UNION RADIO-SCIENTIFIQUE INTERNATIONALE
INTERNATIONAL UNION OF RADIO SCIENCE

Comptes Rendus des Assemblées Générales de l'URSI

Proceedings of URSI General Assemblies

VOLUME XXIII

XXIV Assemblée Générale
XXIV General Assembly

Kyoto, 25.VIII - 2.IX 1993

Publié avec l'appui financier de l'UNESCO
Secrétariat général de l'URSI
Sint-Pietersnieuwstraat 41
B-9000 Gent, Belgium

CONTENTS - TABLE DES MATIERES

pages

Introduction 1
- Acknowledgement 1
- Outline of the Assembly 1
- List of URSI Officers and Officers of Member Committees 3
- Honorary Presidents 3
- Board of Officers 3
- URSI Secretariat 3
- URSI Standing Committees 3
- URSI Representatives on other Scientific Organizations 5
- Member Committees 5
- Associate Member Committees 7

Opening Meeting 8
- Welcome by the Chair of the Japanese Organizing Committee 8
- Welcome Address by the President of the Science Council of Japan 10
- Reply by the President of URSI 12
- Report of the Secretary General 13
- Message from the International Telecommunication Union 16
- Presidential Address 17

Awards Ceremony 21
- Presentation of the Balth. van der Pol Gold Medal 21
- Presentation of the John Howard Dellinger Gold Medal 22
- Presentation of the Appleton Prize 24
- Presentation of the Issac Koga Gold Medal 25

Closing Meeting 28
- Closing Remarks by the Secretary General 28
- Address by the incoming Secretary General 28
- Closing Remarks by the outgoing President 29
- Remarks by Mrs. Anne Jull 30
- Address by the incoming President 31
- Concluding Remarks by Professor Okoshi, Chair of the Japanese Organizing Committee 32

Reports of Meetings 34
- Board of Officers 34
- Council 36
- Coordinating Committee 43
- Round Table Discussion 46

Treasurer's Report on URSI Finances 51

Report of the Standing Finance Committee 73

Report of the Long Range Planning Committee 75

Report of the Standing Committee on URSI Membership 76

Report of the Standing Publications Committee 77

Report of the Standing Committee on Young Scientists....78
Report of the Standing Committee on Developing Countries....79
Report of the Scientific Committee on Telecommunications....80
Report of the Intercommission Working Group on Time Domain Waveform Measurements (IWG-TDWM)....81
Reports on Activities of Inter-Union Organizations....82
Inter-Union Commission on the Allocation of Frequencies to Radio Astronomy and Space Science (IUCAF)....82
Business Transacted by Commissions....85
Commission A - Electromagnetic Metrology....85
Commission B - Fields and Waves....88
Commission C - Signals and Systems....92
Commission D - Electronics and Photonics....95
Commission E - Electromagnetic Noise and Interference....98
Commission F - Wave Propagation and Remote Sensing....103
Commission G - Ionospheric Radio and Propagation....108
Commission H - Waves and Plasmas....112
Commission J - Radio Astronomy....116
Commission K - Electromagnetic in Biology and Medicine....124
Resolutions and Recommendations of the Council....128
Resolutions and Recommendations of Commissions....141
Resolutions et Recommandations du Conseil....150
Resolutions et Recommandations des Commissions....165

INTRODUCTION

ACKNOWLEDGEMENT

The XXIV General Assembly of URSI was held at the Kyoto International Conference Hall, Kyoto, Japan, from 25 August to 2 September 1993. In introducing this account of the proceedings, it seems appropriate to offer the warmest thanks of the Union to :

- the Japanese Committee for URSI;
- the Science Council of Japan and the Institute of Electronics, Information and Communication Engineers;
- the Japanese Organizing Committee, and the cooperating Agencies;
- the Ministry of Education, Science and Culture of Japan;
- the Ministry of Posts and Telecommunications of Japan;
- the Institute of Electrical Engineers of Japan;
- the Institute of Television Engineers of Japan;
- the Remote Sensing Society of Japan;
- the Japanese Society of Geomagnetism and Earth, Planetary and Space Sciences;
- the Astronomical Society of Japan;
- the Japanese Foundation for the Promotion of Electrical, Electronics and Information Sciences;
- the numerous Japanese firms which provided financial support for the organization of the General Assembly;
- the Coordinator and the Associate Coordinator of the Scientific Programme;
- the Chairs and Vice-Chairs of URSI Commissions, who planned the scientific sessions, and to the session Chairs and speakers;
- the organizations which provided funds in support of the URSI Young Scientist Programme : ICSU, the URSI Member Committee in Japan, the Royal Society of London, the Commonwealth Secretariat and Science Council and COSTED (the ICSU Committee on Science and Technology in Developing Countries);
- the International Science Foundation, which awarded 26 grants to scientists to suppport their attendance at the General Assembly.

OUTLINE OF THE ASSEMBLY

The URSI Council, which is composed of the official representatives of the Member Committees, met in Kyoto on five occasions between 24 August and 3 September 1993. The Resolutions and Recommendations adopted by the Council and by the URSI Commissions are reproduced at the end of this volume. Summary accounts of the business transacted by the Council and the Commissions are given elsewhere.

An abundant scientific programme, consisting of 1331 papers (invited or contributed - oral or poster), had been prepared for the 1045 regular and 201 student registrants (among them 113 official "Young Scientists"). In addition, three General Lectures of interest to all participants were given on the following subjects :

- Precise time/frequency : its impact on Science and Technology (by J. McA. Steele, United Kingdom);

- New developments and future prospects of HDTV and Digital Broadcasting (by T. Nishizawa, Japan);
- Radio and Radar exploration from Spacecraft : highlights of Magellan at Venus (by G. Pettengill, USA).

Each Commission had been asked to provide a Tutorial Lecture in its own sphere of interest. The titles of these Lectures were as follows :

A. Frontier Communication Technologies from Radio Waves to Optical Fibres (by S. Shimada, Japan)
B. Modern Concepts in Analysis, Synthesis and Measurements of Antennas (by Y. Rahmat-Samii, USA)
C. Overview of Mobile and Personal Communications (by A. Viterbi, USA)
D. Optical Solitons : Physics and Applications for Telecommunications (by Ph. Emplit, Belgium)
E. Telecommunications at the Cross Road (by R.D. Parlow, USA)
F. Results from Spaceborne Radars (ERS-1, JERS-1, ALMAZ) (by K. Raney, Canada)
G. Ionospheric Modelling (by D. Anderson, USA)
H. Forty years of Whistlers (by R.A. Helliwell, USA)
J. Charm of Radio Astronomy and its Protection (by M. Morimoto, Japan)
K. Electromagnetics in Medicine and Biology (by W.R. Adey, USA)

LIST OF URSI OFFICERS AND OFFICERS OF MEMBER COMMITTEES

Following the elections at the XXIV General Assembly in Kyoto, Japan, the Officers of the Union and the URSI representatives on other organizations are as given below. The list of Presidents and Secretaries of URSI Member Committees is based on information available to the URSI Secretariat up to the time of going to press.

HONORARY PRESIDENTS

Sir Granville Beynon (U.K.)
Prof. W.N. Christiansen (Australia)
Prof. W. Dieminger (Germany)
Prof. W.E. Gordon (U.S.A.)
Prof. F.L.H.M. Stumpers (Netherlands)

BOARD OF OFFICERS

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

URSI SECRETARIAT

Secretary General :	Prof. P. Lagasse
Assistant Secretary General :	Prof. P. Van Daele
Administrative Secretary :	Mrs. I. Heleu

URSI STANDING COMMITTEES

Commission A : Electromagnetic Metrology
Chair : Dr. U. Stumper (Germany)
Vice-Chair : Dr. M. Kanda (U.S.A.)

Commission B : Fields and Waves
Chair : Prof. D. Olver (U.K.)
Vice-Chair : Prof. C.M. Butler (U.S.A.)

Commission C : Signals and Systems
Chair : Prof. P.H. Wittke (Canada)
Vice-Chair : Prof. B.G. Evans (U.K.)

Commission D : Electronics and Photonics
Chair : Dr. T. Itoh (U.S.A.)
Vice-Chair : Prof. R. Sorrentino (Italy)

Commission E : Electromagnetic Noise and Interference
Chair : Prof. V. Scuka (Sweden)
Vice-Chair : Prof. M. Hayakawa (Japan)

Commission F : Wave Propagation and Remote Sensing
Chair : Prof. R.K. Moore (U.S.A.)
Vice-Chair : Mr. M.P.M. Hall (U.K.)

Commission G : Ionospheric Radio And Propagation
Chair : Dr. K. Schlegel (Germany)
Vice-Chair : Dr. B.W. Reinisch (U.S.A.)

Commission H : Waves in Plasmas
Chair : Dr. F. Lefeuvre (France)
Vice-Chair : Dr. V. Fiala (Czech & Slovak Rep.)

Commission J : Radio Astronomy
Chair : Prof. Y.N. Parijsky (Russia)
Vice-Chair : Prof. R.S. Booth (Sweden)

Commission K : Electromagnetics in Biology & Medicine
Chair : Prof. P. Bernardi (Italy)
Vice-Chair : Dr. J.C. Lin (U.S.A.)

Standing Finance Committee
Chair : Prof. K. Géher (Hungary)

Standing Publications Committee
Co-Chairs : Prof. R.L. Dowden (New Zealand)
Dr. W.R. Stone (U.S.A.)

Standing Committee on URSI Membership
Chair : Professor T.B.A. Senior (U.S.A.)

Standing Committee on Developing Countries
Chair : Dr. B.M. Reddy (India)
Secretary : Prof. S.M. Radicella (Argentina)

Standing Committee on Future General Assemblies
Chair : Prof. T. Okoshi (Japan)

Standing Committee on Young Scientists
Chair : Prof. S. Feng (China, CIE)

Long Range Planning Committee (Committee on the Future of URSI)
Chair : Prof. J.B. Andersen (Denmark)
Secretary : Prof. P. Lagasse (Belgium)

Committee on the International Geosphere/Biosphere Programme
Chair : Dr. R.K. Raney (Canada)

ad hoc Group on Environmental Consequences of Nuclear War
Chair : Mr. M. Wik (Sweden)

Scientific Programme for the XXIV URSI General Assembly
Coordinator : Prof. H. Matsumoto (Japan)
Ass. Coordinator : Dr. J. Hamelin (France)

Scientific Committee on Telecommunications
Chair : Prof. L.W. Barclay (U.K.)
Vice-Chair : Prof. P. Delogne (Belgium)

URSI REPRESENTATIVES ON OTHER SCIENTIFIC ORGANIZATIONS

COSPAR (Committee on Space Research) :
Dr. J.P.V. Baptista (Italy)
COSTED (Committee on Science and Technology in Developing Countries) :
Prof. S. Feng (China, CIE)
CPEM (Conference on Precision Electromagnetic Measurements) :
Dr. U. Stumper (Germany)
FAGS (Federation of Astronomical and Geophysical Data Analysis Services) :
Dr. H. Rishbeth (U.K.)
Dr. R. Wielebinski (Germany)
ICSU (International Council of Scientific Unions) :
Dr. P. Bauer (France)
ICSU Committee on the Free Circulation of Scientists :
Prof. E.V. Jull (Canada)
ICSU Panel on World Data Centres (Geophysical and Solar) :
Prof. H. Rishbeth (U.K.)
IGBP (International Geosphere-Biosphere Programme) :
Dr. R.K. Raney (Canada)
IUCAF (Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science) :
Dr. W.A. Baan (U.S.A.)
Dr. R.J. Cohen (UK)
Mr. H.C. Kahlman (Netherlands)
Dr. B.J. Robinson (Australia)
IUWDS Steering Committee (International Ursigram and World Days Service) :
Dr. R.J. Thompson (Australia)(Director)
Dr. B.M. Reddy (India)
SCAR (Scientific Committee on Antarctic Research) :
Prof. M.J. Rycroft (U.K.)
SCOR (Scientific Committee on Oceanic Research) :
Prof. D. Gjessing (Norway)
SCOSTEP (Scientific Committee on Solar-Terrestrial Physics) :
Dr. A.P. Mitra (India)
STEP (Solar-Terrestrial Energy Programme) :
Dr. S. Kato (Japan)

MEMBER COMMITTEES

ARGENTINA	President : Prof. V.H. Padula-Pintos Secretary : Ing. A. Garbini
AUSTRALIA	President : Prof. D.J. Skellern
AUSTRIA	President : Prof. S.J. Bauer

BELGIUM	President : Prof. E. Schweicher Secretary : Prof. C. Vloeberghs
BRAZIL	President : Prof. P. Kaufmann
BULGARIA	President : Dr. A. Spasov
CANADA	President : Dr. G. Delisle Secretary : Mr. R.H. Hayward
CHINA (Beijing)	President : Prof. S. Feng Secretary : Prof. Zong Sha
CHINA (Taipei)	President : Mr. P.Y. Lee Secretary : Dr. Y.-N. Huang
CZECH & SLOVAK REP.	President : Dr. V. Cizek Secretary : Dr. T. Novosad
DENMARK	President : Prof. E. Ungstrup
EGYPT	President : Prof. I.A.M. Salem Secretary : Prof. W.A. Shuhoud
FINLAND	President : Prof. I.V. Lindell Secretary : Dr. A. Sihvola
FRANCE	President : Prof. P. Degauque Secretary : Mr. J.C. Bic
GERMANY	President : Dr. K. Dorenwendt Secretary : Dr. Th. Damboldt
GREECE	President : Prof. J.G. Fikioris
HUNGARY	President : Prof. K. Géher Secretary : Prof. L. Zombory
INDIA	President : Dr. B.M. Reddy Secretary : Dr. P. Banerjee
IRELAND	President : Prof. M.C. Sexton Secretary : Dr. B. McArdle
ISRAEL	President : Dr. J. Shapira Secretary : Dr. O. Hartal
ITALY	President : Prof. A.M. Scheggi Secretary : Mr. E. Bava
JAPAN	President : Prof. S. Adachi Secretary : Dr. M. Yamada
NETHERLANDS	President : Prof. F.W. Sluijter Secretary : Dr. H.C. Kahlmann
NEW ZEALAND	President : Prof. J.E. Titheridge Secretary : Dr. W. Ireland
NIGERIA	President : Prof. G.O. Ajayi Secretary : Mr. S.U.B. Ezekpo

NORWAY	President : Prof. D. Gjessing Secretary : Ms. E. Rödsrud
POLAND	President : Prof. S. Hahn Secretary : Dr. T. Kosilo
PORTUGAL	President : Mr. J.F. Patricio
RUSSIA	President : Prof. V.V. Migulin Secretary : Dr. V.N. Gubankov
SAUDI ARABIA	President : Dr. S. Al-Athel
SOUTH AFRICA	President : Dr. A.W.V. Poole
SOUTH KOREA	President : Prof. J.W. Ra Secretary : Prof. H.J. Eom
SPAIN	President : Prof. J.L. Sebastian Secretary : Dr. R. Villar
SWEDEN	President : Prof. P. Weissglas Secretary : Mr. B. Öhman
SWITZERLAND	President : Prof. M. Ianoz Secretary : Dr. J.-F. Wagen
THAILAND	President : Mr. K. Yupho
TURKEY	President : Prof. M. Idemen Secretary : Prof. A. Büyükaksoy
UKRAINE	President : Prof. N.G. Nakhodkin Secretary : Prof. B. Nesterenko
UNITED KINGDOM	President : Prof. T.B. Jones Secretary : Prof. A.D. Olver
U.S.A.	President : Prof. D.C. Chang Secretary : Dr. S. Avery
UZBEKISTAN	President : Dr. P.K. Khabibuliaev

ASSOCIATE MEMBER COMMITTEES

BELARUS	President : Prof. P.D. Kuharchik Secretary : Prof. I.V. Semchenko
CHILE	President : Prof. J. May
KAZAKHSTAN	President : Prof. U.M. Sultangazin
PERU	President : Dr. R. Woodman Secretary : Dr. C.H. Calderon-Chamochumbi

OPENING MEETING

Wednesday, 25 August 1993

The Opening Meeting was held in the Main Hall of the Kyoto International Conference Hall. The first part of the meeting was chaired by Professor Okoshi, Vice-President of URSI and Chair of the Local Organizing Committee. Were also present the following distinguished personalities :
Dr. Jiro Kondo, President, Science Council of Japan
Professor I. Kimura, Vice-Chair of the Local Organizing Committee.

Professor Okoshi first welcomed the participants in the following terms :

WELCOME BY THE CHAIR OF THE JAPANESE ORGANIZING COMMITTEE

Professor T. Okoshi

It is my great honour and pleasure to welcome you to the ancient City of Kyoto, on behalf of the Japanese Organizing Committee for the 24th General Assembly of URSI, and also as the President of the IEICE, the Institute of Electronics, Information and Communications Engineers, which is one of the two local organizing bodies of the present General Assembly.

According to the latest report from the Registration Desk, the number of participants registered before lunch time today was 1185, and they have come to Kyoto from more than 40 countries. I would like to share with you the pleasure of having such a large number of participants, despite the economic difficulties now being encountered in many countries.

The City of Kyoto was the capital of Japan for more than 1,000 years, from the 8th Century to the 19th Century. As compared with this period, our radio science has a much shorter history.

It was a little more than 100 years ago, in 1888, that Professor Heinrich Hertz discovered a phenomenon, now called the electromagnetic wave, or the radio wave.

A little less than 100 years ago, in 1895, Guglielmo Marconi invented the wireless telegraphy, opening an era of wide application of radio waves.

Since then almost 100 years have elapsed. A time span of 100 years is very short as compared with the millions of years of the history of mankind. However, what has been achieved by radio waves in the past 100 years is really impressive : at present they are used every day and everywhere. We can hardly imagine what our daily life would be without them.

However, what is more important is that the radio waves are now changing the world. They can be propagated over national boundaries, and are now enabling us, the whole mankind, to share common information and common knowledge about the world.

Nobody now denies that the strongest power behind the collapse of the Wall of Berlin was the power of information, specifically carried by radio waves. I believe that the time has come when the human history will be fundamentally influenced by the quiet power of radio waves.

This power will become stronger and stronger throughout the next century until at least, sometime in a distant future, all the people in the world will share common and correct information and knowledge about the world, and thus become more friendly with each other across national boundaries.

The friendly relation among nations has been a dream of mankind for a very long time. I believe that all of us are familiar with Beethoven's Ninth Symphony. In its last movement, the chorus sings the also famous Friedrich von Schiller's poem which tells us that : *"The beautiful sparks of Gods, the daughters from Heaven, Your magical power combines again, those people separated by the mode, and, all the people become brothers, where you tender wings cover."*

It is really wonderful that more than 200 years ago, Friedrich von Schiller called the magical power that would combine people the "sparks of Gods" or, in the German text, "Götterfunken"!

In contemporary German, the word "funken" means nothing but radio waves. However, I do not want to stress this fact too much; it probably was just a coincidence. What I want to stress is that the unity of people, or the unity of nations, has been a dream of mankind for at least 200 years, since the age of von Schiller or Beethoven.

And I believe that this dream will be realized, sometime in the future, by the power of radio waves, rather than by the power of politics.

I also believe that we, the radioscientists, should be more conscious of this new trend in human history, and prouder of our profession.

Well, so far I have talked about the bright aspects of human history and radio science, in particular with respect to the distant future. On a short time basis, however, we all encounter some difficulties. This year the world economy is not smooth. Some countries are encountering serious economic difficulties. I should tell you, for example, that a large number of potential participants to the General Assembly from these countries, including even important officials of the Member Committees, could not come to Kyoto due to economic difficulties, despite the tremendous effort of our President, Professor Jull, and the Secretary General, Professor Van Bladel, to help them financially.

I sincerely hope that participants from such countries who made it to Kyoto, will bring back the achievements of the General Assembly to their respective countries, and convey them effectively to those colleagues of their URSI community who unfortunately could not attend the Kyoto event.

Finally, talking about the scientific programme of this ongoing General Assembly, let me mention that 1331 papers will be presented. Among them, 533 are invited papers, 307 are oral papers, and 518 are poster papers. One unique feature of the Kyoto General Assembly is that a fairly large scale scientific exhibition will be held in the Event Hall attached to the main conference building. This is a "first" in the history of URSI General Assemblies. A large Poster Session will also be held in the same Event Hall, as well as a High Definition Television Show, including a Special URSI-sponsored Programme, entitled the Past, Present and Future of URSI.

Let me also mention that the Japanese radio scientists have the honour to host the General Assembly for the second time, after an interval of 30 years. It is, indeed, in 1963 that the 14th General Assembly was held in Tokyo. In connection with this remark, I would now like to introduce Professor Sogo Okamura, the Honorary Chairperson of this 24th General Assembly, who was one of the youngest key persons at the occasion of the 14th General Assembly in Tokyo, and worked for URSI for many years, in particular serving as a Vice-president from 1981 through 1987. Professor Okamura, could you please stand up?

To conclude my welcome speech, I promise that we, the Members of Japanese Organizing Committee, will do our best to make your stay in Kyoto fruitful and worthwhile.

Thank you very much for your kind attention.

Professor Okoshi's address was followed by a message from Dr. Kondo.

WELCOME ADDRESS BY THE PRESIDENT OF THE SCIENCE COUNCIL OF JAPAN

Dr. Kondo

Mr. Chairman, Ladies and Gentlemen,

It is a great honour for me to have the opportunity to speak on behalf of the Science Council of Japan to people coming from so many countries for the opening of the 24th General Assembly of the International Union of Radio Science.

The Science Council of Japan was established in 1949 as a governmental organization representing qualified Japanese scientists both domestically and internationally, covering all fields of cultural, social and natural sciences. The aim of the Council is to promote scientific development and to improve the quality of administration, industry and civil life through science.

Since the foundation of the Council, we have been working to contribute to the progress of science in cooperation with academic organizations throughout the world, by sponsoring many international congresses here in Japan, and by sending Japanese

delegates to international congresses held overseas. We do this because we believe that the promotion of international scientific exchange is one of our most important duties.

The International Union of Radio Science (URSI) is one of the international academic organizations with which the Council is affiliated, and the Liaison Committee for Radio Science of the Council is playing the role of Member Committee of URSI.

We have opened today the 24th General Assembly of URSI jointly with the Institute of Electronics, Information and Communication Engineers, Japan. It is my great pleasure to meet with distinguished radio scientists from all over the world and to have an opportunity to attend fascinating lectures and presentations.

We find it delightful and meaningful to host the 24th General Assembly of URSI with 1200 participants from 43 countries, the first to be held in Japan, and more generally in East Asia, since the 14th General Assembly was held in Tokyo in 1963.

The International Union of Radio Science is the sole international academic organization dedicated to liaison and promotion of research in radio science, the topics of which have continuously been expanded and diversified year after year. In the present General Assembly it is expected that a number of research outcomes will be reported across various research fields, and intensive debates will be held on the future direction of research, themes of primary importance and international research collaboration. It will be particularly interesting to watch how much progress has been made in the research on global environmental monitoring using radio waves, and on the interaction of biological systems with electromagnetic fields, all topics which are attracting wide attention these days.

The City of Kyoto, where we are gathering now, is located centrally in the Main Island of Japan, and prospered as political, economic and cultural center of Japan for over 1000 years, since it was chosen as the Capital of Japan in 794. Kyoto is blessed not only with beautiful natural scenes and plenty of cultural heritages, but also with the tradition of a science which fosters rapid progress of high-technology industries. It is a city continuously striving for innovative creation. I hope you will bring home as souvenirs some pieces of Japanese traditional culture, as well as information on the latest achievements in radio science resulting from your participation in the present assembly.

Concluding my speech, I sincerely wish the greatest success to the 24th General Assembly of URSI. For those participants from foreign countries, I heartily recommend them to enjoy their stay in Japan and to make personal acquaintance with Japanese scientists, so that the present conference will turn out to be a memorable one for all of us.

Thank you very much.

Following Dr. Kondo's address, Professor I. Kimura, Vice-Chair of the Local Organizing Committee, read the English translation of a message received from the Prime Minister :

"I am pleased to extend a hearty welcome to all delegates of the world at the opening of the XXIV General Assembly of the International Union of Radio Science (URSI), held in Japan under the co-sponsorship of the Science Council of Japan and the Institute of Electronics, Information and Communication Engineers. I wish a great success to this International Assembly, which is devoted to the advancement of Radio Science."

MORIHIRO HOSOKAWA
PRIME MINISTER

REPLY BY THE PRESIDENT OF URSI

Professor E.V. Jull, President of URSI, subsequently replied as follows :

Thank you, Professors Okoshi, Kondo and Kimura, for welcoming us to Kyoto, the ancient capital of Japan, and to the Kyoto International Conference Hall, symbolic of the new Japan as patron of international science.

A great deal of effort goes into arranging every URSI General Assembly, but it is hard to believe how any General Assembly could have been more carefully planned than the present one. We are moved by the warm welcome and delighted by the splendid facilities we have found in Kyoto. We are very grateful to Professors Okoshi, Kimura and Oguchi, to all the local organizers who assisted them, and to Professor Adachi and the Japanese Committee for URSI for bringing us together here.

We are also grateful, Professor Kondo, for the generous support provided by the Science Council of Japan and we acknowledge with thanks co-sponsorship from the Institute of Electronics, Information and Communication Engineers, of which Professor Okohi is President.

Ahead of us is a rich and diverse scientific programme organized by our URSI Commission Chairs and, for our new Commission K, in collaboration with the Bioelectromagnetics Society. The entire programme was coordinated by Professors Bach Andersen and Matsumoto. Local organization of this event has been so efficient that it is probably no exaggeration to claim that it could have been done the way it was done only in Japan.

Some of you here had the privilege of attending an URSI General Assembly in Tokyo 30 years ago and like to remind the rest of us of an exceptionally good meeting we missed. Now that Japan has joined the small group of countries (USA, UK, Belgium) which have more than once been host to an URSI General Assembly, you may have to say that the 1963 Tokyo General Assembly was second only to the 1993 Kyoto General Assembly.

URSI exists in a network of international scientific and technological organizations, many of which are represented here. May I briefly introduce some of their distinguished representatives;
from ICSU, Prof. W.E. Gordon, Vice-President;
from ITU, Mr. Richard Kirby, Director, Radiocommunication Bureau;
from BEMS, Prof. O.P. Ghandi, President;
from IAU, Dr. J. Baldwin;
for IUCAF, Dr. B.J. Robinson, Chairman;
for ICTP, Prof. S. Radicella.

It is also a pleasure to acknowledge the presence here of one of our Honorary URSI Presidents, Professor Gordon.

Thank you again, generous hosts. I declare the XXIV General Assembly of URSI open and invite the Secretary General to deliver his report.

Professor Jull then took the chair to preside over the second part of the Opening Meeting. He first gave the floor to the Secretary General, and thereafter to Mr. Kirby.

REPORT OF THE SECRETARY GENERAL

Professor J. Van Bladel

Ladies and gentlemen,

It is my pleasant duty to present a concise report on the scientific activities, the finances and the general administrative situation of the Union.

URSI sponsored 60 meetings in 1990-1993, a slight increase with respect to the previous triennium. Some of these meetings are series which we co-sponsor, for example the Conference on Precision Electromagnetic Measurements. Others are generated by URSI itself, in a few cases also in the form of a series. The oldest one is the triennial Symposium on Electromagnetic Theory, organized by our Commission B on Fields and Waves. Commissions C and D have now launched a similar effort, a Symposium on Signals, Systems and Electronics, which was held for the first time in Erlangen in 1989, and three years later in Paris. The series seems to be well-established now.

A number of international organizations are concerned with the development of Science and Engineering in Developing Countries. URSI has a strong interest in this area, and has developed fruitful relations with the International Center for Theoretical Physics (the ICTP) and the Third World Academy of Sciences, both located in Trieste. We have co-organized a series of biennial courses on Basic Telecommunication Science there, which last about a month, and have been given in 1989, 1991 and 1993. URSI has taken the responsibility of finding (and supporting) lecturers for these courses, which are attended by typically 50 to 80 participants from Developing Countries. The International Telecommunication Union (the ITU) co-sponsored the last College, and

we hope that this trilateral collaboration, ITU-ICTP-URSI, will further develop. Our goal is to be internationally recognized as the leading expert on high level training of radio scientists, in particular those from Developing Countries.

Mesdames et Messieurs,

Le programme de publication de l'URSI présente deux volets. Le volet "livres" est représenté par les deux volumes que nous avons tous reçus, la "Revue Radioscientifique" trienniale (Review of Radio Science) et "Science Radio Moderne" (Modern Radio Science), édités avec grande compétence et énergie par respectivement Messieurs Ross Stone et Hiroshi Matsumoto. La Revue comporte cette année un ensemble d'articles de synthèse, rangés par Commission, et qui éclairent tous un sujet d'intérêt fondamental. Elle est accompagnée d'une disquette où sont reprises les données bibliograpiques récoltées, dans chaque pays, par les membres officiels des Commissions. Le volume "Science Radio Moderne", quant à lui, rassemble les textes des Conférences Générales et des exposés synthétiques des Commissions. Le volume en est à sa troisième édition, les deux premières datant de 1987 et 1990. Les livres dont nous venons de parler sont publiés tous deux par Oxford University Press, qui leur assure une présentation professionelle et une distribution efficace. L'ensemble de ces articles couvre un domaine très étendu, qui illustre l'aspect multidisciplinaire de nos activités, une caractéristique de l'action de l'URSI qui est aussi mise en évidence par les panneaux que l'on pourra voir à l'Exposition, et qui sont dus aux efforts du Professeur Delogne.

Ladies and gentlemen,

I just discussed the first part of our publications programme, which consists of the two books we all received, the Review of Radio Science and Modern Radio Science. We have also regularly produced our two quarterlies, the Bulletin and the Radioscientist. The Bulletin is now individually airmailed to our 1100 correspondents, who form the embryo of a network of individual members. In addition, 500 copies are mailed, in bulk form, to those Member Committees which, for various reasons, prefer to distribute the Bulletin themselves to their URSI community. "The Radioscientist", edited by Professor Dowden, was launched after the last General Assembly. It is air mailed to 600 URSI Officials and subscribers, and contains articles of a more general scientific nature than the aged, but respectable Bulletin, which concentrates on administrative matters (and has done so since 1938). The Board has proposed to merge the two quarterlies into a single publication, starting with the March 1994 issue. Those in the audience who wish to express an opinion on the contents of these two publications, and on the desirability of their merger, are urged to contact Professor Clarricoats, Chairman of our Publications Committee.

The Members of URSI are some 40 Academies or similar research institutions, each of them active in a given territory. For quite a few years now we have investigated the possibility of having direct contacts with individuals in the URSI community. The network of correspondents is a first step in that direction. This network is still being expanded, since every regular participant in the present General Assembly will automatically become a correspondent for the period 1994-1996 and receive information on URSI's activities through Bulletin and Radioscientist. One of the main tasks of the URSI Council here in Kyoto will be to cast a critical eye on the

whole "correspondent" concept, and see whether the network should be maintained in its present form, expanded or modified. Those who wish to give us the benefit of their wisdom in these matters should contact Professor Senior, Chairman of our Membership Committee.

And now the last item : finances and administration. The last triennium has been one of transition for the Secretariat. It became clear six years ago that both the Executive Secretary and the Secretary General, who were reaching retirement age, should be replaced, and that a new team should be formed. In addition, the facilities which were kindly put at our disposal by the Royal Observatory in Brussels would not remain available after 1990. The Secretariat had been located in Belgium since the birth of URSI in 1919, and many Member Committees expressed a desire to keep it there, if at all possible. I am happy to say that a solution has been found, and that Professor Lagasse has accepted a nomination to the function of Secretary General. In addition, thanks to his efforts, the Secretariat has found a home at the University of Ghent, where a new support team has been formed, centered on Mrs. Heleu, the new Administrative Secretary. The Secretariat is now embedded in a large and well-equipped Laboratory with extended informatics facilities. Thanks to this generous hospitality, and because all URSI officials serve on an honorary basis, the state of our finances may be termed satisfactory. Our conservative policies, supported by a succession of prudent Treasurers, of whom Dr. Pierre Bauer is the most recent exponent, have allowed us recently to make a strong effort in favour of our colleagues from Eastern Europe, while developing a significant Young Scientists Programme in parallel. These efforts made a sizeable dent in our reserves, but circumstances are exceptional, and scientific solidarity should not be an idle word.

Let me conclude, Mr. President, by saying that, in my opinion at least, the administrative part of our activity did not pose any serious problem, and that we did the maximum compatible with our modest resources.

MESSAGE FROM THE INTERNATIONAL TELECOMMUNICATION UNION

Richard C. Kirby
Director, Radiocommunication Bureau

Mr. President, Mr. Secretary General
Distinguished URSI Officers and Participants, Ladies and Gentlemen,

It is a great honour for me to be welcomed again in URSI, and to Japan, this phenomenon of ancient culture, avant-garde technology, and incomparable economy.

The International Telecommunication Union coordinates and fosters telecommunication applications throughout the world. It has been the traditional privilege of the Director of CCIR to address the URSI General Assembly, in view of our family relations for 66 years. Today I bring you greetings form the ITU Secretary General, Dr. Pekka Tarjanne, with his best wishes for the Assembly. The telecommunication world has been changing rapidly and so has ITU.

ITU is newly restructured, and CCIR is no more. CCIR work continues in the new Radiocommunication Assembly and Study Groups, acronymed "ITU-R". The work is closely associated with a new series of World Radiocommunication Conferences responsible for international radio regulation. All of this is part of ITU's new Radiocommunication Sector. I will give more details on these matters to anyone interested at a special session of Commission E.

URSI remains ITU's main scientific connection. Many URSI scientists are deeply involved in telecommunications and the "renaissance of wireless". Eminent URSI personalities helped create CCIR in 1927, and URSI scientists today continue leadership in work of the "ITU-R" Study Groups.

Radiowave propagation and science radio services are strong links : radioastronomy, space research, standard frequency and time. The new ITU-R "Science Services" Study Group can strengthen the voice of science in international recommendations and agreements, for use and protection of these applications in the radio frequency spectrum.

Over the years, URSI has strategically broadened the horizon of radio science, first in geophysics and space research. In telecommunications, an URSI-ITU liaison committee was chaired successively by J.A. Saxton, Marcel Thué and George Hagn. A new initiative was launched at Prague, the URSI Scientifique Committee on Telecommunications. Its Chairman, Professor Barclay, will report to this Assembly. URSI initiatives in Electromagnetics in Biology and Medicine have brought superb contributions in these difficult, multidisciplinary questions, and rich sessions in the present Assembly.

Mr. President, distinguished participants,

Radiofrequency spectrum congestion on earth and in space remains a vital

challenge limiting the development of new telecommunications and the avenues for radio science. Coordination to establish new services in the geostationary orbit is a many-month, sometimes two-year process. New procedures are being developed for the coordination of non-geostationary satellites as needed.

Effective technology is emerging to improve system immunity, with less interference to and from others. But concerning aggregate yield of the spectrum as a global resource, there is more economic research than technical. There are seminars, but few if any university courses or scientific projects. As in other matters of the environment, international cooperation in science may be greater than that in regulation. Maybe URSI can help there.

I hope and urge that the new ITU will enjoy the continued close cooperation of URSI, and wish this Assembly, this great feast of radio science, every success.

PRESIDENTIAL ADDRESS

Professor E.V. Jull

Ladies and Gentlemen, Colleagues :

It is a great honour for me to address this XXIV General Assembly of URSI. It is also my sad duty to begin by reminding you of the loss of several distinguished URSI colleagues. After I have read their names I will ask you to stand for a moment in silent tribute.

Professor B.D.H. Tellegen of the Netherlands, a former URSI Vice-President;
Professor Richard Bates, formerly President of the URSI Committee in New Zealand;
Dr. L. Kratena, Secretary of the URSI Committee in Czechoslovakia and Secretary of the Organizing Committee of the last URSI General Assembly;
Professor J. Prokop, Commission F Chair of the URSI Committee in Czechoslovakia;
Professor A.M. Hussein, President of the URSI Committee in Egypt.
Dr. Peter Christiansen, Chair of EISCAT (and son of an Honorary URSI President);
Professor K. Serafimov, President of the URSI Committee in Bulgaria and member of the URSI Long Range Planning Committee;
Professor Allan Yen, past Chair of Commission J of the URSI Committee in Canada and joint winner of the Rumpford Prize for his work on long baseline interferometry.
Professor George Sinclair, a former co-Chair of URSI Commission VI and Programme Coordinator of the 1969 URSI General Assembly in Ottawa.

Every opening of a General Assembly includes a review of the activities of our union for the past three years. The Secretary General has reported several of them which I shall not repeat except for a few comments. It has been my good fortune to work with a board and secretariat in which all have been very active and efficient on

behalf of URSI. The organization of this meeting, the evolution of the secretariat, URSI publications, URSI outreach and the state of finances, all attest to that.

Development of URSI publications has been particularly impressive : the Radioscientist, Oxford University Press publication of both Modern Radio Science and the Review of Radio Science and sponsorship of journals like Radio Science. All this is happening because of the involvement of URSI people skilled in publications, like Professors Cullen, Dowden, Clarricoats and Dr. Stone.

Our Secretary General has already mentioned changes in the secretariat which occurred with the retirement of our Executive Secretary, Yela Stevanovitch, after more than 30 years of skilful service devoted to URSI. She retains a keen interest in URSI affairs and was Executive Secretary of the successful ISSSE'92 held in Paris a year ago. The new arrangements for the URSI secretariat in Ghent have proven to be very efficient and beneficial for URSI. For this we are grateful to Jean Van Bladel, Paul Lagasse and Inge Sergeant-Heleu. Because of this arrangement and the healthy state of URSI finances inherited by your Treasurer, Dr. Bauer, we have been able to increase scientific expenditures substantially.

At our last meeting, in Prague, there was much talk of other changes in URSI. Looking back further, one realizes that URSI has almost always been in the process of adapting to changing trends in radioscience and technology. But the pace of this change has been increasing and, coupled with a rapid succession of political changes, planning URSI's future all too often is reduced to coping with the present. URSI's adjustments to the recent economic and political changes in the world has rightly occupied a good deal of our time in the past three years and will continue to do so. A significant component of URSI's response to these changes has been through its young scientist programme.

I especially want to welcome the young scientists here today for their first URSI General Assembly. "Would they please stand so we can see who they are ? Thank you." Although there are more of you on young scientists awards than even before, there were also more applications for awards than before. The competition has increased. Moreover, because of the efficiency of the programme organizers, Professors Bach Andersen and Matsumoto, all of you are giving papers in the regular scientific programme so that having a paper accepted was a factor in your selection, as it should be.

Your living expenses at the General Assembly are being provided by our hosts in Japan and we are very grateful to them for steadfastly maintaining a generous early commitment to enlarge the programme.

About half of you are from developing countries and the countries of E. Europe and the former Soviet Union. The support for your travel expenses, for those from developing countries, came from funds provided by ICSU, COSTED, the Commonwealth Science Council and Commonwealth Secretariat. The others received travel support from the Royal Society, from our Japanese hosts and from URSI funds. Our thanks to those organizations for their contributions to the careers of young scientists and the programme of our general assembly.

I would also like to greet those of you from Russia who managed to get here, almost in spite of all odds, on travel grants from the International Science Foundation of New York, for which support we are very grateful. Again, Prof. Kimura was very helpful in receiving requests and notifying awardees. Many more requests were received than there were awards available and, with little time available, applicants were selected almost entirely on the basis of the scientific programme. Notification of the awards was received barely a month ago and it was not even possible to notify all the awardees in time for them to get visas and tickets. Consequently I am afraid that many were disappointed and unable to come. To them I express my sincere regret for their absence, for I know how much they wanted to be here.

URSI has also been increasing its support for young scientists and for colleagues from former socialist countries between general assemblies. In 1992, for example, about 20% of our annual income went about equally to these groups, mainly through our commissions. It is not going to solve the large problems facing our colleagues in these countries, but it will help a few, and whether or not URSI responded will indeed matter to them.

URSI needs also to improve its contact with these colleagues and indeed all colleagues better than in the past when we relied almost entirely on the member committees to pass along information. The Secretary General has described the expanded distribution of the Bulletin and The Radioscientist which has been implemented with direct mailing to names submitted by the member committees. In addition all registered here will become part of the network of correspondents scheme approved in Prague. Here at Kyoto we are discussing ways of further expanding this network and possibly of turning it into some form of individual membership scheme to include others not on the member committee lists, not in Kyoto, or from countries without URSI membership. Other unions, IAU and IUPAC, have done this. COSPAR plans to do this. Should URSI do it and what should the criteria be? There are matters being actively considered by Professor Senior of the membership committee, and which will be put to council.

The scientific activities of URSI will be discussed by the coordinating committee for which a more active role in URSI affairs is planned. At this General Assembly they have an official presence at council meetings for the first time. They will also be asked to periodically provide brief summaries of the latest scientific developments in their commission areas. You are invited to attend a round table discussion on this on the morning of Friday, September 3.

URSI needs to be better known, but even less well known is its umbrella organization ICSU. Depending, like URSI, on a modest budget but a great deal of voluntary effort, ICSU has initiated such vast scientific programmes at the IGBP. This almost anonymous organization as provided the scientific input to the much publicized UNED Conference in Rio de Janeiro. It has recently taken on a new role : that of evaluating, on invitation of the governments, the scientific establishments of some of the former socialist countries of E. Europe : first Hungary and now Russia. One can envisage it becoming a sort of OECD of science with programme evaluations done by scientists rather than economists. ICSU will need more resources for this. From the

unions it will be peoples time, rather than money, that will be asked for, and should be forthcoming.

Let me conclude with a few comments on the future of URSI. All organizations have finite lifetimes. Even religious institutions look forward to the glorious day when their mission will be accomplished. URSI's mission, from the beginning, has been to promote international collaboration in radio science. To this end it cooperates, but does not compete, with national or transnational organizations which have similar goals, for example the IEEE, IEE, IEICE, or CIE. Unlike these organizations URSI does not publish journals, although it sponsors them. If, in time, there is a truly international organization embracing all the radio sciences which does all these things, and it is not URSI, than perhaps URSI's time will have come. But at present the opportunities for and the need for international cooperation in the radio sciences have never been greater. And as long as international cooperation in radio science is important, URSI has a great future.

PRESENTATION TO JEAN VAN BLADEL

Jean Van Bladel, who has served URSI with exceptional skill and extraordinary dedication for the past 14 years, will retire at the end of this General Assembly. Prior to 1972 the URSI secretary general was a paid full time position. When URSI finances no longer permitted this it became an unpaid position, with some of the tasks delegated to the four vice presidents. The vice presidents are indeed active but the scale of all activities has been increasing and all the loose ends naturally gravitate to the secretariat. Consequently, for much of the last three years, Jean Van Bladel has been an unpaid full time URSI Secretary General. He will leave us with a fine successor and our deepest gratitude for all he has done for URSI.

Let me first present this book of letters of appreciation by member committees and individuals.

Now I would like to present this gift on behalf of the fifteen members of the URSI board, vice presidents, presidents and assistant secretaries general during the years 1979-1993. We thank you, Jean, for keeping the Union running smoothly, for your loyal support, and, at least for me, for your occasional discrete improvements in the way we said and did things.

Professor Van Bladel subsequently expressed his gratitude for the marks of friendship which he received upon his retirement from the URSI Secretariat.

AWARDS CEREMONY

The presentation of the Awards took place right after the Opening Ceremony, under the chairmanship of Past President A.L. Cullen, Chair of the Awards Panel.

PRESENTATION OF THE BALTH. VAN DER POL GOLD MEDAL

Professor Frans W. Sluijter, President of the URSI Committee in the Netherlands, gave some background information on the career of Professor Van der Pol :

"The life of the namesake of the medal, Balthazar van der Pol, extended from 1889 to 1959. Van der Pol's first scientific publication dates from 1916 and deals with a transient problem in circuit theory. His last published paper was posthumously published in 1960 and deals with a variant of the Sommerfeld problem in electromagnetics. All his life he was interested in wave propagation problems and mathematical methods. Today he is most remembered for the "van der Pol equation", in connection with the enormous growth in our ability to handle non-linear problems. But this is only part of his longlife interests. Many others will also remember him for his still very readably book on the two-sided Laplace transform, written in close collaboration with Hendrik Bremmer, also very well known to the older members of the URSI community.

Balthazar van der Pol was a very gifted man, with strong opinions. Long before Ministers of Education told young scientists to seek international experience and training, van der Pol travelled to England after having passed his first professional degree in physics and mathematics at Utrecht University. There he worked under the guidance of people like Fleming and J.J. Thomson and became friend for life with E.V. Appleton. After returning to the Netherlands he served as conservator of the Teyler's Foundation at Haarlem, where his boss was Lorentz. He subsequently obtained a Ph. D at Utrecht University in 1920 with a thesis on the propagation of radio waves in an ionized gas. The experimental work for this thesis was done at Cambridge. In 1922 he joined the Philips Company in Eindhoven, and eventually became its Director of Fundamental Radio Research. In 1938 he accepted a part time chair in theoretical electricity at Delft. Positions to be mentioned here include Honorary President of URSI and director of the CCIR (Comité Consultatif International des Radiocommunications).

Therefore, Professor Thomas B.A. Senior, it is very appropriate that you should be the recipient of the 1993 van der Pol Gold Medal, and I now quote the official citation : "For theoretical contributions to diffraction and scattering of electromagnetic waves, with particular reference to the simulation of material effects in scattering". I am convinced that you are exactly the man that Mrs. van der Pol had in mind when she endowed the means for this Award to honour the memory of her husband."

REPLY BY PROFESSOR T.B.A. SENIOR

I deeply appreciate this honor, not least because it was established in the name of one of the founding fathers of URSI, whose rigorous and mathematical approach to electromagnetic problems I have always tried to emulate. I have spent a lifetime dabbling in electromagnetics and have obtained a great deal of personal satisfaction from doing so. All who are engaged in research build on the work of those who have gone before and are influenced in innumerable ways by those they have come in contact with. I am no exception and I have benefited from this wisdom, counsel and assistance of many - for example :
Douglas Jones, who first got me interested in electromagnetics while I was still an undergraduate;
John Ratcliffe and Phil Clemmow, who showed me the added satisfaction that can come from working with real-world problems;
Jim Wait, who persuaded me to try life on the other side of the Atlantic;
Kip Siegel, who made that move possible; and
Sam Silver, who then introduced me to this unusual organization–URSI–that we are all associated with.

You will notice how many of these are prominent in URSI. Last but by no means least, I must acknowledge the help of my colleagues and students throughout my many years at the University of Michigan, and it would be unfair to the rest were I to single out any of them. Suffice to say that I have been blessed with colleagues whose work I admire and respect, and whom I also value as friends.

Those of us who have had the privilege of spending our lives doing what we enjoy most are indeed fortunate, and to be honored in this way is just the icing on the cake. Thank you very much indeed.

PRESENTATION OF THE JOHN HOWARD DELLINGER GOLD MEDAL

Professor C.M. Butler, President of the URSI Committee in the United States of America, gave a short introductory speech :

"The Dellinger Award was established in 1965 in honor of the memory of former URSI Vice-President and Honorary President, John Howard Dellinger. Dr. Dellinger was an eminent US Radio Scientist who devoted his career to science in public service, as a leading figure in the US National Bureau of Standards.

The Dellinger Medal is presented triennially to a scientist who has distinguished himself or herself to an area of radio science within the purview of the ten Commissions of URSI. The recipient of the 1993 Award is Dr. Peter Stubbe of the Max Planck Institute for Aeronomy in Germany. The Award citation reads :"For the conception, construction, and operation of a high frequency ionospheric modification facility in the auroral zone and for the theoretical advancement of the understanding of the associated plasma process".

On behalf of the US National Committee for URSI, I take great pleasure in presenting to you, Dr. Stubbe, the Dellinger Gold Medal and this certificate proclaiming you the awardee. Let me be the first to congratulate you !

REPLY BY DR. PETER STUBBE

It is a great honour for me to receive the John Howard Dellinger Award, and I want to thank the URSI Board of Officers for this high recognition of our work to which so many people from different countries have contributed.

When we started our work at the end of the seventies, we were in the fortunate situation to build upon the experience gained in pioneering work performed in the United States and in several countries of the former Soviet Union, where there had been a long-standing tradition in nonlinear ionospheric physics, connected to such names as Alexander Gurevich.

Ionospheric modification by a powerful radio wave is a fascinating field of research, in which electromagnetic theory, plasma physics and ionospheric physics are interactively combined to produce a host of nonlinear phenomena. A sufficiently powerful radio wave may stir up the ionospheric plasma to the extent that the wave itself becomes almost completely quenched. A weak wave may, therefore, be able to transport more energy through a plasma than an initially much stronger wave. A good deal of the physics in ionospheric modification is related to the conversion of electromagnetic into electrostatic energy, and the possible reconversion to electromagnetic energy. A monochromatic radio wave may thereby generate broad-banded secondary radio waves, possessing characteristically peaked frequency spectra which depend, in a stunningly sensitive fashion, on the detailed choice of the frequency of the primary wave, provided the latter is near to a harmonic of the electron gyrofrequency. These findings are ideally suited for testing our understanding of plasma physics. Experiments that give a particularly deep physical insight are those which make use of the diagnostic capabilities of an incoherent scatter radar which, in our case, has been the EISCAT radar system. One important aspect in these experiments has been the question whether electrostatic states are excited in the form of regular wave modes, or localized in narrow cavitons which may undergo collapse. This issue has been a controversial one during the past years. The high-latitude ionosphere is an especially interesting medium to be modified, partly because of the occurrence of strong natural currents. These can be modulated by periodic heating, and the resulting AC current system may then act as a huge antenna for the efficient radiation of waves at Very Low and Extremely Low Frequencies, or for the generation of micropulsations of the Earth's magnetic field.

Many scientists have made important contributions to this work, but not all can be named here. I nevertheless want to express my appreciation to Prof. Jules Fejer and Prof. Richard Dowden for their valuable advice during the initial phase of the project, to Mr. Helmut Kopka for his ingenious technical design work, to Dr. Richard Barr, Prof. Harry Kohl, Dr. Michael Rietveld, Prof. Tudor Jones with his group at the University of Leicester, and Dr. Bo Thidé with his group at the Swedish Institute of Space Physics, for their continual outstanding experimental and theoretical contributions. The award that I receive today belongs to all to them.

PRESENTATION OF THE APPLETON PRIZE

The Prize was presented by Professor P.J.B. Clarricoats, President of the URSI Committee in the United Kingdom (U.K. Panel for URSI). He made the following comments :

"The Appleton Prize is awarded by the Council of the Royal Society on the recommendation of the Board of Officers of URSI. It is awarded to a distinguished worker in the field of ionospheric physics, the field in which Sir Edward Appleton achieved great distinction leading to the award of a Nobel Prize.

Sir Edward's research collaborator was for 30 years Professor Sir Granville Beynon, a past URSI President, and the present recipient Professor Tudor Jones was himself a research assistant of Professor Beynon. Thus we have in effect a direct relation between the award today and the awarder. The awards citation reads : "For major contributions, individually and in scientific leadership, to the study of ionospheric physics, using radio and radar techniques."

REPLY BY PROFESSOR T.B. JONES

It is a great honour and privilege to be here today to receive the Appleton prize. I had the pleasure of meeting Sir Edward Appleton during the URSI General Assembly in London in 1960. Even though he had by then retired, he still made major contributions to the meeting and left a lasting impression on me as a young graduate student. My other knowledge of Appleton was through my research supervisor Prof. Sir Granville Beynon, who was himself a past president of URSI. Sir Granville had worked with Appleton for more than 30 years and was always willing to tell us of the major contributions Appleton had made to Ionospheric Physics and to the work of URSI. Last year the UK URSI national meeting was held in Bradford to celebrate the centenary of Sir Edward's birth in that city.

My own research career has been almost exclusively in the field of ionospheric radio and the fascination of the subject for me is that it allows one to be simultaneously both physicist and engineer. As a physicist one is concerned with the application of radio and radar techniques to investigate the processes which form and control the ionized regions of the upper atmosphere. As an engineer one's interest is in how this ionized medium affects the propagation of radio waves and, hence, the performance of radio and radar systems.

A good example of this duality of interest from my own research is the topic of ionospheric modification or 'Heating'. Very high power radio waves are employed to modify the ionospheric plasma in a controlled way, thus the ionosphere becomes a giant plasma physics laboratoy. These experiments, undertaken at both high and low latitudes, have yielded a wealth of new and unexpected plasma processes, some of which still require explanation. Conversely, as engineers we now understand why we cannot continue to increase the radiated power in HF broadcasting or in trans-ionospheric propagation such as is required for the solar power satellite without seriously degrading the system performance.

The solution of these problems requires the combination of ionospheric physics and 'radio science' which was pioneered so successfully by Sir Edward Appleton.

The award of this prize reflects not only on my contribution but also on the efforts of members of the Leicester group over many years. In particular, I would like to acknowledge the contributions of the many research students who started their careers at Leicester and who have subsequently moved on to establish themselves as eminent workers in the field.

There is still exciting work to be undertaken in Ionospheric Physics and the new generation of radar facilities now being built, such as the EISCAT/ESR, will ensure a high level of interest and activity of which I am sure Sir Edward would have approved.

Thank you for the award of the Appleton Prize. I am deeply honoured to receive the award that bear's Appleton's name.

PRESENTATION OF THE ISSAC KOGA GOLD MEDAL

The Medal was presented by Professor S. Adachi, President of the URSI Committee in Japan, who said that

"The Medal is endowed to a young scientist of age under 35 who has made outstanding contributions to any of the branches of science covered by the ten commissions of URSI. It honours the memory of the late Professor Issac Koga, who was President of the Union from 1963 to 1966, and Honorary President since 1981.

Dr. Koga was born in Japan in 1899. He studied at the University of Tokyo, and became first Professor at the Tokyo Institute of Technology, later Professor at the University of Tokyo, and finally Dean of its Faculty of Engineering.

Professor Koga's research covered a wide variety of topics in radio science. Particularly noteworthy among these was the invention, in 1932, of a piezo-electric crystal oscillator having almost zero frequency-temperature coefficient. This is widely known as the Koga-cut crystal, and has been used in a variety of applications, in particular with respect to radio-communication and broadcasting.

The first Koga Award was awarded in 1984, and this is the fourth award."

REPLY BY PROFESSOR G. REBEIZ

Thank you Professor Adachi for your introduction.

I stand here today primarily because of four men and four women. On the personal level, I would like to thank my father, Michel Rebeiz, and my uncle, Jean Rebeiz, for instilling in me the value of an education and for keeping our home safe during 18 years of Lebanese civil war. I also thank my nanny, Badiaa, and my aunt, Lina, for creating a nurturing environment in the family and keeping our doors open for family and friends. On the professional level, I thank Prof. David Rutledge,

Caltech, for taking me as his graduate student. When I first joined his graduate group at 18 years of age, I was an untamed wild animal, full of energy, but without discipline. He patiently worked with me for 5 years, and while it is still debatable if he succeeded in taming me, he did show me that honesty and hard work are the basis of success in the First World. I specifically say the First World because, as some of us may know, this is not necessarily true for the Third World. I thank Prof. Fawwaz Ulaby who, when I came to the University of Michigan as a young Assistant Professor at 23 years of age, took me into his family, gave me the key to his house, was a constant support to me, personally and professionally, and showed me that honesty, hard work **and** compromise are the basis of success. I thank Prof. Linda Katehi for sharing everything with me, starting with my first day at the University of Michigan. Together we have built one of the largest and best equipped millimeter-wave group in the country with more than 25 graduate students. Finally, I thank Prof. Emilie van Deventer for showing me the meaning of love.

The millimeter-wave field has been blessed by a group of men that are fiercely honest, hard working and have lent me considerable support during my career. Particularly, I would like to thank Prof. Tatsuo Itoh, UCLA, Dr. Tony Kerr, NRAO, Prof. Bob Mattauch, UVa, Dr. Niel Erickson, UMass, Dr. Paul Goldsmith, Cornell, Dr. Jim Mink, ARO, Dr. Sandy Weinreb, Martin Marietta, Dr. Pieter Siegel, JPL, Prof. Erik Kollberg, Chalmers Univ. of Technology and Prof. Kogi Mizuno, Tohoku University.

I would like to point out that to us, as Professors, it is not the number of publications that counts, it is not even the quality of the publications, but it is the quality of the graduate students that is most important in our work. And in order to create the best graduate student, it is not enough to give him your mind, but you should also give him your soul. It is the graduate student that does all the work, and our job is to provide a creative environment for him, and then leave him alone. Therefore, in the name of my graduate students, I am accepting this award.

Finally, I would like to tell you a story. When I took my Ph.D. defense, my advisor, David Rutledge, asked me about my future plans. I told him that I was going to Michigan to build the biggest and best millimeter-wave group in the world ! In hindsight, this was very rude : Caltech was the best, and I should not have challenged my origin so quickly in time. Dave smiled and said : "Gabriel, please do that, but do not loose yourself doing it". With this note, I conclude my speech. Thank you.

Professor A.L. Cullen asked the J.C. Bose Fellow, Mr. R.N. Bera, as well as the S.K. Mitra Fellow, Mr. Kumar, to rise. They were applauded by the audience. The H.G. Booker Fellow, Dr. Jacqueline Hewitt , could not attend the General Assembly because of a health problem.

The Ceremony concluded with music played by Ms. Tornio Azuma and Company, who had already performed just before the Opening Meeting. The group used the Koto as its instrument. The Koto (the Japanese Harp) was introduced from China about 1,500 years ago. It was originally played by the court nobility for the Imperial Court. The instrument is made of paulownia wood brought up twenty to sixty years in a cold

climate. It has thirteen strings. Its shape resembles that of a dragon sleeping on a sea shore, therefore its parts are called with the prefix "dragon", such as dragon-mouth or dragon-back. The pieces played before the beginning of the Opening Ceremony were typical classical works, whereas the programme "Kaze Kaoru" played at the end of the Ceremony is a modern piece meaning "A Pleasant Breeze".

CLOSING MEETING

Thursday, 2 September 1993

CLOSING REMARKS BY THE SECRETARY GENERAL

Professor J. Van Bladel

At the request of the President, the Secretary General announced the results of the elections to the Board of Officers and to the Chairs and Vice-Chairs of Commissions for the period 1993-1996. He also made a few additional announcements concerning decisions made by the Council, viz. :

(a) The Council accepted the invitation of the Member Committee in France to organize the next General Assembly. The venue will be Lille, in August 1996.

(b) The Council has accepted, pending the usual commitment to ICSU rules and the URSI Statutes, the application to membership of the Academies of Sciences of Russia, the Ukraine, Uzbekistan, the Korean Institute of Science and Technology and the Scietnific and Technical Research Council of Turkey.

(c) The Council also accepted, pending the usual commitment to ICSU rules and the URSI Statutes, the applications for associate membership of the Academies of Sciences of Belarus, Chile and Kazakhstan. It also confirmed the associate status of the Member Committee in Peru.

ADDRESS BY THE INCOMING SECRETARY GENERAL

Professor P. Lagasse

I realize that taking over from Professor Jean Van Bladel as Secretary General of URSI will be very difficult. Matching the very high standards of dedication and quality set by my predecessor in the service of URSI seems a formidable task indeed.

Luckily it is not the first time that I have had the honour and the pleasure to succeed Jean. The extremely smooth transition that we arranged years ago as director of the laboratory at the University, makes me confident that we can achieve a similar result with regard to the URSI Secretariat.

Looking into the future it seems to me that URSI faces an important challenge in the medium term. During the past days, we have heard many speeches emphasising the rapid changes the world is experiencing and the need for URSI to adapt. It is obvious that the paces of change, both in science and society, since 1913 have had a definite tendency to accelerate.

Nowadays established institutions and companies have to constantly prove themselves again, by transforming and adapting to changing technologies and conditions. In my view, a guiding factor in those transformations must always be the core activities, or if you want, the mission statement of the organisation. In the case of URSI this is the stimulation and coordination, on an international basis, of scientific study in the fields of radio, telecommunications and electronic sciences. The Commissions and the Coordinating Committee have therefore the very important task to discuss and define the URSI strategy for continuing to achieve those scientific goals.

The recommendations from the Long Range Planning Committee, the Membership Committee and the Publications Committee, together with the resulting resolutions adopted by Council, show clearly the way for URSI. It will be a challenge, but also an opportunity for me, to help in achieving those goals by serving URSI as Secretary General. I am confident that with the help of Peter Van Daele and Inge Heleu we will be successful.

La prochaine Assemblée Générale se tenant à Lille, je me réjouis de pouvoir coopérer étroitement avec mes collègues français pour préparer cette Assemblée Générale. Je suis persuadé que l'organisation parfaite de nos hôtes Japonnais sera égalée en France, et espère avoir le plaisir de vous retrouver tous à Lille.

See you in Lille in '96.

CLOSING REMARKS BY THE OUTGOING PRESIDENT

Professor E.V. Jull

Ladies and Gentlemen :

Every General Assembly ends with the retirement of some members of the URSI Board. Our Past President Alex Cullen's first General Assembly was in Tokyo in 1963, and so he has been doing things for URSI for more than 30 years. On the URSI Board he has done well almost every job imaginable; from URSI ties (which he introduced) to Young Scientists, Treasurer and under his presidency our URSI publications began to flourish.

Dick Dowden, as URSI Vice-President for publications, began our newsletter and developed it into the newsmagazine "The Radioscientist". Now he is planning "URSI Electronic News". Fortunately he is willing to continue with these projects, which provide URSI individual contacts with radioscientists worldwide.

Jean Van Bladel, as you already know, is retiring as Secretary General, but has generously offered to continue to help the secretariat produce the Proceedings and the Bulletin until the end of the year. He is also willing to continue his help with the Young Scientist programme for the next triennium.

They retire with our deep gratitude for what they have done for URSI and for the favourable state in which they leave our Union.

The remainder of the URSI Secretariat, Paul Lagasse, Peter Van Daele and Inge Sergeant - Heleu, have been working tirelessly behind the scenes keeping URSI business and commission activities proceeding smoothly.

The success of all URSI's activities depends ultimately on the quality of its scientific programme. We thank our Commission Chairs for assembling here an array of exceptional scientific talent. We thank all participants for coming and sharing their discoveries and expertise and we hope they may have been similarly rewarded.

The scientific programme, the exhibition, the business meetings and the social events of this general assembly have all functioned extremely well, not by chance, but by the efforts of our colleagues in Japan who have been willing to devote their time to the task.

Professors Okamura and Okoshi, we thank you for inviting us to Kyoto, with its rich cultural heritage, for this General Assembly. Professor Oguchi and the Tokyo Committee and Professor Kimura and the Kyoto Committee have handled all matters with great efficiency and style. We thank the Science Council of Japan and the Japanese industrial organizations for their financial support. Above all, thanks are due to the local organizers, Professors Kimura and Matsumoto, and to all who assisted them in the Conference Secretariat for doing so much for us so well.

We leave not only with new scientific insights and ideas, new colleagues and friends, but also filled with admiration for the kindness, superb service and matchless style we have experienced here.

Mesdames et Messieurs :

Je vous remercie de l'occassion que vous m'avez donnée de vous servir comme président. Je considère votre confiance comme un honneur et un privilège.

Ladies and Gentlemen :

I thank you for the opportunity to serve as URSI President. It has been a great honour and privilege. And now I will ask my wife Anne to add a few words on the accompanying persons programme, before your new President, Pierre Bauer, addresses you.

REMARKS BY MRS. ANNE JULL

I am not here to discuss scientific programs, but to tell you my impressions of the accompanying persons programme. Everyone I have asked agrees that all the social activities have been superb. Our heartfelt thanks to all the Japanese URSI wives, their

families and their local committee, who have helped us foreigners feel at home in a most gracious way. We appreciate very much that you have taken the time out of your busy schedules to instruct and care for us every day. Friendships have been built that for most of us will last a life time. We hope to have the opportunity to return the kindness and hospitality in our own countries.

ADDRESS BY THE INCOMING PRESIDENT

Dr. P. Bauer

Mesdames, Messieurs, Chers Collègues,

J'ai le grand honneur de m'adresser à vous au nom du nouveau Bureau. Je tiens en tout premier lieu à saluer, pour leurs éminentes contributions à l'URSI, les membres du Bureau dont le mandat vient à expiration.

I have the great honour to adress you on behalf of the newly elected Board. Let me first express our appreciation and gratitude to the retiring members of the Board for their major contributions to the Union.

- Professor Alex Cullen, former President of URSI, who, in a gentle but extremely efficient way, gave a decisive impulse to the Union along the lines which had emerged from the now famous Corsendonk meeting.
- Professor Richard Dowden, who devoted a considerable amount of time and energy to launching and editing "The Radioscientist".
- Last, but not least, Professor Jean Van Bladel, who, under difficult circumstances and on short notice, accepted in 1979 the enormous task of Secretary General. He has been involved so deeply since in running URSI and in developing the Young Scientists Programme that he is begin identified as the living image of URSI ... a high definition one, of course !

Needless to say that Kyoto has exceeded all expectations in terms of charm, beauty of monuments and sceneries, the endless kindness of its people and, above all, the superb organization of the General Assembly.

I join heartily with Professor Edward Jull to express my deepest thanks to Professors Ikamura, Okoshi, Kimura, Oguchi, Ikegami and Matsumoto, and to all the other members of the Organizing Committee.

Most of the scientists associated with URSI are involved in other international scientific organizations dealing, for example, with precise measurements, signal processing, telecommunications, electromagnetic compatibility, study of the Earth environment or astronomy. However, in URSI they find a unique forum, a place where they are able to meet other scientists with completely different backgrounds, but sharing the same or similar scientific interests.

This unique character allows URSI to play a twofold role :

- first, it has the capability of providing a vast scientific experience as, for example, in the field of telecommunications ;
- second, it provides a forum for interdisciplinary work.

In order to strengthen or increase the specificity of the Union, several actions have been taken.

Commission K, the new Commission on Electromagnetics in Biology and Medicine, gathered for the first time in Kyoto. Its scientific programme has been extremely successful, and warm thanks are due to Professor Maria Stuchly, the first Chair of Commission K, for this success.

On this occasion the new URSI "generation", that is the group of young scientists, was able to contribute to the success of the scientific programme in a more visible and efficient way. Indeed, it has been possible to increase the number of young colleagues attending the Assembly under that scheme, and their papers have been included in the regular programmes of the sessions.

Thanks to the sustained effort of the Scientific Committee on Telecommunications, created in 1990, the scientific expertise of URSI in the field of telecommunications has been reinforced. This initiative has been welcomed by the International Telecommunication Union (ITU).

The Network of Correspondents, which will consist mainly in its initial phase of all registrants at the General Assembly, is paving the way to a better communication between the scientists of the URSI family and to the development of interdisciplinary research.

Let me express the hope that the Commissions, which are the heart of the Union, will strengthen their position and, in particular, will intensify the inter-Commission links and cooperation.

Ladies and Gentlemen, speaking on behalf of the new Board, I wish to thank you for your confidence. Be well assured that we will spare no effort in order to keep URSI at the forefront of science.

Mesdames et Messieurs, au nom du nouveau Bureau, je tiens à vous remercier très sincèrement de votre confiance, et à vous assurer que nous consacrerons toute notre énergie à l'URSI, afin que l'Union maintienne et renforce son rôle majeur dans le développement de la Science.

CONCLUDING REMARKS BY PROFESSOR OKOSHI, CHAIR OF THE JAPANESE ORGANIZING COMMITTEE

I feel it a great honour to say a few words on behalf of the Japanese Organizing Committee, at the real end of the Closing Ceremony.

First of all we would like to express our sincere thanks to all the participants, above all the Members of the Board, the Council Members, Chairs and Vice-Chairs of Commissions, Convenors and Presidents of Sessions, Speakers, and all of you, for your kind cooperation for the successful organization of the Kyoto General Assembly.

Besides, please allow me to take this opportunity to express my heartfelt thanks to my Japanese colleagues in the Local Organizing Committee, including Professors Okamura, Kimura, Oguchi, Matsumoto, and the more than 150 people who have worked very hard for the careful preparation and smooth operation of the Kyoto General Assembly, mostly in the past 10 days, but for some key persons for more than 3 years.

I also would like to express my deep appreciation to those people from Japanese industry, who helped us financially, despite the severe economic situation in the recent years.

Before really closing this Ceremony, I have an important announcement. As is announced in the Final Programme, a Discussion Meeting entitled "Open Round Table Discussion on the Scientific Role of URSI" will be held tomorrow morning from 8:30 a.m. to 10:30 a.m., in Room 157 of this building.

This Meeting should be attended by the Chairs and Vice-Chairs of the ten Commissions, and will be chaired by one of the Vice-Presidents of URSI, Professor Bach Andersen. The discussion will focus on the scientific activities of URSI and their future trends. All interested participants are welcome to join the discussion.

Finally, I hope that you will bring back with you good memories of the Kyoto General Assembly, as well as of the City of Kyoto, and wish you a happy and safe trip back to your homes.

Let us meet together again, three years from now, in August 1996 at Lille, France, at the 25th General Assembly.

I thank you again indeed for your kind cooperation, and now, the 24th Kyoto General Assembly is closed.

REPORTS OF MEETINGS

BOARD OF OFFICERS

Summary Report

The Board of Officers met on three occasions, respectively on 23 August, 1 and 3 September.

During the 23 August meeting, which lasted from 8.40 to 12.50, miscellaneous items were discussed (such as the possibility of starting a Bulletin Board system, and the pros and cons of the mock-up version of the joint Bulletin-Radioscientist presented by Professor R.L. Dowden). Most of the time, however, was devoted to an overview of the agenda of the Council. Professor E.V. Jull gave some general information on the Young Scientist Programme.

During the second meeting, which lasted only one hour, the following assignments (involving, in particular, the new Board) were agreed upon for the next triennium :

Dr. P. Bauer :
Member of the Long Range Planning Committee and Liaison with the IGBP Committee

Professor J.B. Andersen :
Chair of the Long Range Planning Committee

Professor P.J.B. Clarricoats :
Treasurer and Member of the Standing Publications Committee

Professor E.V. Jull :
Member of the Standing Committee on Young Scientists, Chair of the Awards Committee, Member of the Long Range Planning Committee

Professor T. Okoshi :
Chair of the Standing Committee on Future General Assemblies, Member of the Standing Committee on Young Scientists

Professor T.B.A. Senior :
Chair of the Standing Committee on URSI Membership, responsible for issues related to the Republics of the former Soviet Union.

Professor J. Van Bladel :
Member of the Standing Committee on Young Scientists and Developing Countries

Professor P. Lagasse :
Secretary of the Long Range Planning Committee

Professor H. Matsumoto :
Coordinator of the Scientific Programme for the XXV General Assembly.
(The French Committee, in consultation with the President, will appoint an Assistant Coordinator of the Scientific Programme.)

The Board appointed Professor P. Van Daele as Assistant Secretary General for the next triennium. Professor Van Daele's name had been submitted by the Secretary General, Professor P. Lagasse.

Professor J. Van Bladel, the outgoing Secretary General, proposed to wrap up the financial matters relating to the Kyoto General Assembly and effectively to transfer all other financial and practical authority to the incoming Secretary General at the start of the fourth quarter of 1993.

He also indicated his willingness to edit the Proceedings of the Kyoto General Assembly, the September and December issues of the Bulletin and the reprinting of the Statutes and the Brochure. The Board gratefully accepted these proposals.

The third meeting, on 3 September, lasted two hours, and was attended by the new Board. Some of the items under discussion were :

- the possibility of concentrating the technical sessions of the General Assembly into a six (consecutive) days programme. The Committee on Future General Assemblies was asked to report on this proposal (at the latest by 1995);
- the practical organization of the Network of Correspondents;
- the production of the first joint Radioscientist/Bulletin in March 1994;
- the conclusions to be drawn from the Round Table Discussion and the meetings of the Coordinating Committee;
- the budget to be allotted to the Commissions ($12,000 for the next triennium, possibly to be raised later if finances permit);
- new guidelines for the sponsorship of meetings;
- the relationship between URSI and supranational agencies such as ESA;
- the financial support to URSI's representatives in ICSU Committees.

COUNCIL

Summary Report

The Resolutions and Recommendations adopted by the URSI Council are reproduced at the end of this volume.

The Council met on Tuesday 24 August (9.00 to 16.45), Friday 27 August (18.10 to 20.05), Tuesday 30 August (18.05 to 20.05). Wednesday 1 September (17.05 to 18.35) and Friday 3 September (14.10 to 15.45).

1. Membership of the Council

President : Prof. E.V. Jull
Secretary : Prof. J. Van Bladel

Representatives of Member Committees (alternate representatives are mentioned between parentheses) :

Argentina : Professor S.M. Radicella
Australia : Professor D.J. Skellern
Austria : Dr. G. Kirchengast
Belgium : Professor P. Delogne
Brazil : Professor P. Kaufmann
Bulgaria : Professor B. Shishkov
Canada : Dr. G.Y. Delisle (Professor P.H. Wittke, Dr. St. Maurice)
China CIE : Professor S. Feng
China SRS : Professor Yinn-Nien Huang
Czechoslovakia : Dr. A. Tlamicha
Denmark : Professor. E. Ungstrup
Egypt : Professor I.A.M. Salem
Finland : Professor V.I. Lindell
France : Professor P. Degauque
Germany : Professor H.J. Albrecht (Dr. K. Dorenwendt)
Greece : Professor J.G. Fikioris
Hungary : Professor K. Géher
India : Dr. A.P. Mitra
Ireland : Professor S.S. Swords
Israel : Dr. J. Shapira
Italy : Professor F. Carassa
Japan : Professor S. Adachi
Netherlands : Professor F.W. Sluijter
New Zealand : Professor J.E. Titheridge
Nigeria : Professor G.O. Ajayi
Norway : Professor D. Gjessing
Poland : Professor S. Hahn
Portugal : Professor H.C. Neto
Russia : Professor V.V. Migulin
South Africa : Dr. A.W.V. Poole
Sweden : Professor S. Ström (Dr. V. Scuka)

Switzerland : Professor M. Ianoz (Professor F. Gardiol)
Thailand : Mr. P. Chooncharoen
United Kingdom : Professor P.J.B. Clarricoats (Professor A.D. Olver)
USA : Professor C.M. Butler

Honorary President W.E. Gordon, the members of the Board, the Chairs and Vice-Chairs of Commissions, the Chair of the Scientific Committee and the Assistant Secretary General attended in an advisory capacity. Observers from Korea, Turkey, Peru, representatives from the Japanese organizers and various URSI officials also attended the meetings, partially or totally.

2. Approval of the Agenda

The agenda had been split into two parts, termed A and B. In Part B were grouped items which could be approved automatically, unless there were questions, in which case they could be discussed more extensively and shifted to Part A. The Council approved the list of items in Part B as proposed, hence the agenda was approved in its original form. The subdivision in Parts A and B, a new procedure, worked well, and increased the efficiency of the deliberations of the Council.

3. Formation of Temporary Committees

(a) Ad hoc Group to recommend final revision of the Statutes

Prof. P.J.B. Clarricoats (U.K.)
Prof. P. Degauque (France)
Prof. J.E. Titheridge (New Zealand)
Prof. J. Van Bladel (for the Secretariat)

(b) Drafting Committee

Prof. L.W. Barclay (U.K.)
Dr. P. Bauer (France)
Prof. A.D. Olver (U.K.)
Prof. J. Van Bladel (for the Secretariat)

4. Organization of the XXIV General Assembly

President Jull thanked all these involved with the organization for their very efficient work. The Local Organizing Committee had set up a most impressive organizational structure, which took excellent care of the needs of the 1045 regular registrants and 201 student registrants (among whom 113 Young Scientists).

Vice-President J.B. Andersen, Coordinator of the Scientific Programme, discussed the Programme in very general terms. He thanked the Associate Coordinator, Professor H. Matsumoto, for his decisive contributions. The abstracts of the invited and contributed papers were collected directly by the Japanese Organizing Committee, a method which worked out extremely well in practice.

A the last meeting of the Council, on 3 September, President Jull asked the Council to express its thanks to our Japanese colleagues for their unparalleled efficiency and courtesy in the organization of the General Assembly, both administratively and scientifically. The Council responded by giving a spontaneous and well-deserved

applause to our Japanese hosts, who spared no effort to ensure the remarkable success of the Kyoto event.

5. Proposal to increase the number of Vice-Chairs of Commissions

Professor Clarricoats presented a proposal made by the URSI Committee (Panel) in the U.K. to increase the number of Vice-Chairs to two. The increase work load which Universities and Laboratories have recently put on the shoulders of their staff seriously decreases the time which the Vice-Chairs can devote to their task. In quite a few cases this task includes the editorship of the Commission contribution to the RRS (Review of Radio Science). This led to the wish to double the number of Vice-Chairs, the understanding being that this new feature would not place any additional financial burden on URSI. An added advantage of the proposal would be to involve additional persons in the affairs of the Union.

The Council asked Professor Clarricoats to gather the reactions of the Commissions to the U.K. proposal, and to report his findings to the Council. This consultation took place, and resulted in the withdrawal of the U.K. proposal.

6. Election of Board of Officers, and of Chairs and Vice-Chairs of Commissions

The results of the elections were as follows :

(a) Board of Officers :

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

Professor E.V. Jull remains a member of the Board as Past President.

(b) Chairs and Vice-Chairs of Commissions :

Commission	Chair	Vice-Chair
A	U. Stumper (Germany)	M. Kanda (U.S.A.)
B	D. Olver (U.K.)	C.M. Butler (U.S.A.)
C	P.H. Wittke (Canada)	B.G. Evans (U.K.)
D	T. Itoh (U.S.A.)	R. Sorrentino (Italy)
E	V. Scuka (Sweden)	M. Hayakawa (Japan)
F	R.K. Moore (U.S.A.)	M.P.M. Hall U.K.)
G	K. Schlegel (Germany)	B.W. Reinisch (U.S.A.)
H	F. Lefeuvre (France)	V. Fiala (Czech.)
J	Y.N. Parijskij (Russia)	R. Booth (Sweden)
K	P. Bernardi (Italy)	J.C. Lin (U.S.A.)

The Chair and Vice-Chair of the Scientific Committee on Telecommunications are respectively Professor L.W. Barclay and Professor P. Delogne.

7. Admission of Member Committees. Resignation of Member Committees.

The Council unanimously accepted the application to membership of the Academies of Sciences of Russia, the Ukraine and Uzbekistan, of the Korean Advanced Institute of Science and Technology, and of the Scientific and Technical Research Council of Turkey (see Resolution U.2). It also accepted the applications to associate membership of the Academies of Belarus, Chile and Kazakhstan (see Resolution U.3), and confirmed the associate status of the Committee in Peru (see Resolution U.4).

The Council also decided that the Committee in Iraq should be considered as having resigned from the Union, given the delays experienced in the payment of its annual contribution (see Art. 9 of the Statutes). The Council hopes that Iraq will soon be able to rejoin URSI's ranks.

8. Membership

Professor T.B.A. Senior, Chair of the Standing Committee on URSI Membership, gave a comprehensive summary of the history of the "individual membership" problem, and continued with a survey of the activities of his Committee during the last triennium. He also discussed the report of his Committee, which recommends an extension of the "correspondent" concept with respect to the Prague version. The Council approved the report (see page 76 and Resolutions U.5 and U.6).

Professor Senior subsequently showed a sample of a possible "Correspondent" card. This led to a few questions concerning the potential advantages of possessing the card, and the possibility of identifying the Commission of main interest to the Correspondent by means of the card.

The Committee in New Zealand had proposed to create a category 1/2 (with dues corresponding to one half the basic unit of contribution). Professor Titheridge explained that the idea was to help economically weak territories join URSI at a higher level of participation than that of Associate Member. The Council briefly discussed the problem, but ultimately decided to refer the question to the Membership Committee.

9. Finances

Treasurer Bauer thanked his predecessor Dr. Albrecht for the way he handled URSI's financial affairs. He presented a few viewgraphs, and made the following comments :

(a) the ratio of scientific to administrative expenses evolved favourably during the triennium, in particular thanks to the support provided by the University of Ghent.
(b) the assets being comfortable, there was a strong probability that the amounts given to the Commissions could be significantly raised above their present level, which is $10,000 per triennium.
(c) the annual accounts should show more clearly, in the future, the amounts devoted to the Young Scientists Programme.

Dr. Bauer also noted that the contributions were now expressed in Belgian francs (BEF), which introduced a favourable amount of stability in the expenses incurred in

Belgian francs (which are mainly connected with administrative and publications items).

The Council approved the accounts of the Union for the triennium 1990-2. It also approved the report of the Finance Committee (see Resolution U.7, and the report on page 73). The Council considered the two budget models prepared by the Committee, and decided to choose Model A. The unit contribution for 1994, 1995 and 1996 will therefore remain at the level of the past triennium, i.e. BEF 30,000 (Model B proposed to raise the unit to BEF 35,000).

10. XXV General Assembly

There were three invitations before the Council, from the Member Committees in China (CIE), Egypt and France. As a result of the vote, the XXV General Assembly will be held in Lille, France, from 28 August to 5 September 1996 (see Resolution U.25). The Coordinator of the Scientific Programme will be Professor H. Matsumoto, assisted by Dr. Hamelin, Associate Coordinator.

11. Future General Assemblies

The Council first discussed the desirability of changing the statutes with respect to the selection of future venues. The main issue was the possibility of selecting a venue six years in advance. Some of the comments made were as follows :

(a) in certain countries facilities can be booked six years in advance, but a financial commitment may be delayed until much later (e.g. two years ahead of the meeting). Reservations could therefore be cancelled without penalty if a bid were not successful. In other countries this system would not work.

(b) some Unions experience increasing difficulties in obtaining bids for their General Assembly.

(c) to change the statutes in an even more flexible way than proposed in the preparation of the Council, it was suggested to modify Art. 67g to read "to decide the year and place of future Ordinary General Assemblies".

(d) if a venue is chosen six years ahead of time, one actually goes over to a six year system (unless the rules are changed along the way).

(e) remembering that proposing for 2002 in 1996 implies that key persons must start working in 1995 (at the latest), the bid would imply that most of these key persons would still be available and active seven years later.

The Council was clearly sympathetic with the need for certain Member Committees to have a lead time of six years, but thought that the problem should be referred to the Standing Committee on Future General Assemblies, given the complexity of the factors involved (see Resolution U.10). The Council reached the same decision concerning two other items. The first one was the choice between a scientific programme concentrated in one week (e.g. Monday to Saturday) (solution I), or the present system, with a weekend in the middle of the programme (solution II). Some of the arguments pro and con were :

(a) Many people like a concentrated programme, which reduces the time invested in the Assembly, and encourages participants to stay the whole length of the meeting.

(b) In favour of solution II is the fact that a General Assembly is not a "run of the mill" scientific meeting, but one in which the contacts between people who

rarely meet, or belong to different disciplines, are encouraged by the rather extended meeting period. Solution I would strongly change the nature of the General Assembly from that point of view.

(c) This argument clearly weakens solution I, but a way out could be found by programming a large number of poster sessions, a solution which would facilitate the contacts between participants.

The second item was the time of the year in which a General Assembly is preferably held. The answer to that question is not evident. Several factors are involved :

(a) the time schedule of the Universities
In the U.S. the academic year has a tendency to start earlier and earlier in August. The period from 20 August to, say, 10 September is therefore unfavourable. In other countries examination periods extending to 15 July may be an obstacle.

(b) conflicts with other important Conferences, which often have a fixed schedule. The European Microwave Conference, for example, is traditionally held around 10 September.

12. Publications

Professor P.J.B. Clarricoats, Chair of the Standing Publications Committee, presented a general survey of URSI's Publications Programme to the Council. He insisted on the great importance, for the image of our Union, of the RRS (Review of Radio Science) and MRS (Modern Radio Science) volumes. He expressed warm thanks to the editors of these volumes, Dr. Stone and Professor Matsumoto, but noted that the work involved had been of such magnitude that measures should be taken to lighten the burden put on the editors.

Professor P.J.B. Clarricoats also noted that the vast information present in our scientific programme should ideally be saved, and made available to the general public. He realized that publishing full Proceedings would not be a realistic proposition, but suggested that individual Commissions might be willing to take steps better to disseminate the work presented in their sessions.

Dr. R. Stone said a few words about the 1993 RRS. He mentioned the high quality of the contributions, and expressed a desire to receive feedback from the URSI community on the way the RRS should develop in the future. Professor Degauque, who had been involved with the production of the diskette, mentioned that the references were not submitted in a standard form, which created much additional work for the sub-editor. He thought that the vast work involved could only be justified if the diskette proved to be really useful. Dr. W. Stone proposed to appoint a separate editor for the diskette, and to impose more stringent requirements on the referees.

Vice-President R.L. Dowden answered questions concerning the agreements which had been signed with periodicals wishing to carry the URSI logo. The Council thought that a maximum number of URSI Scientific Commissions should be involved in the areas covered by those periodicals. It also wished to modify the text of the typical agreement by adding a clause allowing URSI to terminate the agreement, for example when a deterioration in the quality of the periodical is observed.

The Council later heard the report of the Publications Committee (see page 77) and approved this report.

13. Scientific Committee on Telecommunications

Professor L.W. Barclay presented the report of the Committee (see page 80). A lively discussion followed, devoted, in particular, to the relation SCT-Commissions. The following points were made :

(a) this relation must be smooth ; the independence of the Scientific Commissions must be respected;
(b) the SCT must not do anything which Commissions can do better;
(c) it was noted that Commissions already have joint scientific sessions at General Assemblies. The SCT might intervene to bring more cohesion to the programme when more than two Commissions are involved. This would, of course, only hold for topics which concern Telecommunications.

The Council approved the report of the Committee, and in particular the part devoted to Commsphere 94. There was some discussion, however, about the establishment of an e-mail system for rapid communications between members of the "Joint Task Group on the Mobile and Personal Communications Channel". Professor Shapira sees the proposed system as a model for the fast exchange of science, but agreed that there would be some financial implications. Support of such expenses is not traditional URSI policy, and the point was referred to the Board of Officers for further study.

14. Approval of reports

The Council approved the following reports (in addition to those mentioned previously) :

- the report of the Working Group on Time Domain Waveform Measurements (see page 81);
- the report of the Long Range Planning Committee (see page 75);
- the report of the Standing Committee on Developing Countries (see page 79);
- the report of the Standing Committee on Young Scientists (see page 78);
- the report of the Inter-Union Commission on the Allocation of Frequencies to Radio Astronomy and Space Science (IUCAF) (see page 82).

COORDINATING COMMITTEE

Summary Report

The Coordinating Committee met on two occasions, on 23 August and on 3 September 1993. The members discussed a large number of topics of interest to the Commissions. Some of these were also included in the agenda of the Council, and the Summary Report of the Council shows the results of the discussions in that body. The main points raised at the Coordinating Committee's meetings are given below.

1. Scientific Programme of the Kyoto General Assembly

Professor J.B. Andersen, Coordinator of the Scientific Programme, expressed his appreciation for the cooperation and the excellent work performed by Professor H. Matsumoto as Associate Coordinator of the Scientific Programme. For the Kyoto General Assembly a total of 1600 papers were received, out of which 1331 were accepted. Statistics concerning the papers are given in the following table.

Commission	Invited Paper	Contributed Oral	Contributed Poster	Total Accepted	With-drawn	Total Presented	Rejected	TOTAL
A	58	3	1	62	0	62	2	64
B	26	74	50	150	7	143	112	262
C	43	61	24	128	1	127	17	145
D	38	47	8	93	2	91	19	112
E	86	0	17	103	1	102	29	132
F	85	0	31	116	5	111	16	132
G	52	20	137	209	2	207	15	224
H	37	60	151	248	3	245	1	249
J	76	20	47	143	4	139	2	145
K	32	22	34	88	1	87	29	117
YS	0	0	18	18	1	17	0	18
TOTAL	533	307	518	1358	27	1331	242	1600

The use of Kyoto as a single address for the General Assembly papers has proven to be very beneficial from the organizational point of view.

2. Young Scientist Programme

President Jull thanked the Japanese organizers of the General Assembly for providing funding and support for a large number of Young Scientists. The efforts made by the Commission Chairs, and especially by Professor Matsumoto, for integrating the scientific contribution of the Young Scientists into the General Assembly programme were also greatly appreciated. Overall the General Assembly's Young Scientist Programme was a success ; there was a strong competition and the standards were high: 120 applicants were selected out of a total of 224. The URSI Young Scientist Programme has grown over the years into a major effort. It is the largest programme of its kind within ICSU. This strongly increases the visibility of URSI and represents a very worthwhile investment in the future of Radio Science.

President Jull thought that the size of the group should be maintained and not further increased. The French Organizing Committee plans a Y.S. budget of $80,000, with a target of 120 Young Scientists, depending on the availability of funds. The answers to a questionnaire made clear that the inclusion of the Young Scientists papers in the regular sessions was generally appreciated by these young colleagues.

3. Post Mortem of the General Assembly.

This particularly important discussion was led by Professor J.B. Andersen, who based his remarks on the outcome of a questionnaire which had been distributed to session chairs. Some of the main reactions were :

(a) General lectures

The general lectures received very high marks, indicating the interest and the need for continuation of this programme;

(b) Tutorials

The number of attendees to the tutorials was larger than at previous General Assemblies, which for some tutorials resulted in crowded rooms, a problem to be avoided in the future. The lectures were given very good marks;

(c) Scientific sessions

A variety of reactions were received on the scientific sessions, going from "best of several years" to "disappointing in quality". There were also mixed responses on the ratio invited versus contributed papers;

(d) The giant poster session

The giant poster session received a large number of positive reactions and many attendees appreciated the large interaction it encouraged. The number of posters was larger than originally foreseen, due to some shifts from the oral presentations. Some of the answers to the questionnaire indicated that too many posters were presented in too short a time. The suggestion was made to have separate poster sessions for some of the Commissions wishing to accommodate a particularly large number of posters;

(e) Joint scientific sessions

A participant expressed the opinion that "Joint Sessions" were not always really integrated, since in many cases each participating Commission would receive its own time slot, and organize it without due reference to the contributions of the other Commissions. It was suggested that, in the future, papers should be chosen with greater integration in mind;

(f) The programme in general

The reactions on the weight of the programme varied from "just right" (not too light) to "too heavy". It became clear during the meeting that some of the Commissions would have problems to compress the scientific programme into a single week;

(g) Publications distributed at the General Assembly

The size of the whole package (abstracts + Review of Radio Science + Modern Radio Science) has become a problem. A proposal to publish the Abstracts separately per Commission, in order to help solve the weight problem, was not approved, since it would weaken one of the main aims of the General Assembly, namely interaction and integration. The Publications Committee was asked to examine, together with the Local Organizing Committtee in Lille, the possibility of mailing the publications ahead of the Assembly, totally or partially;

(h) Overall impression

The overall impression of the General Assembly was very positive. The programme was deemed a success, and the work of the Local Organizing Committee was unanimously praised.

A few additional organizational items were discussed :

- the possibility of having "Late News" papers in pre-defined slots;
- the desirability of extending the period in which posters are available, and this without requiring the continuous presence of the authors;
- the desirability of having conveners present invited papers in their own session;
- the possibility of giving conveners advance information on the status of registration, the idea being to predict "no-shows" among the speakers;
- the desirability of a very rigid, universally-adhered-to time structure for the scientific sessions. In favour is the ease with which participants could plan moving from one session to another. Against the plan is a certain lack of flexibility, e.g. in moving papers from a regular session to a poster session. After some discussion it was tentatively proposed to adopt a 20 minute slot for regular papers, and 40 minutes for invited papers;
- the optimum length of the Scientific Programme
  A proposal to concentrate the Programme in six consecutive days was discussed, but not all Commissions had broached the topic in their Open Meetings. Six of them did, and four were in favour of the proposal, while two thought that six days would be insufficient to cover their needs (see also the Council report).

4. Guidelines for the Programme of the Lille General Assembly:

The Programme will be based on the structure which worked well in Kyoto. Professor H. Matsumoto intends to send out a questionnaire to all Commission Chairs to collect relevant information. The same general timetable will be used as for Kyoto, viz.

January 1,	1994	:	Letter from Coordinator to Chairs and Vice-Chairs
December 1,	1994	:	Provisional Programme sent by Commission Chairs to Coordinator
April,	1995	:	Finalization of the Programme in Brussels
June 1,	1995	:	First Announcement, Call for Papers
January 15,	1996	:	Deadline for Abstracts
February 28,	1996	:	Paper selection by Chairs + Conveners.

It was felt most important to respect these dates and to have the "First announcement" out before the summer of 1995!

5. Sponsorship of meetings in 1993-1996

The Secretary General read the list of proposals for sponsorship put together on the basis of the information available from the Commission Open Meetings. This list will be submitted to Board and Council. Financial support is provided from various sources, but in particular by the triennial budget put at the Commissions' disposal. This budget was $5,500 in 1987-1990, and was raised to $8,000 in 1990-1993. It was further increased to $10,000 in 1992, to give greater flexibility in supoprting colleagues from Eastern Europe. Dr. Bauer mentioned that the planned Commission budget for 1993-1996 was $12,000, with a possible increase to $15,000, finances permitting.

6. Commission Secretariat

A retiring Commission Chair expressed concern about the fate of the important information about Commission affairs which he had collected in his files. He suggested the creation of Commission archives, and the appointment of a (semi-professional) Secretary to manage these archives, and ensure a reasonable amount of continuity in the activities of the Commissions. The consensus of those present was to leave such a decision to the individual Commissions.

ROUND TABLE DISCUSSION

The Round table discussion was held on Friday 3 September 1993 from 8.30 to 11.00. It was attended by some 50 persons.

Prof. J. B Andersen opened the meeting and welcomed the participants. In a short introduction he outlined the purpose of the meeting as being an open discussion between the Commissions on the scientific role of URSI. He also stressed the different goals of URSI in the field of international radio science research. The different Commissions were then asked to present their views.

Commission A (Presented by Dr. U. Stumper)

Although it was stated that the "Terms of reference" of Commission A had not been changed, research on certain topics will be reinforced. It is expected that results of this increased research will be discussed at the next General Assembly. A recommendation had been proposed in the field of basic units for linking the mass unit to fundamental constants.

In an overview of the activities at the Kyoto General Assembly, it was mentioned that in total 8 joint sessions were organised with other Commissions. A strong interest exists within Commission A for future collaboration with Commission K.

Commission A will be represented in several international bodies, and will sponsor several conferences.

During a short discussion after the presentation, a suggestion was made by Professor R.K. Moore on the organization, at the next General Assembly, of a joint session sponsored by Commissions A and F on radar measurements in space.

Commission B (Presented by Professor F. Gardiol)

The over-all interests of Commission B on "Fields & Waves" cover theory, techniques and concepts. Three areas of interest are identified:
1) propagation (free space & guided);
2) scattering (reflection & diffraction);
3) antennas (guided & free).

The tools which are used for the research include mathematics and computation. Both analytical and numerical techniques are used for validation in both the frequency and the time domains.

Commission B is involved in the organization of several conferences, mostly in collaboration with the Antennas & Propagation Society of IEEE.

During the discussion after the presentation, Professor P. Degauque asked questions on the relation between Commission B and the Antennas & Propagation Society of IEEE. Professor Gardiol answered that there is no official relation, but that cooperation follows out of mutual membership of individuals in both Commission B and the Antennas & Propagation Society.

Professor J.B. Andersen expressed his concern on the limited presence of members of Commission B at sessions of other Commissions. Professor Gardiol agreed with this point of view, but emphasized the fact that joint sessions with other Commissions were held at the Kyoto General Assembly. Dr. F. Lefeuvre also clarified the interest of Commission H in the activities of Commission B, since similar tools are used by both Commissions. He envisages more interaction in the future.

Commission C (Presented by Professor P. Lagasse for Professor P.A. Matthews)

An overview was presented of the different sessions and joint sessions organized by Commission C at the Kyoto General Assembly, illustrating the wide range of topics covered by that Commission.

Related to this wide range of activities and the many international conferences in the field, it is felt that the URSI General Assembly can not be considered as the first forum for presenting new results. URSI nevertheless has a role to play in organizing and providing overviews and tutorials in the field.

In the discussion after the presentation, a question was raised by Dr. P. Bauer on the links between Commissions C and J. Dr. R.K. Ekers replied that, in the past, joint sessions were organized, but this had not been the case at the present General Assembly. A further discussion, involving most of the Commissions, led to the conclusion that indeed in some areas URSI is not considered as the first forum to present new results. How to deal with this fact is an important consideration for the future.

Commission D (Presented by Dr. J. Hénaff)

Dr. J. Hénaff explained the difficult role of Commission D within URSI due to the large range of subjects, although different key areas in electronics and photonics could be identified.

Commission D has several connections with other Commissions and uses these connections to avoid overlapping sessions at the General Assembly. The Commission also organizes, in collaboration with other Commissions, ISSSE and is involved in the organization of several other Symposia. Suggestions were made to organize various sessions on different joint topics.

On a question raised by Professor Andersen during the discussion after the presentation, Dr. Hénaff agreed that URSI is not the first forum for new scientific results in the field of Commission D. To deal with this problem, more tutorials should be included. Professor D. Skellern emphasized that the sessions of Commission D were a success, with many experts presenting overviews on different topics.

Commission E (Presented by Drs. J. Hamelin and V. Scuka)

In an overview of the scientific interests of Commission E, Dr. J. Hamelin identified the different research topics and the structure of Commission E, based on 7 working groups. The activities at the Kyoto General Assembly were presented through a brief outline of the different sessions and joint sessions in which Commission E was involved.

Commission E did not organize symposia on its own, but was involved in the organization of different joint symposia.

Dr. V. Scuka (new Chair) continued the presentation by outlining the plans for future activities and interests.

In a comment after the presentation, Professor M. Ianoz emphasized the interaction between Commissions B and E. It was again stated that URSI is a good place to present reviews of the different fields of interest. On a question raised by Professor J.B. Andersen, the work of these working groups was further clarified. During the General Assembly, they assist in the organization of different sessions, but also continue to work in the interval between General Assemblies. They are a place of cooperation on a limited number of subjects, and are not only a body for exchange of information. The system results in a fast exchange of information on new research, thanks to personal contacts.

Commission F (Presented by Professor R.K. Moore)

In his presentation Professor R.K. Moore clarified the structure of the different sessions organised by Commission F at the present General Assembly. All oral sessions consisted of invited papers, together with some good reviews. All contributed papers were presented as posters at the large joint poster session. It is felt by

Commission F that this structure of organizing sessions is a good solution for the General Assembly.

Several topics of interest for Commission F during the next triennium were then outlined; they include radio wave propagation and remote sensing.

Every third year Commission F organizes an Open Symposium, but it is also involved in the organization of several other meetings. Within the fields of interest of Commission F important new results are presented at these Symposia, while invited papers and reviews generally make up the largest part of the General Assembly.

Commission G (Presented by Professor A.W. Wernik)

The structure of Commission G, as presented by Professor A.W. Wernik, consists of 4 working groups which hold several meetings in the period between General Assemblies. The Commission is also involved in 3 inter-commission working groups and 2 inter-union working groups. Commission G has sponsored 9 symposia and 12 are already planned for the future. At the Kyoto General Assembly, 8 sessions were organized, together with 5 joint sessions with other Commissions.

Commission G also issues newsletters to communicate within the Commission itself. It is strongly recommended that the official members of the Commission should be more actively involved in the work of URSI.

Commission G feels that, during future General Assemblies, stronger emphasis should be put on the radiocommunication aspects of its work. Some outstanding problems have been identified by means of a questionnaire and through the sessions held at Kyoto.

In a short discussion after the presentation, in answer to the comment that some of the topics identified by Commission G are not specific for URSI, it was stated that Commission G attracts people from other organizations, and in that fashion is able to put them in contact with URSI.

Commission H (Presented by Dr. R.F. Benson)

In his presentation Dr. R.F. Benson outlined the work of Commission H at the Kyoto General Assembly and clarified the different topics of interest to the Commission.

Commission J (Presented by Dr. R.K. Ekers)

Dr. R.K. Ekers presented the highlights of the work of Commission J at the Kyoto General Assembly. The Commission clearly understands that URSI is an international forum suitable for discussions of radio techniques in several areas of astronomy. At the General Assembly, however, not the whole field of astronomy could be covered.

On the inter-Commission relations, it was stated that joint sessions are not necessary to have interaction between the different Commissions, since people do attend tutorials of Commissions other than their own.

In the discussion after the presentation, Professor D. Skellern agreed with this point of view, but the number of sessions at the General Assembly must be reduced to increase this interaction, which of course is not stimulated if tutorials do overlap with other sessions.

Commission K (Presented by Professor P. Bernardi)

The speaker presented a brief overview of the (short) history of Commission K. Several research topics were identified, together with the already existing connection and relation with other Commissions, such as A and B. In the future collaboration is envisaged with Commissions C and E.

After the individual presentations by the different Commissions, Professor J.B. Andersen opened the general discussion.

Professor D. Skellern started it by discussing the work of the Coordinating Committee in setting up the different sessions at the General Assembly. He strongly felt that more care should be taken in the future to avoid overlap of sessions. If this overlap at the Kyoto General Assembly was due to the short time which was available at the Brussels meeting of the Coordinating Committee, then this meeting should be lengthened. In his comment Dr. P. Bauer emphasized that a similar round table discussion should be held at the Coordinating Committee meeting to be held in Brussels in April 1995.

In his comment Professor E.V. Jull expressed his satisfaction with this interesting round table discussion, which should be continued at future General Assemblies. He also emphasized that **scientific** aspects are to be discussed, and not aspects related to the **organization**.

Professor J.B. Andersen closed the meeting at 11.00.

TREASURER'S REPORT ON URSI FINANCES

1. Rates of exchange

The URSI account books are kept separately for expenses effectively incurred in Belgian francs, and for expenses effectively incurred in US dollars. At the end of each calendar year, the amounts in Belgian francs are converted into US dollars, and the statements of income and expenditure are presented in dollars, using the rate of exchange in force at the end of the year in question. Some of the fluctuations shown in the balance sheets are mainly the result of the conversion of Belgian francs into US dollars.

During the past triennium, the value of the dollar relative to the Belgian franc showed some fluctuations, as illustrated below :

1 Jan 1990	$1 = BEF 37.5
1 Jan 1991	$1 = BEF 31.2
1 Jan 1992	$1 = BEF 33.0
1 Jan 1993	$1 = BEF 33.0

2. URSI Accounts 1990 - 1992

The accounts of income and expenditure for the calendar years 1990 - 1992 inclusive were prepared by Maquet, Sambaere, Savoir & Associates, and audited by Van Poyer and Cie, Réviseurs d'Entreprises, Brussels. They have been provisionally approved at the annual meetings of the Board of Officers. According to the practice in Belgium, the balance sheets list the purchase value of the assets. The appreciation in their value is given at the end of each year's statement of income and expenditure.

The accounts for 1990 - 1992 are reproduced in Annex I. Copies of the original accounts will be available for inspection by the Standing Finance Committee in Kyoto. As recommended, the URSI accounts were published annually in the "URSI Information Bulletin" (Numbers 257, 261 and 264).

The table below gives a general outline of the expenditure over the past 3 years.

	1990	1991	1992	1993 (projected)
	k$	k$	k$	k$
Scientific activities	133.6 (33%)	58.4 (31%)	111.1 (54%)	190
Publications	33.5 (8.4%)	36.2 (19%)	20.3 (9.8%)	35
Administration + routine meetings	226.9 (57%)	86.1 (46%)	69.1 (33%)	125
ICSU dues	3.9	4.6	5.4	5.0
k$	398.0	185.3	206.0	355.0

A S S E T S		
1990	1991	1992
k$	k$	k$
329.0	435.0	462.0

3. Assets and Funds

The assets of the Union are held in bank deposits and funds in the United States and Europe.

It is to be noted that URSI, as Parent Union, is holding the funds of the Inter-Union Commission on the Allocation of Frequencies to Radio Astronomy and Space Science (IUCAF) and the International Ursigram and World Days Service (IUWDS).

URSI is also responsible for the management of the van der Pol Gold Medal Fund. In 1991, the URSI Board decided to replace the actual value of the Fund by an equivalent amount of Rorento units in order to avoid the Fund being affected by possible fluctuations of the US dollar.

In its Report to the Council in Prague, the Standing Finance Committee pointed out that the reserves held by the Union, amounting to about 2-year operation, exceeded somewhat the usual recommendations of ICSU. However, it was understood that this was intended to allow for the one-time expenses involved with the transfer of the URSI Secretariat from Brussels to Ghent. The Committee suggested that the assets should be stabilized at the level recommended by ICSU. As pointed out by Dr. Albrecht, past Treasurer, in his report to the Council, a high level of reserves, as compared to annual running costs, might exert some negative influence on potential donors.

Regarding the spread of URSI assets, the method followed in earlier years has been maintained : the assets are distributed amongst non-dollar and dollar assets, and investments are concentrated on funds with a relatively stable behaviour.

4. Unit contribution

Up to 1990, the unit contribution payable by Member Committees to the Union was specified in US dollars. Bearing in mind that the fixed administrative costs are incurred in Belgian Francs (BEF), the Standing Finance Committee recommended to the Council in Prague that URSI dues should be specified in Belgian Francs, and that the change should be carried out gradually over the period 1990-1992, but not later than 1 January 1993. It was understood that the change referred to the definition of the dues only, and that the actual contributions could be paid in any convertible currency. The Council agreed to adopt for the years 1991, 1992 and 1993 a constant unit contribution of $860, based on the conversion rate $1 = BEF 35. At its meeting in September 1991, the Board decided to fix the unit contribution at BEF 30,000, which is the equivalent of $860 at the rate of $1 = BEF 34.88. The transfer to the new billing system has been effected without major difficulties.

It is appropriate for the Treasurer to express here his appreciation to the Member Committees for their cooperation in changing to the new system and paying their annual contributions timely.

5. Comments on Accounts 1990-1992

5.1 Young Scientists Programme

In accordance with URSI policy, special attention has been given to promoting the participation of young scientists in both the General Assembly and the symposia organized by Commissions in the interval between Assemblies.

During the past triennium, URSI support to the Young Scientists Programme has been steadily increasing to amount to approx. $40,000 in 1992.

It is worth noting that, for the XXIII General Assembly in Prague, the Czechoslovak Organizing Committee provided accommodation and meals for 96 young scientists, a contribution which is estimated at $26,000. Grants in various forms were also received from ICSU, the Royal Society of London, the Commonwealth Science Council, the Japanese URSI Committee, the Canadian International Development Agency, and the Indian National Academy. These grants are gratefully acknowledged.

5.2 Allocation of funds to URSI Commissions

As agreed by the Council in Prague, each Commission received a financial allocation of $8,000 for the triennium 1991-1993. The same amount was attributed to the new Commission K on Electromagnetics in Biology and Medicine.

At its 1992 April meeting, the Board decided to allocate an additional $2,000 to each Commission, to be earmarked for assistance to scientists from countries with non-convertible currencies.

5.3 Publications

In 1991, the URSI Board, considering the high level of printing and mailing costs connected with the publication of the "URSI Information Bulletin", agreed to cease collaboration with the firm Vaillant-Carmanne, and to seek another printer who would be able to offer better conditions. This was implemented beginning with the March 1992 issue of the Bulletin. The relevant figures show a decrease of 35% in the cost of the Bulletin.

It should be pointed out that the cost of the 1990 edition of the "Review of Radio Science" exceeded significantly the estimation and amounted to $59,396, including mailing of the books to Prague.

5.4 Radio Science Press

During the Assembly in 1990, the Standing Committee on Publications recommended that "The Radioscientist" should be published using a non-profit making company to

be established in Belgium, with URSI Officers as Directors, who would exert financial control over the publication.

The Company referred to above has been established and its Statutes have been published in the Official Journal of the Belgian state.

The Balance Sheet and Statement of Income and Expenditure of the Company are given in Annex II.

5.5 Income from URSI-sponsored Symposia

URSI has been co-sponsoring the International Geoscience and Remote Sensing Symposia (IGARSS) and participated financially in their organisation. The organizers credited URSI with an amount of approximately $29,000 representing the Union's share in the benefits of the symposia held in 1989, 1990 and 1991. This source of income compensated for the decrease in income from Member Committees' contributions in 1992, which was $170,000 as compared to $201,000 in the budgetary estimates.

5.6 Ratio administrative/scientific expenditures

The level of administrative expenses relative to scientific expenses has been considerably reduced during the past triennium. This decrease was made possible thanks to the strong logistic support given by the Laboratory of Electromagnetics of the Ghent University, and to the additional yearly contributions provided by the Belgian Government.

For the calendar year 1992, the ratio administrative/scientific expenditure is approx. 34%/66%. However, it is to be noted that some items as, for example, routine meetings of the Board, which were previously considered as part of administrative expenditure, now appear under "Scientific activities", in accordance with ICSU's instructions.

6. Budgetary estimates 1994-1996

6.1 Income

In considering the budget for the next triennium, it is to be remembered that the major component of the income of URSI is represented by membership dues. Thus it seems essential to avoid any major increase in the unit contribution, which should remain at a level generally affordable. Some fluctuations in that source of income will probably be unavoidable in the forthcoming years owing to several factors : changes in category of membership of some Committees, possible admission of new Member Committees, arrears in payments. This suggests that it would be difficult at the time of writing this report to evaluate the total number of unit contributions payable by Member Committees in the next triennium.

Given the present healthy situation of the Union, it would seem advisable to maintain the present level of BEF 30,000 ($860) for the 3 years ahead, i.e. 1994-1996, as proposed in Budget Model A (see Annex III). To allow for the present trends in the

world economic situation, it is suggested that the Finance Committee should consider also a possible increase of 16.6% in the unit contribution, bringing it to BEF 35,000 ($1,060) as proposed in Budget Model B. Such an increase would be the first since 1990, and would correspond roughly to an inflation rate of 4% per year.

The budget models include also some preliminary estimates for 1997, the year following the General Assembly. This has become normal practice and aims at facilitating the financial planning by the Member Committees.

Other sources of income are represented by the annual ICSU subventions, special contributions, gains from investments and exchange, and sales of publications.

In drafting the budget for the next triennium, the Standing Finance Committee will have to bear in mind also two unpredictable elements : possible fluctuations in the rates of exchange and the general inflation rate.

6.2 Expenditure

The main expenditure items in the URSI budget will be : financial support for scientific meetings of Commissions, preparation and cost of the General Assembly in 1996, including the Coordinating Committee meeting in 1995, Young Scientists Programme, and in 1996 the editions of "Review of Radio Science" and "Modern Radio Science".

The practice to allocate a fixed equal amount to each of the ten Commissions for their activities has proved satisfactory, and it would seem appropriate to maintain and even possibly increase it. The figures shown in the budget models for scientific activities include these allocations.

The Young Scientists Programme is one of URSI's major activities and the general consensus is that it is very worthwhile. A special effort is being made to support not only young scientists from developing countries, but also those from countries with non-convertible currencies. The number of applications for assistance will probably increase over the next years, and it is therefore suggested to raise the amounts allocated to the Young Scientists Programme.

The expenses on publications are included under "Scientific activities" in the budget models.

7. Acknowledgements

The Treasurer wishes to express his appreciation to Dr. J.H. Albrecht, his predecessor, for his very able management of URSI finances in the past, which made easier for him to take over. He acknowledges also the helpful consultations with the Chairman and members of the Standing Finance Committee.

24 May 1993

ANNEX 1

BALANCE SHEET ON 31 DECEMBER 1990

ASSETS

		$
Dollars		
Banque Degroof	7,162.47	
Bank of America	84,065.44	
Alex Brown Inc.	1,669.45	
Merrill Lynch	60.732.65	
		153,630.01
Belgian francs		
Banque Degroof	7,803.46	
Générale de Banque	1.477.18	
		9,280.64
Investments		
Demeter Sicav shares	23,379.23	
Rorento Units	127,215.35	
Merrill Lynch Shares	86,891.24	
Brown Fund	10.000.00	
		247,485.82
Petty cash		867.47
Sundry Debtors		
Deposit RTT		282.05
Other debtors		1,000.00
Total Assets		412,545.99
Less creditors		
IUCAF (*)	7,351.28	
IUWDS (*)	3.795.73	
		11,147.01
Audit fees	1,762.82	
Balth van der Pol Medal Fund (*)	13,986.73	
Cost printing Review of Radio Science	56.602.00	
		72.351.55
NET TOTAL OF URSI ASSETS		329,047.43

The net URSI Assets are represented by :

		$
Scientific Activities Fund :		
Scientific Activities in 1991	55,000.00	
Young Scientists in 1991	10,000.00	
		65,000.00
XXIV General Assembly Fund 1993 :		
Scientific	90,000.00	
Young Scientists	40,000.00	
Organization	50,000.00	
		180,000.00
		245,000.00
Unallocated Reserve Fund		84,047.43
		329,047.43

STATEMENT OF INCOME AND EXPENDITURE
FOR THE YEAR ENDED 31 DECEMBER 1990

I. INCOME		$
Grant from ICSU Fund		18,692.00
Contributions from Member Committees		183,198.67
Special Contributions		16,025.64
Special Grants/Contracts		5,857.31
Sales of Publications		1,413.07
Bank Interest and Gain on Exchange		27,932.66
Other Income		50,125.81
Total Income		303,245.16
II. EXPENDITURE		
a) Scientific Activities		133,640.68
General Assembly - Organization	11,455.06	
General Assembly - Scientific	77,830.07	
General Assembly - Young Scientists	19,292.09	
Symposia/Colloquia/Working Groups	13,325.19	
Representation at Scientific Meetings	5,738.27	
Grants to Organizations	6,000.00	

b) Routine Meetings		
Bureau/Executive Committee		27,518.24
c) Publications		33,543.49
d) Administrative Expenses		199,386.19
Salaries, Related Charges	166,302.98	
General Office Expenses	14,876.54	
Office Equipment	1,090.45	
Accounting and Audit Fees	11,402.95	
Bank Charges and Loss on Exchange	5,713.27	
e) ICSU Dues		3,896.15
Total Expenditure		397,984.75

	$
Excess of Expenditure over Income	94,739.59
Accumulated Balance at 1 January 1990	396,246.49
Balance at 31 December 1990	301,506.90
Appreciation of Belgian Franc	27,540.53
Accumulated Balance at 31 December 1990	329,047.43

Rates of exchange :

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

Observation :

The accounts indicated with (*) are constituted by :

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

Appreciated value of investments on December 31, 1990 :

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

DETAIL OF INCOME AND EXPENDITURE

I. INCOME		$
Special Contributions :		
Ministère Education Nationale	4,807.69	
Special Contribution Belgium	11,217.95	
		16,025.64
Special Grants/Contracts :		
To support URSI Young Scientists :		
Commonwealth Science Council	1,904.48	
Royal Society of London	1,846.96	
Japanese Committee	2,105.87	
		5,857.31
Other Income :		
Symposia : Reimb. IGARSS'89	5,000.00	
Reimb. ISSSE'89	6,482.82	
Reimb. IGARSS'90	5,000.00	
Profit on Sales Rorento	22,725.96	
Profit on Sales Philip Morris	7,831.64	
Trade Mark Rights	200.77	
Sales of Administrative Materials	2,884.62	
		50,125.81

II. EXPENDITURE		
Symposia/Colloquia/Working Groups :		
IEEE/IGARSS'90	5,000.00	
COSPAR	1,500.00	
EQUATORIAL AERONOMY	1,250.00	
BEACON SATELLITE	1,250.00	
CPEM	1,500.00	
EMC	1,500.00	
COMMISSION A	1,325.19	
		13,325.19
Grants to Organizations :		
FAGS 1990	2,000.00	
SCOSTEP	1,000.00	
IUCAF	3,000.00	
		6,000.00

BALANCE SHEET ON 31 DECEMBER 1991

ASSETS

Dollars		$
Banque Degroof	20,802.61	
Alex Brown Inc.	2,233.33	
Merrill Lynch	10.10	
Merrill Lynch WCMA	80,243.72	
Traveller cheque	1,000.00	
Bank transfers	1,244.56	
	----------	105,534.32
Belgian francs		
Banque Degroof	34,362.45	
Générale de Banque	595.12	
	----------	34,957.57
Investments		
Demeter Sicav shares	22,104.00	
Rorento Units	120,276.33	
Alpine Shares	35,000.00	
Pennzoil Shares	51,891.24	
M-L Fund	60,019.95	
Brown Fund	10,000.00	
Bank Deposits	36,363.64	
	----------	335,655.16
Petty cash		446.27

Total Assets		476,593.32
Less creditors		
IUCAF (*)	17,431.94	
IUWDS (*)	4,448.73	
Audit fees	1,515.15	
Salary and social security	5,855.03	
	----------	29,250.85
Balth van der Pol Medal Fund		14,592.00

NET TOTAL OF URSI ASSETS		432,750.47

The net URSI Assets are represented by :

		$
Closure of Secretariat :		
Closure of Secretariat		13,636.36
Scientific Activities Fund :		
Scientific Activities in 1992	65,000.00	
Young Scientists in 1992	10,000.00	
	----------	75,000.00
XXIV General Assembly Fund 1993 :		
Scientific	90,000.00	
Young Scientists	40,000.00	
Organization	50,000.00	
	----------	180,000.00

		268,636.36
Unallocated Reserve Fund		164,114.11

		432,750.47
		==========

STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 DECEMBER 1991

I. INCOME		$
Alloc. from UNESCO to ICSU		19,300.00
Contributions from Member Committees		214,530.52
Special Contributions		14,860.61
Sales of Publications		189.85
Bank Interest		18,634.31
Gain on Exchange		5,705.95
Other Income		14,483.74
Total Income		287,704.98
II. EXPENDITURE		
a) Scientific Activities		58,450.63
General Scientific	2,826.15	
Symposia/Colloquia/Working Groups	30,483.76	
Representation at Scientific Meetings	12,564.96	
Grants to Organizations	12,575.76	
b) Routine Meetings		
Bureau/Executive Committee		15,458.24
c) Publications		36,172.70
d) Administrative Expenses		60,653.36
Salaries, Related Charges	39,697.97	
General Office Expenses	9,810.39	
Accounting and Audit Fees	8,862.88	
Bank Charges	2,167.30	
Loss on Exchange	114.82	

	$
e) ICSU Dues	
	4,580.00
Total Expenditure	175,314.93
Excess of Expenditure over Income	112,390.05
Accumulated Balance at 1 January 1991	329,047.43
Balance at 31 December 1991	441,437.48
Appreciation of Belgian Franc	(8,687.01)
Accumulated Balance at 31 December 1991	432,750.47

Rates of exchange :

1 January 1991 : $1 = BEF 31,20

31 December 1991 : $1 = BEF 33,00

Observation :

The accounts indicated with (*) are constituted by :

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

Appreciation in value of investments on December 31, 1991 :

- DEMETER SICAV :	30,844.00
- RORENTO :	250,997.00
- ALPINE :	Unavailable
- MERRILL LYNCH	61,178.00
- PENNZOIL :	53,073.00

DETAIL OF INCOME AND EXPENDITURE

I. INCOME		$
Other Income :		
Hyannis 1990	4,297.74	
IGARSS'90	10,186.00	
		14,483.74
II. EXPENDITURE		
Symposia/Colloquia/Working Groups :		
IEEE/IGARSS'91	5,000.00	
Radio Prop. Physics Trieste	10,983.76	
COMMSPHERE	3,000.00	
Iguazu Workshop	9,000.00	
Microwave Sign	2,500.00	
		30,483.76
Grants to Organizations :		
Radio Science Press	7,575.76	
FAGS 1991	2,000.00	
Contribution URSI to IUCAF	3,000.00	
		12,575.76
Publications :		
Bulletin No 255	12,098.03	
Bulletin No 256	3,883.06	
Bulletin No 257	4,837.37	
Bulletin No 258	4,286.30	
XXIII General Assembly	11,067.94	
		36,172.70

BALANCE SHEET ON 31 DECEMBER 1992

ASSETS

Dollars		$
Banque Degroof	13,438.13	
Merrill Lynch	82,846.62	
Shearson Lehman Brothers	27.01	
Traveller Cheque	1,000.00	
		97,311.76
Belgian francs		
Banque Degroof	16,926.64	
Générale de Banque	1,600.39	
		18,527.03
Investments		
Demeter Sicav shares	22,104.00	
Rorento Units	120,276.33	
Alpine Shares	35,000.00	
Pennzoil Shares	51,891.24	
Merrill Lynch Fund	60,019.95	
Aqua Sicav	59,374.70	
Shearson Lehman Shares	32,500.00	
Reinvestment Shearson Uhman Shares	512.88	
		381,679.10
Petty cash		604.61
Debtors		
Other debtors		1,419.42
Total Assets		499,541.92
Less creditors		
IUCAF	16,901.94	
IUWDS	3,870.99	
Audit fees	1,515.15	
Other Creditors	688.03	

		(22,976.11)
Balth van der Pol Medal Fund (see (1) page 4)		(14,592.00)
NET TOTAL OF URSI ASSETS		461,973.81

The net URSI Assets are represented by :

		$
Closure of Secretariat :		
Closure of Secretariat		15,545.45
Scientific Activities Fund :		
Scientific Activities in 1993	55,000.00	
Young Scientists in 1993	20,000.00	
		75,000.00
XXIV General Assembly Fund 1993 :		
Scientific	115,000.00	
Young Scientists	40,000.00	
Organization	50,000.00	
		205,000.00
		295,545.45
Unallocated Reserve Fund		166,428.36
		461,973.81

STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 DECEMBER 1992

I. INCOME		$
Grant from ICSU Fund		24,168.00
Contributions from Member Committees		170,075.08
Special Contributions		1,759.79
Sales of Publications		33.94
Royalties		8.43
Bank Interest		15,265.60
Other Income		23,910.03
Total Income		235,220.87
II. EXPENDITURE		
a) Scientific Activities		111,116.78
General Assembly - Organization	1,137.76	
General Assembly - Scientific	575.76	
Symposia/Colloquia/Working Groups	61,426.79	
Representation at Scientific Meetings	39,946.17	
Grants to Organizations	8,030.30	
b) Routine Meetings		
Bureau/Executive Committee		4,052.42
c) Publications		20,319.83
d) Administrative Expenses		65,144.50
Salaries, Related Charges	42,288.03	
General Office Expenses	6,091.33	
Office Equipment	4,692.21	
Accounting and Audit Fees	9,813.48	
Bank Charges	2,259.45	
e) ICSU Dues		5,364.00
Total Expenditure		205,997.53
Excess of Expenditure over Income		29,223.34
Accumulated Balance at 1 January 1992		432,750.47

Balance at 31 December 1992	461,973.81
Appreciation of Belgian Franc	0.00
Accumulated Balance at 31 December 1992	461,973.81

Rates of exchange :

1 January 1992 : $1 = BEF 33,00
31 December 1992 : $1 = BEF 33,00

Observation :

The account indicated with (1) is represented by :

- 400 Rorento Shares
  - market value = 17,735.76

Market value of investments on December 31, 1992 :

- DEMETER SICAV :	33,512.00	
- RORENTO (2) :	288,206.06	
- ALPINE :	35,000.00	> Unavailable
- MERRILL LYNCH 59,899.00		
- PENNZOIL :	52,875.00	
- AQUA-SICAV :	62,848.64	
- SHEARSON LEHMAN :	33,371.38	
		565,712.08

(2) including the 400 Rorento of v. d. Pol Fund

DETAIL OF INCOME AND EXPENDITURE

I. INCOME		$
Other Income :		
IGARSS'89	8,488.64	
IGARSS'91	15,421.39	
		23,910.03

II. EXPENDITURE

Symposia/Colloquia/Working Groups :	
COSPAR	1,500.00
CPEM	2,000.00
MAS	1,046.52

ICPIG XX	2,300.00	
EM THEORY SYMPOSIUM	13,500.00	
SPECTRUM MANAGEMENT	9,324.00	
ISSSE	13,005.15	
SUB-ARC RADIO	1,000.00	
HIGH LAT. IONO	2,300.00	
ETE	1,500.00	
EMC '92	1,383.97	
IAU COLLOQUIUM	1,994.67	
BROADCASTING NIGERIA	3,000.00	
BEACON SATELLITE '92	1,150.00	
EMC '93	1,500.00	
SCOSTEP	2,000.00	
VH ANGULAR RESO IMAG	2,000.00	
JINA	922.48	
		61,426.79

Grants to Organizations :

RADIO SCIENCE PRESS	3,030.30	
FAGS 1992	2,000.00	
CONTRIBUTION URSI TO IUCAF	3,000.00	
		8,030.30

Publications :

Bulletin No 259	7,746.33	
Brochure URSI	486.55	
Info Bulletin	662.97	
Bulletin No 260	1,393.60	
Transportation Cost	1,485.42	
Bulletin No 261	1,599.55	
Transportation Cost	1,485.42	
Bulletin No 261	1,599.55	
Transportation Cost	2,836.73	
Bulletin No 262	1,168.06	
University of Hi	12.50	
Radio Science Press	1,262.79	
Transportation Cost	1,665.33	
		20,319.83

ANNEX II

RADIO SCIENCE PRESS ASBL

BALANCE SHEET 31 DECEMBER 1992

ASSETS

Bank	BEF	BEF
Générale de Banque BF	107.327	
Générale de Banque $	3.465	
Merrill Lynch	36.196	
		146.988
Total Assets		146.988

The Assets are represented by	BEF	BEF
Unallocated Reserve Fund		91.344
Excess of Income over Expenditure		55.644
		146.988

STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 30 DECEMBER 1992

I. INCOME	BEF
Sales of Publications	20.785
Royalties	19.817
URSI contribution	100.000
Bank interest	208
Total Income	140.810

II. EXPENDITURE	
a. Administratieve Expenses	
Publications	81.684
Bank Charges	3.482
Total Expenditure	85.166

Excess of Income over Expenditure	55.644

ANNEX III-1

BUDGET MODEL A
(all figures in k$)

MODEL A	1994	1995	1996	Total	1997 (projected)
Unit contribution at $860 (=BF 30,000)					
INCOME					
Member Committees	170	200	200	570	200
Other Sources	65	65	65	195	65
TOTAL INCOME	**235**	**265**	**265**	**765**	**265**
EXPENDITURE					
Scientific Activities	60	80	60	200	60
Young Scientists	30	30	40	100	30
XXV General Assemby	0	30	170	200	0
Administration	75	80	80	235	80
ICSU Dues	5	5	5	15	5
TOTAL EXPENDITURE	**170**	**225**	**355**	**750**	**175**
Surplus (+) Deficit (-)	+65	+40	-90	+15	

ANNEX III-2

BUDGET MODEL B
(all figures in k$)

MODEL B	1994	1995	1996	Total	1997 (projected)
Unit contribution at $1,060 (=BF 35,000) beginning with 1995					
INCOME					
Member Committees	200	233	233	666	233
Other Sources	65	65	65	195	65
TOTAL INCOME	**265**	**298**	**298**	**861**	**298**
EXPENDITURE					
Scientific Activities	70	90	70	230	70
Young Scientists	35	35	45	115	35
XXV General Assemby	0	40	170	210	0
Administration	75	80	80	235	80
ICSU Dues	5	6	6	17	6
TOTAL EXPENDITURE	**185**	**251**	**371**	**807**	**191**
Surplus (+) Deficit (-)	+80	+47	-73	+54	

REPORT OF THE STANDING FINANCE COMMITTEE

The Finance Committee met on 25 and 30 August 1993 under the chairmanship of Professor Geher.

1. Accounts for the years 1990-1992

The Treasurer, Dr. P. Bauer, presented the balance sheets and other data pertaining to the Union's financial condition and activities during the 1990-92 triennium. The Committee expressed its satisfaction with the general financial health of URSI, which was strong.

2. Review of BEF (Belgian francs) and US$ accounting bases

The practice of utilizing the BEF as the monetary basis, but with dual accounting in BEF and US$, has been successful and the Committee recommends that it continue. An earlier proposal that the ECU be adopted as a monetary basis was discussed and the Committee deems this, in light of recent developments, to be unwise. The balance sheets in BEF and those in US$ were reviewed and the Committee found that each provided useful information that would be difficult to discern from either alone.

It was pointed out that the dual system allowed desired flexibility to nations in the payment of dues. (Approximately 75% of the 1992 dues were paid in BEF, with the balance in US$).

Dr. Bauer recommended that accounting of funds for the Young Scientist and Scientific Programmes each be more explicit so that income and expenditures of each may be more readily understood. The Committee endorsed this recommendation.

3. Changes in the former USSR

The USSR paid dues in category 6. Since 1993, Russia has paid according to category 5. Other countries have applied for membership according to the categories below :

Ukraine	3
Uzbekistan	3
Turkey	1
Korea	2

4. Annual contributions

Two models, A and B, have been proposed by the Treasurer to forecast future financial balance sheets (see Treasurer's report). Model A is based upon a contribution unit of BEF 30,000 ($860) and B, upon a contribution unit of BEF 35,000 ($1,060). The models show surplus and deficit projections through the 1994-1996 triennium. Due to the present good financial health of URSI, and due to the level of the current assets, the Committee recommends adoption of Model A for the immediate future. The contribution unit of BEF 30,000 appears adequate to cover expenses for the next triennium.

The Committee views the present level of cash reserves and assets to be such that a percentage of income from investments, which is more easily predicted than is that from dues, be distributed to Commissions and the Scientific Committee. The

percentage is to be determined by the Secretary General and the Treasurer so as to keep the real value of URSI assets constant in time. In addition, a percentage of income should be earmarked for the Young Scientist Programme.

5. Corresponding and individual members

In Prague the foundation for a network of correspondents was established. At the present meeting approximately $30 of the registration fee is earmarked to support this plan, with the attendees of the Kyoto meeting to be designated "correspondents". In addition, one may become a correspondent between assemblies by paying a pro rata fee.

The Committee recommends that a questionnaire be distributed after the plan has been in place for two years. The questionnaire is to be designed so as to determine the effectiveness of the programme.

6. Acknowledgement

The Committee thanked Dr. Bauer and commended him for outstanding performance as URSI Treasurer.

7. Other

a. The table of 1993 dues payments was discussed.
b. The Committee discussed three questions posed by Vice President Dowden in a letter to Prof. Van Bladel and a related proposal by Prof. Titheridge of the New Zealand Member Committee. Both the proposal and the questions pertain to the minimum level of dues of a country. The Committee deferred comment in order to await a recommendation by the Membership Committee.

C.M. BUTLER

REPORT OF THE LONG RANGE PLANNING COMMITTEE

The Committee met on 25 August 1993, with President E.V. Jull in the Chair. The following items were discussed :

1. Individual Membership

The work and conclusions of the "Standing Committee on URSI Membership" were presented by Professor T.B.A. Senior. Based on those considerations and after extensive discussions, the following slight modifications to the resolution U7 of the URSI Council in Prague were proposed :

i any scientist attending a General Assembly or an URSI symposium will become a correspondent for a three year period, a special fee being included in the registration fee;

ii individual scientists not able to attend a General Assembly will be given the possibility of being included in the Network of Correspondents for a 3-year period by applying directly to the URSI Secretariat and by paying the special fee;

iii the Board can decide to waive this special fee upon request by the scientist;

iv correspondents participating in the Network will receive the Radioscientist-Bulletin and a numbered card allowing reduced registration fees at conferences;

v they will have no voting rights, but will be allowed to express their views in the Commissions on matters of a scientific nature.

2. Information - communication in the 90s

After a presentation by Professor W.E. Gordon and extensive discussions it appears that practically all Commissions contribute to the scientific foundations of the general theme "Information - Communication". By paying special attention to this theme in future URSI symposia and General Assemblies, and by fostering inter-Commission cooperative work on this subject, it should be possible for URSI gradually to increase its role in this important field. A more detailed proposal for discussion by Council and the Coordinating Committee will be prepared by Professors W.E. Gordon and L. Barclay.

3. Eastern Europe and CIS scientists

In view of the complexity of the matter it was proposed that it should become the responsibility of one of the Vice-Presidents.

4. Sponsorship of meetings

It was proposed that the Commissions should take responsibility for indicating how and whether URSI is properly represented and involved in URSI sponsored meetings.

5. Committee members for 1993-1996

It was proposed that the President should chair the Committee and that the Secretary General and the Past President should be members. Professor W.E. Gordon and Professor J.G. Lucas are willing to serve on the Committee. It was also proposed to add a Young Scientist to the Committee.

E.V. JULL, CHAIR

REPORT OF THE STANDING COMMITTEE ON URSI MEMBERSHIP

The Committee noted that the following changes in URSI Membership have taken place since the last General Assembly :

(1) the membership of the former USSR has been replaced by Russia (Category 5), Ukraine (Category 3), Uzbekistan (Category 3), Belarus (Associate Member) and Kazakhstan (Associate Member);
(2) new members are Korea (Category 2), Turkey (Category 1) and Chile (Associate Member), and the associate membership of Peru was confirmed;
(3) the membership of South Africa was changed from Category 3 to Category 2, and Iraq is no longer a member.

One of the charges to the Membership Committee was "to propose ways of bringing URSI to the attention of radio scientists in territories which have not yet decided to adhere to the Union" and one way to do so is through some form of Individual Membership. The Committee has given considerable thought to the matter. The concept was discussed at the Commission B International Electromagnetic Theory Symposium in 1992, and influenced in part by ideas expressed at that time, together with some possible ground rules for Individual Membership. These were described in an Open Letter sent to all Member Committees in February 1993, and seven responses were received, most (but not all) giving cautious support. An abbreviated version was also published in the March 1993 Bulletin. In view of the responses, the Committee does not feel that there is enough support for the idea of Individual Membership to justify pursuing it at this time, but many of the same objectives can be achieved through the Network of Correspondents.

The establishment of the Network was approved at the Prague General Assembly. Financial support is provided by a portion of the registration fee at an Assembly, as was done at Kyoto, but to see how the Network might operate, the Board authorized its establishment on a trial basis starting in 1992, i.e. before Kyoto (see the December 1992 Bulletin for a description). As a result of discussions with the Long Range Planning Committee, it appears that the aim of bringing URSI to the attention of more radio scientists can be achieved by a slight modification to the originally-approved Network. To this end, the following modification to Resolution U.7 of the URSI Council in Prague is proposed (see Resolution U.5) :

(1) any scientist attending a General Assembly or an URSI Symposium will become a Correspondent for the three-year period following the Assembly, financed by a special fee included in the registration fee;
(2) other scientists may seek inclusion in the Network of Correspondents for the same three-year period by applying directly to the URSI secretariat and paying the special fee;
(3) on request, the Board may decide to waive the fee for a scientist in (2);
(4) scientists participating in the Network will be issued a numbered card allowing reduced registration fees at certain URSI-sponsored symposia and conferences, and will receive The Radioscientist Bulletin;
(5) Correspondents will have no voting rights, but will be allowed to express their views in the Commissions on matters of a scientific nature.

It is believed that (1) and (3) above are a reasonable first step in seeking to bring URSI to the attention of radio scientists who are presently not able to attend a General Assembly or an URSI Symposium. Information about the Network and the opportunity to apply for inclusion will be disseminated as widely as possible. A simple application form will be developed and enclosed in a future Bulletin.

It is recommended that the Membership Committee carefully monitor the operation of the Network during the next triennium, and propose any further modification necessary to improve its effectiveness.

T.B.A. SENIOR, CHAIR

REPORT OF THE STANDING PUBLICATIONS COMMITTEE

The Committee met on 27 August 1993 under the Chairmanship of Professor Clarricoats and discussed the following items :

1. Bulletin and Radioscientist

The Committee recommends to Council the merger of the Bulletin and Radioscientist under the joint Editorship of Professors Dowden and Lagasse who will be aided by Associate Editors.

The Commissions will be encouraged to contribute through a specific statement printed in the preface of each issue.

The Editorial policy will be such that material for the Radioscientist will be refereed, as at present, with the Editor executing the final responsibility for publication. The volume of material will be subject to such constraints as imposed by financial considerations.

The publication will be circulated to URSI Member Academies for distribution to their existing lists of radioscientists. Effort will be made to reduce duplication in distribution.

The Editors will seek advice from ISBN to ensure adequate indexing.

2. URSI News

Professor Dowden will investigate the feasibility of producing an e-mail version of URSI News and will advise the radioscience community through the Bulletin/Radioscientist.

3. Review of Radio Science and Modern Radio Science

The Committee recommends that the above publications be published separately rather than as a merged entity.

Dr. Stone agrees to continue as Editor of "Review of Radio Science " while the choice of the Editor for Modern Radio Science will be determined by the organising committee for the 25th General Assembly.

Dr. Stone seeks proposals for an Assistant Editor for "Review of Radio Science " who should be appointed by the URSI Board. He has made arrangements with Commissions to furnish the Commission Editors.

P.J.B. CLARRICOATS, CHAIR

REPORT OF THE STANDING COMMITTEE ON YOUNG SCIENTISTS

URSI does not limit its support of Young Scientists to the implementation of the ambitious attendance programme at General Assemblies. Important funds are also earmarked for the period between General Assemblies. In 1991 URSI provided support for the attendance of 14 Young Scientists at URSI-sponsored or co-sponsored conferences. The URSI commitment to this was $11,000. In addition, the attendance of 26 young scientists from developing countries at the College on Theoretical and Experimental Radio Propagation at Trieste was partially supported by URSI.

In 1992, the attendance of 53 Young Scientists at URSI organized or co-sponsored conferences was assisted by URSI or conference funds. Of these 53 Young Scientists, 25 were from developed countries and 10 from developing countries. Eighteen were from Eastern Europe, the Ukraine and Russia. Total amount of support provided was $42,500.

For the participation of Young Scientists in Kyoto, it should be noted that a total of 223 applications have been received from 46 countries of which 96 are from developed countries, 69 from Eastern Europe and C.I.S. and 58 from developing countries. About 193 of these applicants are suitable for URSI Young Scientist Awards. Of these 90% have papers submitted for a regular session of the General Assembly Scientific Programme. The others have not requested their papers be included in the regular sessions. Arrangements have been made at Kyoto by the Japanese organizers to accommodate and provide registration fees and living expenses for 120 Young Scientists at a cost of about $600 each. In addition they have $10,000 for Young Scientist travel support. URSI has about $40,000 available for Young Scientist travel support (most of these funds are from URSI's own budget).

The Committee intended that almost all Young Scientists should present their papers in a regular session. This factor was to be of importance in the selection process. Other factors will be the ranking provided by the Member Committees and, for the industrialized countries, the membership category of the Committee. Special effort is being made at this General Assembly to assist Young Scientists from Eastern Europe and the C.I.S. Also, as at all General Assemblies, young colleagues from developing countries are especially to be encouraged.

It is against this background that the Committee met on 26 August 1993, and discussed the following items :

1. Review of 1990-93 Activities

The Chair reviewed URSI Young Scientist activities in the period since 1990 and also the arrangements for the programme in Kyoto, many details of which had already been distributed to Council. It was noted that the scale of this programme is now such that

it occupies much of the time of the Secretariat in the eight months prior to the General Assembly, and that it is the largest programme of that kind within ICSU.

2. Recommendations for 1990-93

In view of the above the Committee felt that it might not be advisable at present to attempt to enlarge the scale of the programme further, but rather to try to maintain its current level of funding. For Kyoto this is, approximately :

Accommodation and living	(Japan)	$78,000
Travel expenses	Japan	$10,000
	URSI and ICSU	$35,000
	Other sources	$5,500
		$128,500

3. Sources of funding

Dr. Reddy suggested that letters be sent to each of the Member Committees requesting that they seek sources of funding within their country for the travel costs of their Young Scientists. One may not always be able to count on the high level of support provided by the local organizers at Kyoto. Dr. Reddy felt that it would be possible to do this in India for Indian Young Scientists. He drafted a letter which the Chair agreed to sign after minor revisions.

It was pointed out that the task of providing support would be much simplified if an URSI Young Scientist Foundation existed. An amount of about $200,000 would provide sufficient funds for the present level of activity.

E.V. JULL, CHAIR

REPORT OF THE STANDING COMMITTEE ON DEVELOPING COUNTRIES

The Committee met on 30 August under the chairmanship of Professor S.M. Radicella. Were also present : Professor G.O. Ajayi, Professor S. Feng and Dr. B.M. Reddy.

The Committee discussed the following points :

1. Status of the Handbook on Radio Propagation

The Chair reported on the current status of the Handbook, which is devoted to satellite communication. Many chapters had been written and submitted, while some were still expected. After a thorough discussion, the following decisions were taken :

(i) Professor Pontes of Brazil is to be requested to contribute two chapters;
(ii) Professor Ajayi of Nigeria accepted to contribute two chapters;
(iii) Professors Radicella, Feng, Ajayi and Dr. Reddy will constitute the editorial board under the coordination of Professor Ajayi;
(iv) A meeting of the editorial board is to be held in Delhi, India in January 1994 for about four days to finalise the preparation of the Handbook. URSI support is requested for the meeting expenses.

2. *Training activities and meetings co-sponsored by the Standing Committee / Relation with the reorganized ITU*

The discussion was based mainly on the report to the URSI Council presented by Professor Radicella. The Memorandum of Understanding between ITU, URSI and the ICTP in Italy was commendable and should be encouraged. This is to ensure that developing countries benefit from the reorganization of the ITU, and particularly from the new activities of the Telecommunication Development Sector.

S.M. RADICELLA, CHAIR

REPORT OF THE SCIENTIFIC COMMITTEE ON TELECOMMUNICATIONS

A meeting of the Scientific Committee on Telecommunications was held on Friday 27th August. The meeting was attended by 17 persons.

1. The meeting reviewed the work done in establishing the SCT.
2. The commissions were asked to consider the study topics already identified by the ITU-R members, and also to consider the topics which have been the subject of joint sessions at this General Assembly. The object of this process is to identify if the interest in any topic is sufficient for the establishment of new Task Groups or Joint Task Groups.
3. The continuation of the Joint Task Group on "the characterization of the mobile and personal communication channel" (chaired by Dr.J. Shapira) was confirmed.
4. The meeting took account of the discussions within the Long Range Planning Committee concerning future developments in information transfer and communications, and proposed ways of taking this matter forward.
5. The SCT made the following proposals:
   - 5.1. The Coordinating Committee should coordinate and oversee the programs of the commissions and of the intercommission working groups, directed towards "information / communication beyond 2000" at each of its meetings.
   - 5.2. The SCT should promote the establishment of Task Groups and Joint Task Groups where inter-Commission or Commission / ITU-R Study Group expertise is necessary for the study of relevant topics.
   - 5.3. A session on future telecommunications should be included in the programme of the ISSSE. Consideration should also be given to the inclusion of such sessions at conferences which are URSI-sponsored.
   - 5.4. The SCT should organise, with the active cooperation of the Commissions, COMMSPHERE-94 during the forthcoming triennium. This conference is devoted to future telecommunications and information transfer.

     Key Topics for inclusion in Commsphere-94 include:
     - satellite mobile communications and coordination and integration with terrestrial cellular systems.

- mobility and flexibility in the communications networks.
- radio astronomy and the electromagnetic environment.

5.5. Future General Assemblies should include one or more sessions on the subjects sponsored by the SCT.

Taking advantage of the presence of experts at the General Assembly a first planning meeting has been held anticipating the approval of COMMSPHERE-94. If approved, this conference could be held in Israel in December 94. This provides a geographic spread with ISSSE (San Francisco) and the next General Assembly (Lille).

6. To support the activities of the SCT it would be advantageous if some funding could be made available

6.1. to assist some scientists to attend COMMSPHERE. This will need to be considered when an application for sponsorship of this conference is made;

6.2. to assist in the establishment of an E-mail system for rapid communication between members of the Joint Task Group on the Mobile and Personal Communications Channel.

L. W. BARCLAY, CHAIR

REPORT OF THE INTERCOMMISSION WORKING GROUP ON TIME DOMAIN WAVEFORM MEASUREMENTS (IWG-TDWM)

A meeting of the Intercommission Working Group on time Domain Waveform measurements [IWG--TDWM] was convened on Friday, August 27 at 1:00 p.m.. The meeting was attended by 17 persons representing various commissions.

It was resolved at the meeting that (see Resolution U.14) :

1. The IWG--TDWM should continue for another three years, if approved by the Council.
2. T.K. Sarkar should continue as Chair of the IWG-TDWM, if approved by the Council. No Vice-Chair was proposed.
3. The IWG-TDWM should try to organize joint sessions in the following areas:
   (a) Transient radar (both classical and subsurface) and signal analysis. It is anticipated that Commissions A,B,C, and E would be involved. Dr. Carl Baum (of Com. E) is already organizing a session on transient radar at the international conference EUROEM/NEM/HPEM'94 at Bordeaux.
   (b) Waveform characterization on printed circuits. Commissions A,B,D, and E would be involved.
   (c) Time Domain measurement system calibration . This topic would involve commissions A and B.

T. K. SARKAR, CHAIR

REPORTS ON ACTIVITIES OF INTER-UNION ORGANIZATIONS

INTER-UNION COMMISSION ON THE ALLOCATION OF FREQUENCIES TO RADIO ASTRONOMY AND SPACE SCIENCE (IUCAF)

1. Dr. Robinson prepared a report on the most recent activities of IUCAF. The essential points of this report are summarized below :
"IUCAF, the Inter-Union Commission on the Allocation of Frequencies to Radio Astronomy and Space Science, was set up in 1960 by URSI, IAU and COSPAR. Its brief is to study and coordinate the requirements for radio frequency allocations for radio astronomy, space science and remote sensing in order to make these requirements known to the national and international bodies responsible for frequency allocations. IUCAF also takes action aimed at ensuring that harmful interference is not caused to radio astronomy, space science or remote sensing (operating within the allocated bands) by other radio services. It has to be particularly vigilant about radio transmissions from aircraft or space vehicles.
IUCAF has maintained its network of Correspondents in 35 countries to interact with national authorities responsible for radio frequency allocations.
During the period February to November 1992 it held meetings in Torremolinos (Spain) and Paris (France) and took part in :
   - The ITU World Administrative Radio Conference (Spain, 3 February - 4 March 1992). The "Final Acts" of WARC-92 are a binding international treaty on the member countries of ITU. In these "Acts" the status of space research, earth exploration and radio astronomy has been significantly enhanced relative to other users of the radio spectrum from 137 MHz to 3 GHz and above 13.5 GHz. Delegates from 125 countries at the WARC clearly recognized the importance of scientific use of the radio spectrum in the face of increasing pressures from telecommunications, broadcasting, navigation and military interests, particularly telecommunications and broadcasting transmissions from satellites.
   - Meetings in Moscow (June 1992) with the Russian Administration of the GLONASS Satellite Navigation System and the Russian Scientific Council for Radio Astronomy.
   Harmful interference to radio astronomy observations of the important 1612 MHz line of the Hydroxyl (OH) radical as well as the OH lines at 1665 and 1667 MHz are caused by emissions from the 14 GLONASS navigation satellites launched so far.
   - An IAU/ICSU/UNESCO Exposition in Paris (July 1992) on Adverse Environmental Impacts on Astronomy.
   - Discussions with Space Frequency Coordination Group (SFCG) in Sydney (October-November 1992).

IUCAF also provided input papers to CCIR meetings of Study Group 7 (Scientific Services) in Geneva and Study Group 8 (Mobile Satellite Communications) in Tokyo.

2. Statement of Income and Expenditure for the year ended 31 December 1992

INCOME (in USD)		
Contribution from :	URSI	3,000.00
	ICSU	3,100.00
	IAU-1991-92	4,000.00
	TOTAL INCOME	
	10,100.00	
EXPENDITURE (in USD)		
- Expenses DOUBINSKY		4,200.00
- Expenses SWARUP		2,400.00
- Expenses THOMPSON		620.00
- Expenses ROBINSON		3,410.00
	TOTAL EXPENDITURE	
	10,630.00	
Excess of Expenditure over Income for the year		530,00
Accumulated Balance at 1 January 1992		17,431.94
Accumulated Balance at 31 December 1992		16,901.94

Rates of exchange

1 January 1992 : $1 = BEF 33,00

31 December 1992 : $1 = BEF 33,00

3. Meeting of IUCAF members and correspondents present in Kyoto, on 27 August 1993

The following items were discussed (see Resolution U.18) :

1. (a) Negotiations with the Russian Administration to change the carrier frequencies of the GLONASS navigation satellites will continue in Moscow on 1-5 November 1993. On the basis of joint tests carried out in November 1992 the GLONASS system could use 12 carrier frequencies in place of the existing 24. The highest carrier frequency would be 1608.75 MHz. Interference to the Radio Astronomy Band 1610.6 - 1613.8 MHz would be reduced by more than 20 dB, as shown in the tests in November 1992 [Ref. : ITU Radiocommunication Study Group Doc. 7D/TEMP/17-E of 5 April 93].

1. (b) A high-powered Russian Delegation will be in Australia from 1 to 5 September 1993 and in Japan from 6 to 10 September 1993 to negotiate IFRB coordination of the GLONASS system with the Australian and Japanese governments. IUCAF member Dr. J.B. Whiteoak will take part in the Australian meeting while IUCAF member Dr. M. Ishiguro is in touch with the Japanese Ministry. We plan to advise Dr. Ishiguro of the status of the negotiations to be reached this week in Australia.
2. Concerning INMARSAT plans for Mobile Satellite Communications in Europe, IUCAF has had Dr. R.J. Cohen and Dr. T. Spoelstra active on a CEPT Project Team (SE17) to set sharing constraints for MSS land mobiles in the band 1610-1626.5 MHz. The Project Team has agreed on Coordination Distances of 100 km around Radio Astronomy Observatories for Land Mobile Uplinks to MSS satellites. Also, limits of -125 dBW/4 kHz have been set on out-of-band emissions from land mobile uplinks to MSS satellites.
   The MSS satellite downlinks have secondary ITU allocations and must not interfere (Footnote 733E of Radio Regulations) with the primary allocation to Radio Astronomy in the band 1610.6-1613.8 MHz [WARC-1992].
3. IUCAF discussed preparations for future World Radio Conferences (WRC-93, WRC-95 and WRC-97). Two IUCAF observers will attend WRC-93 in Geneva from 15 to 19 November 93. There is particular concern about a proposal from CEPT countries proposing active services in bands which are currently exclusively passive (e.g. 1400-1427 MHz hydrogen line band) for Mobile Satellite use.
4. A proposed URSI Resolution was discussed. This was later supported by Commission J (see Resolution U.20).
5. Confidentiality of IUCAF Documents was discussed. It was agreed that all numbered IUCAF Documents should have unrestricted circulation.
6. IUCAF discussed the work of the Panel on Adverse Environmental Impacts on Astronomy, including :
   (a) The exposition held at UNESCO Headquarters in Paris in July 1992.
   (b) The recent Space Billboard proposal by Space Marketing Incorporated of Atlanta, Georgia. This proposes a 1000 m x 400 m Space Billboard in low earth orbit (≈ 300 km) in 1996.
7. An ERO/CEPT document was tabled which pointed to the commercial value of the 36GHz of passive spectrum allocated by the ITU below 265 GHz. This was quoted as 15% of the spectrum. This will be challenged at CEPT level by Dr. T. Spoelstra and Dr. R.J. Cohen.
8. IUCAF discussed possible involvement in a series of presentations by the ITU Voluntary Group of Experts in 1993 and 1994. IUCAF had been alerted to these meetings by Dr. Struzak of ITU.

B.J. ROBINSON, CHAIR

BUSINESS TRANSACTED BY COMMISSIONS

The following summaries of the activities of the URSI Commissions during the General Assembly have been prepared using the documents provided by the Officers of the Commissions.

COMMISSION A - ELECTROMAGNETIC METROLOGY

Chair : Dr. J. Vanier (Canada)

Vice-Chair : Dr. P.O. Somlo (Australia)

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held three Open Commission Meetings, respectively on 25, 27 and 30 August 1993. Mr. J. McA. Steele acted as Chair for these meetings in place of Chairman Vanier who was unable to attend the General Assembly following a recent operation. Dr. W.J. Klepczynski kindly volunteered his services as rapporteur for the business sessions. There was unanimous support for the proposal of the acting Chair that he should send a message to Dr. Vanier from all those present conveying collective good wishes for a rapid and complete recovery.

First Open Commission Meeting (25 August 1993)

1. Following approval of the agenda a brief report was presented on the Business Meetings of Commission A held at the XXIIIth General Assembly (Prague, 1990).
2. An explanation on the status of elections for the next Chair and Vice-Chair was given by Mr. Steele. Due to the recent, unexpected retirement of the current Vice-Chair, there was no incumbent in that office to succeed Dr. Vanier as Commission Chair. Accordingly, both a Chair and a Vice-Chair had to be elected at this General Assembly from the list of candidates which has already been circulated to the Official Members. The situation was complicated by the fact that 12 Member Committees had already indicated their preferences by postal votes. It was decided that the Commission should put forward two names, one for the Chair and the other for the Vice-Chair, from the list of candidates. A strong recommendation for the choice of Chair would accompany the names although the final approval would rest, of course, with Council.
3. The discussion next centered on the Chair's report. Meetings mentioned in the report included CPEM (Paris, 1992) and ISEM (Beijing, following the General Assembly). The CPEM Executive Committee had been engaged in a revision of the Charter of the Conference. An executive summary of the changes which were proposed was circulated to the members present to afford them the opportunity to study the revised Charter and assure themselves that the association between URSI and CPEM was still valid. In view of the conjunction of the next URSI

General Assembly and the next but one meeting of CPEM of 1996 it might be desirable to attempt to coordinate the meeting dates. (see Resolutions A.1 and A.2)

The future of the URSI Register of National Standards Laboratory (IOP Publishing, 1990) was briefly discussed. After initial sales of a reasonable number of copies, subsequent annual sales have fallen to a low number (7 in 1992). No need was foreseen at present to consider updating the publication.

The CCIR had recently undergone significant change and its functions were now embodied in the new Radiocommunications Bureau (RB) of the ITU : it was not clear what form the past CCIR/URSI link should take in relation to the revised organization. It was suggested that Mr. R.C. Kirby, Past Director of the CCIR and the first Director of the ITU-RB, who was present at the Assembly, might address the Commission and report on the latest situation.

4. Further discussions ensued on the election of officers : this topic would be pursued at the second Open Commission meeting.
5. Discussion on the sponsorship of conferences by URSI followed. The new charter of CPEM appeared to be acceptable and consistent with the aims of URSI and it was agreed to recommend that sponsorship of this Conference by URSI be continued.
6. The terms of reference for Commission A were then discussed. The acting Chair distributed a copy of the existing terms and requested members to verify their correctness and continued relevance. A round table discussion was scheduled for the second meeting.
7. Nominations for representation to other organizations were discussed. The Chair of Commission A is automatically the representative to the CPEM, CIPM, CCDS, CCDS and CCE. Currently, Olaf Lunden is representative to IEC/ISO, and Sigfrido Leschiutta to IMEKO ; they both agreed to present their respective reports later in the meeting.
8. On the subject of Opinions, Recommendations and Resolutions, a draft Recommendation/Opinion was offered by Dr. K. Dorenwendt (Germany) concerning EM field measurements. Professor S. Hahn (Poland) offered a suggestion for a second Recommendation relating mass to fundamental constants.
9. Finally, Dr. T.K. Sarkar (U.S.A.), chairman of the IWG-TDWM (Inter-Commission Working Group on Time Domain Waveform Measurments) provided a report on the group's activity at the U.S. National URSI Meeting in Boulder, Colorado in January 1992.

Second Open Commission Meeting (27 August 1993)

1. Mr. McA. Steele opened the meeting by reporting on the results of the election. The candidate receiving the most votes was Dr. U. Stumper of Germany. The next candidate was Dr. M. Kanda of the USA. Consequently, these names would be passed to Council with the recommendation that the Dr. Stumper be approved as the incoming Chair and Dr. Kanda as the Vice-Chair for Commission A.
2. Mr. Richard Kirby, Director of the ITU Radiocommunication Bureau, addressed the Commission concerning the future interaction between URSI and the radiocommunications sector of the ITU. He felt that liaison and interchange between the two bodies would continue to be fruitful and would extend also to the

whole field of communications through the activities of the Scientific Committee on Telecommunications.

3. Four draft Recommendations were discussed. Two concerning, respectively, optical frequency generation and measurement and the scheduling of future conferences were accepted and passed to Council. The draft text dealing with EM field measurements was deferred to allow for consultation with Commission K. The remaining text on a proposed quantum base for the unit of mass, derived from Professor Hahn's original suggestion, was tabled for consideration. (see Resolutions A.3 to A.5)
4. The terms of reference of Commission A were further discussed. It was concluded that there was no pressing need for change and that they should be left unaltered.
5. Mr. Kirby further addressed the Commission on the reorganization within the ITU and the role of the Radio Communication Bureau as part of the new structure. Mr. Steele warmly thanked the director for his contribution.

Third Open Commission Meeting (30 August 1993)

1. Acting Chairman Steele opened the meeting by requesting reports on meetings of other organizations which had not so far been presented. He had himself represented URSI at the 12th meeting of CDDS (Sèvres, 24-26 March 1993) and summarized the recommendations which had been adopted. These related to the accuracy of primary standards, timing of millisecond pulsars, scheduling of GLONASS common-view time comparisons, clock comparisons by satellite laser techniques, improved time coordination to UTC and GPS time transfer standardization. In addition, the CCDS had established a Working Group on the Application of General Relativity to Metrology under the chairmanship of Dr. Bernard Guinot. In response to an invitation to contribute an URSI representative to this body Mr. Steele indicated that he would be prepared to serve in that capacity and this was approved.

   Professor Leschiutta next reported on IEC activities. He noted also that he had declined an offer to hold a meeting on time and frequency within the framework of ISO.
2. The two remaining recommendations were approved : one concerning the kilogram in relation to fundamental constants; the other dealing with accurate EM field measurements, after the addition of a clause reflecting its impact on Commission K studies.
3. The major business having been completed Mr. Steele then introduced the Chair-Elect, Dr. Stumper, who subsequently presided the remainder of the meeting.
4. Dr. U. Stumper nominated the next Vice-Chair of the Commission as editor of the Review of Radio Science for Commission A and Mr. Luc Erard as editor of the references contained on disk.
5. Topics for the next General Assembly were then discussed. The suggestions included :
   1) Measurement of field radiation from small devices;
   2) HDTV measurements;
   3) New frequency standards;
   4) Standards for optical fibres in telecommunications.

6. In concluding the session Dr. Stumper conveyed thanks to Mr. Steele for ably chairing the Open Meetings in the absence of Dr. Vanier, thereby allowing Commission business to be satisfactorily discharged.

SCIENTIFIC PROGRAMME

Commission A organized five Scientific Sessions, namely

A1 Communication systems and optical fibres
Conveners : K. Morita and H. Ishio (Japan);
A2 Microwave/millimetre wave standards
Conveners : S. Kashyap (Canada) and T. Iwasaki (Japan);
A3 New developments in atomic frequency standards
Conveners : K. Nakagiri (Japan) and R.J. Douglas (Canada);
A4 Navigation systems : from the sextant to GPS
Conveners : W.J. Klepczynski (USA) and F. Takahashi (Japan);
A5 Quantum metrology and fundamental constants
Conveners : T. Endo (Japan) and B. Taylor (USA).

The Commission was also the leading organizer of the following joint sessions :

AB1 Time domain metrology
Conveners : S. Riad (USA) and K. Itoh (Japan);
AB2 Antenna measurements
Conveners : S. Adachi (Japan) and M. Kanda (USA);
AD Lasers : stabilization and applications
Conveners : J. Helmcke (Germany) and A.J. Seeds (U.K.).

The Commission further participated in joint sessions CA, DA, EA, JA and KA.

COMMISSION B - FIELDS AND WAVES

Chair : Professor Fred E. Gardiol (Switzerland)

Vice-Chair : Professor A. David Olver (United Kingdom)

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held three Open Commission meetings, respectively on 25, 27 and 30 August 1993. They were attended by a total of 58 delegates and members.

1. Election of a Vice-Chair

Three candidates had been nominated for the position of Vice-Chair for the next triennium : S. Adachi (Japan), C.M. Butler (USA) and G.L. James (Australia). Due to the fact that two of the nominations had been received late, it had been necessary to run two mail ballots. At the final business meeting, any Official Member who was

present and had previously voted was given the opportunity to change his vote, and any Member who had not voted was allowed to do so. In the ballot 30 votes were cast, resulting in the submission to the Council of the following two names, in order of preference:

1. C.M. Butler
2. G.L. James

2. Terms of Reference

The Terms of Reference had been revised and agreed to at the XXIIIrd General Assembly in Prague, so it was not felt necessary to modify them after only three years.

3. Review of Radio Science

The Commission B Editor of the Review of Radio Science for the last triennium, Professor S. Ström, reported on the procedure he had used to select the topic and authors of the four Commission B chapters. The work had been encouraging and he thought that the result was four good reviews of important electromagnetic topics. The process of compiling the bibliographic diskette had been time consuming but he had been assisted by 6 Topic Editors who had selected and condensed the references submitted by member countries. He hoped that the disk would be useful to scientists and engineers as a condensed bibliography of electromagnetic theory and applications. The meeting warmly thanked Professor Ström for his hard work.

Dr W.R. Stone, the Editor of the Review of Radio Science, explained that the format for the 1996 Review would be similar to that for this triennium with a book published by Oxford University Press and a diskette. Subsequently it was decided to split the work of editing into two parts, the new Commission Editor, Professor Y Rahmat-Samii, would be responsible for the book chapters and an Assistant Commission Editor, Professor A. Tijhuis, would be responsible for the bibliographic diskette.

A short discussion was held on the usefulness of the diskette. There was general support for the database of references with a feeling that it was too soon to abandon something which had only just been received. Some members felt that the diskette only duplicated existing databases and was not worth the considerable effort needed in compilation, but others thought that it could be a very useful condensed review of publications over the last triennium.

4. Radio Science

Radio Science, published by the American Geophysical Union, has a special issue devoted to selected papers presented at the 1992 Electromagnetic Theory Symposium. The Guest Editor, Professor A. Ishimaru, reported that the editing was complete. The papers would be published over two parts in the September/October and November/December 1993 issues of Radio Science. He also reported that it had been agreed by the Editor of Radio Science that a special issue could be devoted to selected papers from the 1995 Electromagnetic Theory Symposium.

The Chair informed the meeting that each Commission had been asked to appoint an Associate Editor for Radio Science. However, Commission B already had good coverage in the journal. Also the Editor and a journal associate editor were

Commission B people so it was not necessary to have an additional person. Still, it was felt that coverage could be enhanced in parts of the world outside of Europe and the USA. Three participants volunteered from Australia, Israel and Turkey, and their names were transmitted to the Editor of Radio Science.

5. Inter-Commission Working Group on Time Domain Waveform Measurements

This is a Working Group run jointly by Commissions A,B,C,D and E. Professor T. Sarkar, Chair of the Working Group, reported on the work of the Group. A session had been organised at the 1992 Asia Pacific Microwave Conference, and a joint session on Time Domain Metrology was being held at this General Assembly. The Working Group had identified three topics which should be studied: transient radar and signal analysis for both classical purposes and sub-surface investigations; waveform characterisation on printed circuits; time domain measurement system calibration. It was hoped to continue the efforts of the Group to coordinate studies and symposia during the next triennium. The meeting thanked Professor Sarkar and supported the Working Group. It recommended that Professor Sarkar should continue as Chair for the next triennium.

6. Co-sponsorship of Meetings

The meeting decided to support the applications for co-sponsorship from the 'Asia Pacific Microwave Conference' in Japan in 1994, the 'International Conference on Mathematical Methods in Electromagnetic Theory' in the Ukraine in 1994, the conference on 'Physics and Engineering of Millimeter and Submillimeter Waves' in the Ukraine in 1994 and the 'International Conference on Computational Electromagnetic and its Applications' in Beijing, China in 1994.

7. 1995 Electromagnetic Theory Symposium

The Vice-Chair introduced a discussion on the organisation of the 1995 Electromagnetic Theory Symposium to be held in St. Petersburg, Russia, from 23 to 26 May 1995. The Technical Programme Committee was being set up. The Chair of the Local Organising Committee, Professor V. Buldyrev, had the local arrangements in hand. A number of delegates and members requested short time scales with the date for the submission of Abstracts as close to the Symposium as possible. The potential for submission by electronic mail was discussed. The problems of postal communication into and out of Russia meant that it would be better to set up the base of the Technical Programme Committee in London. In this way non-CIS participants could be sure of the expected short time responses and a good programme could be organised.

8. Venue for the 1998 Electromagnetic Theory Symposium

The Chair reminded the meeting that the decision had been made in Sydney to select the venue for the next but one Electromagnetic Theory Symposium in Kyoto. This was 5 years ahead of the event but would give organisers time to book good venues. Four member countries had offered to host the 1998 Symposium - Greece, Ireland, Japan and the USA. Presentation of the venues and facilities were made at the first business meeting by Dr T. Teshirogi for Fukuoka in southern Japan and by Dr E. Kriezis for Thessaloniki in Greece. At the second meeting, Dr A. Cangellaris

presented the proposal from Tucson, Arizona, USA. There was no representative at Kyoto to present the proposal from Dublin, Ireland.

At the third meeting a vote was taken of those official members who were present. The first vote eliminated Dublin and Fukuoka but there was a tie between Thessaloniki and Tucson. A second vote also produced a tie. It was therefore decided to ask the incoming Chair to conduct a postal ballot to decide between Thessaloniki and Tucson.

9. Commission B Programme in Kyoto

The Chair initiated a discussion on the Commission B Programme in Kyoto. The technical contents of the sessions were considered to be well balanced between the Commission sessions on theory and techniques and the more application oriented joint sessions organised with other Commissions. There was commendation for the efforts of the joint Convenors of Commission B sessions who had put together a good selection of invited and contributed papers. There was also strong praise for the local organisers in the Conference Centre who had made all the arrangements work very smoothly.

The large Poster Session was judged to have been a success and some of the presenters said that they had found it well worth while. Two adverse comments were the need for authors to stay by their posters for three hours and the relatively large number of no-shows. By comparison the number of no-shows in the oral sessions was small.

Many delegates expressed the view that the technical part of the General Assembly stretched over too long a period of time and should be compressed into one working week of 6 days. It was felt that this could be done without losing the essential flavour of the General Assembly. A show of hands indicated that 20 were in favour of a shorter Assembly, 4 were in favour of the present arrangement and 10 had no strong view one way or the other. Delegates from the USA expressed the view that the present timing of the General Assembly should be changed because there was an increasing number of Universities which were starting classes in the middle of August.

10. Proposal for two Vice-Chairs of Commissions

The Vice-Chair introduced a discussion on the proposal from the United Kingdom to have two Vice-Chairs for Commissions. This was suggested because of the increased profile of the Commissions in URSI and the consequent greater work load of the officers. There was general support for the aim of increasing the profile of URSI, and realisation that URSI depends on volunteers to achieve its aims. Subsequently the U.K. withdrew the proposal because there had been insufficient support in other Commissions.

11. Individual Membership of URSI

Professor T.B.A. Senior explained the proposal to have a Network of Correspondents instead of individual membership in URSI. All those who attended the Kyoto General Assembly would automatically be Correspondents for the next triennium and would receive a membership card and copies of The Radio-Scientist (which would be merged with the Bulletin). There was general support for this proposal.

12. Vote of Thanks

The Vice-Chair, Professor A.D. Olver, proposed a vote of thanks to the outgoing Chair, Professor F.E. Gardiol, for the excellent way in which he had led the Commission during the last triennium. This was carried by acclamation.

SCIENTIFIC PROGRAMME

Commission B organized eight Scientific Sessions, namely

B1 Guides waves
Conveners : A.H. Sihvola (Finland) and R.E. Collin (USA);
B2 Planar antennas
Conveners : A. Papiernik (France) and T. Teshirogi (Japan);
B3 Small antennas
Conveners : H. Nakano (Japan) and L. Shafai (Canada);
B5 Time domain techniques
Conveners : A. Tijhuis (Netherlands) and R. Luebbers (USA);
B6 Numerical techniques
Conveners : D. Wilton (USA) and E. Yamashita (Japan);
B7 Inverse problems
Conveners : R. Stone (USA) and D. Lessellier (France);
B8 High frequency techniques
Conveners : O. Bucci (Italy) and A. Nosich (Ukraine);
B9 Wave propagation and enhanced backscattering in random media
Conveners : A. Ishimaru and V.I. Tatarskii (USA).

The Commission further participated in joint sessions AB1, AB2, CBEF, EB, JB and KB.

COMMISSION C - SIGNALS AND SYSTEMS

Chair : Professor P.A. Matthews (U.K.)

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held three Open Commission Meetings, respectively on 25, 27 and 30 August 1993.

First Open Commission Meeting (25 August 1993)

1. The terms of reference of Commission C were reviewed. It was suggested that the terms of reference did not adequately reflect the many and varied subjects covered by the Commission and that the terms of reference should be more explicit. However it was considered that the term "telecommunications" was all embracing and that it would be difficult to find other terms which did not exclude some

facets of the work of Commission C. There was no resolution to alter the terms of reference.

2. The reason for the retirement of the Vice-Chair was explained briefly. The candidates for the Chair, Professors Shishkov and Wittke, and those for the Vice-Chair, Professors Evans, Shishkov and Wittke, were introduced to the attendees. It was decided that voting should take place at the next Open Commission Meeting.
3. The appointment of editors for the Review of Radio Science and the disk was discussed, together with the value of the disk. There was a general opinion that the references which could be assembled by the individual national members did not reflect the totality of work in the countries relevant to the interests of members of URSI. Commercial databases such as INSPEC and other networked data bases are comprehensive. The amount of individual effort required from the members is considerable. There was no evidence of use of the previous disk by members of Commission C. It was suggested that the Commission should not contribute to the disk, but it was finally decided that no decision should be taken before further discussion.
4. The need for preparation for ISSSE'95 and GA'96 was introduced by Chairman Matthews. The programme for ISSSE'95 was to be introduced by the Chair of Commission D at the next Open Commission Meeting. Professor Evans offered to collect suggestions for sessions at the next General Assembly (GA'96).

The meeting closed at 16:00 to allow members to attend the Opening Ceremony. Subsequent to this meeting, and after discussion with the Chair, Professor Shishkov decided to withdraw his candidacy for the Chairmanship.

Second Open Commission Meeting (27 August 1993)

1. Dr. Ross Stone attended this meeting to put the case for the preparation of the disk. He told the meeting that he had had positive evidence from a few people that they had used the disk. The Chair made the point that URSI depended on the goodwill of members to carry out work, and that nobody could be ordered to do anything. There was further discussion, which had to be cut short so that other items of business could be dealt with.
2. Election of the Chair. As Professor Shishkov had withdrawn because he considered that at the present time he did not have the facilities to carry out the work required of the Chair, only one candidate remained. On the basis of write-in votes and the votes of members present Professor Wittke was elected to the Chair.
3. Election of a Vice-Chair. Professor Wittke having been elected to the Chair, there were two candidates for the post of Vice-Chair. Professors Evans and Shishkov. Professor Shishkov had expressed the view that in three years time he expected to have the facilities required if he were to take on the Chairmanship. The result of the ballot for Vice-Chair gave, in order of preference, Professor Evans and Professor Shishkov.
4. Preparations for ISSSE'95 were presented by Professor Itoh from Commission D. Because of the retirement of Dr. Wyner there had been no input from Commission C. There was some discussion on the desirability of IEEE

sponsorship. It was agreed that it was appropriate to work with the relevant national organization of the host country, which in the case of the USA is the IEEE. However IEEE sponsorship on this occasion should not be taken as a precedent for future symposia. Professor Wittke as Chair--elect agreed to represent Commission C in the organization of the ISSSE'95, and to make sure that the technical committee membership should be widened to include people outside the USA .

Third Open Commission Meeting (30 August 1993)

1. The results of the elections for President and Vice-Presidents of URSI were announced, as well as the venue for the next General Assembly.
2. The support from Commission C for other meetings was reviewed, and the list provided by the Secretariat for future meetings was considered. It was decided that the meetings on that list contained only one which was appropriate for Commission C support, i.e. the IGARSS meeting, and that this meeting should receive a similar support in the future as it had during the last three years. It was noted that support had been given to the first COMMSPHERE meeting, that none had yet been requested for the second, but that if a request were made and the URSI conditions satisfied, support would again be given as before. There was a request from the floor to support the 2nd International Conference on Digital Signal Processing for Communications, to be held in Adelaide in April 1994. The organizers had been given copies of the URSI regulations and forms. If the conditions are satisfied Commission C would give support for the attendance of young scientists, particularly from SE Asia. Suggested levels of support were :

IGARSS	$2500	YS $2000
COMMSPHERE	$ 750	YS $1000
2nd ICDSPC		YS $1000
ISSSE'95	$2000	YS $1500

3. The issue of the work involved in the preparation of the disk was again debated. After some considerable discussion it was agreed that a selective set of references should be prepared, based on the topics selected for presentation at the next GA. The work would be coordinated by the Commission Chair and Vice-Chair.

SCIENTIFIC PROGRAMME

Commission C organized ten Scientific Sessions, namely

C1 Synthesis and analysis of systems
Convener : B. Shishkov (Bulgaria);

C2 Computer aided telecommunications network design
Convener : K. Geher (Hungary);

C3 Picture coding
Convener : P. Delogne (Belgium);

C4 Optical space communications
Convener : Y. Furuhama (Japan);

C5 Millimetre wave premises communications systems
Convener : J.P. McGeehan (U.K.) and A. Young (Australia);

C6 Synchronization in telecommunications
Convener : M. Moeneclaey (Belgium);
C7 Digital techniques in broadcasting and DAP
Convener : P. Shelswell (U.K.);
C8 Signal processing for magnetic recording
Convener : J. Wolf (USA);
C9 Mobile satellite communication systems
Convener : S. Kato (Japan);
C10 Modelling of signals and systems
Convener : W. Schwarz (Germany).

The Commission was also the leading organizer of the following joint sessions :

CA Recent advances in communications satellites in-orbit testing
Conveners : G. Hyde, V. Rignies (USA) and B. Kastan (France);
CBEF Propagation and modulation in personal radio communication
Conveners : P.A. Watson, L. Lopes (U.K.), J. Shapira (Israel), J.C. Bic (France) and T. Manabe (Japan);
CD Optical-microwave interaction devices and systems
Conveners : M. Akaike (Japan) and T. Berceli (Hungary);
CE Communication in the presence of non-gaussian noise and interference
Conveners : W. Schwarg (Germany) and A.D. Spaulding (USA);
CFG Propagation effects of ionized and non-ionized media on broadband signals
Conveners : K. Craig (U.K.) and C. Rush (USA).

The Commission further participated in joint sessions FCA and FC2.

COMMISSION D - ELECTRONICS AND PHOTONICS

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

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held two Open Commission Meetings, respectively on 25 and 27 August 1993.

First Open Commission Meeting (25 August 1993)

1. Dr. Sorrentino was appointed as minute secretary. Dr. Hénaff circulated an attendance list and an "update" list for Official Members.
2. Election of Officers
At the conclusion of this General Assembly, the present Vice-Chair will become Chair of Commission D.

Dr. Hénaff mentioned that three persons had been nominated as candidates for the Vice-Chair for 1993-96, viz. Dimitri G. Alexandrov (Bulgaria), Ajoy K. Ghatak (India) and Roberto Sorrentino (Italy). It was noted that the first two were not present at the Conference.

Dr. Itoh read the summaries of the three candidates. He described the duties of the Vice-Chair and remarked that the primary duties are to act as Commission D Editor for the Review of Radio Science and to initiate the organization of ISSSE'98.

Dr. Itoh solicited the opinion of the attendees whether it would be advisable to have two Vice-Chairs, a senior and a junior. This would be either for reducing the work load and/or for avoiding problems arising from the possible resignation of the Vice-Chair.

Dr. Skellern stressed the importance of electing somebody who is really interested in doing the job. In case of resignation, additional elections could be made by correspondence.

Dr. Sorrentino expressed the opinion that collaboration between two Vice-Chairs living in far away countries could be very inefficient.

Dr. Itoh expressed the opinion that the job is voluntary, but once accepted, it is not voluntary any more. The work load could be reduced by introducing a secretary.

Dr. Martin Pascual brought up the idea of a permanent secretary, who could also improve the communication with the central organization of URSI.

At the end of the discussion, there was general agreement on the idea of having a permanent secretary rather than two Vice-Chairs.

3. Review of Radio Science

Dr. Itoh reported on recent modifications to the format of the Review. He also described the work he had done as Commission D Editor.

The Commission debated the usefulness of the diskette containing annotated references. The general opinion was that the production of the diskette should be discontinued, since well organized data bases are already accessible from computer networks. (see Resolution D.2)

Professor Feng disagreed with the general opinion. He stressed the mission of Radio Science in combining the wave propagation approach with device description.

The Commission voted a motion proposed by Professor Itoh that the diskette should be discontinued. The motion was approved (unanimous, with one exception).

4. Terms of reference

Dr. Hénaff suggested to keep the present terms of reference.

Dr. Skellern moved (El Ghazaly seconded) that the present terms of reference be confirmed. All were in favour.

5. Proposed ISSSE'95

Dr. Itoh reported on the progress of the organization of the Conference. The ISSSE'95 will be held in San Francisco, Hotel Parc 55, on October 25-27, 1995. The General Chair will be Dr. J. Mink. Estimated attendance : 350.

Copies of the First announcement were circulated.

Cooperative sponsorship had been obtained from several IEEE Societies. The MTT Society was receptive of co-sponsoring ISSSE'95 with a 10% financial involvement.

Dr. Itoh pointed out the advantages of having also the co-sponsorship of an IEEE society (conference mechanism very well organized, liability insurance for officers, bank account, etc.).

IEEE cooperative sponsorship had already been obtained for ISSSE'93 in Paris.

El Ghazaly proposed (Professor Schweicher seconded) to approve the programme proposed for ISSSE'95, with co-sponsorship of the IEEE MTT Society. All were in favour.

6. Scientific Programme for the General Assembly 1996
   A questionnaire was circulated among the attendees.
7. Sponsorship of International Conferences
   The Commission decided to confirm the sponsorship of the following conferences that will be held in the next triennium : APMC, EuMC, ECOC. Other conferences could also be sponsored, subject to approval by the Commission Chair.

Second Open Commission Meeting (27 August 1993)

1. Election of a Vice-Chair
   Dr. Sorrentino left the meeting. He was the only candidate present in Kyoto. The Commission therefore unanimously resolved to forward only his name to the Council as a candidate for the Vice-Chair.
2. Review of Radio Science
   The Commission followed the tradition and appointed the Vice-Chair of the Commission as Commission D Editor.
3. Working Groups
   The Commission decided to drop its interest in a Working Group on Damage to Electronic Devices (organized together with Commission E).
4. Scientific Programme for the 1996 General Assembly
   Forms were circulated with a view toward obtaining suggestions for suitable topics. These forms should be returned to the Commission Chair.
5. New business
   Dr. Katehi mentioned the existence of an Inter-Commission Working Group on Time Domain Metrology. Professor Lagasse proposed to discuss this item in a broader perspective during the Inter-Commission Round Table discussion. The Commission approved this point of view.

SCIENTIFIC PROGRAMME

Commission D organized eleven Scientific Sessions, namely

D1 Active integrated antennas
   Convener : T. Itoh (USA);
D2 Numerical modelling of microwave and millimetre wave circuits
   Convener : R. Sorrentino (Italy);
D3 Physical size limitations in semiconductor devices

Convener : A. Jelenski (Poland);
D4 New techniques for mobile radio communications
Convener : M. Nilsson (Sweden);
D5 Progress in semiconductor lasers
Convener : A.J. Seeds (U.K.);
D6 Computer modelling and design of electronic and optical devices
Convener : P. Lagasse (Belgium);
D7 Coherent optical communications
Convener : A. Leboutet (France);
D9 Engineering and applications of optical fiber sensors
Convener : A.M. Scheggi (Italy);
D10 Ultra-high speed A/D converters
Convener : D. Skellern (Australia);
D11 Towards development of a human-like computer
Convener : G. Matsumoto (Japan);
D12 Sub-micron device modelling for VLSI
Conveners : M. Shur (USA) and T.A. Fjeldly (Norway);
Chairs : K. Lee (Korea) and R.J. Mattauch (USA).

The Commission was also the leading organizer of the joint session :
DA Superconductor circuits and devices
Conveners : O. Vendik (Russia) and B. Korniyama (Japan);
Chair : H. Chaloupka (Germany).

The Commission further participated in joint sessions AD, CD and ED.

COMMISSION E - ELECTROMAGNETIC NOISE AND INTERFERENCE

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

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held three Open Commission meetings, respectively on 25, 27 August and 1 September 1993.

First Open Commission Meeting (25 August 1993)

1. Activities since Prague

Chairman Hamelin reported on the activities of the preceding triennium, and mentioned the emphasis which is traditionally put on the Working Groups. He thought that these should interact more strongly. The attitude of the EMC Zurich was discussed :

although URSI sponsors this Symposium, the organizers refuse to display our logo on their announcements and programmes.

2. 1996 General Assembly

Dr. Hamelin proposed that, if the Assembly is held in Lille, the French EMC Symposium should be held jointly with the Assembly.

3. Vice-Chairs

The Commission voted against the UK proposal to elect two Vice-Chairs, and expressed its satisfaction with the present system. It also decided to present to the Council the following two persons for election to the Vice-Chair. In order of preference :

1. Professor Hayakawa (Japan)
2. Professor Ianoz (Switzerland)

4. URSI publications

Chairman Hamelin presented the plans to merge Bulletin and Radioscientist, and mentioned that P. Degauque had been proposed as associate editor of Commission E for the periodical "Radio Science". Professor Degauque subsequently discussed the next Review of Radio Science, which, for Commission E, would normally consist of short review papers, one per Working Group. It was proposed to limit the input to only some of the Working Groups. No decision was reached.

Second Open Commission Meeting (27 August 1993)

1. Finances of the Commission

Dr. Hamelin mentioned that he tried to contact Prof. Remisov, Official Member for Russia, in order to help Russian scientists attend the Kyoto event, but that he did not get any answer. The participants expressed a desire to earmark a larger part of the Commission funds (which will probably total $12,000 in the next triennium) for support of Young Scientists and Working Group meetings.

2. Sponsorship of future meetings

Support of the following Conferences was suggested and approved :

- CEM Toulouse (mode B)
- NEMP Bordeaux (mode A)
- EMC Zurich (mode B, with a strong request to use our logo)
- EMC Sendai (mode A)
- EMC China (possibly mode B)
- EMC Wroclaw (mode B)

3. URSI Publications

M. Hayakawa accepted the task of Commission E Editor for the next Review of Radio Science (RRS), and R. Gardner agreed to serve as Editor of the diskette.

4. Scientific Committee on Telecommunications

R. Parlow reviewed the Friday 27 Aug. meeting of the Scientific Committee on Telecommunications. The Goal of the group is to have closer ties with the ITU

groups. The Committee agreed on the need to work on this in the years between URSI General Assemblies. For instance, at the last COMMSPHERE Symposium, the use of an expert roundtable was successful : this could be used as a model for future cooperative meetings, especially COMMSPHERE II, which will probably be held in 1994 in Israel. This symposium will cover such topics as integrated wireless access networks. MSS and LEO communication satellite systems, interference and coordination, communication for the developing countries, radio astronomy, the EM environment, spectrum management policies and the future of telecommunications. The committee is looking for participation by Commission E members in this cooperative work. Dr. Kelly (Trieste Institute) is planning a meeting on Telecommunication development in the developing world. R. Parlow recommend that Commission E participate in this meeting. V. Scuka noted the importance of Commission E in working on the quality of communication in view of the rapidly increasing developments in communications. R. Parlow will be the Commission E representative to the meeting of the Scientific Committee on Telecommunicaitons ; he will report back to Commission E.

5. Reports by Working Groups (see Resolution E.1)

Working Group E.1 : R. Parlow reported on the activities of the Working Group on "Spectrum Management and Utilization". He stated his willingness to continue as WG E.1 Chair. This was approved.

Working Group E.2 : No report was received from D. Spaulding. V. Scuka will contact him to ask for his recommendation for WG E.2 Chair. Others may also propose names of candidates.

Working Group E.3 : R. Gardner reported on the activities of the working group on High Power Electromagnetics (HPE). The purpose of this working group is to encourage research in HPE, which is defined as EM of sufficient power to cause nonlinear effects. HPE is associated with EM sources, including lightning return strokes, high power microwaves, and electromagnetic pulses. WG E.3 activities included (1) the NEM conference in Chicago - which was international in scope (1/3 of attendees were foreign), and in which there were several hundred papers on HPE; (2) the China EMC conference, which included sessions on lightning and EMP/SREMP; (3) the Zurich EMC symposia of 1991 (HPE session) and 1993 (open meeting presentations); (4) the HPE Workshop in Varenna, Italy (1991). This resulted in contributions to a book on HP microwave work. WG E.3 contributed an article to the Review of Radio Science. R. Gardner noted the significant review article by Carl Baum "From the Electromagnetic Pulse to High-Power Electromagnetics", Proc. IEEE, Vol. 80, No 6, June 1992, pp. 789-817. Upcoming WG E.3 activities include EUROEM 1994, NEM 1996 and Zurich EMC 1995.

J. Hamelin recommended that R. Gardner should continue as WG E.3 Chair, and this was approved.

Working Group E.4 : M. Hayakawa reported on the activities of the working group on Terrestrial and Planetary Noise. He stressed the importance of investigating the behaviour of Schumann resonances to study global warming. He proposed that, at the Zurich Open Meeting, the aspects of manmade noise be highlighted. In the future there will be a joint E4/E7 workshop and participation in a STEP symposium. M.

Hayakawa does not want to continue as WG E.4 Chair because of his heavy schedule : he proposed Dr. Kawasaki as candidate. D. Llanwyn-Jones stated that cosmic ray triggering of lightning should be looked at.

Working Group E.5 : C. Baum reported on the activities of the working group on Interaction with, and protection of, complex electrical systems.

M. Ianoz and P. Degauque reported on EMC symposium papers on coupling, power line EMC problems and interference in substations. C. Baum, P. Degauque and M. Ianoz were elected to continue as WG E.5 Co-Chairs.

Working Group E.6 : V. Scuka reported on the activities of the working group on Effects of transients on equipment. He also reported that he tried to establish joint cooperation with Commission D, but without success. He received an official notice from them that the cooperation was suspended. V. Scuka and B. Demoulin were elected to continue as WG E.6 Co-Chairs.

Working Group E.7 : H. Kikuchi reported on the activities of the working group on the extra-terrestrial and terrestrial meteorological-electric environment. These included the URSI Workshop on "Dusty plasmas and meteorologico-electric environment. with noise and chaos" held on 25-26 March 1992 in Tokyo, and the URSI-ICPIG-RIKEN Symposium on Dusty Plasmas, Noise and Chaos held on 23-24 August 1993 at Saitama, Japan. He also reported that he tried to establish joint cooperation with Commission D, but without success. H. Kikuchi was elected to continue as WG E.7 Chair.

6. Miscellaneous

- Dr. Yoshino reported on seismic efforts on EM fields, and proposed a joint working group EGH to pursue this subject. The Commission accepted this proposal, and appointed Dr. Yoshino as Co-Chair for the Commission E.
- Mr. Wik reported on the URSI ad hoc group on "Environmental consequences of nuclear war, NEMP and associated effects".
- M. Ianoz reported results of the IEC working group on "Standards for measurements".
- M. Hayakawa proposed to open Commission E sessions to contributed papers as well as invited papers. After discussion it was decided that the Commission would continue to have mainly invited papers, but would allow a limited number of contributed papers, especially from young scientists. M. Hayakawa and V. Scuka were asked to write a special statement on this item.

Third Open Commission Meeting (1 September 1993)

1. Publications

M. Hayakawa reported on the meeting of RRS editors. The general editor, Ross Stone, asked each Commission to produce 3 or 4 tutorial papers. The Commission therefore decided to combine the working groups into four blocks :
E4 + E7 + E2 : Kikuchi*, Kawasaki, Spaulding;
E1 + E2 : Parlow*, Spaulding;
E3 + E5 : Gardner, Ianoz, Baum*, Degauque, Nitsch;
E6 : Scuka, Demoulin*.

* responsible editors (others are co-editors)

V. Scuka asked M. Hayakawa to write to all the editors within a few weeks to give them instructions on how to communicate with him for the RRS, and to give them the schedule for submission of articles.

R. Gardner will send a letter to all participants to specify the required format and schedule for submission of references.

V. Scuka summarized the proposed tutorial topics :
1. Overview of mobile communications using low earth orbiting satellites;
2. Development of unlicensed wireless data networks;
3. nonlinear methods in HPE;
4. Review of natural noise : methods of environmental diagnostics;
5. Topology-based modelling of very large EM Systems;
6. Present and future in evaluation - definition of manmade noise.

The priority of selection of tutorials is as follows :
≠5, with Degauque as responsible editor;
≠6, with Struzak as responsible editor.

The subject 1 and 2 with R. Parlow as author will be proposed as possible general lectures.

SCIENTIFIC PROGRAMME

Commission E organized seven Scientific Sessions, namely
E1 Extraterrestrial and terrestrial meteorologico-electric environment
Convener : H. Kikuchi (Japan);
E2 Terrestrial electromagnetic environment
Convener : M. Hayakawa (Japan);
E3 Planetary lightning and related phenomena
Convener : W.J. Borucki (USA);
E4 Spectrum management and utilization
Convener : R.D. Parlow (USA);
E5 High power electromagnetics
Convener : R.L. Gardner (USA);
E6 Electromagnetic topology for electromagnetic interference analysis and control
Convener : C. Baum (USA);
E7 Coupling to multi-wire cables
Convener : F.G. Canavero (Italy).

The Commission was also the leading organizer of the following joint sessions :
EA Electromagnetic metrology applied to EMC
Conveners : P. Degauque (France), M. Kanda (USA) and K. Astani (Japan);
EB Field propagation and coupling to structures
Conveners : M. Ianoz (Switzerland) and F.M. Tesche (USA);
ED Susceptibility of electronic devices to electrical transients and their response under extreme operation conditions

Conveners : V. Scuka (Sweden), B. Demoulin (France) and T. Itoh (USA);

EF Radio noise above 50 MHz
Conveners : E.K. Smith and E.R. Westwater (USA).

The Commission further participated in joint sessions CBEF, CE and HEG.

COMMISSION F - WAVE PROPAGATION AND REMOTE SENSING

Chair : Professor G. Brussaard (the Netherlands)

Vice-Chair : Professor R.K. Moore (USA)

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held three Open Commission Meetings, respectively on 25, 27 and 30 August 1993. The following items were discussed at the meetings :

1. Symposia and conferences

1.1. Past symposia and specialist meetings were briefly reviewed.

Under mode A sponsorship (no URSI financial participation) :

Wave propagation in random media, Seattle, August '92
ISRP-93, Beijing, August '93
ICAP '91 and '93

Under mode B sponsorship, i.e. with an URSI grant, primarily for travel :

Commsphere, Herzlia, '91	$ 750
Microwave Signatures, Igls, '92	$ 2500
Commission F Open Symposium, Ravenscar '92	$ 2000
Air-Sea Interface Conference, Marseille, '93	$ 2000
International Microwave Conference, Sao Paolo, '93	$ 1500
TOTAL	$ 8750

Under mode C sponsorship, i.e. with an URSI advance and a share of any surplus :

Microwave Signatures, Hyannis, '90
IGARSS, Helsinki, '91
IGARSS, Tokyo, '93

1.2 Lengthy discussions occurred regarding the Commission F cosponsorship of IGARSS meetings. At the January '93 USNC/Commission F meeting in Boulder it was decided to discontinue USNC/Commission F participation in IGARSS meetings held in the USA in even years in favour of meeting every year in conjunction with IEEE/AP (something which previously was done in odd

years only). At the US meeting, it was pointed out that propagation sessions in IGARSS meetings were poorly attended since IGARSS is not primarily interested in propagation. International Commission F feels strongly that the association with IGARSS needs to be maintained. The consensus was that communications-specific topics (such as channel reliability, diversity, fading statistics, etc.) are not appropriate for IGARSS and should be avoided in joint meetings. However, there was agreement that cooperation with IGARSS should be continued and that URSI visibility with IGARSS should be maintained. If the USA Commission F will not sponsor the USA IGARSS meetings, the international Commission F will consider mode C sponsorship.
Subsequently, a policy for International Commission F participation in IGARSS was worked out. This policy is included as an Addendum to this report.

1.3 The following meetings and associated funding were selected for presentation to the URSI Council:

1.	EM scattering from gases and plasmas*, (France) '94	$1000
2.	Microwave signatures (USA), '94	$2000
3.	mm and sub-mm waves (Ukraine)*, '94	$1000
4.	Climatic parameters, (Russia), '94	$2000
5.	Open symposium (India) '95	$2000
6.	7th MST workshop*, '95	
7.	International microwave Conference (Brazil)*, '95	
8.	Optical and microwave remote sensing, (USA)*, '95	
	To be allocated	$3000
	Speaker support (reserve)	$1000
	TOTAL	$ 12000

* Jointly sponsored with other commissions.

1.4 There were two invitations for the '95 Open Symposium, one from Prague and one from India (probably in Ahmedabad or Delhi). India was chosen, and the date should be November '95; Dr. O.P.N. Calla and Mr. Martin Hall will be the contact persons for the Symposium.

2. Election of a vice-chair

The following names were proposed to the Council, in order of preference :

1. M.P.M. Hall (UK)
2. Y. Furuhama (Japan).

3. Society Representation.

3.1 SCOR: The new Commission F representative for SCOR will be Dr. Dag Gjessing (replacing Dr. Valenzuela who stepped down).

3.2 IGBP: At present URSI has a large inter-commission committee on IGBP. When Professor Brussaard was Chair, he tried to get some interest from the committee members, but only two of 10 or more responded to his request. Prof. Moore, who

recently became URSI IGBP representative, just became aware of the committee at this meeting, so had made no attempt.

Since previous Commission F attempts to be formally represented at IGBP were not successful, and since it is unlikely that a separate project suitable for IGBP would be proposed by URSI, it was decided to identify URSI/Commission F people involved in IGBP projects and have them report schedules and events. GEWEX (Global Energy and Water Exchange) involves cloud physics and Commission F membership involvement. Dr. Pedro Batista (Netherlands) agreed to be the contact. Dr. Paolo Pampaloni (Italy) will be our contact with the IGBP vegetation program. An attempt will be made to find a suitable URSI/Commission F contact with the GPCP (Global Precipitation Climatology Project).

Since URSI contact with IGBP is by an inter-commission committee, the makeup of the committee is a responsibility of the URSI Council and President. Committee membership will be revised.

3.3 SCT (Scientific Committee on Telecommunications). Dr. Fedi (Italy) is a member of SCT, and Dr. P. A. Watson (UK) is on a Task Group on Communications. Therefore, no commission action was needed.

4. Terms Of Reference

The need to revise the Terms of Reference for Commission F was raised. After some discussion, it was decided to leave the present ones unchanged.

5. Topics for Review of Radio Science and Next General Assembly

Topics for the '96 Review of Radio Science were discussed. The following suggestions were received:

Remote sensing of clouds, precipitation and water vapour.
Active and passive polarimetry (ULF - UV).
Gaseous absorption 1-1000 GHz (incl. middle atmosphere).
Depolarization in communication links by rain and ice (emphasize Olympus data).
Climatic factors for propagation prediction, including mapping.
Ultra-low frequency signatures for earthquake prediction.
Mobile communications (radio science, not channel aspects).

The above topics are also acceptable for special sessions at the next General Assembly. People were encouraged to submit topics and ideas to the Chair of Commission F (R.K. Moore) in time for the preparatory meeting in approximately a year.

Suggestions are needed for General Lectures and Tutorial Lectures at the next General Assembly. General Lectures are for the entire Assembly, and Tutorial Lectures are for the Commission. A topic suggested for a Tutorial Lecture is "Contributions of radio measurements to climate modeling."

6. Miscellaneous.

A suggestion was discussed to schedule all Commission F sessions at the next General Assembly within one week (i.e., no separation by a weekend) in order to reduce travel duration. No conclusion was reached.

Addendum

STATEMENT AND GUIDELINES REGARDING URSI'S INVOLVEMENT WITH IGARSS

Commission F jointly sponsors IGARSS (International Geoscience and Remote Sensing Symposium) annually, along with the IEEE Geoscience and Remote Sensing Society (GRSS). The URSI sponsorship must include adequate representation on the organizing committee, both technical and financial. In the past IGARSS was sponsored, outside the USA, by URSI under Mode C, while IGARSS meetings in the USA were co-sponsored by USA Commission F. The status of the USA meetings is in doubt at the moment, but URSI will cosponsor them if USA URSI drops out.

The following guidelines are provided for URSI organizers of future IGARSS conferences:

1. A key task is to assure that URSI is properly recognized as a cosponsor of the IGARSS. In view of the size and strength of the GRSS Administrative Committee, this may be a difficult task, but it is an essential one.

2a. One way to assure proper URSI recognition is to have separate URSI, GRSS, and Joint Sessions. In this event, the URSI representative should assure that the radio-science sessions (URSI sessions) are clearly identified as such. Any propagation sessions in IGARSS should concentrate on the effects of the atmosphere on remote sensing or on the remote sensing of meteorological parameters.

2b. The organizers may decide not to have separately-identified sessions for URSI. However, the separately-identified session approach is preferred.

3. URSI has a long tradition of holding meetings in which only abstracts need be submitted in advance. This makes it easy for authors to present the latest results at the meeting, rather than results completed many months before to meet a publications deadline. The GRSS Administrative Committee agreed at the start (prior to URSI involvement) that a "Digest" of 4-page papers should be a part of IGARSS. This makes for potential conflicts in the mode of operation. The URSI representative on an IGARSS organizing committee must find ways to resolve these differences of tradition.

   Some ways to do this are as follows:

   a) Have a separate booklet of abstracts of all papers in URSI sessions, but include all URSI abstracts along with the GRSS papers in the main volumes;
   b) Require URSI authors to conform to the same guidelines as GRSS authors. This has been done, but violates the URSI tradition;
   c) Allow URSI authors to submit only an abstract, which will be published in the main conference Digest along with the GRSS papers. With this, allow the URSI authors to submit a 4-page GRSS-type paper at the authors' discretion;
   d) Have the IGARSS publish an Abstract Booklet for all papers (URSI and GRSS). Thus, all attendees would have a small volume to carry home. The large Digest could be in the form of several volumes which many attendees would mail home (as at recent IGARSS conferences), or on a CD-ROM, as

planned for IGARSS 94. If this is done, it could include either the abstract-only, full-paper, or authors'-choice modes.

The final choice of the method must be at the discretion of the URSI representatives to the organizing committee of a particular IGARSS. Any other mode that satisfies the fundamental needs of URSI would also be satisfactory.

4. For IGARSS meetings outside the USA (and inside if the USA Commission F drops sponsorship), the IGARSS should be a Mode C sponsorship. This involves an URSI advance of $5000-$10000 to the conference, and URSI sharing in any surplus. Mode C sponsorship is handled through the URSI Secretariat, but it must have approval of the Commission Chair. The Commission budget is not involved.

SCIENTIFIC PROGRAMME

Commission F organized nine Scientific Sessions, namely

F1 Ground-based and spaceborne probing of the atmosphere
Convener : M. Chandra (Germany);

F2 Remote sensing of ice

F3 Attenuation due to gases, clouds and fog
Convener : C.J. Gibbins (U.K.);

F4 Refractive effects on terrestrial radio paths, prediction and countermeasures
Convener : L. Martin (France);

F5 Remote sensing of land, especially vegetation
Convener : T. Le Toan (France);

F6 Depolarization due to rain, ice and surface scattering
Convener : Y. Karasawa (Japan);

F7 Remote sensing of the sea surface
Convener : W. Alpers (Germany);

F8 Regional factors and climatology in propagation predictions
Convener : M.P.M. Hall (U.K.);

F9 Probing of the solid earth
Convener : D.R. Mariani (USA).

The Commission was also the leading organizer of the following joint sessions :

FC1 Dynamic propagation effects and adaptive counter measures
Convener : A. Dissanayake (USA);

FC2 Propagation statistics, low availability and system reliability
Conveners : J.P.V. Poiares Baptista (Netherlands) and F. Fukuchi (Japan).

The Commission further participated in joint sessions CBEF, CFG, EF, JF1 and JF2.

COMMISSION G - IONOSPHERIC RADIO AND PROPAGATION

Chair: Professor A.W. Wernik (Poland)
Vice-Chair: Professor K. Schlegel (Germany)

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held three Open Commission Meetings, respectively on 25, 27 and 30 August 1993. The second meeting was held jointly with Commission H.

First Open Commission Meeting (25 August 1993)

The agenda of the meeting was presented by the Chair. It was circulated earlier via the Commission Newsletters and no comments were received.

1. Election of a Vice-Chair

Three candidates had been nominated: A. Kantor (Brazil), S. Radicella (Argentina) and B. Reinisch (USA). The Chair received 24 valid voting papers from Official Members before the General Assembly. Five additional voting papers had been received in Kyoto. Counting of the votes by tellers C. Hanuise (France), R. Hunsucker (USA) and S. Pulinets (Russia) resulted in submission of two names to the Council. These names were (in order of preference): B. Reinisch and S. Radicella .

Briefly the question was raised whether two Commission Vice-Chairs would be advantageous for the Commission work. A vote by the official members showed a 14:2 majority for a single Vice-Chair.

2. Finances

The Chairs presented the Commission expenditures. Out of US$10,000 put at the Commission's disposal, approximately $5,550 had been used to support eight URSI-sponsored Symposia, and the remaining to support six individual speakers at the General Assembly.

3. Working Groups

The Chairs of the four Commission G working groups presented their activity reports: P.Wilkinson for G.1 (Ionosonde Network Advisory Group), R. Leitinger (read in absentia by A. W . Wernik) for G.2 (Studies of the Ionosphere Using Beacon Satellites), J. Holt for G.3 (Incoherent Scatter), B. Reinisch for G.4 (Ionospheric Informatics).

The Chair described the proposal to organize a new inter-commission Working Group on the Middle Atmosphere. The delegates decided that Commission G would be represented by S. Fukao (Japan) on this new Working Group.

4. Terms of reference

The terms of reference of Commission G were reviewed and found to provide an excellent frame for the work of the Commission. A resolution will possibly be

forthcoming to include the term "long-term observations." Reference to "CCIR" must also be changed.

5. Review of Radio Science

Professor Wernik thanked the Commission G. Editor, K.C. Yeh, and authors of the review articles for their dedicated work in preparing the Commission G contribution to the RRS 1990-93.

6. The Questionnaire "Future of Ionospheric Studies"

A report compiled on the basis of responses received as answer to the Questionnaire sent out in 1992 had been distributed. Vice-Chairman K. Schlegel gave a brief summary of the report. Some additional comments were received which will be incorporated into a later version of this report.

7. Commission G Representatives

The following representatives were approved:
- For the International Reference Ionosphere (joint URSI & COSPAR): L. Bossy (Belgium);
- For IGBP/URSI: S. Fukao (Japan).

8. Resolutions Committee

The Chair proposed that the Committee be composed of P. Høeg, W. Kofman and P. Wilkinson. This was approved.

Second Open Commission Meeting (27 August 1993)

1. Joint Working Groups

1.a. GH.1 (Active Experiments in Plasmas)

Co-Chair (for G) Sa. Basu gave a brief report about the activity of the Working Group and listed also some new plans. Co-Chair (for H) P.A. Bernhardt added some aspects related to Commission H. Both reports are available in written form. The proposal of both Co-Chairs to continue the Working Group was accepted by the audience.

1.b. GH.2 (Computer Experiments, Simulation and Analysis of Wave Plasma Processes)

Co-Chair for Comm. G, S. Ossakow, was absent. The Co-Chair for Commission H, H. Matsumoto, could not attend the meeting because of his duties in the Organizing Committee. A suggestion to continue the Working Group was accepted. The audience approved the suggestion of Professor Wernik to replace S. Ossakow by H. Thiemann (Germany).

1.c. CGH.1 (Wave and Turbulence Analysis)

F. Lefeuvre gave a short report about the activities of the Working Group. The Commission decided to continue the Working Group, and noted that the Commission

G Co-Chair, Su. Basu, had resigned. It subsequently appointed A.W. Wernik as the new Co-Chair.

1.d. URSI/IAGA. 1 (VLF/ELF Remote Sensing of the Ionosphere and Magnetosphere - VERSIM)

A brief report was given by U.S. Inan - the URSI representative. The continuation of Commissions G and H involvement in this Working Group was approved, again with U.S. Inan a s URSI representative.

2. Suggestions for joint activities at the 1996 General Assembly

R.F. Benson presented 6 suggestions for joint G and H sessions. After some discussion three further topics were accepted.

3. Joint resolutions

R.F. Benson read three joint resolutions, viz.

- GH.1: the importance of preserving and transforming (to modern digital formats) old geophysical data sets;
- GH.2: the importance of the terrestrial ionosphere/magnetosphere system as a plasma laboratory;
- GH.3: the importance of electromagnetic effects associated with earthquakes and volcanic eruptions.

All three resolutions were accepted by the floor.

Third Open Commission Meeting (30 August 1993)

1. Resolutions

The Chair circulated a set of resolutions among the Official Members. They were asked to sign the resolution if approved. Thanks were given to the Resolution Committee.

2. Working Groups (see Resolutions G.1 and G.2)

Commission G resolved:

- to continue the Working Groups G.1-G.4;
- to maintain the Joint Working Groups GH.1, GH.2 and CGH.1;
- to establish a new Joint Working Group FG.1 on the Middle Atmosphere;
- to participate in a Joint Working Group EGH.1 on Electromagnetic Effects Associated with Seismic Activity. A Co-Chair for Commission G must be found.

3. Terms of Reference

The meeting agreed to a slight change in the terms of reference. The new text will be submitted to the Council for approval.

4. Review of Radio Science

A short discussion on the present format of the RRS took place. It was agreed that the present format of 3-4, rather than 6-7 review articles should be continued. No clear agreement was reached on the usefulness of the reference disk. Any further comments regarding the disk should be forwarded to the new Chair.

5. Commission Program for the General Assembly 1996

A list of proposals for sessions at the next GA was presented by Vice-Chairman K. Schlegel. The list already contained more topics than can probably be accepted. The list will be reduced by combining and/or discarding certain topics.

6. Symposia for Commission Sponsorship in 1993-1996

A list of 4 Symposia for which URSI sponsorship was requested was presented by the Vice-Chair. Five other Symposia were added as suggestions from the floor. In addition there are four Joint Symposia with other Commissions.

7. Address by Chairman K. Schlegel

The present Vice-Chairman K. Schlegel thanked Chairman A.W. Wernik for his excellent work in the Commission G. He gave a short outlook of the future work, and asked all members of the Commission to keep close contact with him, and to bring new ideas, suggestions and problems to his attention.

8. Miscellaneous

T. Spoelstra, member of IUCAF, gave a short presentation on the matter of frequency allocations for scientific research. It was agreed that this matter needed further attention, and a meeting of T. Spoelstra, the Commission Chair and interested Commission members was planned.

SCIENTIFIC PROGRAMME

Commission G organized nine Scientific Sessions, namely

G1 Recent results of coordinated campaigns
Convener : Su. Basu (USA);
G2 Ionosphere middle- and lower atmosphere interactions
Convener : J. Röttger (EISCAT);
G3 New results from coherent and incoherent scatter experiments
Convener : S. Fukao (Japan);
G4 Ionosphere prediction and modelling
Convener : B.W. Reinisch (USA);
G5 Open session and latest results
Convener : A.P. Mitra (India) and K. Schlegel (Germany);
G6 Ionosonde networks and stations
Convener : P.J. Wilkinson (Australia);
G7 Progress in understanding ionospheric irregularities : techniques, observations and theory

Convener : C. Hanuise (France);

G8 Observations and modelling of solar-terrestrial relationships
Convener : E.P. Szuszczewicz (USA);

GW Workshop "Dynamics and coupling : ionosphere, middle and lower atmosphere"
Convener : J. Röttger (EISCAT).

The Commission further participated in joint sessions CFG, HEG, HG1, HG2 and HG3.

COMMISSION H - WAVES AND PLASMAS

Chair : Dr. Robert F. Benson (USA)

Vice-Chair : Dr. François Lefeuvre (France)

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held three Open Commission Meetings, respectively on 25, 27 and 30 August 1993. The second meeting was held jointly with Commission G.

First Open Commission Meeting (25 August 1993)

The meeting was attended by 41 persons. The following items were discussed :

1. Brief Introduction of Commission Activities during the General Assembly

The Chair gave a brief introduction and summary of the planned Commission activities during the General Assembly where, in addition to the Commission H Tutorial Lecture on "Forty Years of Whistlers" by Prof. R. A. Helliwell, over 250 papers (including invited, oral and poster papers) were accepted for presentation in seven Commission H scientific sessions and four joint scientific sessions involving Commission H (HEG, HG1, HG2 and HG3).

2. Previous and Proposed Sponsorship of meetings

Chairman Benson reported the sponsorships given by Commission H in the past triennium, based on recommendations made at the General Assembly in Prague, and solicited suggestions for sponsorships in the subsequent triennium. The following Workshops and Symposia were supported by Commission H in the last three years:

- Artificial Modification of the Ionosphere, Suzdal, U.S.S.R., 1991 (Mode B);
- 4th International School for Space Simulation, Nara, Japan, 1991 (Mode B);
- XXth International Conference on Phenomena in Ionized Gases (ICPIG), Barga, Italy, 1991 (Mode B);

- Active Experiments in Space Session, COSPAR Meeting, Washington, D. C., U.S.A., 1992 (Mode B);
- Workshop on Turbulence in Space Plasmas, Aussois, France, 1993 (Mode B);
- XXIst International Conference on Phenomena in Ionized Gases (ICPIG), Dresden, Germany, 1993 (Mode B).

3. Opinions, Recommendations, Resolutions and Terms of Reference

The opinions, recommendations, resolutions and terms of reference approved in Prague were presented, and suggestions for new recommendations and a slight improvement in the text of the terms of reference were discussed. There was some discussion on a proposed recommendation to stress the importance of the earth's ionosphere / magnetosphere system as a natural plasma laboratory. It was agreed that this agenda item would be finalized at the third Commission H meeting and inputs prior to that meeting were solicited by the Chair.

4. Working Groups (see Resolution H.1)

The current Working Groups in which Commission H is involved are the following :

(a) An Inter-Union (URSI/IAGA) Working Group on Passive Electromagnetic Probing of the Magnetosphere called "VLF/ELF Remote Sensing of the Ionosphere and Magnetosphere (VERSIM)", with U.S. Inan (U.S.A.) as Co-Chair for Commission H;

(b) A Joint Working Group CGH.1 on Wave Analysis called "Wave and Turbulence Analysis", with F. Lefeuvre (France) as Co-Chair for Commission H;

(c) A Joint Working Group GH.1 on Computer Experiments, Simulation and Analysis of Wave Plasma Processes, with H. Matsumoto (Japan) as the Commission H Co-Chair;

(d) A Joint Working Group GH.2 on Active Experiments in Plasmas, with P. Bernhardt (USA) as Co-Chair for Commission H.

All working groups were active during the last triennium and the members indicated a desire to continue them.

5. Scientific Sessions for 1996 General Assembly

The scientific sessions for the current General Assembly were reviewed and topics for the 1996 General Assembly were solicited, so that a recommended list could be determined at the third Commission H meeting.

6. URSI Publications

The following URSI publications and activities were briefly discussed: the URSI Bulletin; the Radioscientist; Modern Radio Science; collaboration with Radio Science; Review of Radio Science and the Disk containing the complete references. There was considerable discussion on the procedure used by Commission H to select authors and editors for the Review of Radio Science and the Disk as well as on the value of the Disk. The Vice-Chair, and current editor of the Review and the Disk, Dr. François Lefeuvre, strongly recommended that two editors be used for the next triennium (one for the Review and one for the Disk). He also stressed the benefit of having the Vice-Chair act as the editor of the Review, which encourages the contact with active Commission H scientists. It was agreed that the procedure used by Commission H to

select authors for the Review of Radio Science would remain the same, i.e. they would be selected from the suggestions of the Commission H conveners selected for the 1996 General Assembly, the idea being that a review would be written by the person chosen by the convener to give the introductory (or overview) presentation for the session.

7. Should URSI Commissions have Two Vice Chairs?

The suggestion that URSI commissions should have two Vice-Chairs in order to ease the work load of the commissions was discussed and it was decided that Commission H was in favour of keeping the present system, which requires only one Vice-Chair.

8. Election of a Vice-Chair for 1993 - 1996

There were three candidates for the position of Vice-Chair of Commission H, namely, Prof. Carl-Gunnar Fälthammar (Sweden), Dr. Vladimir Fiala (Czech Republic) and Dr. Kuang-Chih Huang (China SRS). According to the results of the ballot, it was agreed that Commission H would report to the Council that it recommended Prof. Fälthammar as first choice and Dr. Fiala as second choice for the Vice-Chair. Prof. Fälthammar, however, was not present at the meeting. He arrived shortly after and stated that, while he was honoured to have been proposed as the new Vice-Chair of Commission H, he had regrettably come to the conclusion that because of other commitments he had to decline to accept the position. In view of this situation, the present Chair (Benson) and Vice-Chair (Lefeuvre) agreed to recommend Dr. Fiala as a first choice and Dr. Huang as a second choice for the Vice-Chairmanship. (Dr. Fiala was present at all three Commission H meetings and expressed a willingness to serve, Dr. Huang was not present at the General Assembly, and had sent a letter of apology to the Chair prior to the meeting). This decision was conveyed to the Commission H membership at the second meeting (held jointly with Commission G), and no objection was raised.

Second Open Commission Meeting (held together with Commission G on 27 August 1993)

After an announcement concerning the Commission H selection for the new Vice-Chair (see above), discussions took place concerning joint G & H activities (working groups, scientific sessions at the 1996 General Assembly and resolutions). The details are reported in the Commission G minutes.

Third Open Commission Meeting (30 August 1993)

The meeting was attended by 22 persons. The following items were discussed :

1. Convener's Reports
   Dr. Benson thanked the conveners for their efforts in organizing their sessions, and encouraged them to write brief reports of their sessions, and to provide the press reports requested by the Local Organizing Committee.
2. Terms of Reference, Opinions, Recommendations, Resolutions and proposed meetings and working groups for 1993 - 1996
   The terms of reference approved in Prague were approved again (with the addition of a comma in (a) (ii)). Three recommendations concerning old geophysical data

sets, the ionosphere/magnetosphere system as a plasma laboratory, and electromagnetic effects associated with earthquakes and volcanic eruptions were approved. Since these three recommendations were identical to recommendations submitted by other commissions, they were submitted to the URSI Council with the recommendation that they be considered as Union Recommendations (see Resolutions U.22, 23 and 24). Commission H also recommended that URSI co-sponsor 7 symposia and meetings, and resolved to continue 4 inter-union and inter-commission working groups and to establish a new inter-commission working group (EGH.1).

3. Opinions, Recommendations, Resolutions and Terms of Reference
   The opinions, recommendations, resolutions and terms of reference approved in Prague were presented and suggestions for new recommendations and a slight improvement in the text of the terms of reference were discussed. There was some discussion on a proposed recommendation to stress the importance of the earth's ionosphere/magnetosphere system as a natural plasma laboratory. It was agreed that this agenda item would be finalized at the third Commission H meeting and inputs prior to that meeting were solicited by the chairman.
4. Working Groups
   The current Working Groups in which Commission H is involved are the following :
   1. An Inter-Union (URSI/IAGA) Working Group on Passive Electromagnetic Probing of the Magnetosphere called "VLF/ELF Remote Sensing of the Ionosphere and Magnetosphere (VERSIM)", with U.S. Inan (U.S.A.) as Co-Chair for Commission H;
   2. A Joint Working Group CGH.1 on Wave Analysis called "Wave and Turbulence Analysis", with F. Lefeuvre (France) as Co-Chairman for Commission H;
   3. A Joint Working Group GH.1 on Computer Experiments, Simulation and Analysis of Wave Plasma Processes, with H. Matsumoto (Japan) as the Commission H Co-Chairman;
   4. A Joint Working Group GH.2 on Active Experiments in Plasmas, with P. Bernhardt (USA) as Co-Chairman for Commission H. All working groups were active during the last triennium and the members indicated a desire to continue them.
5. Scientific Sessions for 1996 General Assembly
   The scientific sessions for the current general assembly were reviewed and topics for the 1996 general assembly were solicited so that a recommended list could be determined at the meeting.

SCIENTIFIC PROGRAMME

Commission H organized seven Scientific Sessions:

H1 Observations and interpretations of interplanetary and planetary wave emissions
Convener : R.G. Stone (USA);

H2 Electromagnetic and electrostatic cyclotron waves in magnetospheric and laboratory plasmas : theory, simulations and experiments
Conveners : D. Nunn (U.K.) and Y. Omura (Japan);

H3 Parallel electric fields in laboratory and space plasmas

Conveners : E. Whipple (USA) and J. Lemaire (Belgium);

H4 Nonlinear resonance effects produced in the F region by high-power radio waves
Conveners : F. Djuth (USA) and A. Gurevich (Russia);

H5 Computer simulation of MHD processes in space plasmas
Conveners : S.T. Wu (USA) and G. Chanteur (France);

H6 Whistlers and particle precipitation
Conveners : H. Strangeways (U.K.) and U.S. Inan (USA);

H7 Open session on waves in plasmas
Convener : R.F. Benson (USA).

The Commission was also the leading organizer of the following joint sessions :

HEG Electromagnetic effects associated with earthquakes and volcanic eruptions
Conveners : M. Parrot (France), O.A. Molchanov (Russia), T. Yoshino (Japan) and A.C. Fraser-Smith (USA);

HG1 Active experiments in space
Conveners : R. Anderson (USA) and P. Stubbe (Germany);

HG2 Computer experiments of nonlinear kinetic processes in space plasmas
Conveners : H. Matsumoto (Japan) and H. Thieman (Germany);

HG3 Nonlinear wave theories and observations in space
Conveners : F. Lefeuvre (France) and B. Thide (Sweden).

COMMISSION J - RADIO ASTRONOMY

Chair : Dr. R.D. Ekers (Australia)

Vice-Chair : Professor Y.N. Parijskij (Russia)

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held three Open Commission Meetings, respectively on 25, 27 and 30 August 1993. The discussions and resolutions are summarized as follows :

1. Terms of reference

no changes were proposed

2. Inter-Union Programmes

2.1. Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science (IUCAF)

(a) URSI nominations to IUCAF

URSI nominates four members of IUCAF. Each member has a six year term, with two members rotating at each URSI General Assembly. The current URSI members are: R.M. Price (USA), H.C. Kahlmann (Netherlands), B.H. Grahl (Germany) and B.J. Robinson (Australia) - Chairman.

Grahl and Price retire at this General Assembly, and Commission J recommends the appointment of J. Cohen (UK) and W. Baan (USA).

Furthermore it is expected that B.J. Robinson will retire from IUCAF before the next General Assembly. Considering the importance of maintaining continuity Commission J recommends that, when he retires, he should be replaced by J. Whiteoak (Australia).

These recommendations have been sent to the President and General Secretary

(b) IUCAF Resolution

URSI urges the ITU and affiliated national and regional administrations to recognise that the electromagnetic spectrum is a unique and limited natural resource, to allocate spectrum only to those services which *must* radiate electromagnetic energy, and to avoid allocating spectrum in cases where other technologies, such as guided-waves, could be used (see Resolution U.20).

2.2. ICSU Working Group on Adverse Environmental Impacts on Astronomy

Prof. D. McNally had asked URSI (8 June 1993) to nominate a member of this new Working Group. Commission J feels that it is important to have an active astronomer who is also involved in IUCAF on this committee, and nominates J. Cohen (UK) (see Resolution U.19).

3. Vice-Chair election

Votes from 14 Official Members were received before the General Assembly and 5 additional countries voted in Kyoto. Results were, in order of preference :

1. Roy Booth (Sweden);
2. Jim Moran (USA).

4. Report on the Review of Radio Science

The Commission editor, Dr T. Tzioumis, discussed the procedures used for the Review and the Disk.

4.1. Discussion of the review

- There was strong support for the new structure of the reviews.
- A preference was expressed for a small number of reviews (say 3).
- What is the distribution ? Are reprints available ? To these questions Ross Stone answered : "Oxford University Press will promote sales to libraries aggressively. It is not possible to provide reprints but authors are free to distribute their manuscript".

4.2. Discussion of the disk

The value of the disk was strongly questioned :

- These data are available from established data bases;
- No one knows of anyone who used the Prague disk;

- Best value is on the boundary of astronomy and techniques;

A memo was sent to the Publications Committee (Appendix 1).

4.3. Appointment of a Commission Editor

- Tasso Tzioumis (Australia) was appointed as Commission J editor of the RRS.
- No one was nominated for the disk.

4.4. Associate editor for Radio Science

- Mark Gordon (Tucson, USA) was proposed.

5. URSI organisational issues

5.1. Discussion of Individual Membership

- Membership should not be included in registration because some government regulations (e.g. in the USA) do not allow reimbursement of membership fees [This aspect has been checked : USA government regulations are only a problem if the membership component is separable, and it will not be];
- Membership should be optional for individuals;
- Wait until individuals have attended two General Assemblies before making them correspondents - otherwise the list will contain many scientists with only peripheral interest in URSI;
- Will correspondents have Commission affiliation ? It is important that they do, in order to provide commissions with mailing lists. [Comment by Matsumoto - no information was requested for the General Assembly in Kyoto, but a form requesting this information will be mailed to all participants].

5.2. Member Committee organisation

The effectiveness of the URSI Member Committee structure was discussed. Many scientists appear to have no contact with their local Member Committee representatives. For example, a show of hands indicated that 30% of Commission J attendees were unaware of the request for nominations or voting for Vice-Chair. This indicates a need to strengthen scientific aspects of the Member Committees in many countries, and strengthens the case for individual membership. There was little support for a proposed Commission J secretariat unless an individual can be found who wants to do it.

6. Reports of the Working Groups

6.1. Global VLBI

This working group was formed at the Prague General Assembly to coordinate Global VLBI experiments. There has been a series of meetings, the last one in Onsala (May 1993).

Global VLBI Working Group Resolution:

Considering the activities and success of this Working Group, and the need to continue these activities until the launch of the Space VLBI missions, Commission J resolves

to continue the Working Group until 1996, but with an increase in membership to include representation from the Space VLBI missions (NASA, ISAS, Lebedev Institute), and to change the overall membership as follows:

Australia : 1
Europe : 2
Japan : 1
USA : 2
Ex USSR : 1
Space agencies : 3
At large : up to 3

6.2. Working groups on new instruments

These groups should address scientific and technical issues. It is not appropriate to include broader political issues, hence it is better to have separate groups for each initiative rather than a single working group for future telescopes.

6.2.1. Formation of a Large Telescope Working Group

Commission J,

considering

1. the strong scientific case for a new, internationally accessible observing facility at frequencies below a few GHz with one to two orders of magnitude greater sensitivity than that of any existing or planned facility;
2. the need for innovative technical developments to realise such a facility at an affordable price;
3. the likely need for international collaboration to allow realisation of this facility.

resolves to appoint a Working Group with the following terms of reference (see Resolution J.2).

1. to explore the range of scientific problems to be undertaken;
2. to discuss the technical specifications and general design considerations needed to maximise the scientific return of such a facility;
3. to identify and, in so far as possible, resolve the major technical challenges to realisation of an affordable radio telescope with a square kilometre of collecting area at frequencies below a few GHz.

Dr R. Braun (Netherlands) will be convener for this group, and membership will be open to individuals in countries with a strong interest in the science drivers and required technology.

6.2.2. Formation of a Working Group for "Large Millimeter/Submillimeter Array".

It is time for millimeter/submillimeter astronomers to consider the next generation telescope, which will require high angular resolution and an order of magnitude increase in sensitivity over present day instruments. (see Resolution J.1).

Considering that such an instrument will be very expensive and will demand international collaboration, the Commission proposes that URSI should establish a working group called "Large Millimeter/Submillimeter Array" (see Resolution J.1).

The objectives of the working group would be :

1. to study the main scientific objective for the early 2000's;
2. to coordinate and evaluate the radio seeing data for site evaluation and observing strategy;
3. to study new designs for telescopes and instrumentation;
4. to investigate the potential international partnerships.

Coordinators: M. Ishiguro, R.S. Booth

Membership:

USA	3 members
Japan	2 (total)
Asia	1
France	1
Germany	1
Italy	1
UK	1
Australia	1
South America	1
Netherlands	1
Sweden	1
	14

7. Antarctica

After some discussion it was felt that this was covered by the IAU working group but that there should be an URSI nominated member to cover technical radioastronomy aspects.

8. Review of scientific programme at Kyoto

- Too many oral sessions, one needs to have more discussion time;
- Do not hold associated symposia adjacent to General Assembly. Total time is far too long, and few people attended both General Assembly and symposium;
- The single combined poster session was successful, but make sure posters are up for at least 3 days.

9. Symposia for Commission sponsorship in 1993-1996

9.1. VLBI symposium (Appendix 2)
Contact: T. Cornwell. Location: Socorro, New Mexico, USA. Date: 1996;

9.2. Sub-millimetre Astronomy (Appendix 3)
Contact: J. Baars. Location: Tucson, Arizona, USA. Date: Fall 1995;
9.3. Universe at Meter Wavelengths (Appendix 4)
Contact: G. Swarup. Location: Pune, India. Date: Early 1997.

General discussions during the General Assembly

- 80th birthday wishes to be sent to Sir Bernard Lovell, (Commission J Chair in 1957-60) and Chris Christiansen (Commission J Chair in 1963-66 and President of URSI in 1978-80);
- there was a request from conveners of scientific sessions that the Local Organization Committee feed information on registrations back to them so they can plan for no-shows;
- there was a preference for a continuous 6 day programme of scientific sessions, but with a wish to keep General Lectures, Tutorials and Open (business) Meetings, while reducing the number of scientific sessions to fit into 6 days;
- keep the observatory reports, but schedule them early (day 2) in the meeting;
- keep one open scientific session for new results.

Appendix 1

TO : Prof. P. Clarricoats (Chair, Publications Committee)
Dr. W. R. Stone (Editor, Review of Radio Science)
FROM : R Ekers (Chair, Commission J)

SUBJECT : Collected References on Disk

Commission J had a detailed discussion on the collection of references on the disk at its second Open Commission Meeting. Some members had already looked at the disk and found it well documented, and easy to install and use.

However, the overwhelmingly strong reaction was that the usefulness of this data-base was not sufficient to justify the effort needed to produce a high quality product.

Most participants preferred to use the commercial data-bases (such as INSPEC) to do literature searches since these are more up to date, provide powerful searching tools and give more information. No participants had used the Prague disk, and very few thought they would use the new disk. It was noted that the greatest value of the disk was at the boundary of astronomy and techniques but even so the usefulness was not sufficient to offset the effort.

It was found impossible to appoint a Commission J disk editor given the lack of support for the project.

Appendix 2

TO : R D Ekers
Chairman, URSI Commission J
FROM : T Cornwell
NRAO, Socorro, NM, USA
DATE : August 1993

SUBJECT : URSI Sponsorship for Symposium

Commission J seeks URSI sponsorship for a meeting on VLBI to be held in Socorro, NM, USA, during 1996. There are plans for reviews of advances in major astronomical areas, presentation of selected contributed papers of special interest and discussions of areas of future technical development.

Such a meeting would be timely given the recent commissioning of the VLBA, the forthcoming construction of a correlator dedicated to EVN observing and the expected launch of two international space-based VLBI experiments in 1996.

Sufficient interest is expected to sustain a meeting of 200-400 people drawn from the wide range of countries active in VLBI.

Appendix 3

TO : Ron Ekers
Chairman, URSI Commission J
FROM : Jaap Baars
Director, SMT Observatory, Tucson, AZ, USA

SUBJECT : URSI-supported Symposium

Since 1980, at intervals of about 4 years, URSI has sponsored Symposia on the subject of (Sub-) Millimeter Astronomy and Techniques. These symposia were organised by institutes, normally at a time of some significant occurrence in its life:

1990 - Grenoble : start of IRAM;
1984 - Granada : start operation Pico Veleta telescope;
1988/89 - Kona : JCMT & CSO start on Mauna Kea;
1992 - Hakone : Nobeyama interferometer.

In 1994 the Sub-millimeter Telescope (SMT) on Mount Graham in Arizona will start its astronomical activity. There have been preliminary discussions to hold the next "Sub-millimeter Astronomy" symposium in Tucson. The most likely date would be the Fall 1995 or the Spring 1996. The SMT - Observatory, probably in cooperation with NRAO-Tucson, would organize the conference.

Commission J would like URSI to act as sponsor of this symposium, in the established tradition of the earlier ones. It is expected that an official announcement of the symposium could be made in the spring of 1994.

Appendix 4

PROPOSAL FOR AN IAU/URSI SYMPOSIUM

The GMRT will be operational by late-1994. It may therefore be useful to plan an IAU/URSI Colloquium or Symposium in late 1996 or early 1997 on a suitable topic. In such a Symposium it would be proposed to cover radio astronomy from a few MHz to 1600 MHz. Work is being done at longer wavelengths at Cambridge, Mauritius, Canada, China, Gauribadanur, Fleuers, VLA, Westerbork, Bologna, USSR etc. It will obviously be preferred to concentrate only on a few specialised aspects of radio astronomy at metre wavelengths.

Govind Swarup
National Centre for Radio Astrophysics, TIFR
Poona University Campus
Post Bag No. 3
Pune, INDIA

SCIENTIFIC PROGRAMME

Commission J organized eleven Scientific Sessions, namely

J1 Digital techniques in radioastronomy
Convener : Y. Chikada (Japan);

J2 Radio-telescope for the third millennium
Convener : R. Frater (Australia);

J3 Global VLBI
Convener : R. Booth (Sweden);

J4 Astrometric and geodetic VLBI
Convener : A. Whitney (USA);

J5 Solar radioastronomy
Convener : S. Enome (Japan);

J6 Radar/radio studies in the solar system
Convener : D. Campbell (USA);

J7 Millimetre and sub-millimetre astronomy : instrumentation, techniques and observations
Convener : J. Moron (USA);

J8 Search for extraterrestrial intelligence
Convener : K. Kellermann (USA);

J9 Highlights from poster sessions
Convener : Y. Parijskij (Russia);

JP1 Observatory reports

Convener : R. Wielebinski (Germany);

JP2 New results
Conveners : R. Wielebinski (Germany) and R. Davies (U.K.).

The Commission was also the leading organizer of the following joint sessions :

JA Pulsar timing
Conveners : D. Backer and D.W. Allan (USA);

JB Imaging with adaptive antennas and spatial signal processing
Conveners : T. Cornwell and B. Steinberg (USA);

JF1 Radio interference to passive systems
Conveners : T. Gergely and A. Gaszewski (USA);

JF2 Refractive effects on transatmospheric paths
Conveners : T. Spoelstra (Netherlands) and J. Baars (USA/Germany).

COMMISSION K - ELECTROMAGNETIC IN BIOLOGY AND MEDICINE

Chair : Professor M.A. Stuchly (Canada)

Vice-Chair : Professor P. Bernardi (Italy)

REPORT ON THE OPEN COMMISSION MEETINGS (BUSINESS MEETINGS)

The Commission held a single Open Commission Meeting, on 30 August 1993. The meeting was attended by 12 Official Members (or their substitutes). The following points were discussed :

1. Election of a Vice-Chair

Professor Stuchly asked that any outstanding votes for the position of Vice-Chair be cast. The two nominees were Professor Lin and Dr. De Wagter. Professor Stuchly reminded the meeting that the Vice-Chair would become, de facto, the Chair in the following triennium. The following two names were proposed to the Council, in order of preference :

1. J.C. Lin (USA)
2. C. De Wagter (Belgium)

2. Report on Scientific Sessions at the XXIV General Assembly

Professor Stuchly indicated that Commission K had organized a programme with four full sessions and two joint sessions. Altogether 117 papers had been submitted and 29 rejected.

The Chair invited questions and comments from the meeting regarding the XXIV General Assembly. It was noted that the room allocated for the Commission K Tutorial Lecture given by Professor R. Adey was too small to accommodate all interested attendees. The meeting accepted a proposal that a Resolution for Council

should note that the room size allocated to particular lectures or sessions should be appropriate to the likely number of attendees.

3. Scientific Meetings

Professor Stuchly noted that, in contrast to the other Commissions, Commission K had not yet organized scientific meetings on a triennial basis. She felt that Commission K was not sufficiently well-developed at the present to undertake this task, but urged members to advise Professor Bernardi, the next Chair of Commission K, of any ideas or feelings in this regard.

The Chair also noted that URSI could sponsor other related scientific meetings, but had only modest financial resources. In industrialized countries, URSI may well lend support in name only, but developing countries might expect some degree of financial support. This was often in the form of small grants, of the order of $500 - $1,000, e.g. to young scientists.

The following meetings had applied or been granted URSI sponsorship :

- Microwaves in Medicine, Rome, October 1993;
- European Bioelectromagnetics Society, Slovenia, 1993 (no financial commitment);
- Future Telecommunications and EM Environment, Eilat, Israel, 1994 (tentative);
- Millimetre Waves, Ukraine, 1994 (tentative);
- Electromagnetic Compatibility, Wroclaw, Poland, 1994 (tentative).

Members were asked to draw the attention of the Commission to other meetings of interest, but to note that there was a lead time of at least 1 year between application for sponsorship and possible approval. The possibility that URSI might consider acting as co-sponsor for the 1994 BEMS meeting to be held in Copenhagen was raised ; co-sponsorship for mini-symposia on Mobile communications and on Human exposure assessment were suggested as particularly appropriate.

4. Commission's publications

4.1. Review of Radio Science and Disk

The Vice-Chair of the Commission, Professor Bernardi, who acted as editor for the Review of Radio Science and the Disk, reported on the results of his work. He noted that all the 5 chapters scheduled for Commission K were completed on time and thanked the various contributors for their efforts. He invited comments from the meeting.

In general, it was noted that the Review was large and bulky, possibly discouraging an avid readership. It was suggested that some assessment be made of the success of the Review, perhaps by assessment of the number of volumes sold. The separate publication of the tutorial and review papers was discussed. It was suggested that the joint publication of the tutorial and review papers for each Commission should be considered. The meeting accepted a proposal that these points should be brought to the attention of the Council.

On balance, it was felt that the list of references on disk, compiled by Commission representatives from each country, was useful, although the allocation of references to appropriate Commission areas was sometimes difficult. Professor Bernardi emphasized

that the success of the list depended on action by the Official Members from each Member Committee.

4.2. Special Section in Radio Science

Professor Stuchly noted that Radio Science was now the official journal of URSI, and recommended that members consider future publications under topics related to any Commission areas in this journal. She drew the attention of the meeting to the Special Section in Radio Science on Electromagnetics in Medicine and Biology, comprising 6 invited and 6 contributed papers. Publication is expected in about a year.

5. Co-operation with Professional Societies

Professor Stuchly reminded the URSI representatives to consider URSI co-operation with other professional societies, and to draw any proposals to the attention of the future Chair, Professor Bernardi, or the future Vice-Chair, Professor Lin.

6. Commission Programme at the 1996 General Assembly

It was noted that the next General Assembly would be held at Lille, France, in 1996.

7. Other Business

A resolution for the General Assembly concerning *wireless communication* was proposed. It was felt that this was an important area likely to show considerable development in the future, and in which any potential impact on health should be assessed. Following considerable discussion, resolution K1 on *wireless communication* was formally accepted by the meeting.

The attention of the meeting was drawn to the round table discussion on the future of URSI, to be held on the morning of Friday, 3rd September. Professor Bernardi will represent Commission K at this activity.

The meeting closed with a vote of thanks, proposed by Professor Bernardi, to Professor Stuchly for her hard work and the guidance she gave to the Commission K representatives, in her capacity as the first Chair of Commission K.

SCIENTIFIC PROGRAMME

Commission G organized four Scientific Sessions, namely

K1 Interaction mechanisms
Convener : T. Tenforde (USA);

K2 Health effects
Conveners : R. Saunders (U.K.) and D.L. Szabo (Hungary);

K3 Electromagnetic fields in medical diagnosis
Conveners : M. Saito (Japan) and G.J. Beers (USA);

K4 Therapeutic applications of electromagnetic fields
Conveners : B. Veyret (France) and C.K. Chou (USA).

The Commission was also the leading organizer of the following joint sessions :

KA Exposure assessment and measurements in complex environments
Conveners : L.E. Paulsson (Sweden) and M. Kanda (USA);

KB Computational electromagnetics in biology and medicine
Conveners : J.C. Lin (USA) and S.N. Hornslett (Denmark).

RESOLUTIONS AND RECOMMENDATIONS OF THE COUNCIL

U.1 ..... URSI Scientific Commissions

The URSI Council,

noting

1. that, according to Resolution C.1 (Lima, 1975), the topics covered by the Commissions should be reviewed at each General Assembly;
2. that Commissions A, B, C, D, E, F and J do not feel it necessary to modify their terms of reference as stated in the Annex to Resolutions U.1 (Prague, 1990);
3. that Commissions G and H have requested small modifications to their terms of reference by the addition of two words (Commission G) or a comma (Commission H);
4. that there existed only a temporary version of the title and terms of reference of Commission K.

confirms or approves, as appropriate, the titles and terms of reference of the Commissions as given in the Annex.

Annex

1. Commission A - ELECTROMAGNETIC METROLOGY, Electromagnetic measurements and standards.
   The Commission promotes research and developments in :
   (a) Measurements and standards in time and frequency, including infrared and optical frequencies;
   (b) Measurements in the time domain;
   (c) Measurements in the frequency domain;
   (d) Measurements in telecommunications;
   (e) Measurements using lasers;
   (f) Quantum metrology and electrical methods in fundamental constants;
   (g) Measurements and standards from microwaves to sub-millimetre waves.

2. Commission B - FIELDS AND WAVES, Electromagnetic theory and practice, including antennas and waveguides.
   The interest of Commission B is fields and waves, encompassing theory, analysis, computation, experiments, and validation. Areas of emphasis are :
   (a) Time-domain phenomena;
   (b) Scattering and diffraction;
   (c) Propagation and wave guiding;
   (d) Radiation and antennas;
   (e) Inverse scattering.

The Commission fosters the creation, development and refinement of associated analytical and numerical tools to understand these phenomena. It encourages innovation and seeks to apply interdisciplinary concepts and methods.

3. Commission C - SIGNALS AND SYSTEMS.

The Commission promotes research and development in :

(a) Telecommunication systems;
(b) Spectrum and medium utilization;
(c) Modulation and coding;
(d) Signal and image processing;
(e) Circuit theory and design;
(f) Information theory.

The design of effective telecommunication systems requires the balance of scientific, engineering and economic factors. The Commission emphasizes research into the scientific factors, and provides expertise in other areas of radio science required for system design.

4. Commission D - ELECTRONICS AND PHOTONICS.

The Commission promotes research and reviews new development in :

(a) Electronic devices and applications;
(b) Photonic devices and applications;
(c) Physics, materials, CAD, technology and reliability of electronic and photonic devices,

with particular reference to radio science and telecommunications.

The Commission deals with devices for generation, detection, storage and processing of electromagnetic signals together with their applications, covering all frequencies, including those in the microwave and optical domains.

5. Commission E - ELECTROMAGNETIC NOISE AND INTERFERENCE.

The Commission promotes research and development in :

(a) Terrestrial and planetary noise of natural origin; man-made noise;
(b) The composite noise environment;
(c) The effects of noise on system performance;
(d) The lasting effects of transients on equipment performance (this includes the Nuclear Electromagnetic Pulse);
(e) The scientific basis of noise and interference control;
(f) Spectrum utilization.

Note : Many of the subjects mentioned are treated under the common title of Electromagnetic Compatibility.

6. Commission F - WAVE PROPAGATION AND REMOTE SENSING (including radio-meteorology, radio-oceanography and remote sensing of non-ionized media).

The Commission encourages :

(a) The study of all aspects of wave propagation at all frequencies in a non-ionized environment :
    (i) wave propagation over the Earth's surface,

(ii) wave propagation in, and interaction with, the neutral atmosphere,
(iii) wave interaction with the Earth's surface, oceans, land and ice,
(iv) wave propagation through, and scattering by, the subsurface medium,
(v) characterization of the environment as it affects wave phenomena;

(b) The application of the results of these studies, particularly in the areas of remote sensing and communications;

(c) The appropriate cooperation with other URSI Commissions and other relevant organizations.

7. Commission G - IONOSPHERIC RADIO AND PROPAGATION (including ionospheric communications and remote sensing of ionized media).
The Commission deals with the study of the ionosphere in order to provide the broad understanding necessary for radio communications. Specifically, the study includes the following areas :
(a) Global morphology and modelling of the ionosphere;
(b) Ionospheric space-time variations;
(c) Development of tools and networks needed to measure ionospheric properties and trends;
(d) Theory and practice of radio propagation via the ionosphere;
(e) Application of ionospheric information to radio communications.
To achieve these objectives, the Commission cooperates with other URSI Commissions, corresponding bodies of the ICSU family (IUGG, IAU, COSPAR, SCOSTEP, etc) and other organizations (ITU, IEEE, etc.).

8. Commission H - WAVES IN PLASMAS (including space and laboratory plasmas).
The goals of the Commission are :
(a) To study waves in plasmas in the broadest sense and, in particular :
(i) the generation (i.e. plasma instabilities) and propagation of waves in plasmas,
(ii) the interaction between these waves, and wave-particle interactions,
(iii) plasma turbulence processes and chaos,
(iv) spacecraft-plasma interactions ;

(b) To encourage the application of the results of these studies, particularly in the areas of solar/planetary plasma interactions, and the increased exploitation of space as a research laboratory.

9. Commission J - RADIO ASTRONOMY (including remote sensing of celestial objects).
(a) The activities of the Commission are concerned with observation and interpretation of all radio emissions and reflections from celestial objects.
(b) Emphasis is placed on :
(i) the promotion of technical means for making radio-astronomical observations and data analysis,
(ii) support of activities to protect radio-astronomical observations from harmful interference.

10. Commission K - ELECTROMAGNETICS IN BIOLOGY AND MEDICINE
The Commission is charged with promoting research and development in the following domains :
(a) physical interactions of electromagnetic fields with biological systems;
(b) biological effects of electromagnetic fields;
(c) interaction mechanisms;
(d) human exposure assessment;
(e) experimental exposure systems;
(f) medical applications.
The Commission emphasizes its interdisciplinary character and fosters research co-operation among various disciplines.

U.2 Admission of New Members

The URSI Council,

having considered the applications for full membership submitted by the following scientific institutions :
1. the Academy of Sciences of Russia;
2. the Academy of Sciences of the Ukraine;
3. the Academy of Sciences of Uzbekistan;
4. the Korean Advanced Institute of Science and Technology;
5. the Scientific and Technical Research Council of Turkey;

resolves to accept the applications subject to the above institutions satisfying the criteria of the URSI Statutes.

U.3 Admission of New Associate Members

The URSI Council,

having considered the applications for associate membership submitted by the following scientific institutions :
1. the Academy of Sciences of Chile;
2. the Academy of Sciences of Belarus;
3. the Academy of Sciences of Kazakhstan;

resolves to accept these applications subject to the above institutions satisfying the criteria of the URSI Statutes.

U.4 Confirmation of an Associate Status

The URSI Council,

having noted the continued interest in radio science within Peru;

resolves to continue the associate membership of the URSI Committee in Peru.

U.5.....Network of Correspondents

The URSI Council,

noting the recommendations of the URSI Standing Committee on Membership;

resolves to modify items (i) to (v) of Resolution U.7 of the XXIII General Assembly, which concerns the Network of Correspondents :

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

U.6.....Standing Committee on URSI Membership

The URSI Council,

having considered the recommendations contained in the report of the Standing Committee on URSI Membership, and in particular the analysis devoted to the need to increase contacts with individual members of the URSI community;

resolves

1. to approve the recommendations of the Standing Committee on URSI Membership (see also resolution U.5);
2. to appoint the following as members of the Standing Committee on URSI Membership for the next triennium :

Chair :	T.B.A. Senior (USA)
Members :	F. Fedi (Italy)
	V.N. Gubankov (Russia)
	Y.N. Huang (China, SRS)
	S. Okamura (Japan)
	M. Petit (France)

U.7.....URSI Finances and Membership of the Standing Finance Committee

The URSI Council,

having considered the recommendations contained in the Report of the Standing Finance Committee, dated 30 August 1993;

resolves

1. to accept the recommendations of the Standing Finance Committee;
2. to approve the audited accounts of the Union for the years ending 31 December 1990, 1991 and 1992;
3. to publish the Report of the Treasurer and the Report of the Standing Finance Committee in Volume XXIII of the *Proceedings of URSI General Assemblies*;
4. to place on record its appreciation of the outstanding services rendered to the Union by Dr. P. Bauer in his capacity as Treasurer;
5. to appoint the following as members of the Standing Finance Committee for the next triennium :

Chair :	K. Géher (Hungary)
Members :	J.G. Lucas (Australia)
	S.M. Radicella (Argentina)
	F.W. Sluijter (Netherlands)
	K. Suchy (Germany)
	S.S. Swords (Ireland)
	W.W.L. Taylor (USA)

U.8 .....URSI Publications and Membership of the Standing Publications Committee

The URSI Council,

having considered the remarks and recommendations contained in the Report of the Standing Publications Committee, dated 27 August 1993;

resolves
1. to approve the recommendations of the Standing Publications Committee;
2. to publish the Report of the Standing Publications Committee in Volume XXIII of the *Proceedings of URSI General Assemblies;*
3. to appoint the following as members of the Standing Publications Committee for the next triennium :

Co-Chairs :	R.L. Dowden (New Zealand) and W.R. Stone (USA)
Members :	P.J.B. Clarricoats (U.K.)
	K. Géher (Hungary)
	P. Lagasse (Belgium)
	H. Matsumoto (Japan)

U.9 .....Standing Committee on Developing Countries

The URSI Council,

having considered
1. the report of the Standing Committee on Developing Countries for the 1990-3 triennium;
2. the proposals for future activities of the Committee;

resolves
1. to approve the report and the proposals of the Standing Committee on Developing Countries;

2. to appoint the following as members of the Standing Committee on Developing Countries for the next triennium :

Chair :	B.M. Reddy (India)
Secretary :	S.M. Radicella (Argentina)
Members :	G.O. Ajayi (Nigeria)
	P. Chooncharoen (Thailand)
	S. Feng (China, CIE)
	I. Kimura (Japan)
	M.S. Pontes (Brazil)
	I.A. Salem (Egypt)
	R.W. Stone (USA)
	J. Van Bladel (Belgium)
	J. Voge (France)

U.10 Standing Committee on Future General Assemblies

The URSI Council,

considering

1. that the optimal length of the scientific programme of a General Assembly has been discussed extensively in Council, but only in a preliminary way;
2. that the optimal period of the year in which to hold a General Assembly is a function, not only of local needs, but also of more general factors, such as conflicts with existing events;
3. that the choice of the venue of a General Assembly three years in advance (the present system) might discourage certain Member Committees from offering venues, because they need a longer preparation time;

resolves

1. to ask the Standing Committee on Future General Assemblies to make recommendations concerning the points referred to above;
2. to appoint the following as members of the Standing Committee on Future General Assemblies for the next triennium :

Chair :	T. Okoshi (Japan)
Members :	V. Fiala (Czechoslovakia)
	J.W. Klein (Germany)
	I.A. Salem (Egypt)
	A.M. Scheggi (Italy)
	J. Shapira (Israel)

U.11 Standing Committee on Young Scientists

The URSI Council,

having considered the recommendations contained in the report of the Standing Committee on Young Scientists;

resolves

1. to approve the report and the recommendations of the Standing Committee on Young Scientists;

2. to appoint the following as members of the Standing Committee on Young Scientists;

Chair :	S. Feng (China, CIE)
Members :	D. Gjessing (Norway)
	E.V. Jull (Canada)
	A.P. Mitra (India)
	T. Okoshi (Japan)
	G. Pillet (France)
	B. Shishkov (Bulgaria)
	J. Van Bladel (Belgium)
	L. Zombory (Hungary)

U.12 Long Range Planning Committee (Committee on the Future of URSI)

The URSI Council,

having considered the report of the meeting of the Long Range Planning Committee held on 25 August 1993;

resolves :

1. to approve the report and the proposals of the Long Range Planning Committee;
2. to appoint the following as members of the Long Range Planning Committee for the next triennium :

Chair :	J.B. Andersen (Denmark)
Members :	P. Bauer (France)
	R. Ekers (Australia)
	Y. Furuhama (Japan)
	W.E. Gordon (USA)
	E.V. Jull (Canada)
	V. Khaikin (Russia)
	J.G. Lucas (Australia)
	J. Shapira (Israel)
	M.A. Stuchly (Canada)
Secretary :	P. Lagasse (Belgium)

U.13 Inter-Commission Working Group on Scientific Uses of the "Global Positioning System" (GPS)

The URSI Council,

considering

1. the importance of using space- and ground-based observations of GPS signals to monitor the global environment of the atmosphere;
2. the use which future spaceborne observations of the temperatures of the lower atmosphere and the electron densities of the ionosphere will make of this technique;

resolves to establish an Inter-commission Working Group on the Scientific Uses of GPS Signals.

U.14 Inter-Commission Working Group on Time Domain Waveform Measurements

The URSI Council,

having considered the report of the meeting of the Working Group on Time Domain Waveform Measurements held on 27 August 1993, and the recommendations made therein;

resolves

1. to extend the mandate of the Inter-Commission Working Group on Time Domain Waveform Measurements by another three years;
2. to re-appoint Dr. T.K. Sarkar as Chair of the Working Group.

U.15 Inter-Commission Working Group on the Middle Atmosphere

The URSI Council,

recognizing the importance of studies of the middle atmosphere for understanding the global change problems;

noting

1. that proven techniques exist for applying electromagnetic waves to investigate (i) the physics and chemistry of the middle atmosphere (ii) the coupling of the middle atmosphere to regions above and below;
2. that these topics are included in the terms of reference of both Commissions F and G;

resolves to establish an Inter-commission Working Group on the Middle Atmosphere, with the following terms of reference :

1. to coordinate within URSI and with other ICSU bodies the relevant activities for studies of the middle atmosphere;
2. to stimulate research for understanding both the dynamic processes in the middle atmosphere and the climatology of these regions, and to cover, for instance, the development and application of
   (i) MST and related radar and radio techniques,
   (ii) lidar and related optical techniques, and
   (iii) satellite-borne and ground-based passive remote sensing techniques.

U.16 Committee on the International Geosphere-Biosphere Programme (IGBP)

The URSI Council,

noting

1. the numerous activities of the various Committees of the IGBP;
2. the difficulties of interfacing with these activities, but also the need to keep contact with the Programme;

resolves

to re-appoint a Committee on the IGBP for the next triennium, formed as follows :

Chair :	K. Raney (Canada)
Members :	J.P.V. Baptista (Italy)

P. Bauer (France)
S. Fukao (Japan)
H. Hallikainen (Finland)
H. Rishbeth (UK)
P.A. Watson (UK)

U.17 Ad hoc Group on Environmental Consequences of Nuclear War

The URSI Council,

considering that the Ad hoc Group might still have a role to play in the future;

resolves to maintain the ad hoc Group on Environmental Consequences of Nuclear War for the next triennium, with the following membership :

Chair :	M. Wik (Sweden)
Members :	W. Graf (U.S.A.)
	D. Hansen (Switzerland)
	J. Shiloh (Israel).

U.18 Inter-Union Commission on Frequency Allocation to Radio Astronomy and Space Science (IUCAF)

The URSI Council,

considering

1. the report of the meeting held by the IUCAF delegation on 27 August 1993;
2. the efficiency with which IUCAF defended the interests of the scientific community during the 1992 World Administrative Radio Conference (WARC), and the need for continuous vigilance in the struggle to keep parts of the radio spectrum free for scientific observations;

resolves

1. to approve the report and the recommendations contained therein;
2. to continue URSI's financial support of the activities of IUCAF;
3. to appoint the following as URSI members of the Commission :
   W.A. Baan (USA)
   R.J. Cohen (UK)
   H.C. Kahlmann (Netherlands)
   B.J. Robinson (Australia)
4. to replace, for the sake of continuity, B.J. Robinson by J. Whiteoak (Australia) as member of IUCAF if, as expected, B.J. Robinson retires from IUCAF before the next General Assembly.

U.19 Inter-Union Working Group on Adverse Environmental Impacts on Astronomy

The URSI Council,

noting

1. the need to maintain optimal conditions under which scientific space and astronomical research may be carried out;
2. the dangers represented by increasing electromagnetic interference, increasing amounts of space debris and, more recently, plans to start "advertising in space";

resolves

1. to approve participation of URSI in the Inter-Union Working Group on Adverse Environmental Impacts on Astronomy;
2. to propose R.D. Parlow (USA, Commission E) and J. Cohen (UK, Commission J) as Members of the Working Group.

U.20 Use of the Frequency Spectrum

The URSI Council,

urges the ITU and affiliated national and regional administrations :

1. to recognize that the electromagnetic spectrum is a unique and limited natural resource, and;
2. to allocate spectrum only to those services which must use free-space propagation, and;
3. to avoid allocating spectrum in cases where other technologies, such as guided-waves, could be used.

U.21 On Free Access to Environmental Data

The URSI Council,

noting the idea growing in some quarters of considering environmental data as a market commodity;

recognizing that such consideration could be acceptable when data are to be used for a commercial purpose;

urges agencies that archive this data to warrant the access to environmental information for scientific purpose free of charge, or at marginal cost.

U.22 Importance of the Terrestrial Ionosphere/Magnetosphere System as a Plasma Laboratory

The URSI Council,

considering

1. that the terrestrial ionosphere/magnetosphere system is the most readily accessible space plasma for cost-effective in situ and remote investigation;
2. that many processes operating in this system have similar counterparts elsewhere in astrophysical plasmas;
3. that there are basic questions in plasma physics that can be better addressed in the natural plasma laboratory provided by this system than in ground-based laboratories;

resolves that the attention of national administrations be drawn to the importance of conducting controlled active experiments - both *in situ* and remote - in the ionosphere/magnetosphere system, with the purpose of investigating basic problems in plasma physics as well as processes giving rise to naturally occurring space phenomena.

U.23 Importance of Electromagnetic Effects Associated With Earthquakes and Volcanic Eruptions

The URSI Council,

considering

1. that various experiments from ground and space have indicated the appearance of electromagnetic (EM) emissions, plasma disturbances and other effects before, during and after earthquakes and volcanic eruptions;
2. that a physical understanding of these natural electromagnetic processes is important for possible future applications relevant to the public domain;
3. that theoretical analyses of these effects allow multi-disciplinary approaches to investigate various underground wave-generation processes, and wave propagation through stratified random media, nonlinear wave amplification, and wave steepening and dissipation in ionospheric and magnetospheric plasmas;

resolves that the attention of appropriate national scientific organizations be drawn to the importance of both ground-based and space research in this area, including the retrospective analysis of available space plasma data banks to improve EM signature identification.

U.24 Importance of Preserving Old Geophysical Data Sets and Transforming Them to Digital Formats

The URSI Council,

considering

1. the importance of extensive continuous data sets for investigating long term trends and variations of ionospheric/magnetospheric parameters;
2. the inability to reproduce such existing data sets;
3. the imminent danger of losing some of these data sets through deterioration and/or disposal;

resolves that the attention of national administrations be drawn to the importance of preserving these data sets and transforming them into modern digital formats that will be more amenable to analysis.

U.25 XXV General Assembly

The URSI Council,

having considered the invitations for the XXV General Assembly which had been submitted by the URSI Member Committees in China (Beijing), in Egypt and in France;

resolves

1. to accept the invitation of the French URSI Committee to hold the XXV General Assembly in Lille from 28 August to 5 September 1996;
2. to record its thanks to the Member Committees in China (Beijing) and in Egypt for their invitations.

U.26 ....UNESCO and ICSU Subventions

The URSI Council,

considering

1. that an important part of the activities of URSI consists in the organization of international scientific symposia and other meetings, in the issuing of publications, and in its Young Scientist Programme;
2. that the subventions from UNESCO and from ICSU are used to cover part of the cost of these activities;

resolves to convey to these organizations its warm thanks and appreciation for the valuable support thus provided.

U.27 ....Vote of Thanks to the Japanese URSI Committee

The URSI Council,

resolves unanimously to record its warm appreciation of the invitation extended to it by the Japanese URSI Committee to hold the XXIV General Assembly in Kyoto. The generous hospitality and the excellence of the facilities provided by the Local Organizing Committee, coupled to a faultless administrative collaboration, made a deep impression on the participants. A special word of appreciation is offered to the Japanese hosts for a most enjoyable and successful programme of social events and for their welcome to the persons accompanying the participants in the Assembly.

RESOLUTIONS AND RECOMMENDATIONS OF COMMISSIONS

These resolutions and recommendations have been approved by the URSI Council at its 3 September 1993 meeting.

COMMISSION A - ELECTROMAGNETIC METROLOGY

A.1. Conference on Precision Electromagnetic Measurements (CPEM)

Commission A,

considering the revised charter for CPEM and

agreeing that the new terms are satisfactory;

recommends that URSI continue to sponsor the international Conference on Precision Electromagnetic Measurements .

A.2. Dates of Meetings

Commission A,

considering

1. the close affinity of interest between Commission A and the Conference on Precision Electromagnetic Measurements (CPEM);
2. the coincidence in 1996 of the 25th General Assembly of URSI in Lille (France) and the meeting of CPEM in Braunschweig (Germany);

recommends that the respective organizing bodies for the two meetings attempt to align the dates so that one meeting follows immediately after the other meeting.

A.3. The kilogram in the SI

Commission A,

considering

1. that the kilogram is a base unit in the SI realized by a material standard - the international prototype;
2. that it is desirable to monitor (and possibly later to define) the kilogram in terms of fundamental constants;

recommends that appropriate laboratories intensify work leading to the realization of methods which will link the kilogram to selected fundamental constants.

A.4. Optical Frequency Generation and Measurement

Commission A,

considering
1. the general trend to move to optical frequencies;
2. the interest of both research scientists and communications engineers in applying coherent detection techniques requiring frequency synthesis;
3. the availability of suitable devices and components;

recommends
1. that studies and experiments should be performed with a view toward developing coherent and tuneable sources;
2. that studies should be pursued leading to the realization of optical frequency counters;
3. that finely tuneable and stable sources should be developed to meet the needs of spectroscopic research.

A.5. Accurate Electromagnetic Field Measurements

Commission A,

considering
1. the growing public interest in the effects of electromagnetic fields on biological systems;
2. the difficulties in accurately measuring field strength in the course of studying these effects, especially in the vicinity of antennas;
3. the effect of field distortions by the biological system and by the measurement system itself;

expresses the opinion
1. that methods for accurate field strength measurements under well-defined conditions should be developed;
2. that effective models for the electromagnetic field distribution in the vicinity of radiating structures and within biological systems near these radiators should be developed;
3. that this work will hopefully assist the studies in Commission K of exposure and dosimetry standards.

COMMISSION D - ELECTRONICS AND PHOTONICS

D.1. Symposia at the 1996 General Assembly

Commission D,

noting the multi-disciplinary character of Commission D within URSI;

intends to increase the number of joint sessions with other Commissions.

D.2. Bibliographic disk produced in conjunction with the Review of Radio Science

Commission D,

considering

1. that the intended readership of the bibliographic disk is not clearly defined;
2. that Commission D covers areas of extremely wide technical and scientific endeavour;
3. that these areas are advancing extremely rapidly;
4. that there exist other easily accessible reference sources ;

resolves not to participate in the compilation of references for the next bibliographic disk.

D.3. Sponsorship of International Conferences

Commission D,

recommends sponsorship or co-sponsorship, as appropriate, of the following meetings :

- URSI International Symposium on Signals, Systems and Electronics (ISSSE'95), San Francisco, 25-27 October 1995, organized jointly by Commissions C and D;
- European Conferences on Optical Communication (ECOC), in 1994, 1995 and 1996;
- European Microwave Conferences in 1994, 1995 and 1996;
- Asia Pacific Microwave Conference (APMC) in 1994, 1995 and 1996;
- 22nd International Symposium on Compound Semiconductors in 1995.

COMMISSION E - ELECTROMAGNETIC NOISE AND INTERFERENCE

E.1. Working Groups

Commission E,

considering the reports submitted by its various Working Groups;

resolves

1. to establish, with Commissions G and H, a Joint Working Group EGH.1 entitled "Electromagnetic Effects Associated with Seismic Activity", with Professor T. Yoshino (Japan) as Co-Chair for Commission E;
2. to maintain the previous Working Groups of Commission E, i.e. :
   E.1. Spectrum Management and Utilization

Chair : R.D. Parlow (USA);

E.2. Non-Gaussian Noise in Communication
Chair : A.D. Spaulding (USA);

E.3. High Power Electromagnetics
Chair : R.L. Gardner (USA);

E.4. Terrestrial and Planetary Electromagnetic Noise
Chair : Z. Kawasaki (Japan);

E.5. Interaction with and Protection of Complex Electrical Systems
Co-Chairs : C. Baum (USA), P. Degauque (France) and M. Ianoz (Switzerland);

E.6. Effects of Transients on Equipment
Co-Chairs : V. Scuka (Sweden), and B. Demoulin (France);

E.7. Extra-Terrestrial and Terrestrial Meteorologic-Electric Environment
Chair : H. Kikuchi (Japan).

E.2. Symposia

Commission E,

considering the proposals of symposia for the next triennial period,

resolves

1. to support, in mode A, the following conferences :
   - International Symposium on Electromagnetic Environment and Consequences (EUROEM), Bordeaux, France, 1994;
   - International Symposium on Electromagnetic Compatibility, Sendai, Japan, 1994;
2. to support, in mode B, the following conferences :
   - Colloque international et exposition sur la compatibilité électromagnétique, Toulouse, France, 1994;
   - International Wroclaw Symposium on Electromagnetic Compatibility, Wroclaw, Poland, 1994;
   - International Zurich Symposium and Technical Exhibition on Electromagnetic Compatibility, Zurich, Switzerland, 1995;
   - International Wroclaw Symposium and Exhibition on Electromagnetic Compatibility, Wroclaw, Poland, 1996.

COMMISSION G - IONOSPHERIC RADIO AND PROPAGATION

G.1. Working Groups

Commission G,

resolves to maintain the following Working Groups :

G.1. Ionosonde Network Advisory Group (INAG)
Chair : P.J. Wilkinson (Australia)

Secretary : R. Conkright (USA);

G.2. Studies of the Ionosphere Using Beacon Satellites
Chair : R. Leitinger (Austria)
Vice-Chairs : J.A. Klobuchar (USA), T.R. Tyagi (India);

G.3 Incoherent Scatter
Chair : J.M. Holt (USA)
Vice-Chair : P.J.S. Williams (UK);

G.4 Ionospheric Informatics
Chair : D. Anderson (USA)
Vice-Chair : R. Hanbaba (France).

G.2. Joint Working Groups

Commission G,

resolves to maintain the following Joint Working Groups :

GH.1 on Active Experiments in Plasmas, with Sa. Basu (USA) as Commission G representative;

GH.2 on Computer Experiments, Simulation and Analysis of Wave Plasma Processes, with H. Thiemann (Germany) as Commission G representative;

CGH.1 on Wave and Turbulence Analysis, with A.W. Wernik (Poland) as Co-Chair for Commission G;

Inter-Union (URSI/IAGA) Working Group 1 on "VLF/ELF Remote Sensing of the Ionosphere and Magnetosphere (VERSIM)", with U. Inan (USA) as URSI Co-Chair;

recommends to establish, with Commisisons E and H, a Joint Working Group EGH.1 entitled "Electromagnetic Effects Associated with Seismic Activity". The Co-Chair for Commission G will be appointed later.

G.3. Low Frequency (LF) Wind Measurements

Commission G,

considering

1. that there is an essential requirement for long-term observations of the Earth's atmosphere with a view toward investigating trends in global change which could most sensitively be recognized by the observation of upper atmosphere parameters;
2. that the inexpensive LF wind measurements made at oblique incidence are of eminent importance for continuous monitoring of the ionosphere, the upper atmosphere and the lower thermosphere;
3. that those measurements, in combination with reflection height measurements using the modulation spectrum of the transmissions, could allow calculation of the vertical profiles of the wind field parameters;

recommends that LF wind measurements be made within 150 to 400 km of LF broadcasting stations.

G.4. Bulletin of the Ionosonde Network Advisory Group (INAG)

Commission G,

recognizing the important role of the "INAG Bulletin" in maintaining the world network of ionospheric sounding stations and the quality of the data acquired by the network;

expresses its thanks to the Australian Department of the Arts and Administrative Services for the support it provides, through the Radio and Space components of the Ionospheric Prediction Services (IPS), for the production of this Bulletin.

recommends to the Council that URSI continue to support financially the publication of the Bulletin for the next three years.

G.5. Mesosphere-Stratosphere-Troposphere (MST) Radar in the Equatorial Region

Commission G

considering

1. the importance of studying the middle atmosphere as evidenced by the formation of an inter-commission working group on the subject (see resolution U.15);
2. the presence of a chain of ST radars in the equatorial region in the Pacific sector;

recommends that a high-sensitive Incoherent Scatter/MST radar be established in the equatorial region of South-East Asia to provide an anchor for this chain of radars.

G.6. Sponsorship of Symposia 1993-1996

Commission G,

recommends sponsorship by URSI of the following Symposia during 1993-1996 in Mode A or Mode B, subject to receipt of proper requests from the organizers :

- (With Commission H) Electromagnetic Scattering from Gases and Plasmas, Aussois, France, 20-25 March 1994;
- (With Commission H) Eighth International Symposium on Solar Terrestrial Physics Dedicated to Solar Terrestrial Energy Program (STEP), Sendai, Japan, 5-10 June 1994 (Mode B) (H. Oya);
- (With Commission H) Suzdal Symposium on the Modification of the Ionosphere by Powerful Radio Waves, Uppsala, Sweden, September or October, 1994 (Mode B) (B. Thide);
- (With Commission H) STEP/GAPS (Solar Terrestrial Energy Program/Global Atmospheric and Plasma Structure) Workshop on Theory and Observations of Nonlinear Processes in the Near-Earth Space Environment, Warsaw, Poland, Spring, 1995, (Mode B) (A. W. Wernik [G], Su. Basu [G] and F. Lefeuvre [H]);
- International Reference Ionosphere (IRI) Workshop, Trieste, Italy, October 1993;

- Beacon Satellite Symposium, Aberystwyth, U.K., July 1994;
- Incoherent Scatter Workshop, Ukraine, 1995;
- COMMSPHERE 94, Eilat, Israel, December 1994;
- MST Radar Workshop, USA;
- MST Radar School, India;
- IIWG Workshop, 1994;
- Equatorial Aeronomy Symposium, Japan, 1995.

Addendum

Commission G also made recommendations leading to the creation of

1. the Inter-Commission Working Group on the Middle Atmosphere (see resolution U.15). S. Fukao (Japan) will be the Co-Chair for Commission G;
2. the Inter-Commission Working Group on Scientific Uses of the Global Positioning System (see resolution U.13). P. Høeg (Denmark) will be the representative of Commission G;

COMMISSION H - WAVES IN PLASMAS

H.1 Working Groups

Commission H,

considering the reports submitted by its various Working Groups,

resolves

1. to continue the Inter-Union (URSI/IAGA) Working Group 1 VLF/ELF Remote Sensing of the Ionosphere and Magnetosphere (VERSIM), with U.S. Inan (U.S.A.) as Co-Chair for Commission H;
2. to continue, with Commissions C and G, the Joint Working Group CGH.1 on "Wave and Turbulence Analysis", with F. Lefeuvre (France) as Co-Chair for Commission H;
3. to continue, with Commission G, the Joint Working Group GH.1 on "Active Experiments in Plasmas", with P. Bernhardt (USA) as Co-Chair for Commission H;
4. to continue, with Commission G, the Joint Working Group GH.2 on "Computer Experiments, Simulation and Analysis of Wave Plasma Processes", with H. Matsumoto (Japan) as Co-Chair for Commission H;
5. to establish, with Commissions E and G, a Joint Working Group EGH.1 on "Electromagnetic Effects Associated with Seismic Activity", with M. Parrot (France) as Co-Chair for Commission H.

H.2. Sponsorship of Symposia and Meetings

Commission H,

recommends the sponsorship by URSI of the following meetings during 1993-1996 in Mode A or Mode B, subject to receipt of proper requests from organizers:

- (With Commission G) Electromagnetic Scattering from Gases and Plasmas, Aussois, France, 20-25 March 1994 (Mode B);
- (With Commission G) Eighth International Symposium on Solar Terrestrial Physics Dedicated to Solar Terrestrial Energy Program (STEP), Sendai, Japan, 5-10 June 1994 (Mode B) (H. Oya);
- (With Commission G) Suzdal Symposium on the Modification of the Ionosphere by Powerful Radio Waves, Uppsala, Sweden, September or October, 1994 (Mode B) (B. Thide);
- (With Commission G) STEP/GAPS (Solar Terrestrial Energy Program/Global Atmospheric and Plasma Structure) Workshop on Theory and Observations of Nonlinear Processes in the Near-Earth Space Environment, Warsaw, Poland, Spring, 1995, (Mode B) (A. W. Wernik [G], Su. Basu [G] and F. Lefeuvre [H]);
- 22nd International Conference on Phenomena in Ionized Gases (ICPIG), tentatively in College Park, Maryland, USA (Summer 1995) (Mode B) (K. Suchy);
- 5th International School for Space Simulations (ISSS-5) to be held in 1995 (Mode B) (C. Dum [Germany], M. Ashour-Abdalla [USA] and H. Matsumoto [Japan]).

COMMISSION J - RADIO ASTRONOMY

J.1. Millimetre - Submillimetre Array Working Group

Commission J,

considering

1. that the time has come for millimetre / submillimetre astronomy to consider the next generation telescope, which will require high angular resolution and an order of magnitude increase in sensitivity over present day telescopes;
2. that such a telescope will be very expensive and will demand international collaboration;

recommends that URSI should establish a Working Group on the "Large Millimetre / Submillimetre Array", with the following terms of reference :

1. To study the main scientific objective for the beginning of the next century;
2. To coordinate and evaluate the "radio-seeing" data for site evaluation and observation strategy;
3. To study new designs for telescopes and instrumentation;
4. To investigate potential international partnerships.

J.2 Large Telescope Working Group

Commission J,

considering

1. the strong scientific case for a new, internationally accessible radio telescope with one to two orders of magnitude greater sensitivity than that of any existing or planned facility;
2. the need for innovative technical developments to realize such a facility at an affordable price;
3. the likely need for international collaboration to allow realization of this facility;

resolves to establish a Working Group with the following terms of reference :

1. to explore the range of scientific problems to be addressed by the instrument;
2. to discuss the technical specifications and general design considerations needed to maximize the scientific return of such a facility;
3. to identify and, in so far as possible, solve the major technical challenges to realization of an affordable radio telescope with the required sensitivity.

COMMISSION K - ELECTROMAGNETICS IN BIOLOGY AND MEDICINE

K.1 Wireless Communication

Commission K,

considering

1. that there is a rapid development of new technologies such as wireless local area networks (LAN's), cellular phones, low earth orbiting satellite communication networks (LEO's, e.g. Iridium), personal communication services (PCS), cordless telephones, etc... and that their wide spread is anticipated;
2. that there exists scientific uncertainty about potential impact on human health of electromagnetic fields from wireless communication;
3. that there is public concern about health effects of all electromagnetic systems;

recommends that broadbased research programmes should be established nationally and internationally to address the following key questions :

1. what are the interaction mechanisms, with living systems, of weak electromagnetic fields of various characteristics;
2. what biological effects - and particularly potentially harmful effects - are caused, and under what exposure conditions;
3. how to evaluate the exposures through proper measurements and dosimetric modelling.

The Commission gratefully acknowledges the promised support of Commission A in the area of the measurements, and of Commission B in the area of the dosimetric modelling.

RESOLUTIONS ET RECOMMANDATIONS DU CONSEIL

U.1 .....Les Commissions scientifiques de l'URSI

Le Conseil de l'URSI,

notant

1. qu'aux termes de la Résolution C.1 (Lima, 1975), les Commissions sont tenues de réexaminer leurs sujets d'étude à l'occasion de chaque Assemblée générale;
2. que les Commissions A, B, C, D, E, F, H et J n'estiment pas nécessaire de modifier leurs mandats tels qu'ils figurent à l'annexe de la Résolution U.1 (Prague, 1990);
3. que la Commission G désire modifier son mandat par l'addition de deux mots;
4. qu'il n'existait qu'une version temporaire du titre et du mandat de la Commission K;

confirme ou approuve, selon le cas, les titres et mandats des Commissions reproduits en annexe.

ANNEXE

1. Commission A - METROLOGIE ELECTROMAGNETIQUE, Mesures et étalons électromagnétiques.
   La Commission tend à promouvoir les recherches et les développements dans les domaines suivants:
   (a) mesures et étalons de temps et de fréquence, y compris les infrarouges et le domaine optique;
   (b) mesures dans le domaine temporel;
   (c) mesures dans le domaine des fréquences;
   (d) mesures dans les télécommunications;
   (e) mesures au moyen du laser;
   (f) métrologie quantique et méthodes électriques dans le domaine des constantes fondamentales;
   (g) mesures et étalons dans la gamme allant des hyperfréquences aux ondes submillimétriques.

2. Commission B - ONDES ET CHAMPS. Théorie électromagnétique et applications, y compris les antennes et les guides d'ondes.
   L'intérêt de la Commission B porte sur *les champs et les ondes*, et englobe la théorie, l'analyse, le calcul, les expériences, et leur confirmation, l'accent étant mis sur les sujets suivants:
   (a) phénomènes dans le domaine temporel;
   (b) diffusion et diffraction;

(c) propagation et guidage des ondes;
(d) rayonnement et antennes;
(e) méthodes inverses appliqueés à la diffusion.

La Commission encourage les études ayant pour but de créer, de développer et d'affiner les méthodes numériques et analytiques susceptibles d'améliorer la compréhension de ces phénomènes. Elle préconise l'esprit d'innovation et s'efforce d'appliquer des concepts et méthodes pluridisciplinaires.

3. Commission C - SIGNAUX ET SYSTEMES.

La Commission tend à promouvoir les recherches et les développements dans les domaines suivants:

(a) systèmes de télécommunications;
(b) utilisation du spectre et des milieux de transmission;
(c) modulation et codage;
(d) traitement du signal et de l'image;
(e) théorie et conception des circuits;
(f) théorie de l'information.

La conception de systèmes de télécommunications efficaces requiert un équilibre entre les considérations liées à l'ingénierie scientifique et les facteurs économiques. La Commission met l'accent sur la recherche scientifique et fournit l'expérience nécessaire à la conception des systèmes dans d'autres domaines de la radioélectricité scientifique.

4. Commission D - ELECTRONIQUE ET PHOTONIQUE.

La Commission tend à promouvoir les recherches et à faire le point des nouveaux développements dans les domaines suivants:

(a) dispositifs électroniques et applications;
(b) dispositifs photoniques et applications;
(c) physique, matériaux, CAO, technologie et fiabilité des dispositifs électroniques et photoniques

présentant un intérêt particulier pour la radioelectricité scientifique et les télécommunications.

La Commission étudie les dispositifs pour la production, la détection, le stockage et le traitement des signaux électromagnétiques, ainsi que leurs applications à toutes les fréquences, y compris les hyperfréquences et les fréquences optiques.

5. Commission E - BRUITS ET BROUILLAGES ELECTROMAGNETIQUES.

La Commission tend à promouvoir les recherches et les développements dans les domaines suivants:

(a) bruits terrestres et planétaires d'origine naturelle, bruits artificiels;
(b) bruits composites ambiants;
(c) effets des bruits sur la qualité des systèmes;
(d) effets durables des phénomènes transitoires sur la qualité des équipements (incluant l'impulsion électromagnétique nucléaire);
(e) base scientifique des bruits et maîtrise des brouillages;
(f) utilisation du spectre.

Note : *Nombre des sujets précités sont traités sous le titre commun de compatibilité électromagnétique.*

6. Commission F - PROPAGATION DES ONDES ET TELEDETECTION (y compris la radiométéorologie, la radioocéanographie et la télédétection des milieux non ionisés).

La Commission tend à encourager :

(a) l'étude de tous les aspects de la propagation des ondes à toutes les fréquences dans un milieu non-ionisé:
  (i) propagation des ondes au-dessus de la surface de la Terre,
  (ii) propagation des ondes dans l'atmosphère neutre et interaction des ondes avec l'atmosphère neutre,
  (iii) interaction des ondes avec la surface de la Terre : océans, sol et glace,
  (iv) propagation et diffusion des ondes en milieu souterrain,
  (v) caractérisation de l'environnement en ce qu'il affecte les phénomènes ondulatoires;

(b) l'application des résultats de ces études, en particulier dans les domaines de la télédétection et des communications;

(c) le développement d'une collaboration appropriée avec les autres Commissions de l'URSI et les organisations concernées.

7. Commission G - RADIOELECTRICITE IONOSPHERIQUE ET PROPAGATION (y compris les communications ionosphériques et la télédétection des milieux ionisés).

La Commission s'occupe de l'étude de l'ionosphère ayant pour but la compréhension générale de ce milieu nécessaire aux radiocommunications. Elle s'intéresse plus spécifiquement aux sujets suivants :

(a) morphologie globale et modélisation de l'ionosphère;

(b) variations spatio-temporelles de l'ionosphère;

(c) développement des outils et réseaux nécessaires à la mesure des caractéristiques et des facteurs d'évolution de l'ionosphère;

(d) théorie de la propagation radioélectrique par l'intermédiaire de l'ionosphère, et applications;

(e) application aux radiocommunications de la connaissance de l'ionosphère.

Pour atteindre ces objectifs, la Commission collabore avec d'autres Commissions de l'URSI, les organismes concernés du CIUS (UGGI, UAI, COSPAR, SCOSTEP, etc.) ainsi qu'avec d'autres organisations internationales (UIT, IEEE, etc.)*

---

* CIUS : Conseil International des Unions Scientifiques
UGGI : Union Géodésique et Géophysique Internationale
UAI : Union Astronomique Internationale
COSPAR : Comité de Recherche Spatiale
SCOSTEP : Comité Scientifique de Physique Solaire-Terrestre
UIT : Union Internationale des Télécommunications
IEEE : Institution of Electrical and Electronic Engineers

8. Commission H - ONDES DANS LES PLASMAS (y compris les plasmas spatiaux et de laboratoire).

La Commission a pour buts:

(a) d'étudier les ondes dans les plasmas au sens le plus large et, en particulier, les sujets suivants:
   (i) la génération (instabilités dans les plasmas) et la propagation des ondes dans les plasmas,
   (ii) les interactions onde-onde et les interactions onde-particule,
   (iii) les processus de turbulence dans les plasmas et le chaos,
   (iv) les interactions entre les plasmas et les engins spatiaux;

(b) d'encourager l'application des résultats de ces études, en particulier dans les domaines suivants : interactions entre plasmas solaires et planétaires et utilisation accrue de l'espace comme un laboratoire de recherche.

9. Commission J - RADIOASTRONOMIE (y compris la télédétection des objets célestes).

(a) Les activités de la Commission concernent l'observation et l'interprétation de toutes les émissions et réflexions radioélectriques en provenance d'objets célestes.

(b) L'accent est mis sur :
   (i) la promotion de moyens techniques pour les observations et l'analyse des données radioastronomiques,
   (ii) l'appui des démarches ayant pour but d'obtenir la protection des observations radioastronomiques contre les brouillages nuisibles.

10. Commission K - ELECTROMAGNETISME EN BIOLOGIE ET MEDECINE

La Commission a pour tâche de promouvoir les recherches et les développements dans les domaines suivants :

(a) interactions physiques entre champs électromagnétiques et systèmes biologiques;
(b) effects biologiques des champs électromagnétiques;
(c) mécanismes des interactions;
(d) évaluation des expositions humaines;
(e) systèmes d'exposition expérimentaux;
(f) applications médicales.

La Commission met l'accent sur son caractère interdisciplinaire, et encourage la coopération des diverses disciplines de recherche qui sont de son domaine.

U.2 ..... Admission de nouveaux Comités Membres

Le Conseil de l'URSI,

ayant examiné les demandes d'admission présentées par les institutions scientifiques suivantes :

1. l'Académie des Sciences de Russie;
2. l'Académie des Sciences d'Ukraine;
3. l'Académie des Sciences d'Uzbekistan;
4. le Korean Advanced Institute of Science and Technology;
5. le Conseil de la Recherche scientifique et technique de Turquie;

décide d'accepter ces demandes sous réserve que ces institutions satisfassent aux conditions prévues par les Statuts de l'URSI.

U.3 Admission de nouveaux Membres associés

Le Conseil de l'URSI,

ayant examiné les demandes d'admission présentées par les institutions scientifiques suivantes :

1. l'Académie des Sciences du Chili;
2. l'Académie des Sciences de Biélorussie;
3. l'Académie des Sciences du Kazakhstan;

décide d'accepter ces demandes sous réserve que ces institutions satisfassent aux conditions prévues par les Statuts de l'URSI.

U.4 Confirmation du statut d'un Membre associé

Le Conseil de l'URSI,

notant l'intérêt permanent des scientifiques péruviens pour les activités de l'URSI;

décide de maintenir le statut d'associé du Comité Membre Péruvien.

U.5 Réseau de Correspondants

Le Conseil de l'URSI,

ayant pris connaissance des recommandations formulées par le Comité permanent pour l'adhésion à l'URSI;

décide de modifier comme suit les points (i) à (v) de la Résolution U.7 de l'Assemblée Générale de Prague, qui traite du Réseau de Correspondants :

(i) tout scientifique participant à une Assemblée générale de l'Union deviendra correspondant pour la période de trois ans suivant l'Assemblée, grâce à une cotisation incluse dans le droit d'inscription;
(ii) d'autres scientifiques peuvent adhérer au réseau de correspondants pour la même période de trois ans, en s'adressant directement au Secrétariat de l'URSI et en versant la cotisation mentionnée en (i);
(iii) le Bureau peut, sur demande de l'intéressé, exonérer un scientifique de la catégorie (ii) du versement de la cotisation;

(iv) les scientifiques membres du réseau recevront gratuitement le périodique "Radioscientist-Bulletin", ainsi qu'une carte numérotée leur accordant des réductions sur les droits d'inscription à certains Symposia et Conférences parrainés par l'URSI;

(v) les Correspondents n'auront pas droit de vote, mais seront autorisés à émettre leur avis sur les questions à caractère scientifique discutées au sein des Commissions.

U.6 Comité permanent pour l'adhésion à l'URSI

Le Conseil de l'URSI,

ayant pris connaissance des recommandations formulées dans le rapport du Comité permanent pour l'adhésion à l'URSI, et en particulier de celles consacrée au désir d'augmenter les contacts individuels avec les membres de la communauté URSI;

décide

1. d'accepter les recommandations du Comité permanent pour l'adhésion à l'URSI;
2. de désigner les personnalités suivantes comme membres du Comité permanent pour l'adhésion à l'URSI pour les trois années à venir :

Président :	T.B.A. Senior (EUA)
Membres :	F. Fedi (Italie)
	V.N. Gubankov (Russie)
	Y.N. Huang (Chine, SRS)
	S. Okamura (Japon)
	M. Petit (France)

U.7 Finances de l'Union et composition du Comité permanent des finances

Le Conseil de l'URSI,

ayant pris connaissance des recommandations formulées dans le rapport du Comité permanent des finances, en date du 30 août 1993;

décide

1. d'accepter les recommandations du Comité permanent des finances;
2. d'approuver les comptes certifiés de l'Union pour les exercices prenant fin au 31 décembre 1990, 1991 et 1992;
3. de publier les rapports du Trésorier et du Comité des finances dans le Volume XXIII des *Comptes Rendus des Assemblées générales de l'URSI* ;
4. d'exprimer au Dr. P. Bauer sa gratitude pour les éminents services qu'il a rendus à l'Union en sa qualité de Trésorier;
5. de désigner les personnalités suivantes comme membres du Comité permanent des finances pour les trois années à venir :

Président :	K. Géher (Hongrie)
Membres :	J.G. Lucas (Australie)
	S. Radicella (Argentine)

F.W. Sluijter (Pays-Bas)
K. Suchy (Allemagne)
S.S. Swords (Irlande)
W.W.L. Taylor (EUA)

U.8 ..... Publications de l'URSI et composition du Comité permanent des publications

Le Conseil de l'URSI,

ayant pris connaissance des remarques et recommandations formulées dans le rapport du Comité permanent des publications en date du 27 août 1993;

décide

1. d'approuver les recommandations du Comité permanent des publications;
2. de publier le rapport du Comité permanent des publications dans le Volume XXIII des *Comptes Rendus des Assemblées générales de l'URSI ;*
3. de désigner les personnalités suivantes comme membres du Comité pour les trois années à venir :

Co-Présidents :	R.L. Dowden (Nouvelle Zélande) et W.R. Stone (EUA)
Membres :	P.J.B. Clarricoats (Royaume-Uni)
	K. Géher (Hongrie)
	P. Lagasse (Belgique)
	H. Matsumoto (Japon)

U.9 ..... Comité permanent pour les pays en développement

Le Conseil de l'URSI,

ayant pris connaissance

1. du rapport d'activités 1990-1993 du Comité permanent pour les pays en développement;
2. des propositions faites par ce Comité concernant ses futures activités;

décide

1. d'approuver le rapport et les propositions du Comité permanent pour les pays en développement;
2. de désigner les personnalités suivantes comme membres du Comité pour les trois années à venir :

Président :	B.M. Reddy (Inde)
Secrétaire :	S.M. Radicella (Argentine)
Membres :	G.O. Ajayi (Nigeria)
	P. Chooncharoen (Thailand)
	S. Feng (Chine, CIE)
	I. Kimura (Japon)
	M.S. Pontes (Brésil)
	I.A. Salem (Egypte)

R.W. Stone (EUA)
J. Van Bladel (Belgique)
J. Voge (France).

U.10 Comité permanent pour les Assemblées générales de l'URSI

Le Conseil de l'URSI,

considérant

1. que la durée optimale du programme scientifique d'une Assemblée Générale a été longuement discutée au Conseil, mais seulement de façon préliminaire;
2. que la période de l'année qui se prête le mieux à l'organisation d'une Assemblée Générale dépend non seulement des conditions locales, mais aussi de facteurs plus généraux, comme la possibilité de conflits temporels avec d'autres conférences;
3. que le choix du lieu de l'Assemblée générale, effectué dans le système actuel trois ans à l'avance, peut décourager certains comités membres susceptibles de proposer l'organisation de l'Assemblée, dans la mesure où cette organisation nécessite un delai de préparation plus étendu;

décide

1. de demander au Comité de formuler des recommandations quant aux points susmentionnés;
2. de désigner les personnalités suivantes comme membres du Comité pour les trois années à venir :

Président :	T. Okoshi (Japon)
Membres :	V. Fiala (Tchécoslovaquie)
	J.W. Klein (Allemagne)
	I.A. Salem (Egypte)
	A.M. Scheggi (Italie)
	J. Shapira (Israël).

U.11 Comité permanent pour les jeunes scientifiques

Le Conseil de l'URSI,

ayant pris connaissance des recommandations formulées dans le rapport du Comité permanent pour les jeunes scientifiques;

décide

1. d'approver le rapport et les recommandations du Comité permanent pour les jeunes scientifiques;
2. de désigner les personnalités suivantes comme membres du Comité pour les trois années à venir:

Président :	S. Feng (Chine, CIE)
Membres :	D. Gjessing (Norvège)
	E.V. Jull (Canada)
	A.P. Mitra (Inde)

T. Okoshi (Japon)
G. Pillet (France)
B. Shishkov (Bulgarie)
J. Van Bladel (Belgique)
L. Zombory (Hongrie)

U.12 Comité de réflexion sur la politique à long terme de l'URSI (Comité de réflexion sur l'avenir de l'URSI)

Le Conseil de l'URSI,

ayant pris connaissance du rapport du Comité de réflexion sur la politique à long terme de l'URSI, qui s'est réuni le 25 août 1993;

décide

1. d'approver le rapport et les propositions du Comité de réflexion sur la politique à long terme de l'URSI;
2. de désigner les personnalités suivantes comme membres du Comité pour les trois années à venir:

Président :	J. Bach Andersen (Danemark)
Membres :	P. Bauer (France)
	R. Ekers (Australie)
	Y. Furuhama (Japon)
	W.E. Gordon (EUA)
	E.V. Jull (Canada)
	V. Khaikin (Russie)
	J.G. Lucas (Australie)
	J. Shapira (Israël)
	A.M. Stuchly (Canada)
Secretaire :	P. Lagasse (Belgique)

U.13 Groupe de travail inter-Commissions sur l'utilisation scientifique du Système de Localisation Globale (GPS)

Le Conseil de l'URSI,

considérant

1. l'importance d'utiliser les signaux GPS, au sol et dans l'espace, afin d'observer l'environment de l'atmosphère à l'échelle globale;
2. l'utilisation future de cette technique par les moyens d'observation spatiaux des températures de la basse atmosphère et des densités électroniques de l'ionosphère;

décide de créer un Groupe de travail inter-Commissions sur l'utilisation du Système de Localisation Globale.

U.14 Groupe de travail inter-Commissions sur la mesure des formes d'onde dans le domaine temporel

Le Conseil de l'URSI,

ayant pris connaissance du rapport de la réunion du Groupe de travail inter-Commissions sur la mesure des formes d'onde dans le domaine temporel, tenue le 27 août 1993, et des recommandations qu'il contient,

décide

1. de maintenir le Groupe de travail inter-Commissions sur la mesure des formes d'onde dans le domaine temporel pendant la période 1993-6;
2. de désigner à nouveau T.K. Sarkar comme Président du Groupe de travail.

U.15 Groupe de travail inter-Commissions sur l'atmosphère moyenne

Le Conseil de l'URSI,

conscient de l'importance de l'étude de l'atmosphère moyenne pour une meilleure compréhension des problèmes liés au changement global;

prenant en considération les techniques bien connues d'application des ondes électromagnétiques à l'étude (i) des propriétés physiques et chimiques de l'atmosphère moyenne, (ii) du couplage de celle-ci à ses régions inférieures et supérieures;

notant que ces sujets d'étude sont inclus dans les mandats des Commissions F et G;

décide de créer un Groupe de travail inter-Commissions sur l'atmosphère moyenne, avec pour tâches :

1. de coordonner au sein de l'URSI, et avec les autres organisations appartenant au CIUS, les programmes consacrés à l'étude de l'atmosphère moyenne;
2. d'encourager et stimuler les recherches consacrées à une meilleure compréhension de la climatologie et des processus dynamiques de l'atmosphère moyenne, et d'y inclure, par exemple, le développement et l'application
   (i) des techniques Mésosphère-Stratospère-Troposphère (MST), et des techniques radar et radio apparentées;
   (ii) du lidar et autres techniques optiques;
   (iii) des techniques de télédétection passive mettant en jeu une instrumentation au sol ou dans l'espace.

U.16 Comité pour le Programme International Géosphère-Biosphère (IGBP)

Le Conseil de l'URSI,

notant

1. les activités nombreuses des divers Comités de l'IGBP;
2. les difficultés que l'URSI éprouve à participer efficacement à ces activités, mais aussi son désir de conserver un contact suffisant avec le Programme;

décide de renouveler le mandat du Comité pour le Programme international géosphère-biosphère, et de le constituer comme suit pour les trois années à venir :

Président :	K. Raney (Canada)
Membres :	J.P.V. Baptista (Italie)

P. Bauer (France)
S. Fukao (Japon)
H. Hallikainen (Finlande)
H. Rishbeth (Royaume-Uni)
P.A. Watson (Royaume-Uni)

U.17 Groupe ad hoc sur les conséquences d'une guerre nucléaire pour l'environnement

Le Conseil de l'URSI,

considérant que le Groupe ad hoc pourrait encore être appelé à jouer un certain rôle dans l'avenir;

décide de maintenir le Groupe ad hoc sur les conséquences d'une guerre nucléaire pour l'environnement, composé des membres suivants :

Président : M. Wik (Suède)
Membres : W. Graf (EUA)
D. Hansen (Suisse)
J. Shiloh (Israël).

U.18 Commission inter-Unions pour l'attribution de fréquences à la radioastronomie et à la science spatiale (IUCAF)

Le Conseil de l'URSI,

ayant pris connaissance du rapport de la réunion de la délégation de l'IUCAF tenue le 27 août 1993, et

notant

1. l'éfficacité avec laquelle l'IUCAF a défendu les intérêts de la communauté scientifique lors de la Conférence Administrative Mondiale de 1992 (WARC);
2. le besoin permanent de lutter pour la protection des fréquences nécessaires aux observations scientifiques;

décide

1. d'approuver le rapport et les recommandations de la Commission;
2. de maintenir le soutien financier que l'URSI accorde à l'IUCAF;
3. de désigner les personnalités suivantes comme membres URSI de l'IUCAF:
   W.A. Baan (EUA)
   R.J. Cohen (UK)
   H.C. Kahlmann (Pays-Bas)
   B.J. Robinson (Australie);
4. d'assurer la continuité de l'action de la Commission en designant dès maintenant J. Whiteoak (Australie) comme remplaçant de B.J. Robinson, au cas probable où ce dernier se retirerait de l'IUCAF avant la prochaine Assemblée générale.

U.19 Groupe de travail inter-Unions sur les effets néfastes de l'environnement sur les observations astronomiques

Le Conseil de l'URSI,

notant

1. la nécessité d'assurer aux recherches spatiales et astronomiques les conditions qui leur permettent de se développer de façon optimale;
2. les dangers que représentent (a) la croissance de l'interférence électromagnétique et du nombre de débris spatiaux, (b) le projet récent de créer un système de publicité spatiale;

décide

1. d'approuver la participation de l'URSI au Groupe de travail inter-Unions sur les effets néfastes de l'environnement sur les observations astronomiques;
2. de proposer R.D. Parlow (EUA, Commission E) et J. Cohen (Royaume-Uni, Commission J) comme membres de ce Groupe de travail.

U.20 Utilisation du spectre radioélectrique

Le Conseil de l'URSI,

demande instamment à l'Union Internationales des Télécommunications (ITU) et aux administrations nationales et régionales affiliées :

1. de reconnaître le caractère unique de la resource naturelle limité constituée par le spectre électromagnétique;
2. de limiter l'attribution de fréquences aux services qui, pour remplir leur rôle, doivent utiliser la propagation en espace libre;
3. d'éviter d'attribuer des fréquences aux services qui peuvent utiliser d'autres technologies, par exemple celle des ondes guidées.

U.21 Sur le libre accès aux données environnementales

Le Conseil de l'URSI,

conscient de l'idee qui se fait progressivement jour, dans certains milieux, de considérer les données environnementales comme des produits de marché ;

reconnaissant que ce point de vue peut être défendable quand ces données sont utilisées à des fins commerciales ;

demande instamment aux organisations qui ressemblent ces données d'en garantir l'accès gratuit (ou du moins à prix coûtant) dès qu'elles sont utilisées à des fins scientifiques.

U.22 Sur l'importance du système ionosphère/magnétosphère terrestre comme laboratoire naturel de plasmas

Le Conseil de l'URSI,

considérant

1. que le système ionosphère/magnétosphère terrestre est, d'un point de vue économique, le plasma spatial le plus facilement accessible aux mesures in situ ou à distance ;
2. que de nombreux processus présents dans ce système trouvent leur contrepartie dans les plasmas astrophysiques ;
3. que certains problèmes fondamentaux de la physique des plasmas peuvent être mieux étudiés dans le laboratoire naturel constitué par ce système que dans les laboratoires au sol ;

recommande que l'attention des administrations nationales soit attirée sur l'importance d'effectuer des expériences actives pilotées *in situ* et à distance dans le système ionosphère/magnétosphère terrestre, ceci dans le but d'étudier des questions fondamentales de la physique des plasmas, et d'appréhender les processus qui donnent naissance à des phénomènes spatiaux naturels.

U.23 ....Sur l'importance des effets électromagnétiques associés aux tremblements de terre et aux éruptions volcaniques

Le Conseil de l'URSI,

notant

1. que diverses expériences, au sol et dans l'espace, ont montré l'existence d'émissions électromagnétiques, de perturbations dans les plasmas, ainsi que d'autres effets se produisant avant, pendant et après les tremblements de terre ;
2. qu'une compréhension physique de ces processus électromagnétiques naturels est importante en vue d'applications possibles dans le domaine public ;
3. que l'analyse théorique de ces effets repose sur des études multidisciplinaires de phénomènes comme les processus d'émission d'ondes dans le sous-sol, la propagation d'ondes dans les milieux aléatoires stratifiés, l'amplification non-lineaire de celles-ci, et leur croissance et décroissance dans les plasmas ionosphériques et magnétosphériques ;

décide d'attirer l'attention des organisations scientifiques nationales compétentes sur l'importance de la recherche dans ce domaine (au sol et dans l'espace), en particulier grâce à l'analyse rétrospective des bases de données existantes sur les plasmas spatiaux, afin d'améliorer l'identification de la signature électromagnétique.

U.24 ....Sur l'importance de sauvegarder les données géophysiques du passé, et de leur donner un format digital

Le Conseil de l'URSI,

ayant consideré

1. l'importance de disposer de données continues et abondantes dans l'étude des variations des paramètres ionosphériques/magnétospheriques, ainsi que de leurs tendances évolutives à long terme;
2. l'impossibilité de dupliquer de tels ensembles de données;
3. le danger imminent de perte de certaines bases de données par suite de leur dégradation, ou même de leur élimination;

décide d'attirer l'attention des administrations nationales sur l'importance de sauvegarder ces données, et de les mettre sous la forme digitale moderne qui les rendra plus adaptées à l'analyse.

U.25 ....XXV^{e} Assemblée générale

Le Conseil de l'URSI,

ayant examiné les invitations présentées par les Comités Membres de l'URSI en Chine (CIE, Pékin), en Egypte et en France pour la tenue de la XXV^{e} Assemblée générale;

décide

1. d'accepter l'invitation du Comité français d'organiser la XXV^{e} Assemblée générale à Lille, du 28 août au 5 septembre 1996;
2. d'exprimer ses remerciements aux Comités chinois (CIE, Pékin) et égyptien pour leurs aimables invitations.

U.26 ....Subventions de l'UNESCO et du CIUS

Le Conseil de l'URSI,

considérant

1. que l'Union consacre une part considérable de ses activités à l'organisation de réunions et de colloques scientifiques internationaux, à la production de publications et à son Programme de jeunes scientifiques;
2. que les subventions accordées à l'URSI par l'UNESCO et le CIUS permettent de couvrir en partie les frais de ces activités;

décide d'exprimer à ces deux organisations sa vive gratitude pour le précieux appui qui lui est ainsi fourni.

U.27 ....Remerciements au Comité japonais de l'URSI

Le Conseil de l'URSI,

décide à l'unanimité d'exprimer sa très sincère gratitude au Comité japonais de l'URSI pour l'invitation de tenir la XXIV^{e} Assemblée générale à Kyoto. L'ensemble des participants ont été très impressionnés par l'accueil chaleureux du Comité organisateur local, ainsi que par l'excellence des dispositions administratives et matérielles prises par ce Comité. Le Conseil exprime aux hôtes japonais sa profonde appréciation pour la mise en oeuvre d'un programme extra-scientifique particulièrement agréable et réussi, ainsi que pour la qualité de l'accueil aux personnes accompagnant les participants à l'Assemblée.

RESOLUTIONS ET RECOMMANDATIONS DES COMMISSIONS

Ces résolutions et recommendations ont été approuvées par le Conseil de l'URSI en sa séance du 3 septembre 1993.

COMMISSION A - MÉTROLOGIE ÉLECTROMAGNÉTIQUE

A1. Conférence sur les mesures électromagnétiques de précision (CPEM)

La Commission A,

ayant pris connaissance des statuts révisés de la CPEM;

ayant marqué son accord sur les nouveaux statuts;

recommande que l'URSI continue à parrainer la Conférence internationale sur les mesures électromagnétiques de précision.

A2. Dates de deux conférences

La Commission A,

considérant

1. que la Commission A et la Conférence sur les mesures électromagnétiques de précision (CPEM) ont des intérêts scientifiques communs ;
2. que la XXV^{e} Assemblée générale de l'URSI (à Lille) et la CPEM (à Braunschweig) ont toutes deux lieu en 1996 ;

recommande que les organisations responsables choisissent les dates de telle sorte que l'une des deux conférences ait lieu immédiatement après l'autre.

A3. Le kilogramme au sein du Système International (SI)

La Commission A,

considérant

1. que le kilogramme (une des unités de base du SI) est réalisé par un étalon matériel : le prototype international ;
2. qu'il est désirable de contrôler la valeur du kilogramme - et peut-être même ultérieurement de définir celle-ci - à partir de constantes fondamentales ;

recommande que les laboratoires compétents intensifient les études permettant d'établir un lien entre le kilogramme et certaines constantes fondamentales appropriées.

A4. Synthèse et mesure de fréquences dans le domaine optique

La Commission A,

considérant

1. la tendance générale vers l'utilisation des fréquences optiques ;
2. l'intérêt que les milieux de la recherche et des communications portent à l'application des techniques de détection cohérente s'appuyant sur des systèmes de synthèse de fréquences ;
3. l'existence de composants et d'appareils adéquats ;

recommande

1. de poursuivre des études et des expériences menant au développement de sources cohérentes et accordables ;
2. de poursuivre des études menant à la réalisation de fréquencemètres couvrant la gamme des fréquences optiques ;
3. de développer des sources stables permettant un accord fin, en particulier dans le but de satisfaire aux besoins de la recherche spectroscopique.

A5. Mesures précises du champ électromagnétique

La Commission A,

considérant

1. l'intérêt croissant du public pour les effets des champs électromagnétiques sur les systèmes biologiques ;
2. la difficulté de mesurer avec précision, dans l'étude de ces effets, l'intensité du champ, en particulier au voisinage des antennes ;
3. les effets produits par les distorsions du champ dues, soit aux systèmes biologiques, soit aux systèmes de mesure eux-mêmes ;

émet l'avis

1. qu'il est nécessaire de développer, dans des conditions bien déterminées, des mesures précises du champ;
2. qu'il est nécessaire de développer des modèles représentatifs de la distribution du champ électromagnétique (i) au voisinage des systèmes rayonnants (ii) au sein des corps biologiques placés à proximité de ces systèmes ;
3. qu'il est permis d'espérer que ces divers travaux aideront la Commission K dans ses études des normes d'exposition et de dosimétrie.

COMMISSION D - ELECTRONIQUE ET PHOTONIQUE

D1. Symposia à la XXV^{e} Assemblée générale (1996)

La Commission D,

consciente du caractère multidisciplinaire de la Commission D au sein de l'URSI ;

exprime l'intention d'accroître le nombre de symposia qu'elle organisera conjointement avec d'autres Commissions.

D2. Disquette bibliographique accompagnant la Review of Radio Science

La Commission D,

notant

1. que le public visé par la disquette bibliographique n'est pas clairement défini ;
2. que la Commission D couvre des domaines d'intérêts scientifique et technique extrêmement vastes ;
3. que ces domaines se développent à un rythme extrêmement rapide ;
4. qu'il existe d'autres bases de données de référence aisément accessibles ;

décide

de ne pas collaborer à l'édition de la prochaine disquette bibliographique.

D3. Patronage de conférences internationales

La Commission D,

recommande le patronage ou le copatronage, selon les cas, des conférences suivantes :

- Le Symposium international sur les signaux, les systèmes et l'électronique (ISSSE'95) à San Francisco (EUA), 25-27 octobre 1995, organisé conjointement par les Commissions C and D ;
- Les Conférences européennes sur les communications optiques (ECOC), en 1994, 1995 et 1996 ;
- Les Conférences européennes sur les microondes, en 1994, 1995 et 1996 ;
- Les Conférences Asie-Pacifique sur les microondes, en 1994, 1995 et 1996 ;
- Le 22^{e} Symposium international sur les semiconducteurs composés, en 1995.

COMMISSION E - BRUITS ET BROUILLAGES ELECTROMAGNETIQUES

E.1. Groupes de travail

La Commission E,

considérant les rapports présentés par les différents groupes de travail;

décide

1. de constituer, avec les Commissions G et H, un groupe de travail commun EGH-1 sur les "Effets électromagnétiques associés à l'activité sismique", avec pour la Commission E, T. Yoshino comme co-président;
2. de maintenir les groupes de travail de la Commission E existants, c'est à dire :
   - E.1. Gestion et utilisation du spectre de fréquences;
     Président : R.D. Parlow (EUA);
   - E.2. Bruit non gaussien dans les communications;
     Président : A.D. Spaulding (EUA);
   - E.3. Systèmes électromagnétique à haute puissance;
     Président : R.L. Gardner (EUA);
   - E.4. Bruits electromagnétiques terrestres et planétaires;
     Président : Z. Kawasaki (Japon);
   - E.5. Interactions avec les systèmes électriques complexes et protection de ceux-ci;
     Co-présidents : C. Baum (EUA), P. Degauque (France) et M. Ianoz (Suisse);
   - E.6. Effets des transitoires sur les équipements;
     Co-présidents : V. Scuka (Suède) et B. Demoulin (France);
   - E.7. Environnements électro-météorologiques extraterrestre et terrestre;
     Président : H. Kikuchi (Japon).

E.2. Symposia

La Commission E,

considérant les propositions de symposia pour les trois prochaines années;

décide

1. d'apporter, en mode A, son soutien aux conférences :
   - International Symposium on Electromagnetic Environment and Consequences (EUROEM), Bordeaux, France, 1994;
   - International Symposium on Electromagnetic Compatibility, Sendai, Japon, 1994;
2. d'apporter, en mode B, son soutien aux conférences :
   - Colloque international et exposition sur la compatibilité électromagnétique, Toulouse, France, 1994;

- International Wroclaw Symposium on Electromagnetic Compatibility, Wroclaw, Pologne, 1994;
- International Zurich Symposium and Technical Exhibition on Electromagnetic Compatibility, Zurich, Suisse, 1995;
- International Wroclaw Symposium and Exhibition on Electromagnetic Compatibility, Wroclaw, Pologne, 1996.

COMMISSION G - RADIOÉLECTRICITÉ IONOSPHÉRIQUE ET PROPAGATION

G1. Groupe de travail

La Commission G,

décide de maintenir les Groupes de travail suivants :

G1. Groupe Conseil du réseau d'ionosondes (INAG)
Président : P.J. Wilkinson (Australie)
Secrétaire : R. Conkright (EUA);

G2. Etude de l'ionosphère au moyen de satellites à balise
Président : R. Leitinger (Autriche)
Vice-Presidents : J.A. Klobuchar (EUA) et T.R. Tyagi (Inde);

G3. Diffusion incohérente
Président : J.M. Holt (EUA)
Vice-Président : P.J.S. Williams (Royaume-Uni);

G4. Informatique ionosphérique
Président : D. Andersen (EUA)
Vice-Président : R. Hanbaba (France).

G2. Groupes de travail communs

La Commission G,

décide de maintenir les Groupes de travail communs suivants :

GH1. Expériences actives dans les plasmas
Représentant de la Commission G : Sa. Basu (EUA);

GH2. Expériences, simulation et analyse par ordinateur des processus d'ondes dans les plasmas
Représentant de la Commission G : H. Thiemann (Allemagne);

CGH1. Analyse des ondes et de la turbulence
Co-président pour la Commission G : A.W. Wernik (Pologne);

Groupe de travail inter-Unions (URSI/IAGA) de télédétection TBF/EBF de l'ionosphère et de la magnétosphère (VER SIM)
Co-président pour l'URSI : U. Inan (EUA);

recommande

de créer avec les Commission E et H, un Groupe de travail commun EGH1 sur les "Effets électromagnétiques associés à l'activité sismique". Co-président pour la Commission G : à désigner plus tard.

G3. Mesures radioélectriques basse-fréquence (BF) des composantes du vent

La Commission G,

considérant

1. qu'il est essentiel de faire des observations à long terme de l'atmosphère terrestre, afin de détecter les tendances du changement global qui pourraient être particulièrement révélées par l'observation des paramètres de l'atmosphère supérieure ;
2. que les mesures - peu coûteuses - du vent à basse fréquence, faites à incidence oblique, revêtent une grande importance pour l'observation continue de l'ionosphère, de l'atmosphère supérieure et de la thermosphère inférieure ;
3. que ces mesures, combinées à celles de l'altitude de réflexion des ondes obtenues grâce à une modulation du spectre émis, pourraient permettre le calcul des profils verticaux du champ du vent ;

recommande

d'effectuer des mesures BF du vent à des distances de 150 à 400km des émetteurs de radiodiffusion BF.

G4. Bulletin du Groupe Conseil du Réseau ionosphérique (INAG)

La Commission G,

reconnaissant le rôle important que joue le Bulletin du Groupe Conseil du Réseau ionosphérique (INAG Bulletin) dans le maintien du réseau mondial des stations de mesures ionosphériques et de la qualité des données acquises par celui-ci ;

exprime ses remerciements au Département Australien des Arts et Services administratifs pour le précieux appui qu'il fournit, par l'entremise des services spatiaux et radio IPS (Ionospheric Prediction Services), à la production de ce Bulletin ;

recommande au Conseil que l'URSI maintienne ses contributions financières à la publication de ce Bulletin pendant les trois années à venir.

G5. Radar Mésosphère - Stratosphère - Troposphère (MST) dans les régions équatoriales

La Commission G,

considérant

1. que la création d'un Groupe de travail inter-Commissions sur l'atmosphère moyenne (voir la résolution U.15) souligne à l'évidence l'importance qu'il faut attacher à l'étude de cette région;
2. qu'il existe une chaîne de radars ST dans la région équatoriale du Pacifique ;

recommande

qu'un radar fontionnant en mode MST et en mode à diffusion incohérente de haute sensibilité soit installé dans la région équatoriale du Sud-Est asiatique, et constitue l'élément-clé de cette chaîne de radars.

G6. Patronage de colloques 1993 - 1996

La Commission G *recommande* que l'URSI parraine, en mode A ou mode B suivant les cas, les colloques suivants pendant la période 1993-1996, sous réserve que les organisateurs soumettent les demandes règlementaires :

- Diffusion électromagnétique dans les gaz et les plasmas (avec la Commission H), Aussois, France, du 20 ou 25 mars 1994;
- Huitième symposium international sur la physique des relations Soleil-Terre (avec la Commission H), dédié au programme "Couplage énergétique Soleil-Terre" (STEP), Sendai, Japon, du 5 ou 10 juin 1994, en mode B. Contact : H. Oya;
- Symposium Suzdal sur la modification artificielle de l'ionosphère à l'aide d'ondes électromagnétiques de forte puissance (avec la Commission H), Uppsala, Suède, en septembre ou octobre 1994, en mode B. Contact : B. Thide;
- Atelier sur la théorie et l'observation des processus non-linéaires dans l'environnement proche de la Terre (avec la Commission H). Cet atelier STEP/GAPS (Couplage énergétique Soleil-Terre, structure globale plasma - atmosphère) se tiendra à Varsovie, Pologne, au cours du printemps 1995, en mode B. Contacts : A.W. Wernik (Commission G), Su. Basu (Commission G) et F. Lefeuvre (Commission H);
- Atelier International Reference Ionosphere (IRI), Trieste, Italie, octobre 1993;
- Symposium sur les satellites à balise, Aberysthwyth, Royaume-Uni, juillet 1994;
- Atelier sur la diffusion incohérente, Ukraine, 1995;
- COMMSPHERE 94, Eilat, Israël, décembre 1994;
- Atelier Radar MST, EUA;
- Ecole Radar MST, Inde;

- Atelier IIWG, 1994;
- Symposium sur l'aéronomie équatoriale, Japon, 1995.

ADDENDUM

La Commission a également recommandé la création

1. d'un Groupe de travail inter-Commissions sur l'atmosphere moyenne (voir la résolution U.15). S. Fukao (Japon) sera le Co-Président pour la Commission G.
2. d'un Groupe de travail inter-Commissions sur l'utilisation scientifique du Système de localisation globale (voir la résolution U.13). P. Høeg (Danemark) sera le représentant de la Commission G.

COMMISSION H - ONDES DANS LES PLASMAS

H1. Groupes de travail

La Commission H,

considérant les rapports présentés par ses différents Groupes de travail,

décide

1. de maintenir, avec les Commissions C et G, le Groupe de travail inter-Unions URSI/IAGA.1 "Sondage électromagnétique passif de la magnétosphère", sous le nouveau titre "Télédétection TBF/EFB de l'ionosphère et de la magnétosphère (VERSIM)". Co-président pour la Commission H : U.S. Inan (EUA) ;
2. de maintenir, avec les Commissions C et G, le Groupe de travail commun CGH.1 "Analyse des ondes et de la turbulence". Co-président pour la Commission H : F. Lefeuvre (France) ;
3. de maintenir, avec la Commission G, le Groupe de travail commun GH.1 "Expériences actives dans les plasmas". Co-président pour la Commission H : P. Bernhardt (EUA) ;
4. de maintenir, avec la Commission G, le Groupe de travail commun GH.2 "Expériences, simulation et analyse par ordinateur des processus d'ondes dans les plasmas". Co-président pour la Commission H : H. Matsumoto (Japon) ;
5. de créer, avec les Commissions G et H, un Groupe de travail commun EGH.1 sur les effets électromagnétiques associés à l'activité sismique. Co-président pour la Commission H : M. Parrot (France).

H2. Patronage de colloques et de conférences

La Commission H *recommande* que l'URSI parraine, en mode A ou en mode B suivant les cas, les colloques suivants pendant la période 1993-1996, sous réserve que les organisateurs soumettent des demandes règlementaires :

- Diffusion électromagnétique dans les gaz et les plasmas. Aussois, France, du 20 au 25 mars 1994, en mode B;
- Huitième symposium international sur la physique des relations Soleil-Terre (avec la Commission G), dédié au programme "Couplage énergétique Soleil-Terre" (STEP). Sendai, Japon, du 5 ou 10 juin 1994, en mode B. Contact : H. Oya;
- Symposium Suzdal sur la modification artificielle de l'ionosphère à l'aide d'ondes électromagnétiques de forte puissance (avec la Commission G). Uppsala, Suède, en septembre ou octobre 1994, en mode B. Contact : B. Thide;
- Atelier sur la théorie et l'observation des processus non-linéaires dans l'environnement proche de la Terre (avec la Commission G). Cet atelier STEP/GAPS (Couplage énergétique Soleil-Terre, structure globale plasma - atmosphère) se tiendra à Varsovie, Pologne, au cours du printemps 1995, en mode B. Contacts : A.W. Wernik (Commission G), Su. Basu (Commission G) et F. Lefeuvre (Commission H);
- 22^{e} Conférence internationale sur les phénomènes dans les gaz ionisées (ICPIG), probablement à College Park, Maryland (EUA), au cours de l'été 1995 (mode B). Contact : K. Suchy;
- 5^{e} Ecole internationale de Simulation des Plasmas spatiaux, 1995 (mode B). Contacts : C. Dum (Allemagne), M. Ashour - Abdalla (EUA) et H. Matsumoto (Japon).

COMMISSION J - RADIOASTRONOMIE

J1. Groupe de travail pour un Grand réseau millimétrique - submillimétrique

La Commission J,

considérant

1. que l'avenir de l'astronomie aux longueurs d'onde millimétriques et submillimétriques requiert de réfléchir dès maintenant au concept du télescope de la génération prochaine, qui devra (i) être doué d'une résolution angulaire élevée (ii) être d'un ordre de grandeur plus sensible que les téléscopes existants ;
2. qu'un téléscope de cette nature sera très onéreux, et que sa construction exigera une forte collaboration internationale ;

recommande la création d'un Groupe de travail consacré au "Grand réseau millimétrique - submillimétrique", dont le mandat serait :

1. d'envisager les principaux objectifs scientifiques qui seront d'actualité au début du siècle prochain ;
2. de coordonner et d'évaluer les données radio nécessaires à l'évaluation du site et à la stratégie des observations;
3. d'étudier les concepts nouveaux d'instruments et de télescopes;
4. d'étudier sérieusement les possibilités de collaboration internationale.

J2. Groupe de travail pour un Grand Télescope

La Commission J,

considérant

1. que le besoin se fait jour de construire un radiotélescope accessible à la communauté internationale, et possèdant une sensibilité supérieure d'un ou deux ordres de grandeur à celle des instruments existants, ou en projet;
2. que la réalisation à un prix acceptable d'un instrument de cette nature nécessitera la mise en œuvre de techniques innovantes;
3. que la réalisation de cet instrument devra probablement se fonder sur une forte collaboration internationale ;

décide de créer un Groupe de travail ayant le mandat suivant :

1. explorer le champ scientifique devant être couvert par ce télescope ;
2. discuter des specifications techniques et des concepts généraux qui permettront d'optimaliser l'efficacité de l'instrument ;
3. identifier, et même résoudre dans la mesure du possible, les problèmes techniques principaux que posera la construction d'un télescope de coût raisonnable, et possèdant la sensibilité requise.

COMMISSION K - ELECTROMAGNÉTISME EN BIOLOGIE ET MÉDECINE

K1. Communications sans fil

La Commission K,

considérant

1. que de nouvelles technologies se développent rapidement, notamment celles des réseaux radio locaux, des systèmes téléphoniques cellulaires, des réseaux de satellites de télécommunication sur orbites basses (exemple : Iridium), des services de communication personnels, des téléphones sans fil, et d'autres systèmes qui, selon toute probabilité, auront une large diffusion;
2. que les effets sur la santé des champs électromagnétiques produits par les communications sans fil sont mal connus;
3. que le grand public se préoccupe des effets nocifs possibles des appareillages électromagnétiques auxquels il est exposé;

recommande

que d'importants projets de recherches soient consacrés - aux échelles nationale et internationale - à l'étude des problèmes principaux, à savoir :

1. l'appréhension des mécanismes d'interaction des champs électromagnétiques faibles - de caractéristiques diverses - avec les systèmes vivants;
2. l'étude des effets biologiques de ces champs, et en particulier de leur caractère potentiellement nocif, en fonction des conditions d'exposition;
3. l'évaluation précise des taux d'exposition aux champs, basée sur des mesures et des modélisations dosimétriques pertinentes.

La Commission exprime sa reconnaissance pour le soutien que lui ont promis la Commission A, dans le domaine des mesures, et la Commission B, dans celui de la modélisation dosimétrique.