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BULLETIN No 265 **JUNE 1993**

U.R.S.I.

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NEW PHONE AND FAXNUMBERS URSI

Please note that *on 26 June 1993* our phone and fax numbers changed to the following

Tel.: (32) **9 - 2**64.33.20 (formerly (32) 91-64.33.20) (Mrs. I. Heleu)

(32) **9 - 2**64.33.21 (formerly (32) 91-64.33.21) (Secretary General)

Fax : (32) **9 - 2**64.35.93 (formerly (32) 91-64.35.93)

URSI ACCOUNTS 1992

The Balance Sheet and the Income and Expenditure Accounts of URSI for the year ended 1992 have been prepared by Maquet, Sambaere, Savoir & Ass., and audited by Van Poyer & Cie, Réviseurs d'Entreprises, Brussels, at the end of March 1993. They are reproduced below.

The URSI financial health can be considered as rather good for several quantitative and qualitative reasons :

1) By the end of 1991, the URSI assets were equal to about twice the yearly income, which is fairly close to the recommendations made by the International Council of Scientific Unions.

2) The excess of income over expenditure in 1992 reflects the need to build up the Fund for the XXIV General Assembly in 1993 (see Balance sheet : distribution of assets).

3) The expenditure on scientific activities (including publications) corresponds to 64% of the total expenditure.

4) The largest part of "Representation as scientific meetings" represents expenses related to attendance of the Commission Chairmen and Officers of the Board at the 1992 Coordinating Committee meeting, which was devoted to the detailed scientific planning of the Kyoto General Assembly, and to a prospective analysis of future scientific trends of URSI.

5) Thanks to the allocations from the ICSU Fund and the UNESCO Subvention to ICSU, as well as to other URSI sources of income, $40,000 were made available in 1992 for supporting the participation of young scientists in specific symposia.

6) The 3 year allocation of $8,000 to each Scientific Commission was raised to $10,000 in order to facilitate the participation of a number of scientists (in particular those from Eastern European countries) in scientific meetings.

P. BAUER, TREASURER

INTERNATIONAL UNION OF RADIO SCIENCE (URSI)
BALANCE SHEET : 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 = 33,00 BF
31 December 1992 : $1 = 33,00 BF

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

APPENDIX

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	

		20,319.8[illegible]

MEETING OF THE BOARD OF OFFICERS

Brussels, 14 - 16 April 1993

The Board discussed several routine matters, such as the approval of the accounts for 1992 (see details in this Bulletin). These items are of little interest to most readers of the Bulletin. A few other points, however, should be mentioned, on which the readers are urged to make their views known to the relevant URSI officials should they wish to react. For example :

1. Individual membership

The network of correspondents , now 1100 strong, is being progressively developed. Whether to modify its form, or create another kind of personal membership, is one of the main problems on the Kyoto agenda. The Board asked Professor Senior, Chair of the Membership Committee, to proceed with his previous analysis of the question. A clearly formulated proposal must be in the hands of the Council if the latter is to reach a decision before the end of the General Assembly. This proposal should be part of the preparation of the Council, and form the basis for a series of discussions which should start with an early meeting attended by :

(a) the Long Range Planning Committee
(b) the Chairs of the Membership, Finance and Publications Committees.

This meeting will be held on Wednesday 25 August, 1993.

2. Publications

The main problems are :

(a) whether to merge the "Bulletin" and the "Radioscientist" into a single quarterly and, in the affirmative, to define the modalities of the merger.
(b whether to merge the "Review of Radio Science" and "Modern Science" into a single book.

Both problems will be on the agenda of the Publications Committee, chaired by Professor P.J.B. Clarricoats.

3. Professor Rishbeth, who represents URSI on the Panel on World Data Centres, has submitted a pertinent question to the URSI community, viz. :

"A question that currently concerns the WDC Panel is that of "free access to data for scientific research". By "free" we mean that the data should be available to all, either free of charge or at the cost of supplying the data from archives, as specified by the WDC rules. In 1991 the U.S. Government adopted a liberal policy, along these lines, for data for global environmental research. However, we are disturbed by the growth of the idea of data as a "market commodity" to be bought and sold. This idea is being promoted in some quarters in Europe (e.g. the U.K.) and we believe it is finding favour in Russia and India, I hear that there is European pressure on the U.S.A. to reconsider its "open access" policy. We are *not* against the idea of charging for data used for commercial purposes, but a "data market" could have serious implications for scientific research. For example, it could eventually lead to data acquisitions being governed by perceived "short-term market values". This is a matter on which URSI might take a view."

4. FAGS

Dr. Wielebinski, who is Secretary of FAGS, mentions that the FAGS Council requests suggestions for a new URSI sponsored service (in addition to IUWDS and the Sunspot Index Data Centre). Readers who have suggestions are urged to contact Dr. Wielebinski, whose coordinates are in the December 1992 Bulletin.

5. Questionnaire

The session Chairs will be asked to complete a questionnaire on the session they were responsible for. Typical items will be : scientific content format, time allotted for discussions etc. Every participant is urged to give his views to the Chair of the sessions he attends.

URSI AWARDS

The readers of the Bulletin may remember that the rules for the URSI Awards have been published in the March 1992 issue. At its April 1993 meeting in Brussels, the URSI Board decided to award :

- the van der Pol Gold Medal to Professor T.B.A. Senior (University of Michigan) with the citation : "For theoretical contribution to the diffraction and scattering of electromagnetic waves, with particular reference to the simulation of material effects in scattering".

- the Dellinger Gold Medal to Dr. P. Stubbe (Max-Planck-Institut für Aeronomie) with the citation : "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 processes".

- the Koga Gold Medal to Professor Rebeiz (University of Michigan), with the citation "For contributions to the advancement of sub-millimetre wave antenna science and technology".

Upon recommendation by the Board, the Royal Society decided to award the Appleton Prize to Professor T.B. Jones (University of Leicester) with the citation : "For major contributions, individually and in scientific leadership, to the study of ionospheric physics, using radio and radar techniques".

The Awards will be presented at the Opening Ceremony in Kyoto, which starts at 4 P.M. on Wednesday 25 August.

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PROFILE OF MEMBER COMMITTEES

FRANCE

QUATRE-VINGTS ANS D'ACTIVITES

En octobre 1912 le professeur belge Robert B. GOLDSCHMIDT, protecteur spirituel et financier des débuts de l'URSI, vint à Paris pour participer à la Conférence Internationale de l'Heure qui réunissait les délégués de 16 nations. Il y rencontra Henri ABRAHAM, professeur à la Sorbonne, qui travaillait sur les mesures de fréquences et allait devenir le premier président de la Commission A, consacrée à la métrologie, ainsi que le grand ami de celui-ci, Gustave FERRIE, qui était responsable des transmissions militaires. G.FERRIE cherchait à utiliser les ondes hertziennes pour communiquer avec le Maroc, alors que R.B. GOLDSCHMIDT procédait à des expériences similaires pour communiquer avec le Congo Belge (devenu le Zaïre). Comme les autres scientifiques présents à la Conférence, ils étaient tous trois convaincus que la compréhension des phénomènes de propagation des ondes radioélectriques exigeait une coopération internationale des scientifiques. Et c'est au cours de cette conférence de Paris que fut émise la proposition de fonder un organisme central appelé à coordonner cette coopération.

Un an après, le 13 octobre 1913, se tint à Bruxelles une réunion au cours de laquelle fut créée la Commission provisoire internationale de télégraphie sans fil scientifique (T.S.F.S). H. ABRAHAM et G. FERRIE se trouvaient parmi la dizaine de participants venus de six pays. Mais les scientifiques français avaient déjà ébauché un groupe de travail pour examiner la coopération internationale dans ce domaine. Présidé par André BLONDEL, il avait pour secrétaire Raymond JOUAUST. Et, comme il fallait constituer officiellement un comité français appelé à adhérer à la nouvelle commission, ce groupe informel s'érigea tout naturellement en Comité national français de radiotélégraphie scientifique (C.N.F.R.S.) dès la conclusion de la réunion de Bruxelles. On peut fixer à octobre 1913 la naissance du Comité français, qui va donc fêter son quatre-vingtième anniversaire cette année.

En avril 1914, une seconde réunion eut lieu à Bruxelles. Entre temps, trois Comités nationaux avaient été constitués : en Belgique, en France et au Royaume Uni. La Commission provisoire put donc se transformer officiellement en Commission Internationale de Télégraphie sans fil scientifique. et procéder à l'élaboration de ses statuts. En mai 1914, le

premier Bulletin de la Commission publiait la liste des membres du premier Comité français ainsi officialisé.

Le Comité français est donc né pour assurer la participation de la France à la structure internationale. Mais il entendait aussi organiser en France des expériences en coopération internationale.Dès 1913, il entreprit la mise au point d'émetteurs et d'appareils de mesure pour étudier l'influence de l'éclipse de Soleil du 21 août 1914 sur la propagation des ondes hertziennes. Le 4 août 1914, la folle inconscience des hommes politiques allait plonger le monde dans la tragédie...Mais comme les militaires avaient besoin de transmettre des informations, l'utilisation des ondes hertziennes pour les télécommunications progressa rapidement de 1914 à 1918. La triode était arrivée des Etats-Unis sous forme de prototype de laboratoire. H. ABRAHAM avait pu réaliser, avec son ami, l'industriel A. de GRAMONT, la première usine sortant des triodes fiables, la T.M. (ou triode militaire...). G. FERRIE à la tête des transmissions de l'armée française joua un rôle essentiel dans la naissance des grands réseaux de télécommunications hertziennes.

Au sortir de la guerre, les scientifiques français se préoccupèrent de relancer la coopération internationale tout en l'adaptant aux circonstances nouvelles. En juillet 1919, à Bruxelles, lors de la création du Conseil international de recherches (l'actuel Conseil international des Unions scientifiques), il fut proposé de transformer la Commission de 1914 en Union internationale de radiotélégraphie scientifique et de la rattacher au Conseil nouvellement fondé. C'est alors que G. FERRIE succèda à W. DUDDELL, premier Président de la Commission internationale. Il restera 13 ans dans ce poste où, en collaboration étroite avec R.B. GOLDSCHMIDT, il contribua efficacement à l'organisation et à la consolidation de l'Union dont le titre fut modifié en 1928, le terme "radiotélégraphie scientifique" étant remplacé par "radio-scientifique". G. FERRIE procèda simultanément à la restructuration du Comité national français qu'il présidait aussi. Raymond JOUAUST en était le secrétaire général. Les autres membres étaient Henri ABRAHAM, René MESNY, Charles MAURAIN et Paul BOUCHEROT. Des statuts déposés le 24 juillet 1920 maintenaient la double mission de ce comité : assurer la participation de la France à l'URSI, mais aussi effectuer des travaux scientifiques. Au sein de ce groupe, R. JOUAUST consacrait la plus grande part de son activité à la première mission, et R. MESNY à la seconde. Ce dernier organisa une série de mesures à l'Observatoire de Meudon sur les "signaux URSI" émis à la Tour Eiffel, à Basse Lande près de Nantes, et à Croix d'Hins près de Bordeaux. Des études furent aussi conduites sur les parasites atmosphériques et, à partir de 1928, sous l'impulsion de Robert BUREAU, sur les ondes décamétriques. Ces expériences sont à l'origine des travaux français sur la propagation

ionosphérique, et sur les parasites de toutes natures. Le directeur de l'Observatoire de Zikawei, près de Shangai, participait à ces travaux et devint bientôt une personnalité importante du Comité français, puis de l'URSI. Il s'agit de Pierre LEJAY.

En 1932, Camille GUTTON devient président du Comité français. L'activité scientifique continue, mais la crise économique mondiale et l'incapacité, ou la folie, des hommes politiques qui allait conduire au déclenchement de la seconde guerre mondiale n'étaient guère favorables à la recherche scientifique ou à la coopération internationale dans ce domaine.

En outre deux phénomènes interviennent en France depuis le début des années 1920 et vont jouer un rôle de plus en plus important. D'une part l'industrie se développe; Maurice PONTE, élève d'ABRAHAM, met en place une industrie des tubes hyperfréquences du type magnétron, et l'étude de la propagation (en vue de la détection) entre, encore timidement, au programme des recherches industrielles. D'autre part, la France est un pays centralisé où, depuis le XVIIème siècle, l'Etat intervient dans tous les domaines, par exemple celui de la recherche scientifique et celui de la coopération internationale. Le laboratoire militaire, monté par G.FERRIE, était devenu, par union avec les "Postes, Télégraphes et Téléphones", le Laboratoire national de radioélectricité. Bernard DECAUX y monte un service moderne pour la mesure des fréquences. En 1936 le gouvernement fait construire un grand laboratoire à l'Ecole Normale Supérieure pour remplacer les quelques pièces où travaillait H. ABRAHAM avec ses élèves, notamment Yves ROCARD et Pierre GRIVET.

La tragédie politique et militaire déclenchée en 1939 pour la seconde fois, se termina en 1945. Le CNFRS avait été maintenu par C. GUTTON, mais mis officiellement en sommeil car l'armée allemande qui occupait la France avait interdit toute opération impliquant la radioélectricité (à moins de tout contrôler). Il y eut néanmoins une activité importante, exigée par la nécessité de transmettre au delà des "frontières" qui séparaient les belligérants..Les conséquences furent souvent dramatiques pour les opérateurs.

Robert BUREAU succéda à C. GUTTON en 1949 à la présidence du CNFRS (dans le titre duquel le mot "Radiotélégraphie" est alors remplacé par "Radioélectricité"). Puis le Comité fut piloté par Pierre DAVID, spécialiste des transmissions militaires qui reprenait la tradition de G. FERRIE. A cette époque l'activité française en radioélectricité progressait rapidement. On trouvait d'une part les installations militaires et, d'autre part, le Centre national d'études des télécommunications

(CNET) qui avait absorbé le Laboratoire national de radioélectricité. Jean VOGE, André BLANC-LAPIERRE, Pierre MISME, Marcel THUE y travaillaient. L'industrie s'équipait de laboratoires de recherche et les universités disposaient de financement pour parvenir à de brillantes réalisations. Le laboratoire de l'Ecole normale supérieure avait, grâce à Yves ROCARD, lancé la radioastronomie (en utilisant des radars allemands construits à Wurzburg), puis essaimé à Nançay, avec Jean-François DENISSE et Emile-Jacques BLUM, pour construire le premier observatoire français de radioastronomie. C'est dire que le rôle principal du CNFRS -susciter des recherches en France- était rempli. Par ailleurs, la participation française à l'URSI allait prendre d'autant plus d'importance que notre Union allait bientôt compter une quarantaine de Comités membres, et que le nombre des scientifiques français travaillant dans ce domaine dépassait le millier...

C'est à cette tâche que s'est consacré le Comité français depuis plus de quarante ans. Il invita l'Assemblée générale à Paris en 1946 et, malgré des problèmes financiers importants, parvint toujours à assurer une importante participation aux Assemblées générales et aux colloques "inter-assemblées". Il est présidé actuellement par Pierre DEGAUQUE,spécialiste de la compatibilité électromagnétique, qui vient de succéder à Pierre BAUER dont les travaux, ainsi que ceux de Michel PETIT, apportèrent une contribution importante aux recherches ionosphériques.

Le CNFRS a eu l'honneur de constater que huit de ses membres ont été élus par l'Union comme Président, Président d'Honneur, ou Vice-Président (G. FERRIE, R. JOUAUST, R. MESNY, R. BUREAU, P. LEJAY, B. DECAUX, J. VOGE, P. BAUER). Il est sans doute le seul comité national à avoir fourni à l'Etat-Major de l'URSI un général de division, quatre académiciens et un jésuite. Une quinzaine d'autres membres du CNFRS ont été élus à la tête de Commissions ou de groupes de travail et cette tradition se maintient comme le montre le numéro de décembre 1992 du Bulletin de l'URSI. Le CNFRS est également fier que la première femme à présider une Commission, Jeannine HENAFF, ait été choisie parmi les physiciens français.

En poursuivant ses efforts pour la coopération scientifique internationale, le CNFRS souhaite offrir à la communauté scientifique de la "Radioélectricité" une ouverture sur les travaux français. mais aussi faciliter la participation des scientifiques français à des programmes de recherche en commun avec leurs collègues étrangers.

M.Y. BERNARD et G. PILLET

EIGHTY YEARS OF ACTIVITIES

In October 1912, Professor Robert Goldschmidt, the principal supporter of URSI in its early years, spiritually and financially, came to Paris to participate in the Conférence Internationale de l'Heure, which was attended by delegates representing 16 nations. There he met Henry Abraham, a professor at the Sorbonne, who was working on frequency measurements and was later to become the first Chairman of Commission A on Metrology, and also Gustave Ferrié, who was responsible for Army transmissions. At the time, G. Ferrié was trying to use radio waves for establishing communications with Morocco, whereas R. Goldschmidt was conducting similar experiments with the Belgian Congo (now Zaire) in mind. The three of them, as well as other scientists present at the Conference, were convinced that the understanding of phenomena in radio wave propagation required international cooperation. And indeed the proposal to create a central organization to coordinate such cooperation was put forward during the Paris Conference.

One year later, on 13 October 1913, a group of nine scientists from six European countries met in Brussels and decided to establish the International Provisional Commission on Scientific Wireless Telegraphy (TSFS). Both H. Abraham and G. Ferrié were present. However, an informal working group had already been formed by the French scientists to consider international cooperation in that field of research. The group was chaired by André Blondel, with Raymond Jouaust as Secretary. As a French Committee had to be instituted officially to adhere to the new Commission, it was only reasonable that the group should have reformed as the Comité National Français de Radiotélégraphie Scientifique (CNFRS) just after the close of the Brussels meeting. October 1913 can thus be considered as the date of birth of the French Committee, which will celebrate this year its eightieth anniversary.

In April 1914, a second meeting was convened in Brussels. Meanwhile, three Committees had been set up : in Belgium, in France and in the United Kingdom. Consequently, it had become possible to transform the provisional Commission into an official body: the International Commission on Scientific Wireless Telegraphy, and to proceed to the drafting of its Statutes. In May 1914, the membership list of the first official French Committee was published in the first issue of the Commission's Bulletin.

So the French Committee came into being in order to ensure the participation of France in the new organization. But its objective was also to organize international cooperative experiments within the country. As early as 1913, transmitters and measuring instruments had been installed for studying the influence of the 21 Aug. 1914 solar eclipse on radio wave propagation. On 4 August the same year, owing to the lack of awareness and insanity of politicians, the world was plunged into an unprecedented tragedy. But as the Army had to transmit information, the use of radio waves for telecommunications evolved rapidly in the period 1914-1918. The triode had come from the United States in the form of a laboratory prototype. With his friend, the industrialist A. de Gramont, H. Abraham had been able to install the first factory to produce reliable triodes, the M.T. (or military triode). As for G. Ferrié, at the head of the Signal Corps of the French Army, he played a key role in developing large networks of radio telecommunications.

One of the concerns of French scientists, after the end of the war, was to start again international cooperation, while adapting it to newly created circumstances. In July 1919, when the International Research Council (now International Council of Scientific Unions) was founded in Brussels, it was proposed to transform the 1914 Commission into an Union : the International Union on Scientific Wireless Telegraphy, and to affiliate it with the newly created Council. G. Ferrié then succeeded W. Duddell, first President of the International Commission. He remained in office for 13 years. In close collaboration with R. Goldschmidt, he contributed outstandingly to the organization and strengthening of the Union, in the title of which the term "scientific radio telegraphy" had been replaced in 1928 by "scientific radio". Simultaneously, G. Ferrié undertook to reorganize the French Committee, which he also chaired. The members were : Raymond Jouaust (Secretary General), Henri Abraham, René Mesny, Charles Maurain and Paul Boucherot. The Statutes adopted formally on 24 July 1920 confirmed the twofold mandate of the Committee, which was to promote the participation of France in URSI, and to develop scientific work. Within the group, R. Jouaust devoted most of his activities to the first aspect, while R. Mesny concentrated on the second one. At the Meudon Observatory, the latter performed a series of measurements on "URSI signals" transmitted from the Eiffel Tower, from Basse Lande near Nantes, and from Croix d'Hins near Bordeaux. Studies were conducted also on atmospherics and, starting with 1928, on HF waves, at the instigation of Robert Bureau. French research work on ionospheric propagation and all kinds of interference originated with these experiments. The Director of the Zikawei Observatory, near Shanghai, was taking part in that work; he was to become an important figure in the French Committee, and later in the Union. His name was Pierre Lejay.

In 1932, Camille Gutton was elected President of CNFRS. Scientific activities were going on, but the world economic crisis, and the incompetence, or irrationality, of politicians, which was to lead to the outbreak of the Second World War, were already jeopardizing research work and international cooperation.

In addition, two factors occurring in France since the early 1920's were to play an ever increasing role. On the one side, industry was developing: Maurice Ponte, a student of H. Abraham, had started industrial production of microwave tubes of the magnetron type, while propagation studies (for detection purposes) were appearing, though timidly, in the programme of industrial research. On the other side, with the centralization of powers in France since the XVIIth century, the State was intervening in all areas including, for example, scientific research and international cooperation. By fusion with the "Postes, Télégraphes et Téléphones", the Army laboratory set up by G. Ferrié had become the "Laboratoire National de Radioélectricité" within which Bernard Decaux established a modern laboratory for frequency measurements. In 1936, the government provided for a large laboratory to be installed at the Ecole Normale Supérieure, to replace the few rooms allocated to H. Abraham and his students, among whom were Yves Rocard and Pierre Grivet.

The political and military tragedy launched for a second time in 1939 came to an end in 1945. During the war, the CNFRS had been suspended officially, since the German armed forces occupying the French territory had forbidden any radio operations, at least if outside their control. In spite of that interdiction, considerable activity was developed because of the need to exchange information across the "frontiers" that separated the forces at war. Needless to add that the consequences often proved catastrophic for the operators.

In 1949, R. Bureau succeeded C. Gutton as President of the CNFRS (the term "radioélectricité" was then substituted to "radiotélégraphie" in the name of the Committee). Later the Committee was led by Pierre David, an expert in military transmissions, who followed Ferrié's lead. At the time, radio research in France was developing rapidly, both in Army establishments and in the Centre National d'Etudes des Télécommunications (CNET), which had absorbed the Laboratoire National de Radioélectricité. Jean Voge, André Blanc-Lapierre, Pierre Misme and Marcel Thué were working in CNET. Industry was being equipped with research laboratories, and universities were provided with sufficient financial resources to achieve brilliant results. The laboratory of the Ecole Normale Supérieure had launched radio astronomy (using German Würzburg radars), thanks to Y. Rocard, and these efforts were

pursued by Jean-François Denisse and Emile-Jacques Blum, resulting in the construction at Nançay of the first radio astronomy observatory in France. To summarize : the main objective of the CNFRS - to stimulate radio research in France- had been achieved. On the other hand, French participation in the activities of the Union was becoming more important, especially as the French radio scientists numbered more than a thousand, and the Union was soon to include forty Member Committees.

The French Committee has been devoting its efforts to these tasks for more than 40 years. It invited URSI to hold its General Assembly in Paris in 1946. In spite of financial problems, it has always succeeded in sending large numbers of participants to General Assemblies and to Symposia held in the intervals between Assemblies. The present president of CNFRS is Pierre Degauque, an expert in electromagnetic compatibility. He recently succeeded Pierre Bauer who, together with Michel Petit, contributed greatly to ionospheric research.

The CNFRS feels honoured that eight of its members have been elected as President, Honorary President or Vice-President : G. Ferrié, R. Jouaust, R. Mesny, R. Bureau, P. Lejay, B. Decaux, J. Voge, P. Bauer. It is probably the only national Committee to have contributed a lieutenant-general, 4 academicians and one Jesuit to the URSI top administration. About 15 other members of the French Committee have been elected as Chairs of Commissions or Working Groups. This tradition is being continued, as can be seen by consulting the December 1992 issue of the URSI Bulletin. The CNFRS notes also with pride that the first lady to chair an URSI Commission, Jeannine Hénaff, was chosen among French physicists.

In pursuing its efforts in favour of international scientific cooperation, the CNFRS wishes to provide the radio science community with an insight into French research work, and to facilitate the participation of French scientists in joint research programmes with theirs colleagues from abroad.

(text received from the Committee in France)

NEWS FROM THE COMMISSIONS

COMMISSION G

Summary of the responses to the questionnaire *"Future of ionospheric studies"*

On our provocative statement *"Ionospheric studies are unimportant and obsolete. Scientists should switch to more important fields of science and engineering"* we received 14 detailed reactions. We had hoped for more responses, but fortunately the answers all came from distinguished scientists in our field, making the conclusions sound and predicative.

The overall tenor was a vigorous contradiction to our statement.

Several colleagues stressed that ionospheric physics comprises various branches of physics (like plasma physics, electromagnetic theory, atomic and molecular physics, thermodynamics, fluid dynamics). This variety of disciplines assures that ionospheric physics remains an interesting and advancing field of studies. Developed over the last 70 years it is also regarded as a 'mature' science.

Another important aspect of many responses was the view of the ionosphere as part of a coupled system of the earth's environment, as an active boundary to space and as an important link in solar terrestrial relations. The electromagnetic, dynamic and chemical interactions of the ionosphere with the magnetosphere, above as well as with the atmosphere below, are far from being satisfactory understood, and certainly need further investigation.

A variety of open and unresolved questions was listed to emphasize that further ionospheric studies are necessary :

1. What causes and influences the day-to-day variability ?
2. What determines the "quiet-time" ionosphere ?
3. Which processes govern the upper atmospheric circulation ?
4. How can we describe the global atmospheric dynamics as a whole?
5. What causes the enormous hemispherical differences in ionospheric behaviour ?
6. Is the ionospheric/upper atmosphere influenced by earth's surface features or earthquakes, thunderstorms etc.
7. Are there ionospheric trigger mechanisms for certain weather phenomena ?
8. What exactly happens during an ionospheric storm ?

9. What are the main processes determining the interaction with the magnetosphere (field aligned currents, particle precipitation, ion-outflow, others) ?
10. Which processes contribute to the various feedback mechanisms between ionosphere and magnetosphere ? What role does the ionosphere play in triggering magnetospheric energy releases ?
11. How is the F-region influenced by plasma convection, particularly in the polar cap, and how does the IMF influence the ionosphere (upper atmosphere) ?
12. How does the ring current affect the ionosphere ?
14. What processes create small scale/medium scale/large scale waves and irregularities, and how do these disturbances react on the ionosphere ?
15. What are the sources, sinks and behaviour of "patches" and "blobs"?
16. What influence do external sources have (e.g. a supernova besides the sun) ?
17. The study of planetary ionospheres.

Several contributors also mentioned the anthropogenic influence on the ionosphere/upper atmosphere for which increasing evidence is being found (increase of CO_2 and water vapor mixing ratio, temperature changes in the mesosphere), a factor which needs further studies. In this context the necessity of long term observations was stressed, since they form the basis of such investigations.

The archiving, quality assurance and handling of data in turn require powerful and easily accessible data centers.

Strongly emphasized also was the study of plasma physical processes using the ionosphere as a natural plasma laboratory for passive and active experiments. Problems and areas of further research mentioned in this context are :

I. The creation and onset of instabilities
II. Magnetospheric influence on ionospheric instabilities
III. The feedback of instabilities
IV. Ionospheric scintillations
V. Non-Maxwellian velocity distributions
VI. Ion-neutral interactions
VII. Active experiments

Also addressed by many contributors was the topic of measurements and measuring techniques. They stressed on one hand the need for more measurements with better global coverage (global networks), better time resolution and standardized format, but also the impact of ionospheric

research on the development of new techniques such as MST radars, wind profiles, interferometry and advanced coding. The prevailing view was that only a combination of in-situ and ground based techniques could fill the future needs.

It was also mentioned in this context that compared with other areas in physics, fruitful research in our field can be performed with relatively inexpensive equipment (HF-receivers, riometer, magnetometer). This means, for instance, that developing countries have a chance to contribute to the advancement of ionospheric research. The importance of contributions from developing countries, particularly in questions related to the equatorial ionosphere, was particularly mentioned.

The important role of the ionosphere in communication was addressed by several contributors. HF-technique is still regarded as the cheapest way of communication over long distances. The forecasting of transmission paths, and the prediction of wave propagation, need better ionospheric models than currently available. To improve these models a better understanding of the ionospheric behaviour and answers to the questions listed above are necessary. "Expert systems" with real-time solar terrestrial data input are mentioned as possible future tools. Such models should also provide the customer with information on the probability of disturbances (scintillations, storm effects etc.). It was specifically mentioned that the number of customers in this area is not decreasing despite the progress in satellite communication. In fact the ionosphere is even affecting signals in the UHF and GHz range used by satellites.

We thank J. Aarons, N. Danilkin, A.D. Danilov, G.L. Gdalevich , R.D. Hunsucker, M. Lehtinen, H. Opgenoorth, S.M. Radicella, H. Rishbeth, A. Rodger, J. Röttger, P.J.S. Williams, D. Whitehead and E.B. Wodnicka for their valuable contributions. They will certainly help in planning future activities of Commission G.

A.W. WERNIK
Chair
Commission G

K. SCHLEGEL
Vice-Chair
Commission G

A NOTE FROM THE WORKING GROUP E4

TERRESTRIAL AND PLANETARY ELECTROMAGNETIC NOISE

Is it possible to forecast the earthquake stroke using a radiophysical equipment ?

The international scientific community will discuss the problem of electromagnetic emissions associated with earthquakes at a joint session of Commissions H, E and G, as part of the programme if the URSI General Assembly to be held in Kyoto (25 August - 2 September 1993). This is only a half-day symposium, but due to the importance of the problem, four conveners : Drs. A.C. Fraser-Smith (USA), T. Yoshino (Japan), O. Molchanov (Russia), M. Parrot (France) were selected. Twenty-one reports will be presented, a rather heavy time schedule. It is hoped that more extensive discussions on the problem will be conducted at the "International Workshop on Electromagnetic Phenomena Related to Earthquake Prediction, which will be held in Chofu, Tokyo, Japan, just after the URSI General Assembly. Organizers of the Workshop are Drs. M. Hayakawa and Y. Fujinawa, who hope that this meeting will be attended not only by the participants to the General Assemblies, but also by specially invited and supported scientists from Russia (and other former Soviet republics), China, Turkey and other countries where earthquake prediction is crucial. About 100 reports from 12 countries will be delivered in the Workshop.

Disastrous earthquakes happen 100 to 200 times each year, and are a permanent menace to residents of our planet. The world community spends billions of dollars a year as a compensation for the damage from earthquakes, and since old times earthquake prediction has been a great challenge to international science. Over many decades traditional seismological, geophysical, tectonomagnetic and other investigations have been going on in the majority of developed countries, but the problem is still far from being perfectly understood. A very good example is that of the recent California, Loma Prieta, October 18 1989 earthquake. In a zone which features tremendously large amounts of traditional ground-based facilities, and where an earthquake had long been expected, no reliable seismic precursors were recorded, and no warning followed. In this situation any additional possibility should not be rejected. It is therefore reasonable to use the electromagnetic phenomena allegedly associated with earthquakes. There are at least two

such phenomena, both well documented in many scientific papers : slow variations of the electric and magnetic fields preceding the main shock by a few weeks or days, and noise-like electromagnetic emissions in the ULF (10^{-2} ~ 10 Hz) or ELF/VLF (10 Hz ~ 30 kHz) frequency ranges, appearing a few days or hours before the earthquake. Until now it is not evident that these phenomena are interconnected. It is often believed that the first precursor is produced by water movement through ground pores, resulting in an electro-kinetic effect. But the probable reason for the electromagnetic emission is the creation of numerous microcracks in the ground during drastic changes in pressure or shear stress. Due to piezoelectric or triboelectric effects each new crack produces shot charges and current pulses. This emission mechanism has been investigated in numerous laboratory experiments, where the real situation before and during earthquakes was simulated. The first attempts to use the slow electric and magnetic variations as earthquake precursors were already reported in China and Greece. But seismogenic electromagnetic emission is usually claimed to be questionable, mainly because of the high probability to confuse it with other non-seismogenetic signals such as man-made interference, lightning pulses or natural noise from space. However, the situation is not really hopeless, because sophisticated methods of measurement and data processing accumulated by radio physicists are now available. Anyway, the energetic sensitivity of the usual electromagnetic equipment exceeds the usual seismic sensitivity by at least six orders of magnitude in the ULF range, and eight or nine orders in the ELF/VLF ranges of frequencies. This means that even if the coefficient of transformation of the energy of underground movement into the electromagnetic fields is very small in comparison with similar coefficients of transformation in seismic waves, the electromagnetic observations are rather perspective if the ratio of the coefficients is better than 10^{-6}. Some theoretical estimations show that this ratio is much better. There are already hundreds of scientific papers and reports devoted to the seismogenic electromagnetic emission recently observed in Japan, Russia, China, the USA and other countries. For example, Russian scientists before the famous Armenian earthquake of 1988, and American scientists before the well-known Loma Prieta earthquake of 1989, registered surprisingly similar ULF emissions, using nearly the same magnetic detectors. In Japan, this type of ULF events was also observed before the strong earthquake of 1992, using a huge borehole electric antenna system at a depth of 300 m. Some very interesting bursts of ULF and ELF/VLF emissions in the space environment of the Earth, possibly related to earthquakes. were registered by Russian and French investigators using satellite-borne receivers. To check the reliability of this effect and develop a bank of data suitable for statistics, plans have been formed to launch a special satellite mission nicknamed DEMETER

(Detection of electromagnetic emission from terrestrial seismic sources). The operative data analyses will be conducted by onboard computers with rather big memory capacity. This international project is open for participation, and will be discussed at the above-mentioned session of the Kyoto General Assembly, and at the Workshop on Electromagnetic Phenomena Related to Earthquake Prediction Tokyo.

M. HAYAKAWA
(The University of Electro-Communications, Chofu, Tokyo)
O.A. MOLCHANOV
(Institute of Physics of the Earth, Russia,
now at the University of Electro-Communications).

UTC TIME STOP

on the 1st of July 1993

A positive leap second will be introduced at the end of June 1993.

The sequence of dates of the UTC second markers will be :

1993 June 30,	23h 59m 59s
1993 June 30,	23h 59m 60s
1993 July 1,	0h 0m 0s

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

from 1992 July 1, 0h UTC, to 1993 1, Oh UTC : UTC-TAI = -27s.

from 1993 July 1, 0h UTC, until further notice : UTC-TAI = -28s.

Leap seconds can be introduced in UTC at the end of the months of December or June, depending on the evolution of UT1-TAI. Bulletin C mailed every six months, either to announce a time step in UTC, or to confirm that there will be no time step at the next possible date.

MARTINE FEISSEL
Director, Central Bureau of IERS

REPORTS ON URSI-SPONSORED MEETINGS

VERIFICATION AND NEW DEVELOPMENT OF THE INTERNATIONAL REFERENCE IONOSPHERE

3 September 1992, Washington D.C., USA

The URSI/COSPAR Task Group on the International Reference Ionosphere (IRI) conducted its annual scientific meeting during the World Space Congress (COSPAR/IAF) in Washington, D.C. Four well-attended sessions were held with participants from 11 countries presenting 15 talks and 10 posters (to be published in *Advances in Space Research,* edited by K. Rawer and W.R. Piggott). The following is a synopsis of the meeting highlights, and the final resolutions and recommendations.

After the release of IRI-90 (Version-No 12) the model is now mid-way through its next improvement cycle. The focus of this workshop was therefore on verification of IRI-90 with newer data and on the discussion of future improvements. Noteworthy is the number of presentations that compared the present IRI model with large data bases providing valuable information about IRI-90 shortcomings and indicating ways of improvement. Data sets used in this context included the data base of Arecibo incoherent scatter data (*Mahajan et al.*), the GSFC comprehensive data base of satellite in situ measurements (*Hoegy and Grebowsky*), ionosonde data from the worldwide network of digisondes (*Reinisch*), a compilation of close to 100 rocket observations (*Danilov* and *Smirnova*) and the data accumulated by the SUNDIAL program (*Szuszczewicz et al.*).

Electron density - topside

Shortcomings of the IRI-90 topside model were noted in comparisons with DE Langmuir probe measurements (*Hoegy and Grebowsky)* and with electron content data from Paulista, Brazil (*Batista et al.*). All topside modelling to date depends in one way or another on the rather limited compilation of Alouette/ISIS topside sounder data done by Bent and his co-workers in the early seventies. Considering the importance of topside electron density for a wide range of IRI applications, high

priority is given to an improvement of the IRI topside model with newer data. A topside modelling project is now in its planning stage utilizing as yet unused topside sounder data from the Alouette and ISIS missions (*Bilitza*); an important consideration will be the use of a field-aligned coordinate in place of the presently used vertical height.

Electron density - middle ionosphere

A data intensive study of the EE valley region was presented based on Arecibo incoherent scatter data base (*Mahajan et al.*). The task group decided to use the Mahajan results for a better representation of the E valley parameters at low latitudes. Incoherent scatter data (from Malvern, UK) were also used for an assessment of foE during nighttime (*Bradley*). Discrepancies were found for the dawn periods and will be corrected in the next version of IRI. Digisonde data were used for a look at the representation of the half-density point (Ne = 0.5 * NmF2) in IRI. A persistent discrepancy was observed in the early morning hours, which will need further investigation (*Reinisch*).

Electron density - lower ionosphere

The limited pool of reliable data for this region remains the major road block towards a better representation of seasonal, diurnal,, and solar cycle variations. Based on the study of a large amount of rocket data (compilations by Danilov and by Friedrich) it was also proposed to include the effect of the Winter Anomaly and of stratospheric warnings in the IRI D-region model (*Danilov and Smirnova*). Further studies are solicited for the 1993 IRI workshop,, where a dedicated half-day session should lead to a group consensus on future improvements for the critical region.

Electron density - F peak mapping

Results were presented of two international projects : VIM (Verification of Ionospheric Models, URSI G.4, *Reinisch*) and SUNDIAL (NSF, *Szuszczewicz*). Concerning the F peak density, in general, good agreement was found between these ionosonde data and IRI/CCIR. It is clear, however, that a better representation of the solar cycle variation would be of great benefit.

Plasma temperatures

Comparisons with the large DE data base confirmed the overall excellent representation of electron and ion temperatures in IRI (*Hoegy and Grebowsky*). In situ measurements of the Japanese Hinotori satellite show that the smoothed diurnal structure of the topside electron temperature omits important features, in particular the early morning peak ("morning overshoot") (*Oyama*). The task group decided that the Hinotori results should be incorporated into the next edition of IRI (*Bilitza, Oyama*). Data from the Japanese Akebono satellite could be of help in describing the plasmaspheric electron temperature (*Oyama*).

Ion composition

Several studies pointed to two of the major shortcomings of the present IRI ion composition model : (i) the height of the transition from O^+ to H^+ and He^+ ions is too low (DE : *Hoegy and Grebowsky*; OGO-6, ISS-b, Taiyo : *Kutiev and Stankov*); (ii) cluster ions and negative ions are not yet included (*Danilov and Smirnova*). A modelling approach based on the characteristic transition heights (light ions <-> O^+ <-> molecular ions <-> cluster ions <-> negative ions) may help to alleviate both of these shortcomings (*Bilitza, Kutiev*). Global maps exist for the upper two transition heights,, but more data are needed for the lower two. Modelling efforts are also concentrating on the molecular ion ratio NO+/O2+ in the E region and on the cluster-to-molecular ion ratio in the D region (Kopp; Friedrich).

Membership and meetings

Dieter Bilitza was elected as new Chairman of the IRI task group and K. Oyama as Vice-Chairman. T. Gulyaeva remains as the URSI Vice-Chair. Several new members were accepted into the task group : M.A. Abdu, INPE, Brazil; S. Radicella, ICTP, Italy/Argentina; T. Maruyama, Hiraiso, CRL, Japan; R. Hanbaba, CNET, France; P. Kishcha, IZMIRAN, Russia and P. Wilkinson, IPS, Australia.

IRI workshops and related meetings : "Ionospheric Prediction and Modeling", Kyoto, Japan, URSI 1993 General Assembly; "Off-Median Phenomena and IRI", Trieste, Italy, October 19-22, 1993; "The High-Latitudes in the IRI", Hamburg, Germany, 2 days during the 1994 COSPAR General Assembly.

D. BILITZA

CONFERENCE INTERNATIONALE START

(Spatio-Temporal Analysis for Resolving Plasma Turbulence)

31 janvier - 5 février 1993, Aussois, France

L'objectif principal de cette conférence ESA, parrainée par les Commissions H et G de l'URSI ainsi que par le CNES et le CNRS, était de réunir la communauté internationale de la physique des plasmas spatiaux pour lui permettre d'approfondir sa maîtrise des concepts et des outils relatifs à la caractérisation de la turbulence plasma (MHD et Cinétique).

Les exposés se sont plus particulièrement focalisés sur le développement de nouveaux outils de diagnostic, adaptés à la réduction et à l'interprétation des données qui seront obtenues grâce aux mesures locales multi-points permises par la mission CLUSTER (Turbulence à petite échelle dans la queue et les frontières externes de la magnétosphère terrestre et le vent solaire) et à certaines observations de la mission SOHO (Spectro-imagerie à haute résolution du milieu coronal). Toutefois, afin de réunir une communauté "plasmicienne" plus large, et donc d'enrichir les débats, tant sur les outils de diagnistic que sur les modèles théorique, des exposés ont été consacrés aux plasmas de laboratoire, à la physique ionosphérique et à la physique solaire (couches externes).

Les principaux sujets traités au cours de la conférence concernaient :

- les concepts généraux en matière de turbulence fluide, MHD et cinétique,
- le rôle de la turbulence dans la thermalisation, la diffusion spatiale et l'accélération du plasma,
- les méthodes d'analyse de la turbulence, en particulier à l'aide de mesures multi-points, en laboratoire, dans l'ionosphère, la magnétosphère, le vent solaire, ainsi que celles qui peuvent être associées à la spectro-imagerie à haute résolution dans le proche environnement solaire,
- le rôle de la simulation numérique dans la préparation, le dépouillement et l'interprétation des missions spatiales. Un intérêt plus particulier a été porté à la modélisation des résultats que fourniront les instruments de la mission CLUSTER.

La Conférence START a été organisée autour d'une série de conferences invitées, thématiquement renforcées par des contributions orales et par des contributions affichées présentées au cours de séances non parallèles. Elle a réuni 119 participants appartenant à 11 nationalités différentes.

Les actes de la conférence sont en cours de publication dans un rapport ESA-SP édité sous la responsabilité de :

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European Space Agency
ESTEC (SI)
Postbus 299
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The Netherlands

THIRD ICTP-URSI COLLEGE ON THEORETICAL AND EXPERIMENTAL RADIOPROPAGATION PHYSICS

Trieste, Italy, 1-26 February, 1993

followed by the

WORKSHOP ON SCIENTIFIC ASPECTS OF THE RURAL COMMUNICATIONS IN DEVELOPING COUNTRIES

Trieste, Italy, 1-5 March, 1993

Introduction
Following the results of the previous College held in Trieste on January 7 - February 1, 1991 and the suggestions that were presented during the Open Discussion on Telecommunications Problems in Developing Countries carried out as one of the exercises of that College, these two activities have been held at the ICTP premises in Trieste between February 1 and March 5, 1993.

Organization and Support
As for the previous Colleges, held in 1989 and 1991, the College and the Workshop were jointly sponsored and organized by the International Centre for Theoretical Physics (ICTP) and the International Union of Radio Science (URSI). The Directors of the activities were Professor S.M. Radicella of ICTP and Professor J. Van Bladel, from the University of Ghent, Belgium, and Secretary General of URSI. The activities received financial support from the organizing institutions and also from the International Telecommunications Union - Telecommunications Development Bureau and the Italian Istituto Nazionale di Geofisica.

The College Programme

The College included lectures, advanced computer exercises, and practical exercises with the Olympus Satellite receiver system installed by the Italian Istituto Superiore per le Poste e Telecomunicazioni and the Fondazione Ugo Bordoni at the ICTP. In addition, Participants Contributions Sessions and Open Discussion Sessions have been organized.

The structure of the programme was as follows :

1. Introductory course on Electromagnetics (J. Van Bladel, University of Ghent, Belgium) and Computer techniques (F. Gardiol, Ecole Polytechnique de Lausanne, Switzerland)
2. Noise and Interference in radiocommunications (P. Degauque, Université des Sciences et Technique, Lille, France)
3. Radiopropagation aspects of satellite communications (A. Martellucci, Fondazione Ugo Bordoni, Rome, Italy)
4. Radio Spectrum management and Electromagnetic Compatibility (R. Struzak, CCIR-ITU, Geneva, Switzerland)
5. Ionospheric effects on modern telecommunications systems (L. Barclay, Radiocommunications Agency, London, U.K. and K. Hughes, CCIR-ITU, Geneva, Switzerland)

As a concrete result of the practical computer exercises carried out during the College a "Digital Atlas of VHF/UHF Propagation for Africa" was elaborated by a number of the College participants under the direction of Professor R. Struzak. The results were presented during the following Workshop.

The participants

The College was attended by 44 physicists and engineers from universities, research centres, and telecommunications administrations and services. The distribution of participants by regions was as follows :

Africa	10
Asia	21
Europe	4
Latin America	9

An anonymous questionnaire requiring opinion on different matters was completed by the participants. The Planning and the Running of the Activities was considered Very Good or Good by 77% of the participants and Satisfactory by the remaining 23%. Scientific Services during the College were considered Very Good or Good by 72% of the participants and Satisfactory by the remaining 28%.

Future Colleges

From the questionnaire, the Open Discussion Sessions and the opinion of the lecturers, it appears evident that this type of activities is considered important for the training and updating of physicists and engineers involved in radiocommunication science and technology in developing countries, and that they should be continued. In addition several suggestions for the structure of future Colleges were given. These can be summarized as follows :

1. The next College should be devoted mainly to Informatics and Radiocommunication Physics, with two to three weeks of computer use for Mini-Projects carried out by the participants on the basis of concrete problems in the field of radiocommunications science an applications. This proposed structure implies the early definition of the next College programme in order to allow for preparation by potential participants.
2. In order to fulfil the objectives of the proposed scheme it will be necessary to provide the assistance to participants by software experts during most of the period of the College.
3. Lectures should include topics such as : Radiometeorology, Propagation problems of digital radiocommunications and Antennas. Particular attention should be devoted to the new field of Biological effects of Radiowaves.
4. The period proposed for the forth College is February - March 1995.

The Workshop Programme and Participants

The Workshop included lectures, reports on the experiences of various countries in Rural Communications, and Round Table discussion sessions, with the following scheme :

Lectures on :

- Human development, Economics and Telecommunications (S.M. Radicella, ICTP)
- Radio Spectrum management for rural telecommunications (R. Struzak, CCIR-ITU, Geneva, Switzerland)
- HF/VHF Radio systems for Rural-remote Area Telecommunications (J.S. Belrose, Communications Research Center, Dept. of telecommunications, Ottawa, Canada)
- Low availability Systems for Satellite Communications (F. Barbaliscia, Fondazione Ugo Bordoni, Roma, Italy)

Reports on Rural Communications from :

Argentina : M. Garnero, Neuquen Province Telecommunication Direction, Neuquen, Argentina

Brazil : J.C. Rocha Melo, TELEBRAS, Brasilia, Brazil

P.R. of ChinaT: Ma, China Research Institute of Radiowave Propagation, Xinxiang, P.R. of China
Nigeria : G.O. Ajayi, Obafemi Awolowo University, Ile-Ife, Nigeria
Sudan : M.O.Y. Sanhouri, SUDATEL, Khartoum, Sudan

Round Table Discussion Session on :
Scientific and Technical aspects of Rural Communications
Moderators : J.S. Belrose and R. Struzak
Reporter : G.O. Ajayi, Obafemi Awolowo University, Ile-Ife, Nigeria
Social and Economic aspects of Rural Communications
Moderators : S.M. Radicella and R. Struzak
Reporter : M.A.H. Abbas, University of Khartoum, Sudan

The Workshop was attended by the College participants with the addition of two colleagues from Africa and one from Asia.

Conclusions of the Workshop
The Round Table Discussions represented the forum where some of the most important topics of interest to developing countries were treated. In many cases the discussions covered wider areas than those related only to rural communications.

1. The importance of the role of the Telecommunications Development Bureau of ITU in promoting the advancement of telecommunications in developing countries in general and in the rural areas in particular has been stressed.
2. The importance of regional studies, done by local working groups, to identify concrete areas of research and development in telecommunications of interest to the local societies, to be proposed to the international attention, has been emphasized.
3. The need for the contribution of developing countries to the work of international organizations such as the technical bodies of ITU, in particular CCIR, for the regional validation and possible modification of the radiopropagation models has been indicated.
4. The need to find ways to increase the interaction between scientists working at universities and research centres and the telecommunication services and administrations in developing countries has been stressed.
5. Examples of projects identified as important to the advancement of telecommunications in developing countries in general, and in rural areas in particular, that should include scientists and technical staff from telecommunication services, are : A) Digital Terrain Mapping for Radiocommunication Planning ; B) HF Adaptive Systems with

Real Time Channel Evaluations ; C) Adaptive Modelling of Economics and Telecommunications for Developing Countries.

6. It was suggested that ICTP could be the basis for such projects, if adequate support is found, taking into account the importance of the Centre as a focal point for science and technology in developing countries.
7. The joint effort of ITU, URSI and ICTP for the promotion and coordination of the activities concerning telecommunications science and technology in developing countries has been recognized and future joint endeavours like those indicated above have been encouraged.

S.M. RADICELLA
Local organizer
Chairman of the Standing Committee
on Developing Countries

EIGHTH INTERNATIONAL CONFERENCE ON ANTENNAS AND PROPAGATION

30 March - 2 April 1993, Edinburgh, U.K.

URSI has co-sponsored the IEE biennial series of International Conferences on Antennas and Propagation since its inception in 1978. The eighth in the series was held at Heriot-Watt University in Edinburgh, Scotland. The format and style of ICAP-93 was similar to previous events with plenary invited talks and four parallel sessions, two on antennas, two on propagation. This format allows delegates to follow their own interests without being overwhelmed by papers and gives plenty of opportunity to learn about other topics within the broad subjects of antennas and propagation. A roughly equal balance between antennas and propagation was maintained and reflects the interdependence of each community upon the other - a balance which URSI has helped to foster.

The organising committee, led by the able Chairmanship of Dr. John Newbury, had put together a good series of invited review papers: 'Mobile systems; from chaos to convergence' by R. S. Swain, 'The ACTS propagation campaign' by F. Davarian of JPL, 'Spacecraft antenna design and applications' by G. Crone of ESTEC, 'Recent advances in the measurement precipitation by radar' by A. J. Illingworth of the University of Reading, 'Computer modelling of antennas: A comparison

of available techniques' by P. Foster and 'Millimetre-wave optics and quasi-optical antenna design' by D. H. Martin of Queen Mary and Westfield College, London. These were followed by sessions developing the themes in the invited lectures.

Antenna sessions covered all the usual antenna topics from the practical topics of reflector antennas, microstrip patch antennas and adaptive antennas to the theoretical topics of diffraction analysis techniques and electromagnetic theory. Unlike some conferences in the past, no one type of antenna could be said to be dominant, perhaps reflecting maturity, yet there were plenty of new ideas presented. Authors were reporting advances in all topics with new antenna design techniques and new types of antennas to satisfy specific applications. There was much interest in the relative merits of different computational techniques for antenna analysis, and a recognition that each technique has advantages and disadvantages. There is growing interest in the potential of finite difference - time domain techniques for solving scattering and antenna problems. These combine the spatial domain and time domain in one program giving a considerable amount of information about the performance but requiring large computers and careful modelling of the antennas.

The emphasis in the propagation sessions was clearly directed towards the system aspects of propagation. Papers were presented which combined the application of propagation data with the details of the radio systems. Mobile systems are very dependent on the propagation characteristics of the environment. Sessions were held on HF/VHF mobile, system planning, mobile future systems, HF direction finding, indoor mobile. There were also sessions on the scientific aspects of propagation such as ionospheric tomography, melting band effects, polarimetry and line-of-sight propagation.

A very successful, and relatively large, poster session with nearly 50 papers was held during one evening. The success was due to the fact that a buffet supper was provided so that delegates could eat and wander around the displays in a relaxed atmosphere throughout the evening. This format worked very well and can be strongly recommended to other conference organisers as a way of making a poster session come alive and giving authors a real chance to interact with interested participants.

The Poster session was preceded by a historical interlude in the form of a lecture by Dr. P. Excell of Bradford University commemorating the centenary of the birth of Sir Edward Appleton who did so much to develop propagation as a serious topic for study (for which he was

awarded the Nobel Prize in 1947) and who was also dedicated to the ideals of URSI, being President for 18 years, from 1934 to 1952.

The facilities at the Heriot-Watt University Conference centre were excellent enabling everyone to live on the campus in good quality accommodation with convenient lecture halls and eating facilities. This undoubtedly helped to encourage much informal discussion which is one of the major benefits of any international conference as well as contributing towards the lively sessions.

The numbers attending this year were slightly down on last time, probably due to the world-wide recession and the cut-backs in government support for research. The 350 delegates came from a total of 29 countries thus emphasising the international nature of the conference.

The next ICAP will move out of the UK for the first time and will be held at Eindhoven in the Netherlands from 4 to 7 April 1995.

A. D. OLVER.

MEETING ANNOUNCEMENTS

OFF-MEDIAN PHENOMENA AND IRI

19 - 22 October, 1993, ICTP, Trieste, Italy

This meeting continues the annual workshops organized by the URSI/COSPAR Working Group on the International Reference Ionosphere (IRI). At present IRI provides a monthly average description of the electron density, electron and ion temperature ion composition, and ion drift in the undisturbed ionosphere. The focus of this year's workshop will be on off-median phenomena in the global and temporal behaviour of ionospheric parameters. Special emphasis will be given to the description of irregularities like Spread-F and Sporadic-E and to the modeling of storm-time behaviour of the ionosphere.

Other topics of general interest include :
- Comparisons of IRI with ground and space data, and with other models;
- Improvements and extensions of the IRI model;
- Application of the IRI model for science, engineering and educational purposes;
- Studies that could lead to a better representation of ionospheric parameters in IRI.

Programme Committee : K. Rawer, L. Bossy; D. Bilitza, T. Gulyaeva
Local Organizer : Prof. S.M. Radicella (for his address, see list of addresses)
Contributions and inquiries should be addresses to the Local Organizer.

SEPTIÈME COLLOQUE INTERNATIONAL ET EXPOSITION SUR LA COMPATIBILITÉ ÉLECTROMAGNÉTIQUE

2 - 4 mars 1994, Toulouse, France

Ce colloque aura lieu au Parc des Expositions de Toulouse, où une exposition permanente pendant les trois journées accompagnera les conférences. Le CEM'94 est organisé par le Laboratoire

d'Electromagnétique de l'ENSEEIHT, en collaboration avec le Laboratoire de CEM du CNES à Toulouse, et bénéficiera du soutien des grands organismes nationaux et régionaux. Cette manifestation permettra la présentation des travaux en cours dans les différents centres de recherche universitaires et industriels, et sera l'occasion de faire l'état de l'art dans les divers domaines de la CEM. La présidence du Comité scientifique est assurée par le Professeur Baudrand (ENSEEIHT).

Thèmes du colloque
1. Source de bruit naturel et artificiel
2. Couplage avec les structures et les systèmes
3. Techniques et systèmes de mesure
4. Techniques et moyens de protection
5. Modélisation numérique en CEM
6. CEM et électronique de puissance
7. Effets biologiques

Le Comité Scientifique étudiera également toute communication concernant la CEM en dehors des thèmes ci-dessus.

Exposition

L'exposition permanente, en parallèle avec le Colloque, devrait elle aussi prendre en compte l'élargissement et les nouvelles orientations des thèmes scientifiques. Dans le domaine de la CEM la liste suivante, non exhaustive, est proposée :
- Composants, équipements et systèmes
- Matérials et moyens d'essais et de mesures
- Prestations de services et d'études
- Moyens et systèmes de protection

Note aux Auteurs

La langue du Colloque est le français. Les auteurs qui souhaitent présenter une communication au CEM 94, doivent envoyer d'urgence un résumé de leurs travaux en 4 exemplaires au secrétariat du CEM 94, à l'adresse :

Secrétariat du CEM 94
Laboratoire d'Electronique de l'ENSEEIHT
2, Rue Charles Camichel
F-31071 Toulouse Cédex, France
Tél. (33) 61 58 82 46 ENSEEIHT
Tél. (33) 61 27 33 77 CNES
Fax (33) 61 58 83 77 ENSEEIHT

SPECIALIST SYMPOSIUM ON MICROWAVE SENSING OF THE EARTH, OCEANS AND ICE

18, 19, 20 May 1994, Lawrence, Kansas, USA

The Seventh URSI Commission F Specialist Meeting on Microwave Sensing of the Earth, Oceans, and Ice will be held in Lawrence, Kansas, USA, as was the second. The meeting will be cosponsored by the University of Kansas, and tentatively by the U.S. Office of Naval Research and the U.S. National Aeronautics and Space Administration. Topics to be addressed include:

Active and passive microwave sensing of

- Land surfaces
- Vegetation
- Sea ice
- Ocean waves
- Soil moisture
- Cultural targets
- Continental ice
- Other ocean features

Microwave remote sensing systems, including

- Imaging radars
- Scatterometers
- Altimeters
- Earth- and ice-probing radars
- Radiometers

Calibration of microwave remote sensors

Special sessions will be devoted to ERS-1 radar results.

The conference language will be English. A digest of papers is planned. Deadlines will be announced later.

For further information, please contact:

Prof. S. P. Gogineni
Radar Systems and Remote Sensing Laboratory
The University of Kansas
Lawrence, Kansas 66045-2969, USA
Tel: (1) 913-864-7734
Fax: (1) 913-864-7789
E-mail: pgogineni@tesla.ece.ukans.edu

Please copy e-mail messages to: graham@ardneh.rsl.ukans.edu

INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC ENVIRONMENT AND CONSEQUENCES

30 May - 3 June 1994, Bordeaux, France

The EUROEM94 International Symposium will be held at the Bordeaux-Lac Convention Centre from 30 May to 3 June, 1994.

Authors are invited to submit papers on all topics of interest as listed below.

Suggested topics

Nuclear Electromagnetic Pulse	Electromagnetic Compatibility
Natural Lightning	High Power Transients
Transient Radar	High Intensity Radiated Fields
High Power Electromagnetics	Environment
Pulse Power for High Power Electromagnetics	Electromagnetic Perturbation and Interference
Phenomenology	Coupling
Hardening and Protection	Simulation Techniques
Numerical Methods	Standards and Specifications
Metrology	Hardness Assurance and Maintenance
Technology	Statistical Methods

ALL ABSTRACTS AND SUMMARIES MUST BE RECEIVED BY JANUARY 10, 1994

Address correspondence and all papers to :

EUROEM94 Symposium
Technical Programme Committee
Centre d'Etudes de Gramat
F-46500 GRAMAT
FRANCE
Fax (33) 65 10 54 33

Exhibits

Industrial exhibits will be open from 30 May through 2 June, 1994. The Bordeaux-Lac Convention Centre has been designed to allow easy relationship between attendees, participants and exhibitors. Potential exhibitors can obtain detailed information by writing to :

EUROEM94 Symposium
Exhibits Committee
Centre d'Etudes de Gramat
F-46500 GRAMAT
FRANCE
Fax (33) 65 10 54 33

or

EUROEM94 - BCS
Palais de Congrès
Quartier du Lac
F-33330 BORDEAUX
FRANCE
Fax (33) 56 43 17 76
Mr. J.P. Robin :
Phone (33) 56 11 88 60/61

General Information about the EUROEM94 Symposium may be obtained from :

- Ms. H.V. Dhur, Symposium Secretary, Phone (33) 65 10 54 06, Fax (33) 65 10 54 33
- Ms. D.J. Serafin, Symposium Coordinator, Phone (33) 65 10 54 46, Fax (33) 65 10 54 09

INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY

28 June - 1 July, 1994, Wroclaw, Poland

The Wroclaw EMC Symposium is organized since 1972 as a biennial event open to all scientists and engineers throughout the world. In 1994, immediately after the Symposium (i.e. 4 - 8 July), a Regional Information Meeting on the work of the ITU Voluntary Group of Experts (VGE) "Developments in Spectrum Management", organized by the Radiocommunications Agency of Poland in cooperation with the International Telecommunication Union, is planned in Wroclaw. This creates an easy opportunity to take part in both events.

Language

The Proceedings, available at the Symposium, will contain the full texts of all papers in English. The meetings will all be conducted in English.

Scope

All aspects of EMC theory and practice. EMC is understood in a broad sense as the ability of a device, equipment, or system to function satisfactorily in its electromagnetic environment, without introducing intolerable disturbances to anything in that environment. Spontaneous papers are solicited, and invited sessions are planned.

Hot topics

Workshops and Round Table Discussions will be organized on hot topics such as :

- European vis-a-vis worldwide standardization
- recent trends and developments in national and international spectrum management and spectrum engineering.

Prospective authors are invited to submit original, unpublished papers concerning all aspects of EMC before 31 July, 1993. Suggested topics include :

- Antennas and Propagation, EMC Aspects
- Biological Effects of EM Radiation
- Education in EMC
- EMC in Power Engineering
- EMC in Wire Communications
- EMC Measurements and Instrumentation
- EMC Prediction, Analysis, Modelling
- EMI Sources and Coupling Paths to victims
- ESD, Lightning, EMP
- EMI Reduction Techniques
- Filters and Filtering Techniques in EMC
- Grounding and Shielding
- Immunity
- Natural and Man-made EM Environment
- Regulations and Standards in EMC
- Spectrum Management, Engineering, Sharing, Monitoring
- Other

Nine copies of the abstract and summary should be sent to :
EMC Symposium, Box 2141, 51-645 Wroclaw 12, Poland.

One copy should be sent to : Professor F.L. Stumpers, Elzentlaan 11, NL-5611 LG Eindhoven, The Netherlands.

For more information, please contact : Mr. W. Moron, EMC Symposium, Box 2141, 51-645 Wroclaw 12, Poland, phone +4871 481041, fax +4871 483248, telex 712118 ilw pl.

A REMINDER - FORTHCOMING URSI-SPONSORED MEETINGS

International Microwave Conference
2-5 August, Sao Paulo, Brazil
Contact address : Paulina CARDOSO
IMT-Escola de Engenharia Maus
Estrada das Lagrimas, 2035
09580 S. Caetano do Sul - SP, Brazil

International Geoscience and Remote Sensing Symposium (IGARSS 93)
18-21 August, Tokyo, Japan
Contact address : Professor Mikio TAKAGI
Institute of Industrial Science
University of Tokyo
7-22-1 Roppongi, Minato-Ku
Tokyo 106, Japan
Tel. : (81) 3-3402-6231
Fax : (81) 33-402-6226

International Symposium on Radio Propagation (ISRP'93)
18-21 August, Beijing, P.R. China
Contact address : Prof. Zong SHA
China Research Institute of Radiowave
Propagation, P.O. Box 138/93
Xinxiang, Henan 453003, China

Third International Symposium on Antennas and EM Theory (ISAE'93)
6-9 September, Nanjing, P.R. China
Contact address : Prof. Wen Xun ZHANG
Chairman of TPC, ISAE'93
Southeast University
Nanjing 210018, P.R. China
Fax : (86) 25-713 019

Space VLBI Conference
6-10 September, Kyoto, Japan
Contact address : Dr. M. MORIMOTO
Tokyo Astronomical Observatory
Osawa Mitaka, Tokyo 181, Japan

21st International Conference on Phenomena in Ionized Gases
(ICPIG XXI)
19-25 September, Bochum, Germany
Contact address : Dr. Udo ARENDT
Arbeitsgemeinschaft Plasmaphysik
Ruhr-Universität Bochum
Universitätsstraße 150, Postfach 10 21 48
W-4630 Bochum 1, Germany
Tel. : (49) 234-700 3757 or (49) 234-700 6709
Fax : (49) 234-709 4178, Telex : 17-234-356
E-mail : icpig@tp4.ruhr-uni-bochum.de

Microwaves in Medicine 1993
11-14 October, Rome, Italy
Contact address : Prof. Guglielmo D'INZEO
Dept. of Electronic Engineering
University "La Sapienza" of Rome
Via Eudossiana 18, I-00184 Rome, Italy
Fax : (39) 6-474 2647

Second International Conference on Signal Processing
26-30 October, Beijing, P.R. China
Contact address : Prof. Yan BAOZONG
Institute of Information Science
Northern Jiaotong University
Beijing 100044, China

OTHER MEETINGS WHICH HAVE BEEN BROUGHT TO OUR ATTENTION :

European Conference on Electron and Optical Beam Testing of Electronic Devices,
1-3 September, 1993, ETH, Zurich, Switzerland
Contact address : Swiss Federal Institute of Technology
Reliability Laboratory, EOBT 1993
ETH-Zentrum, CH-8092 Zürich
Switzerland
Phone : (41) 1-256 2743
Fax : (41) 1-251 2172
E-mail : eobt93@nimbus.ethz.ch

International Astronautical Federation - International Congress,
16-22 October, 1993, Graz, Austria
Contact addresses of the Programme Committee co-Chairs :
J. Hess
Aerospace Consultant
12782 Spring Street
Garden Grove, CA 92645, USA
Phone : (1-714) 893-6849
Fax : (1-714) 893-6849
and : W. Riedler
Space Research Institute
Austrian Academy of Sciences
Inffeldgasse 12, A-8010 Graz, Austria
Phone : (43) 316 465 721/(43) 316 463 697

Third European Conference on Satellite Communications,
2-4 November 1993, Manchester, U.K.
Contact address : Miss J.A. Gordon
ECSC 3, Conference Services
IEE, Savoy Place
London, WC2R 0BL
United Kingdom
Phone : (44) 71-344 5477
Fax : (44) 71-497 3633
Telex 261176 iee ldn g

International Zurich Seminar on Digital Communications,
8-11 March, 1994, ETH, Zurich, Switzerland
Contact address : Mrs. Annette Schicker
ISZ'94 Secretariat
Postfach
CH-8340 Hinwil
Switzerland
Phone : (41) 1-938 1556
Fax : (41) 1-938 1557
E-mail : izs94@clients.switch.ch

Second International Conference on Computation in Electromagnetics,
12-14 April, 1994, Nottingham, U.K.
Contact address : CEM 94 Secretariat
IEE Conference Services
Savoy Place
London WC2R OBL
United Kingdom
Phone : (44) 71-344 5478/5477
Fax : (44) 71-497 3633
Telex 261176 iee ldn g

International Conference on Electronic Engineering in Oceanography,
19-21 July, 1994, Churchill College, Cambridge, U.K.
Contact address : Louise Bousfield, EEO'94 Secretariat
Conference Services, Savoy Place
London WC2R OBL, United Kingdom
Phone : (44) 71-240 1871 ext. 222
Fax : (44) 71-497 3633
Telex 261176 iee ldn g

BOOKS PUBLISHED BY MEMBERS OF THE URSI COMMUNITY

INFORMATION THEORY APPLIED TO SPACE-TIME PHYSICS

by H.F. Harmuth
Catholic University of America

306 pages, published by World Scientific Publ. Co
ISBN 981-02-1278 X

Preface

Historical Review

Information Theory applied to measurements

Coordinate systems

Time and motion

Propagation in unusual coordinate systems

Distinction of sinusoidal functions

Discrete topologies and difference equations

Schrödinger and Klein-Gordon difference equations

Schrödinger difference equation with Coulomb field

Klein-Gordon difference equation with Coulomb field

Dirac difference equation with Coulomb field

Mathematical supplements

Reference and bibliography

FROM THE ARCHIVES OF URSI

From the Bulletin of July - August 1953

The main item in this Bulletin was a report on the first plenary meeting of the Special Committee for the IGY, held in Brussels from 30 June to 3 July, 1953. The Committee, presided by Father Lejay, took cognizance of the proposals submitted by some 21 National Committees, and appointed eleven working groups to deal with : world days, meteorology, magnetism, aurorae and airglow, cosmic rays, solar activity, ionosphere, longitudes and latitudes, glaciological and climatic change studies, oceanography and publications.

These groups were asked to draft a programme which would take into account the possibilities of the collaborating countries.

From the Bulletin of July - August 1963

This Bulletin contains a report on documents approved by the 1963 Plenary Assembly of the CCIR in Geneva. Some of the documents explicitly requested the collaboration of URSI. This was the case for :

the resolutions

1. Optimum use of the frequency spectrum
14. Standard-frequency and time signal emissions

the questions

239. Effects of plasma on communications with spacecraft
248. Special problems of HF radiocommunication associated with the equatorial ionosphere

the opinions

6. Identification of precursors indicative of short term variations of ionospheric propagation conditions
9. Effects of the ionosphere on radiowaves used for telecommunication with and between spacecraft beyond the lower atmosphere.
10. Fading of signal propagated by the ionosphere

the reports

227. Factors affecting the selection of frequencies for telecommunications with spacecraft re-entering the earth's atmosphere.
232. Constants in the equation for the radio refractive index
266. Fading of signals propagated by the ionosphere
267. Standard frequencies and time signals

the study programmes

133A. Communication theory
192. Influence of non-ionized regions of the atmosphere on wave propagation

Elsewhere in the Bulletin, scientific programmes are suggested for world days and intervals on the calendar, and details on the national programmes for the IQSY (International Quiet Sun Year).

From the Bulletin of June 1973

The possibility of creating individual membership is one of the main items to be discussed at our next General Assembly in Kyoto. This cyclic problem has been with us for a long time, a statement confirmed by the following excerpt from the June 1973 Bulletin :

Individual Membership of URSI

Note by the Secretary General

The document reproduced below was sent to all Member Committees on 13 May 1973 (URSI-M303/304). The comments and opinions of the Committees, and of various individuals to whom the document was addressed, will be summarized in a report which is to be prepared before the end of 1973. The Board of Officers will give further consideration to the subject at its meeting in March 1974.

1. Introduction

During the meetings of the URSI Council in Warsaw, there was some discussion of the advantages of admitting individual members to URSI in addition of the present Member Committees. It was noted that Commission V was particularly in favour of such a step, since it was believed that the existence of individual members, as in IAU, would

result in a greater personal interest and involvement of scientists in the activities of the Union.

The Board of Officers was authorised by the Assembly to examine the internal structure of URSI including the admission of individual members and to recommend modifications designed to stimulate the scientific activities of the Union. At its meeting, in March 1973, the Board gave further consideration to the question of individual membership of URSI and to the necessary distinction between the responsibilities and privileges of the two membership categories : Member Committees and Individual Members. It was agreed to ask the Secretary General to examine the Statutes of IAU in order to see whether the practice at present in use in this Union could be applied to URSI. It would clearly be premature to suggest revisions to the text of the URSI Statutes since there has, so far, been no opportunity for Member Committees to express their opinions on the principle, or to consider the implications of the admission of individual members. The purpose of the present document of to summarize the main features of the procedure for electing individuals as members of the IAU, and the resulting changes in the structure of the General Assembly and the activities of the Commissions of URSI.

The following paragraph contains some comments on the possible changes in URSI, while the Annex summaries those articles in the Statutes of IAU which have some bearing on individual members.

2. Comments

1. It is important to note that the two classes of members (Member Committees and Individual Members) would have different rights and responsibilities. These would be reflected in the business of the General Assembly where :
   (a) for administrative and financial questions, only the Member Committees would have voting rights (in Council Meetings);
   (b) for purely scientific questions, not involving the finances of the Union, all the Individual Members present at a Plenary Meeting would have voting rights.

2. The Commission would be composed of Individual Members proposed by the Chairmen and Vice-Chairmen of the Commissions. There would be no representatives of Member Committees (Official Members).

3. The range of topics covered by an IAU Commission (of which there are 39) is narrower that for an URSI Commission (of which there are

8). If the range of topics of the URSI Commissions were narrow, it would be possible for a member to take a more personal and active interest in the field covered by its Commission. This personal aspect would be emphasized by the fact that the members are selected, by the Chairman and Vice-Chairman, in view of their ability and their wish to contribute to the work of the Commission. The existence of a larger number of more specialized Commissions would result in an increase in the number of scientists having a personal role to play in the activities of the Union.

From the Bulletin of June 1983

Besides routine announcements the Bulletin contains a note concerning the creation of the Issac Koga Gold Medal by the URSI Committee in Japan. This Medal commemorates Professor Issac Koga, Honorary President of URSI, who died in September 1982. The Award is reserved for a Young Scientist, of age not more than 35 on 30 September of the year preceding the General Assembly at which the Medal will be presented.

PERSONALIA

We have just heard that *Professor T. Okoshi*, Vice-President of URSI and Chair of the organizing and Steering Committees of the Kyoto General Assembly, has become the founding Director-General of a new national laboratory called "National Institute for Advanced Inter-disciplinary Research (NAIR)". The new laboratory is an ambitious scheme aiming at becoming a real centre-of-excellence in basic research area. It belongs to the Agency for Industrial Science and Technology (AIST), which is a part of the Ministry of Industrial Science and Technology (MITI), and is located in Tsukuba Science City, some 50 km north-east from downtown Tokyo.

Professor Okoshi has also been elected President of the Japanese IEICE for 1993-4. This is the Institute of Electronics, Information and Communication Engineers, with a membership of about 40,000.



view of the new laboratory

On 21 April 1993 the Schlumberger-Doll Award was presented to *Professor A. T. de Hoop* at the Delft University of technology. Professor de Hoop subsequently gave an address on "Similarity in wave propagation under a global relaxation law".

LIST OF CHANGED ADDRESSES OF URSI OFFICERS

Amendments to the List published in No 263 (December 1992) of the URSI Information Bulletin are listed below. An alphabetical index of these amendments with names and addresses is given in paragraph 7.

1. Board

Professor A.L. Cullen : new fax number
Professor T. Okoshi : new address

2. URSI Secretariat

Please note that on 26 June 1993 our phone and fax numbers changed to the following :

Tel. : (32) 9-264.33.20 (Mrs. I. Heleu)
(32) 9-264.33.21 (Secretary General)
Fax : (32) 9-264.35.93

3. Member Committees

New Officials :

Canada :	President : Dr. G. DELISLE
	Secretary : Dr. S.C. KASHYAP
France :	President : Prof. P. DEGAUQUE
Ireland :	President : Prof. M.C. SEXTON
	Secretary : Dr. B. McARDLE
Israel :	Secretary : Mr. O. HARTAL
Switzerland :	President : Dr. M. IANOZ
	Secretary : Dr. J.-F. O. WAGEN

Changes or additions :

China (Taipei) :	President : Mr. P.-Y. LEE
Germany :	President : Dr. H.J. ALBRECHT (addition fax number)
	Secretary : Dr. Th. DAMBOLDT (new phone and fax)
Hungary :	President : Prof. K. GEHER (new fax number)
	Secretary : Prof. L. ZOMBORY (new phone and fax)
India :	President : Dr. B.M. REDDY
	Secretary : Dr. P. BANERJEE (addition phone and fax)
Israel :	President : Dr. J. SHAPIRA
Poland :	President : Prof. S. HAHN (addition fax number)
USA :	President : Prof. C.M. BUTLER (new fax number)

4. Official Members of Commissions

Commission A on Electromagnetic Metrology
France : Mr. C. BOISROBERT

Commission B on Fields and Waves
France : Mr. H. BAUDRAND
India : Mr. B.K. SINHA

Commission C on Signals and Systems
France : Prof. M.G. BATTAIL (addition phone and fax)
Germany : Prof. D. WOLF (addition fax number)
Switzerland : Prof. G.S. MOSCHYTZ

Commission D on Electronics and Photonics
France : Mr. J.-Y. LE TRAON
Germany : Prof. J.W. KLEIN (addition fax number)
Hungary : Prof. L. ZOMBORY (new phone and fax)
India : Dr. W.S. KHOKLE

Commission E on Electromagnetic Noise and Interference
France : Mr. A. ZEDDAM
Germany : Dr. R. STURM
India : Mr. B.K. SINHA
South Africa : Prof. D.C. BAKER
Switzerland : Dr. G. MEYER

Commission F on Wave Propagation and Remote Sensing
Canada : Dr. R.L. OLSEN
France : Mr. Ph. FORGET
Germany : Dr. H. JESKE
India : Dr. O.P.N. CALLA
Switzerland : Dr. Ch. MÄTZLER
U.S.A. : Dr. J. Fr. HJELMSTAD

Commission G on Ionospheric Radio and Propagation
Chair : Prof. A.W. WERNIK (sabbatical leave address)
Argentina : Prof. S.M. RADICELLA (address in Italy)
Canada : Dr. J.-P. St. MAURICE
France : Mr. C. HANUISE
Portugal : Prof. H.C. NETO

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