/MLTCS/SUNDIAL/WAGS; 9-10 Apr; 11-12 Jun; 10-11 Jul; 10-11 Sep; 7-9 Oct GISMOS; 4-10 Dec CADITS/MLTCS/SUNDIAL/WAGS; 27-29 Jan 1992.

where CADITS= Coupling and Dynamics of the Ionosphere-Thermosphere System;
 GISMOS= Global Ionospheric Simultaneous Measurements of Substorms;
 MLTCS= Mesosphere, Lower-Thermosphere Coupling Study;
 SUNDIAL= Coordinated study of the ionosphere/magnetosphere;
 WAGS= Worldwide Acoustics Gravity Wave Study.

OPERATIONAL EDITION, September 1990

SERVICE INTERNATIONAL DE LA ROTATION TERRESTRE

SAUT DE TEMPS DE UTC

le 1er janvier 1991

Une seconde intercalaire positive sera introduite à la fin de décembre 1990. La séquence des dates des repères de secondes de UTC sera:

1990 décembre 31,	23h 59m 59s
1990 décembre 31,	23h 59m 60s
1991 janvier 1,	0h 0m 0s

La différence entre UTC et le Temps Atomique International TAI est:

de 1990 janvier 1, 0h UTC, à 1991 janvier 1, 0h UTC:

UTC - TAI = -25s

de 1991 janvier 1, 0h UTC, jusqu'à nouvel avis:

UTC - TAI = 26s.

INTERNATIONAL EARTH ROTATION SERVICE

UTC TIME STEP

on the 1st of January 1991

A positive leap second will be introduced at the end of December 1990. The sequence of dates of the UTC second markers will be:

1990 December 31,	23h 59m 59s
1990 December 31,	23h 59m 60s
1991 January 1,	0h 0m 0s

The difference between UTC and the International Atomic Time TAI is:

from 1990 January 1, 0h UTC, to 1991 January 1, 0h UTC:

UTC - TAI = - 25s

from 1991 January 1, 0h UTC, until further notice:

UTC - TAI = -26s.

Martine Feissel, Director

BOOKS PUBLISHED BY URSI PERSONALITIES

E.J. CHAPUIS and A.E. JOEL Jr.

Electronics, Computers and Telephone Switching
A Book of Technological History

(North-Holland Studies in Telecommunication, 12)

1990, 428 pages. Price: US\$90.00/Dfl. 175.00

ISBN 0-444-88042-9

OBITUARY

HOWARD F. BATES

1927-1990

Dr. Howard F. Bates, a long-time URSI member, died in Alaska on 26 January 1990. "Skip" (as he was known to his friends) was born in Portland, Oregon on 27 March 1927; he received his B.S. and M.S. degrees in Physics from Oregon State University in 1950 and 1956 respectively. He was employed as a physicist at the Naval Electronics Labs in San Diego, California from 1951-1952 and summer of 1954, and was an Instructor in Electrical Engineering at the University of Washington from 1955-1957. He was first employed at the Geophysical Institute of the University of Alaska in Fairbanks during the summers of 1952 and 1953, becoming an Instructor of Geophysics in 1957 and receiving his Ph.D. in Geophysics in 1961. He served as an Associate Professor of Geophysics at the Geophysical Institute until 1966 when he "emigrated" from Alaska to California and worked at Stanford Research Institute of Menlo Park as a Senior Research Physicist until 1970 when he returned to the Geophysical Institute as a Professor of Geophysics. From 1970 until he "retired" in 1980 he carried on research in ionospheric physics using the Chatanika Incoherent Scatter Radar (ISR) and taught courses in the Electrical Engineering Department. He remained a Consultant to the Geophysical Institute until 1982 when he accepted a job at Eielson AFB as an Electrical Engineer working on power systems until January 1990.

He authored or co-authored some 47 professional papers on ionospheric physics, auroral phenomena, radio instrumentation, HF and VLF propagation, and sea ice physics. Skip was a pioneer in applying the HF backscatter and ISR techniques to studies of the high-latitude ionosphere. Among his significant contributions to high-latitude ionospheric physics were: the first reliable measurement of the height of F-region field-aligned irregularities (1959-1960); developing an HF backscatter sounder near the magnetic north pole to continuously monitor the position of the auroral oval (1965-1966); the relation between the aurora and HF non-great circle propagation; studies of atmospheric expansion through joule heating, and other studies of auroral ionosphere morphology using the Chatanika incoherent scatter radar (1971-1977).

Skip Bates will be remembered as a man who ignored his physical disabilities and concentrated on his abilities. In 1961 he married Florence Martin, who survives him. He was an accomplished outdoorsman and Alaskan "Bush Pilot" who constructed much of his own equipment. In 1986 he received artificial knees at the Mayo clinic, enabling him to walk without pain for the first time in 40 years. He had a droll sense of humor, a special way of telling stories and an unobtrusive sense of kindness. Besides his wife, he is survived by his mother, three brothers (all physicists) John Murray, Peter Murray, David Bates and a sister Susan Lamb. He is sorely missed by his family and friends.

Robert D. HUNSUCKER,
a friend and colleague
of 32 years.

