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XXII GENERAL ASSEMBLY OF URSI

25 August - 2 September 1987, Tel Aviv, Israel

PROVISIONAL SCIENTIFIC PROGRAMME

The Provisional Scientific Programme for the XXII General Assembly of URSI has been published in *URSI Information Bulletin* No 240 (March 1987), pp. 4 - 47. However some of the details concerning scientific sessions were not available at that time. The additional information received at the URSI Secretariat since the end of March 1987 is reproduced below.

Commission B on Fields and Waves

Session B.6 Planar antennas

Conveners: J.R. Mosig, Switzerland, N.G. Alexopoulos, USA

1. Microstrip antennas: A review of recent progress in France. A. Papiernik, France.
2. Microstrip antennas for space applications. L. Vegni, F. Rispoli, Italy.
3. Radiation and scattering from printed phased-array antennas. D.M. Pozar, USA.
4. A multi-layer leaky wave antenna for millimeter wave applications. D.R. Jackson, A.A. Oliner, USA.
5. An integral equation method for the analysis of millimeter wave microstrip discontinuities. P.B. Katehi, USA.

Commission C on Signals and Systems

Session C.3 Multiple user channels

Convener: J.K. Wolf, USA.

1. Identification models in multi-user communication theory. G. Dueck, FRG.
2. Transmission of information of two correlated sources over an asymmetric multiple-access channel. E.C. van der Meulen, Belgium.

3. Performance analysis of interconnected multiple-use circuit switched channels. I. Rubin, USA.
4. Random access communication and graph entropy. J. Korner, K. Marton, Hungary.
5. Coding for the magnetic recording channel. J.K. Wolf, USA.

Session C.4 Computer network

Convener: R. Rom, Israel.

1. Computer networking: Its past and future. D.J. Farber, USA.
2. Routing and flow control in processor limited packet-nets. M. Gerla, USA.
3. Necessary and sufficient conditions for distributed routing with no update looping. J.J. Garcia-Luna-Aceves, USA.
4. Hierarchical naming and routing in point-to-point networks. B.K. Wade, D.L. Cohn, USA.
5. High-speed LAN management in the 90's. W.R. Franta, USA.
6. Some new results on voice and data integration on a CSMA/CD bus. C. Szabo, Hungary.
7. The large controls networks for the CERN Leptons collider. J. Altaber, Switzerland.

Session C.8 Packet radio communications

Convener: I. Chlamtac, Israel.

1. Packet radio - trends and issues. A. Livne, Israel.
2. Design and analysis of point-to-multipoint error control protocols. D. Towsley, USA.
3. Radio LAN with collision avoidance protocol. A. Herman, USA.
4. Dynamic behaviour of Tandem packet radio networks. J.M. Jaffe, USA, Z. Rosberg, Israel.
5. Collision-free access protocol for packet radio networks. L. Fratta, Italy, J. Wozniak, Poland.
6. A distributed assignment algorithm for multi-HOP packet-radio networks. I. Cidon, USA, M. Sidi, Israel.

7. Optimization of collision free link activation protocols in multi-HOP radio networks. I. Chlamtac, A. Ganz, G. Karmi, Israel.

Commission D on Electronic and Optical Devices and Applications

Session D.6 Nonlinear optics and phase conjugation

Convener: B. Fischer, Israel.

1. Image processing in nonlinear optics. A. Yariv, USA.
2. Optical phase conjugation and its application to problems in laser technology. I.J. Biglo, USA.
3. Non linearities and optical amplifications in single mode fibers. J.P. Pocholle, France.
4. Nonlinear optics of a single electron. A.E. Kaplan, USA.
5. Conoscopic holography. G.Y. Sirat, France.

Commission G on Ionospheric Radio and Propagation

Session G.2 The high-latitude ionosphere

Conveners: T. Jones, UK, A. Wernik, Poland.

1. Magnetosphere-ionosphere interactions. H.A. Rishbeth, UK.
2. Ground-based and space observations of the polar ionosphere. H.C. Carlson, USA.
3. Coherent radar observations at VHF. E. Nielsen, FRG.
4. Coherent radar observations at HF. C. Hanuise, France.
5. Trans-ionospheric propagation studies: High-latitude scintillations: A review. Santimay Basu, Sunanda Basu, India.
6. Trans-ionospheric propagation studies: High-latitude electron content: A review. R. Leitinger, Austria.
7. Review of poster sessions. T. Jones, UK.
8. Advanced ionosonde measurements. J. Buchau, USA.
9. Riometer and other techniques. J.K. Hargreaves, UK.
10. VHF radar and beacon satellite observations of the Antarctic auroral ionosphere. T. Ogawa, K. Igarashi, T. Tanaka, K. Aikyo, Japan.

11. Joint radar interferometer and incoherent scatter studies of auroral E-region plasma waves and elevated electron temperatures. J. Providakes, J. Sahr, B.G. Fejer, D.T. Farley, W.E. Schwartz, USA; I. Haggström, A. Hedberg, Sweden.

Poster session:

1. A new measure of ionospheric roughness. G.S. Sales, B.W. Reinisch, G.C. Dozois, USA.
2. Effect of field-aligned currents on high latitude ionosphere. P.K. Chaturvedi, S.L. Ossakow, P.N. Guzdar, J.A. Fedder, USA.
3. A study of the southern hemisphere mid-latitude trough using the differential phase technique. M. Mallis, E.A. Essex, Australia.
4. VHF scintillation measurements at Hornsund. A.W. Wernik, M. Gola, Poland.
5. High latitude observations of medium scale TIDs by radio interferometry. P.F.J. van Velthoven, H. Kelder, T.A.T. Spoelstra, Netherlands.
6. Rocket observations of auroral zone E region plasma turbulence. R.F. Pfaff Jr., B.G. Fejer, M.C. Kelley, USA.
7. Propagation characteristics of high-latitude medium frequency (MF) paths over a wide range of ionospheric disturbance levels. R.D. Hunsucker, B.S. Delana, J.C.H. Wang, USA.
8. Phase scintillation at European high latitudes. L.Kersley, N.S. Wheadon, UK.
9. Joint 50 MHz radar interferometer and incoherent scatter studies of high latitude E-region irregularities over Greenland. J. Providakes, B.G. Fejer, W.E. Swartz, J. Sahr, D.T. Farley, J.F. Vickery, USA.
10. Rocket observations of plasma density and electric field fluctuations in the ELF frequency range. E. Sagawa, T. Ogawa, H. Mori, Japan.
11. Long-term variation in the occurrence frequency of sequential sporadic E at Sodankylä. J. Oksman, Finland, T. Turunen, Sweden.
12. Heat input during high temperature cusp events. E.G.

Fontheim, L.H. Brace, J.D. Winningham, USA.

13. Polar cap F-region plasma convection. B.W. Reinisch, J. Buchau, E.J. Weber, USA.
14. Simultaneous measurements at the E region by EISCAT and the KRM and ESY auroral radars. P.J.S. Williams, B. Jones, UK; M. Uspensky, G. Starkhov, USSR.
15. Sub-auroral F-layer irregularities. J. Aarons, USA; A.S. Rodger, UK.

Session G.4 The low latitude ionosphere and its effects on telecommunications

Convener: S.M. Radicella, Argentina

(Oral presentations as published on pp.40-41 of *URSI Information Bulletin* No 240).

Poster session:

1. On the daily development of the ionospheric equatorial anomaly. Y.N. Huang, K. Cheng, S.W. Chen, Taiwan.
2. VHF scintillations near equatorial anomaly crest region. M. Devi, A.K. Barbara, P. Bordodoi, K. Rahman, India.
3. Storm-induced perturbations on ionospheric parameters seen at equatorial anomaly crest region. A.K. Barbara, M. Devi, India.
4. Latitudinal and solar cycle dependence on C-layer effect in the lower ionosphere. V.L. Requia Kuntz, L. Rizzo Piazza, P. Kaufmann, Brazil.
5. A comparative study of magnetic storm effects of very low frequencies in the South Atlantic Magnetic Anomaly. N.M. Paes Leme, L. Rizzo Piazza, P. Kaufmann, M.S.S. Macedo Moura Brazil.
6. Preliminary results on long-term VLF propagation phenomena in the Antarctic Peninsula. L. Rizzo Piazza, P.C. Alvala, P. Kaufmann, A. Mendes da Costa, N.M. Paes Leme, V.L. Requia Kuntz, R.E. School, M.S.S. Macedo Moura, Brazil.

Commission J on Radio Astronomy

Session J.1 Radio astronomy in space

Convener: R. Schilizzi, Netherlands.

Introduction: R.A. Preston, USA.

1. A proposal for a low frequency space array. R.W. Weiler, B.K. Dennison, W.C. Erickson, K.J. Johnston, M.L. Kaiser, R.S. Simon, J.H. Spencer, USA.
2. Quasat: an overview. R.S. Booth, Sweden.
3. Technical aspects of quasat. A. Hawkyard, Netherlands.
4. Japanese efforts towards space VLBI. M. Morimoto, Japan.
5. Very long baseline interferometry observations using the tracking data and relay satellite as an orbiting radio telescope. G.S. Levy, R.P. Linfield, J.S. Ulvestad, C.D. Edwards, J.F. Jordan Jr, S.J. Di Nardo, C.S. Christensen, R.A. Preston, L.J. Skjerve, L.R. Stavert, B.F. Burke, A.R. Whitney, R.J. Capallo, A.E.E. Rogers, K.B. Blaney, M.J. Maher, C.H. Ottenhoff, USA; D.L. Jauncey, J.E. Reynolds, Australia; T. Nishimura, T. Hayashi, T. Takano, T. Yamada, H. Hirabayashi, M. Morimoto, M. Inoue, M. Tokumaru, N. Kawaguchi, J. Amagai, Japan.
6. The ESA far-infrared space telescope: overview. R. Genzel, FRG.
7. First - on ESA sub-millimetre astronomy mission. U. Frisk.
8. The large deployable reflector (LDR) - A far infrared-submillimeter observatory for space. Paul. N. Swanson, USA.

Session J.2 VLBI techniques

Convener: B. Anderson, UK.

1. The very long baseline array. J.D. Romney, USA.
2. The EVN processor. A. Bos, Netherlands.
3. Continuum mapping techniques in VLBI. P. Wilkinson, UK.
4. Geodetic VLBI. B.O. Roennaeng, Sweden.
5. Phasing the Westerbork array for VLBI. A. van Ardenne, Netherlands.

SPACE COMMUNICATIONS FOR DEVELOPMENT

The United Nations Committee for the Peaceful Uses of Outer Space has a Scientific and Technical Subcommittee which meets once a year. In the last few years, the ICSU Committee for Space Research (COSPAR) and the International Astronautical Federation (IAF) have been invited to organize a scientific colloquium on the occasion of these meetings. In 1987, the topic of the colloquium was: Space Communications for Development. Since URSI is the main ICSU organization dealing with problems of radiocommunications, COSPAR has invited URSI to cooperate in nominating speakers for the COSPAR-IAF Colloquium, which took place in New York, 17-18 February 1987. The two speakers nominated by URSI were J.V. Evans, Past President of the US URSI Committee, and J. Voge, Past President of URSI. The text of M. Voge's presentation is reproduced below.

LES SATELLITES ET L'ECONOMIE DE LA COMMUNICATION

par J. Voge

Depuis 1965, date du lancement des satellites EARLY BIRD et MOLNYA, le trafic des télécommunications internationales a cru de 25% par an, soit deux fois plus vite qu'auparavant, celui des liaisons entre pays industrialisés et ceux du Tiers Monde augmentant même de 30 à 35%. Aujourd'hui 165 pays utilisent le réseau mondial INTELSAT et une vingtaine INTERSPUTNIK. Des satellites régionaux (en Europe, dans les pays arabes ou ceux du sud-est asiatique), et des dizaines d'autres à couverture nationale interconnectent les réseaux téléphoniques urbains et distribuent des programmes aux réseaux de télévision hertzienne ou câblée. Certains d'entre eux étendent leurs services à des liaisons interentreprises ou, comme en Inde, en Indonésie ou au Pérou, à la desserte de zones rurales ou isolées et à la diffusion de télévision à de petites stations communautaires (dans des écoles ou des

centres d'information). Les satellites de diffusion directe pour le grand public vont se multiplier dans les prochaines années.

La technologie ne cesse de progresser. L'accès multiple d'un grand nombre de stations terriennes à un même satellite est devenu très flexible et permet d'attribuer des circuits individuels à la demande, pour des temps limités, à des liaisons de faible capacité. Sur de telles liaisons, on peut opérer avec des stations équipées d'antennes paraboliques de quelques mètres de diamètre, cent fois moins chères que les grandes stations normalisées d'INTELSAT. Plus généralement, il est aujourd'hui possible d'optimiser les dimensions et le prix des stations terriennes en fonction de la capacité à transmettre, tandis que les coûts d'utilisation des satellites d'INTELSAT ont baissé depuis 1965 dans un rapport supérieur à 20 en monnaie constante.

Dans de telles conditions les réseaux de télécommunications édifiés avec et autour des satellites ont ou vont acquérir une bonne rentabilité, sauf malheureusement dans les zones rurales, où vivent plus de la moitié de la population du monde et plus de 70% des habitants des pays en développement d'Afrique et d'Asie. Faut-il pour autant renoncer à donner à ces zones accès aux satellites? Certainement pas, si l'on se souvient que la rentabilité de la communication doit être appréciée au niveau de l'ensemble d'une économie. L'information qui circule sur les réseaux est, comme l'énergie et les matières premières, une ressource essentielle du développement. Elle est indispensable pour organiser et réguler les appareils de production et la vie sociale. C'est pourquoi dans les zones rurales l'absence de moyens de communication et d'information serait plus onéreuse encore que leur mise en oeuvre, si l'on en évalue les coûts indirects: analphabétisme, malnutrition, assistance médicale inexistante, improductivité des services publics et des activités locales ou exode massif vers les bidonvilles urbains. A ces arguments difficilement contestables certains rétorquent cependant, en s'appuyant sur l'expérience des agences de presse et des média, que les satellites mettent en péril, par des flux d'information à sens unique, inadaptés et incontrôlables, les bases même du développement des pays du Tiers Monde, leur identité culturelle et leur souveraineté nationale, tout en détériorant durablement leur balance commerciale en équipements et en

services. Je ne ferai qu'évoquer les longues discussions qui ont eu lieu aux Nations Unies, à l'UNESCO et ailleurs sur un nouvel ordre mondial de l'information et de la communication et sur des aspects controversés du droit international: satellites de télévision directe et de détection des ressources terrestres ou flux transfrontières de données, dont 90% correspondent à la gestion des sociétés trans-nationales. Il y a certainement un risque de voir ces nouvelles technologies accroître encore les disparités et les dépendances entre pays riches et pauvres, mais aussi entre les élites urbaines et les populations rurales.

Je voudrais tenter de montrer qu'une approche scientifique de l'économie de la communication à l'ère du satellite conduit à dépassionner ces débats. Elle révèle en effet que les problèmes à résoudre sont aussi critiques pour les pays les plus avancés que pour ceux qui le sont moins et que de profondes restructurations et un nouvel ordre économique de la communication s'imposent à tous et pas seulement dans les relations Nord-Sud.

C'est le prestigieux mathématicien John von Neumann, père de la théorie des jeux et de l'ordinateur digital, dans un article publié dans "Fortune" en juin 1955 (1), qui fut le premier à souligner les effets pervers des technologies de la communication et de l'informatique. Il prévoyait qu'elles allaient entraîner une crise très grave qui "d'ici 1980 se développerait probablement au-delà de tout ce qui s'était vu dans le passé" (2). Elles conduisent en effet à mettre en interdépendance toutes les régions du monde, leurs marchés et leur media, et à accélérer ces interactions, en particulier par la circulation de monnaie électronique, de telle façon que les organisations humaines, dont les constantes de temps sont déterminées par des facteurs physiologiques et psychologiques, n'arrivent plus à les contrôler. Cette montée explosive de la "complexité" se manifeste sous des formes très variées. Les mécanismes de régulation ne fonctionnent plus correctement, suscitant des instabilités et des turbulences politiques et financières. Les marchés n'arrivent pas à s'équilibrer; les risques et incertitudes se multiplient, comme aussi les

(1) Sous le titre "Can we survive technology".

(2) Il prévoyait aussi une crise de l'énergie due au gaspillage technique "d'une énergie abondante et à bon marché".

rachats et restructurations sauvages d'entreprises. D'autre part l'information prolifère et il devient de plus en plus difficile d'y retrouver celle dont on a besoin: au Japon 7% de l'information produite est réellement utilisée. La communication tend aussi à se saturer, la violence restant parfois le seul recours des minorités pour faire passer leurs messages. Le nombre d'appels téléphoniques nécessaire pour trouver l'interlocuteur désiré ne cesse de croître et les dossiers administratifs stagnent des semaines ou des mois entre deux passages à l'ordinateur.

Les conséquences économiques de ces désadaptations entre les techniques et leurs usages se concrétisent dans une observation récente de la revue "Fortune" (1): Les millions d'ordinateurs implantés aux Etats-Unis depuis 25 ans et les centaines de milliards de dollars dépensés en équipements informatiques et de communication n'ont pas réussi à accroître la productivité des cols blancs, c'est-à-dire de ceux qui produisent, traitent ou exploitent l'information. Dans un même temps, la productivité des cols bleus augmentait de 60%, mais leur pourcentage dans la main d'oeuvre ne cessait de diminuer. Ce phénomène que l'on observe dans tous les pays très industrialisés signifie que l'industrie, l'agriculture, les services de transport ou d'électricité, les hôpitaux comme les chaînes hôtelières ont à payer directement ou indirectement un tribut de plus en plus lourd à une myriade d'activités de production ou de diffusion d'information; ces frais généraux d'organisation et d'investissement immatériel tendent alors à absorber tous les gains de productivité que la modernisation des techniques de production peuvent induire, par exemple avec des robots. Ainsi s'est développée la crise économique prévue par von Neumann, qui a conduit à des baisses de rentabilité du capital génératrices de chômage, en particulier en Europe, et à un freinage des gains moyens de productivité, allant jusqu'à la stagnation aux Etats-Unis.

A cette crise, on peut trouver une explication et les principes d'une solution dans une "science de la complexité", en cours d'élaboration, qui a été l'objet de plusieurs colloques récents dont l'un eut lieu en 1984 à Montpellier sous

(1) Dans son numéro du 26 mai 1986.

l'égide de l'Université des Nations Unies (1). Elle concerne tous les systèmes formés d'un grand nombre d'éléments en interaction complexe, qu'ils soient physiques, biologiques, techniques ou des organisations humaines. Les lois qui régissent ces systèmes sont évidemment très différentes, mais les relations entre leurs structures et leurs dépenses d'organisation (en énergie dissipée et en coûts) sont pratiquement les mêmes. On a pu ainsi intégrer des apports théoriques d'origines variées: théorie de l'information et des réseaux de communication, sciences de l'organisation, thermodynamique de l'auto-organisation, recherches portant sur les mécanismes de la pensée et du langage.

Deux conclusions importantes peuvent être tirées de cette nouvelle science:

a) Les structures traditionnelles des organisations humaines, pyramidales et centralisées, avec leurs chaînes verticales, rigides et descendantes, de production et de communication, sont très onéreuses en coûts d'organisation. L'information circule essentiellement du haut en bas et les sommets des pyramides sont des goulets d'étranglement qui l'empêchent de remonter. Les structures les plus économiques pour la circulation et le traitement de l'information sont celles que l'on rencontre dans les réseaux téléphoniques. Comme on le voit sur la Figure 1, elles comportent plusieurs niveaux de connexion, mais sont cellulaires, maillées et décentralisées; deux interlocuteurs peuvent communiquer entre eux interactivement par une pluralité de voies alternatives horizontales autant que verticales, alors que la pyramide impose une unique voie hiérarchique (Figure 2). Pour tirer vraiment bénéfice des nouvelles technologies, les organisations humaines devront adapter leurs propres structures à ce schéma en faisant jouer un rôle privilégié à la communication horizontale et interactive. Elles devront pour cela s'appuyer sur les valeurs partagées et l'imaginaire culturel plutôt que sur

(1) Les textes en ont été publiés en 1985 par l'Université des Nations Unies, sous le titre "The Science and Praxis of Complexity", avec une traduction en français éditée par la Documentation française.

la seule rationalité, en laissant une grande autonomie à leurs cellules de base (petites collectivités ou équipes de travail). Celles-ci s'intégreront dans des ensembles politiques ou économiques plus vastes par un réseau d'alliances très souples plutôt que par des fusions ou une intégration pyramidale.

b) La technique seule ne saurait suffire à déclencher une mutation aussi radicale, si elle n'est pas assistée par de nouvelles stratégies politiques et de management. C'est curieusement la nature qui peut servir de guide car au cours de sa longue évolution elle a édifié systématiquement par auto-organisation des structures cellulaires décentralisées dans l'univers physique et biologique. Elle a utilisé pour cela en conjonction étroite des mécanismes apparemment contradictoires de compétition et de coopération: la sélection naturelle et une tendance à l'aggrégation spontanée de groupements ou sous-ensembles stables (molécules puis édifices moléculaires, cristaux et réseaux cristallins, cellules et organismes pluricellulaires, étoiles et galaxies). La sélection darwinienne tend moins à éliminer par les lois de la jungle certains des groupements qui ont pu se former qu'à les obliger à se différencier des groupes dominants. Ils acquièrent ainsi des propriétés complémentaires qui transforment la compétition en coopération et génèrent de nouveaux groupements de niveau supérieur. Ainsi l'évolution naturelle a-t-elle progressé par niveaux successifs de l'infiniment petit à l'infiniment grand et du plus simple au plus complexe. La pensée elle-même n'échappe pas à ce double jeu de l'analyse (sélection) et de la synthèse (groupement) en prenant deux formes complémentaires: rationnelle, critique et objective d'une part, intuitive, émotionnelle, imaginative, subjective de l'autre.

De cette incursion trop rapide dans la science de la complexité, plusieurs leçons sont à tirer. La première est qu'il faut s'appuyer au maximum sur les forces naturelles d'auto-organisation et sur la fameuse "main invisible" des économistes, à qui la crise actuelle a donné une vigueur nouvelle. La seconde est que l'édification des structures en réseau part des cellules de base et remonte la hiérarchie des niveaux, à contre-courant des modèles classiques du développement. Ceci confère un intérêt tout particulier aux petites collectivités et aux villages ruraux. Les petites entreprises

des pays industriels tiennent déjà le premier rôle en matière d'innovation et de création d'emploi. La troisième leçon s'adresse aux hommes politiques et aux "managers". Ils pourraient accélérer l'évolution souhaitable s'ils conjuguent harmonieusement, comme dans la nature et aussi dans le sport, la compétition et la coopération, c'est-à-dire dans le contexte du monde actuel la dérégulation et la décentralisation qui favorisent respectivement la concurrence et une participation collective aux responsabilités et aux décisions. Une dérégulation trop poussée, on commence à le constater aux Etats-Unis, tend à augmenter les concentrations d'entreprises, si elle n'est pas contrebalancée par des décentralisations volontaires ou autoritaires comme ce fut le cas lors du démantèlement d'A.T.T. L'économie de la communication pose ainsi, en dehors de toute idéologie, une question relative aux sociétés transnationales. Ne faut-il pas envisager une autonomie administrative et financière totale de leurs filiales nationales, même si elles continuent à coopérer entre elles et à porter un même sigle? Leur coopération serait alors fondée sur la complémentarité et donc la réciprocité plutôt que sur la dépendance. C'est sans doute dans cette voie - de co-production - qu'il faut chercher un antidote aux monopoles exorbitants des grandes sociétés de production audiovisuelle. Des co-productions entre les pays d'une même région, comme entre les pays du Nord et du Sud, semblent indispensables pour alimenter les satellites de diffusion en programmes adaptés aux besoins spécifiques du développement et aux échanges trans-culturels.

Les principes traditionnels de gestion enseignés par les universités occidentales doivent aussi être remis en cause. Au nom de la rationalité scientifique, ils se voulaient trop indépendants des cultures, c'est-à-dire des philosophies de la vie en société. Mais c'est la subjectivité, l'imaginaire, voire les mythes, plus encore que la rationalité qui donnent à une information son véritable sens et son dynamisme. Science et culture doivent donc se concilier pour atteindre à une efficacité et à une économie optimales, comme les Japonais en fournissent chaque jour la preuve. L'ordinateur est lui-même trop exclusivement rationnel, alors que la télévision reçoit passivement émousse l'esprit critique des téléspectateurs dont les réactions devant une publicité ou une propagande sont beaucoup plus émotionnelles que rationnelles. L'ordinateur doit donc s'initier au traitement parallèle et synthétique

de l'information qui est celui de la pensée subjective, tandis que les réseaux câblés en fibre optique ouvrent la voie à une télévision interactive.

Ainsi l'économie de la communication implique toujours un "double jeu" équilibré (1). Les satellites permettent d'interconnecter des réseaux géographiquement dispersés, en favorisant l'universalité des communications et l'intégration de leurs services, mais l'infrastructure terrestre électronique et humaine doit rester cellulaire et décentralisée. Et si on veut accroître la valeur ajoutée d'un réseau, en y insérant des ordinateurs et des prothèses télématiques, il faut y associer aussi des intermédiaires ou "médiateurs" humains de communication. Leur rôle sera d'aider à la sélection en un temps minimal d'un bon interlocuteur ou de la bonne information, de filtrer l'information parasite, de contrôler la bonne interprétation des messages échangés, de fournir une information personnalisée, d'intervenir enfin dans tous les cas où un cerveau humain conserve sa prééminence sur un logiciel électronique. C'est à travers les médiateurs que se créeront les solidarités et que se formeront les consensus (2). Leur multiplicité et leur diversité devraient dissiper toute crainte de les voir confisquer le pouvoir à leur profit.

Il me reste à conclure. On observe bien aujourd'hui dans les pays industriels une timide évolution spontanée vers de nouvelles structures d'organisation. La société actuelle dite "d'information", où l'information circule du haut en bas et des puissants vers les faibles, devrait se muter en une société "de communication" basée sur le dialogue, l'interactivité et la réciprocité. L'impératif premier de cette mutation est économique. Il faut que les nouvelles technologies réussissent enfin à accroître notablement la productivité des cols blancs (et des bureaucrates), comme l'espère d'ici l'an 2000 le Prix Nobel Wassily Leontief (3). Il reste

-
- (1) Entre les communications verticale et horizontale, la rationalité et la subjectivité, la compétition et la coopération, l'autonomie et la solidarité.
 - (2) A l'exemple des cadres moyens japonais.
 - (3) W. Leontief et F. Duchin. *The future impact of automation on workers*, Oxford University Press, 1986.

beaucoup à faire pour en arriver là et les analyses de la complexité revêtent donc une extrême importance pour l'humanité. Les organisations internationales devraient appuyer ces études, en relançant, dans ce contexte scientifique qui exclut tout élément passionnel, l'instauration d'un nouvel ordre économique qui s'imposera aussi à l'information et à la communication. C'est là où se trouvent sans doute les clés de l'avenir, d'une renaissance de l'économie et de modèles plus efficaces du développement..

Les satellites ont joué un rôle salulaire en faisant prendre conscience au monde de sa complexité et des risques qu'elle entraîne. Leur réussite sera totale le jour où ils permettront de maîtriser cette complexité pour en tirer pleinement bénéfice.

Figure 1

Schéma d'un réseau téléphonique à structure cellulaire, pour un modèle très simplifié où huit abonnés se répartiraient entre quatre centraux élémentaires à deux lignes d'entrée et de sortie, avec trois niveaux d'interconnexion.

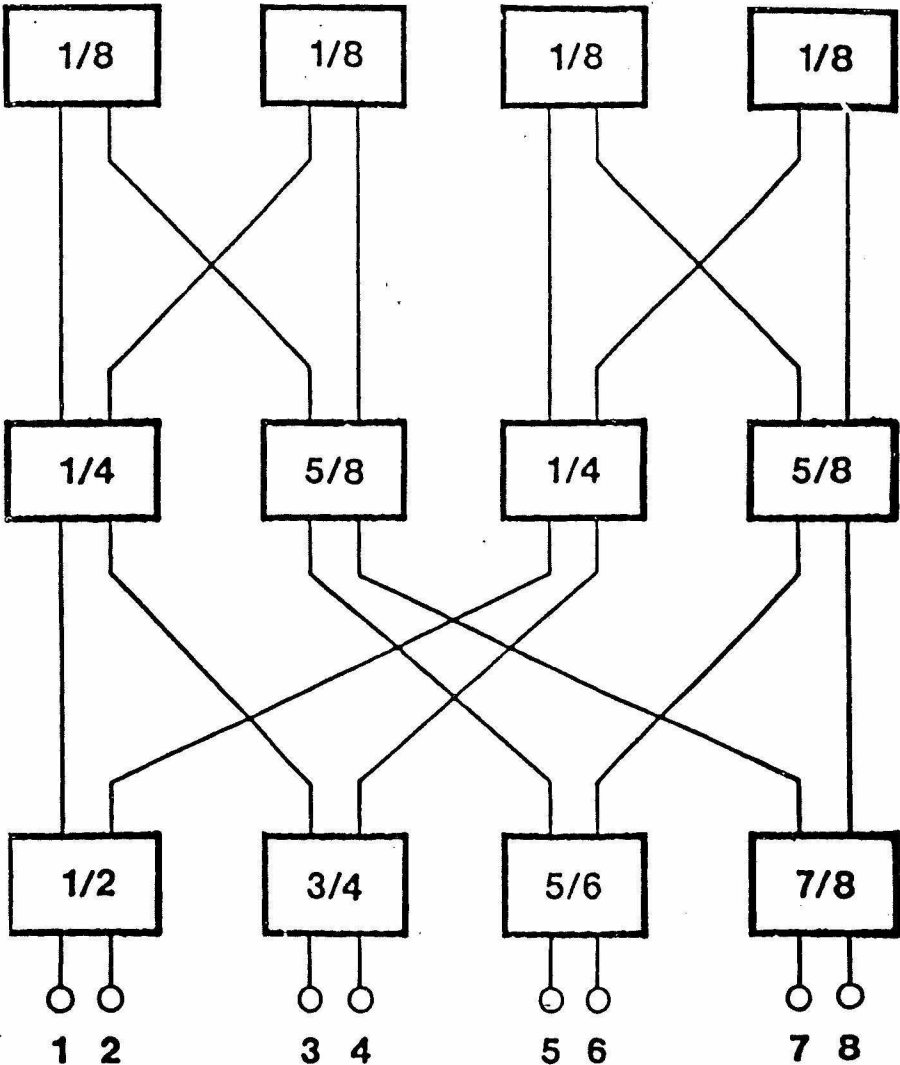
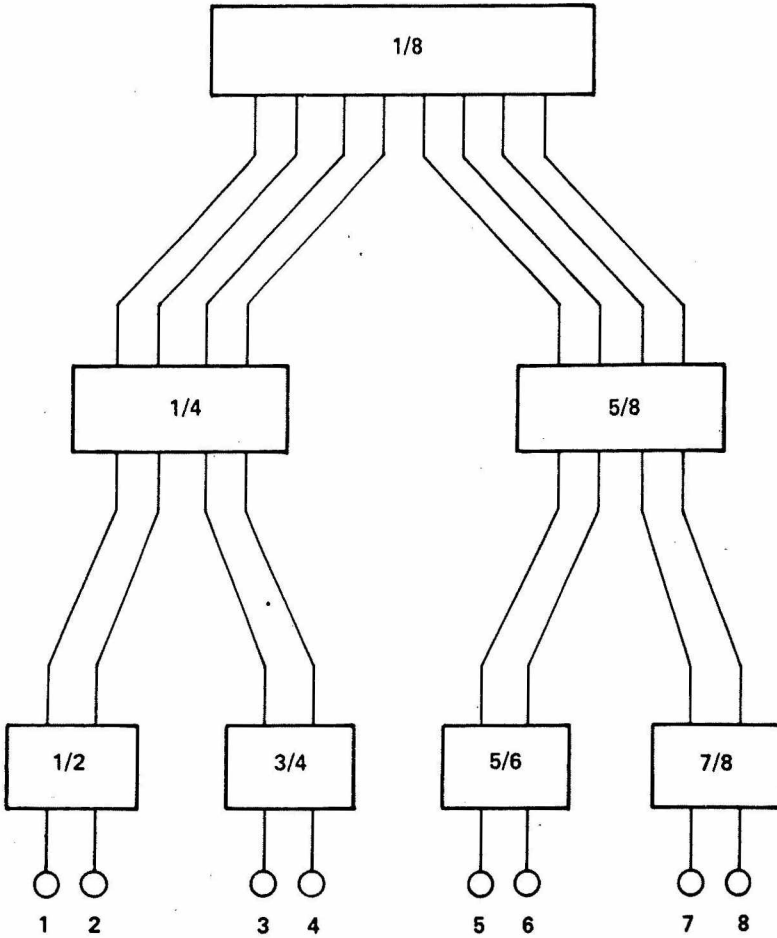


Figure 2

Schéma d'un réseau téléphonique à structure pyramidale, dans les mêmes hypothèses que la figure 1.



INTERNATIONAL SYMPOSIUM ON MODIFICATION OF THE IONOSPHERE BY POWERFUL RADIO WAVES

RESOLUTION

The International Symposium on Modification of the Ionosphere by Powerful Radio Waves was held in Suzdal from 8 to 13 September 1986. It was organized by the Soviet URSI Committee, the Scientific Council on the Problem of Radio Wave Propagation and the Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation of the Academy of Sciences of the USSR.

The Symposium was attended by 115 scientists from 4 countries: USSR, USA, FRG and Sweden.

At the Symposium 73 papers were presented on the following topics:

- Modification of the upper ionosphere (F region);
- Modification of the atmosphere and the lower ionosphere;
- Modulation of current jets and geophysical effects;
- LF-emission effects in the upper ionosphere and magnetosphere.

The participants in the Symposium have discussed the results obtained during the last three years, after the Soviet Symposium on Effects of Powerful Radio Waves on the Upper Ionosphere and Magnetosphere (Suzdal, September 1983).

The Symposium states that over this period a great number of investigations were made in several countries and important scientific results were obtained. The physical processes in the ionospheric plasma and the peculiarities of radio wave propagation in the modified ionospheric plasma were investigated.

The Symposium notes the results obtained at the Tromsø, Arecibo and Gorky facilities. In particular, a new phenomenon is studied in detail concerning the artificial (stimulated) emission of the ionosphere as well as the peculiarities of non-linear processes in resonant regions. The investigations of radio wave propagation at oblique incidence of powerful

radio waves on the ionosphere have been identified.

The Symposium recommends:

1. To improve and to expand the international cooperation and coordination of investigations on ionosphere modification by powerful radio waves; to work out universal terminology.
2. To perform complex international experiments with the powerful heating facilities in Tromsø using various diagnostic techniques simultaneously.
3. To request the Council of URSI to confirm this Symposium as a regular "Suzdal URSI Symposium on Ionosphere Modification", thus facilitating a regular exchange of information and a discussion of the results obtained; to hold this Symposium every two years: once in four years in the USSR and, in the meantime, in another country according to the URSI decision.

The participants are very grateful to URSI for its attention and support as well as to the Soviet URSI Committee, to the Programme and Organizing Committees for providing a high level of preparation and leading of the Symposium.

This Resolution has been adopted at the closing session of the Symposium on 12 September 1986.

Prof. V.V. Migulin
President of the Soviet
URSI Committee

16TH EUROPEAN MICROWAVE CONFERENCE

The 16th European Microwave Conference was held on 8-11 September 1986 at the National Concert Hall, Dublin, Ireland. It was organized by the Management Committee, European Microwave Conference, Microwave Exhibitions and Publishers Ltd, and cosponsored by The Royal Irish Academy, The Institution of Engineers of Ireland, the Irish Branch of IEE, URSI, EUREL, IMPI and IEEE.

The number of participants was 387 coming from 24 countries. The Call for Papers resulted in the submission of 291 papers from 34 countries. These were reviewed by more than 100 specialists from 19 countries. Finally, 123 papers were chosen for presentation in 19 regular sessions and 1 poster session. Papers in these sessions covered the following topics: MM-wave components; Circuits and receivers; Radio link systems; Device modelling; Propagation; Antennas; Radar systems; Filters; Medical and industrial applications; MM-wave oscillators; MMICs; Remote sensing; Active circuits; Measurements; Satellite communication systems; Characterisation of circuits and devices. The poster session was concerned with passive devices.

The invited papers consisted of 6 regular session papers and 8 special session papers from both Japan and the United States. These latter papers in which expert speakers presented surveys of the latest advances in selected aspects of microwaves, represented a major new innovation for the European Microwave Conference. Details of the invited papers are as follows:

Regular Invited Papers

- Microwaves and future ESA programmes, G. Mica.
- Suspended substrate filters and multiplexers, J.D. Rhodes.
- Millimeter-wave atmospheric propagation and system implications, A. Vander Vorst.
- Millimeter-wave meteorology, D.R. Pick.
- Medical imaging using microwaves and ultrasound, H. Ermert.
- 64-QAM digitalization of an analogue microwave radio network, W.J. Barnett, F.J. Witt, and J.D. Hubbard.

Special Invited Papers (USA)

A Survey of Microwave Research Activities in USA:

- MMICs, modelling and CAD - where do we go from here?
R.A. Pucel.
- MMIC prospects in microwave communications, F. Ivanek.
- US GaAs digital IC technology, P.T. Greiling.
- Millimeter-wave monolithic integrated circuits, B.E. Spielman.

Special Invited Papers (Japan)

A Survey of Microwave Research Activities in Japan:

- Microwave and millimeter-wave transistor devices, Y. Takayama.
- Research on microwave and mm-wave passive devices at Universities, T. Yoneyama.
- Microwave antenna technology, T. Katagi.
- Microwave propagation studies, Y. Furuhashi and J. Awaka.

All delegates were invited to attend both a State Reception hosted by the Irish Government and a Reception hosted by the Lord Mayor of Dublin.

Copies of the Conference Proceedings, if required, are available from:

Microwave Exhibitions and Publishers Ltd
90 Calverley Road
Tunbridge Wells
Kent TN1 2UN
United Kingdom.

Prof. J.O. Scanlan
Conference Chairman

BIREGIONAL LATIN AMERICAN-AFRICAN WORKSHOP ON RADIO
PROPAGATION RESEARCH AND APPLICATIONS
(INCLUDING SPECTRUM MANAGEMENT)

Introduction

The Biregional Workshop was approved by the URSI General Assembly in Florence (Italy) in 1984, as one of the activities of the Standing Committee on Developing Countries. Its main scope was the presentation of status reports from the two regions, the exchange of information and discussion among scientists in the field of radio propagation research and development of the two regions, and the search for possible cooperative efforts. Prof. S.M. Radicella of Argentina and Prof; J.O. Oyinloye of Nigeria were appointed convenors for the Workshop.

Supporting Organizations

The Workshop has been supported financially by URSI, the Third World Academy of Sciences (TWAS), the International Council of Scientific Unions (ICSU), the United Nations Educational Scientific and Cultural Organization (UNESCO) and the National Programme of Radio Propagation (PRONARP) of the Scientific and Technological Research Council (CONICET) of Argentina. PRONARP was also in charge of the preparation and local organization of the Workshop.

A local committee was established with Prof.V.H. Padula Pintos, Ing. A. Garbini and Dr. A. Giraldez as members.

The Workshop was held at Buenos Aires, in the main building of the "Secretaria de Estado de Comunicaciones", the national agency for telecommunications of Argentina, from 1 to 4 April 1987.

Participants

The final list of participants included two scientists from Nigeria, one from Kenya, one from Congo-Brazzaville, now resident in France, three from Brazil, one from Peru and twenty from Argentina.

The President of URSI was represented at the Workshop by Dr. B.M. Reddy, also member of the URSI Standing Committee on Developing Countries.

Programme

The Workshop included the following sessions:

- Opening session: General remarks and Tutorial Lecture.
- Session I: Ionospheric Research and Propagation (3 sub-sessions)
3 invited reports and 11 contributed papers
- Open discussion on Ionospheric Research and Propagation
- Session II: Tropospheric Radio Propagation (2 sub-sessions)
2 invited reports and 4 contributed papers
- Open discussion on Tropospheric Radio Propagation
- Open discussion on Spectrum Management, including short presentations.
- Open discussion on future biregional efforts in Radio Propagation Research and Applications
- Final discussion on draft conclusions.

A Reviewer Group was in charge of the preparation of a review of all important matters raised during the sessions and of the guidelines for the open discussion sessions. Together with the convenors of the Workshop, they drafted the final conclusions. The Reviewer Group was composed of Prof. G.O. Ajayi (Nigeria), Dr. M. Mopfouma (Congo-Brazzaville), Dr. A. Giraldez (Argentina) and Dr. L. Rizzo Piazza (Brazil).

Recommendations

At the final session on future biregional efforts, a series of recommendations were approved covering matters concerning technical subjects and cooperation policies accepted by the group attending the Workshop. In particular, an ad hoc working group was established with the main objective of looking into the continuity of the various possible technical programmes identified and into possible international sources of funding for the specific projects to be established. This working group will also try to organize future biregional workshops.

Proceedings

The Proceedings of the Workshop will be ready by the time of the XXII General Assembly of URSI in late August 1987. They will contain extended summaries of each of the presented papers, including figures and references, and the final recommendations on future activities. The Proceedings will be edited and published under the responsibility of the PRONARP.

S.M. Radicella

INTERNATIONAL WORKSHOP ON IONOSPHERIC INFORMATICS RECOMMENDATIONS

The International Workshop on Ionospheric Informatics was held in Novgorod, USSR, from 25 to 29 May 1987. It was organized by the Academy of Sciences of the USSR and cosponsored by URSI and COSPAR.

The following Recommendations were adopted by the Workshop.

Recommendation 1

The Workshop on Ionospheric Informatics,
considering

- that the different measuring techniques aiming at obtaining information about the terrestrial ionosphere produce a very large amount of data;
- that collection, processing, storage and transfer of these, as well as their interchange with other disciplines, can now readily be executed with modern electronic computer methods;
- that international interchange of all relevant publications could be a very valuable help for the scientists working in this field,

recommends

1. that the concerned World Data Centers should make definitive efforts in view of elaborating a modern storage system for ionospheric data obtained by any observational method and also of managing and processing such data in a way that facilitates interdisciplinary interchange and cooperation;
2. that a computer accessible catalogue be also established for all material earlier obtained in classical recording techniques, e.g. on paper or microfilm;
3. that a computer accessible catalogue (complete references and key words) should be established for all relevant publications (past and current) in journals, books,

proceedings and reports.

Recommendation 2

The Workshop on Ionospheric Informatics,

considering

- that the detailed spectral optical data of the solar emissions in the extreme UV and X-ray ranges are of primary importance for aeronomic investigations of all kinds;
- that satellite observations are the only means to gather relevant information, and
- that sufficiently advanced techniques for recording and calibrating relevant measurements are known for 15 years,

noting that during that long time useful data were obtained for limited periods only and in often interrupted series,

urges COSPAR to undertake efforts so that space agencies organize a satellite patrol yielding day-by-day intensity spectra over the whole wavelength range of aeronomical interest.

Recommendation 3

The Workshop on Ionospheric Informatics,

considering

- that empirical mapping of the peak parameters of the terrestrial ionosphere is of great interest for radio wave propagation predictions, for empirical modelling of the electron density in IRI and for aeronomic investigations, and
- that such maps could only recently be obtained via direct worldwide observation, e.g. with the Japanese ISS-b satellite and with the Soviet Intercosmos 19,

noting that the maps obtained by one satellite cover a large time period so that seasonal and diurnal variations are intermixed,

urges URSI and COSPAR to recommend to the space agencies the establishment of a satellite monitoring system that generates a global map within a short time interval.

Recommendation 4

The Workshop on Ionospheric Informatics,

considering the need for global mapping of the ionospheric electron density with high spatial and temporal resolution for radio wave propagation predictions,

noting

- that the incoherent scatter radars (ISR) are operating one day a month collecting electron density and temperature data;
- that a large number of vertical incidence (VI) ionosondes exists which can provide rapid sequences of electron density profiles which could be calibrated with the ISR profiles for colocated stations;
- that the effects of gravity waves on the electron density distribution require clarification, and
- that better EF valley information is required in support of the IRI modelling effort,

urges URSI to organize world-wide campaigns, each covering 3 days around RWD's at suitably chosen times, with rapid (5 min) ionogram sequences and simultaneous incoherent scatter radar observations during three different seasons of a year.

Recommendation 5

The Workshop on Ionospheric Informatics,

considering

- that the characteristics determined by the traditional evaluation of ionograms are insufficient for modelling purposes;
- that, in view of these purposes, characteristics of the true height profile are needed, and
- that some experience already exists with synthesizing model electron density profiles from a small number of inputs,

recommends

1. that the following parameters be added to the URSI ionogram (profile) evaluation rules:
 - (i) the frequency of the minimum virtual height at the base of the F region, $f(h'_{\min F})$,

- (ii) the EF valley depth,
 - (iii) the height of minimum electron density in the valley and the upper valley boundary,
 - (iv) the ratio of the F2 half peak density height to the peak height h_mF2 ,
 - (v) possibly one more characteristic height in cases where F1 influences the latter parameter,
2. that URSI and COSPAR recommend to observers of D-region profiles obtained by any of the existing methods of observation that they should specify the height and electron density of the (log density) inflection point appearing almost regularly near 80 km;
 3. that URSI should recognize the great importance of again comparing the different techniques for the EF valley true height computations, and of reaching an agreement on the best available method.

ANNOUNCEMENTS OF MEETINGS AND SYMPOSIA

1987 INTERNATIONAL CONFERENCE ON

DIGITAL SIGNAL PROCESSING

7-10 September 1987

The programme for the 1987 International Conference on Digital Signal Processing, which is co-sponsored by URSI, has been received at the URSI Secretariat. The Conference Co-Chairmen are V. Cappellini (University of Florence and IROE-CNR Florence) and A.G. Constantinides (Imperial College, London).

The areas covered by the Conference come under the all-embracing heading of digital signal-image processing. The major topics are the following:

1. Design methods and techniques, quantization effects, accuracy and stability;
2. Multidimensional filtering methods;
3. Transforms and spectral estimation;
4. Digital image processing;
5. Hardware implementation techniques and architectures (including VLSI, CCD, switched capacitors and SAW);
6. Applications to signal and image processing in different fields: speech, digital communications, biomedicine, remote sensing, object recognition and robotics.

A special highlight of the programme is the Round Table on "Impact of Digital Signal Processing in Technical and Industrial Areas", chaired by Prof. F. Carassa. Further special sessions are: "Optimum and Adaptive Processing", "Digital Techniques in ISDN and IBC Networks", "Local Area Networks", "Industrial Robotic Vision", "Communication Aids for the Blind", and "Processing of Works of Art".

A Technical Scientific Exhibition will take place during the Conference. Finally a Computer Art Exhibition will take place during the Conference, with the cooperation of Prof. R. Saldarelli, Accademia di Belle Arti, Florence.

For further information, contact:

ENIC ITALIA SRL
Via S. Caterina d'Alessandria 12
I-50129 Florence, Italy.

INTERNATIONAL SYMPOSIUM ON RADIO PROPAGATION

The 1988 International Symposium on Radio Propagation (ISRP'88) will be held in Beijing, China, from 18 to 21 April 1988, under the co-sponsorship of the Chinese Institute of Electronics (CIE) and URSI, and in cooperation with the IEEE Antennas and Propagation Society (IEEE/AP-S). The Symposium is organized by the CIE Radio Propagation Society (CIE/RP-S).

Key topics will be as follows:

- Electromagnetic theory;
- Tropospheric propagation;
- Ionospheric propagation and ionospheric physics;
- Earth-space radio propagation;
- Waves in plasmas;
- LF, VLF and ELF propagation;
- Radio sounding of the earth environment;
- Propagation problems in remote sensing;
- Inverse scattering and imaging;
- Laser beam propagation.

Abstracts of proposed papers are requested by 1 August 1987 and the photo-ready summary by 15 December 1987. For further information, address as below:

Professor Sha Zong (Z.Sha)
China Research Institute of Radio Wave Propagation
P.O.Box 138/88, Xinxiang, Henan
People's Republic of China.

CONFERENCE ON PRECISION ELECTROMAGNETIC MEASUREMENTS

(CPEM '88)

The Conference on Precision Electromagnetic Measurements, to be held in Asia for the first time, will take place from 7 to 10 June 1988 at Tsukuba Science City, Japan. It is organized by the Society of Instrument and Control Engineers, with URSI as one of the co-sponsoring organizations.

All papers concerned with electromagnetic measurements and related fundamental constants will be considered. Recent progress in measuring techniques now offers various new approaches to the measurements of ultra-high speed phenomena and ultra-fine material structures, as well as highly sensitive and stable measurements. Papers concerned with basic ideas of fundamental technologies of such novel precision EM measurement methods are also invited.

Papers in the following three fields are regarded as particularly appropriate for this Conference:

1. Precision measurements of electromagnetic quantities.
2. Standards for electromagnetic measurements:
 - Direct current and low frequency
 - Radio frequencies, microwaves and millimeter waves
 - Time and frequency
 - Lightwaves (frequency, wavelength, power, etc.)
 - Fiber optics
 - Antenna and field measurements
 - EMC/EMI measurements
 - Fundamental constants
 - Cyro-electronics
 - Measurement of material constants (or characteristics)
 - Time domain waveform measurements.
3. New measurement applications:
 - Sensors and transducers.
 - Scanning tunneling microscope
 - Lasers and optical fibers (spectroscopy, interferometry, etc.)
 - Global positioning system (GPS)

- Very long baseline interferometer (VLBI)
- Automated measurements
- Measurement employing imaging technology
- Environmental measurement.

Original papers that have not been presented previously are solicited. Authors should request an authors kit for the preparation of the paper by applying to:

CPEM'88 Secretary
Dr. Toshio Nemoto
c/o Business Center for Academic Societies Japan
Conference Department
40-14, Hongo 2-chome, Bunkyo-ku
Tokyo 113, Japan.

Original 2-page summary with illustrations or tables suitable for technical digest publication and its two copies should be forwarded no later than 18 January 1988 to:

Ken-ich Noda, Prof.
Technical Programme Committee Chairperson
c/o Business Center for Academic Societies Japan
Conference Department
Yamazaki Building, 4F
40-14, Hongo 2-chome, Bunkyo-ku
Tokyo 113, Japan.

The programme of CPEM'88 will include both oral and poster sessions.

The Conference Chairperson is Professor Sogo Okamura.

NINTH INTERNATIONAL WROCLAW SYMPOSIUM ON
ELECTROMAGNETIC COMPATIBILITY

The 9th International Wrocław Symposium on Electromagnetic Compatibility will be held from 28 to 30 June 1988 at the Technical University of Wrocław, Poland. The Symposium is organized by the Association of Polish Electrical Engineers, the Technical University of Wrocław and the Institute of

Telecommunications, in cooperation with URSI, CCIR, CCITT, IEC, CISPR, the Institute of Radioengineering and Electronics of the USSR Academy of Sciences, and various professional societies of Electrical and Electronics Engineers.

The Chairman and Vice-Chairman of the Symposium Council are Prof. A. Smolinski (Poland) and Prof. R.G. Strużak (CCIR) respectively. The Scientific Programme Committee is chaired by Prof. F.L. Stumpers (Netherlands) with Dr. R.C. Kirby (CCIR) as Vice-Chairman.

Prospective authors are invited to submit original, unpublished papers on all aspects of EMC. Suggested topics include, but are not limited to, the following:

- Antennas and propagation
- Coatings and composites
- Computer aided EMC analysis and design
- Computers and PCBs
- EM radiation hazards
- EMC and biological risks
- EMC in wire communications
- EMI coupling paths
- EMC management
- EMI measurements
- EMI prediction and analysis
- EMI reduction techniques
- EMI sources
- ESD, lightning, EMP
- Filters and filtering techniques
- Grounding and shielding
- Immunity of electronic systems
- Medical electronics
- Microelectronics
- Natural EM earth fields
- Power lines
- Regulations and standards in EMC
- Spectrum management and utilization
- Spectrum monitoring
- Susceptibility and vulnerability.

The authors' schedule is as follows:

- | | |
|--------------------------------------|-------------------|
| - Abstract and summary mailed by | 15 July 1987 |
| - Notification of acceptance | 30 September 1987 |
| - Camera-ready manuscripts mailed by | 31 January 1988. |

One copy of the abstract and summary should be sent to:
Prof. F.L. Stumpers, Elzentlaan 11, Eindhoven 561 1LG, The
Netherlands. The remaining copies should be sent to: EMC
Symposium, Box 2141, 51-645 Wrocław 12, Poland.

For more information contact:

Mr. W. Moron
EMC Symposium
Box 2141
51-645 Wrocław 12, Poland.

URSI CONFERENCE ON WAVE-INDUCED PARTICLE PRECIPITATION
AND WAVE-PARTICLE INTERACTIONS (URSI-WIPP89)

The URSI-WIPP89 will be held from 5 to 11 February 1989
at the University of Otago, New Zealand. The Convener is
Prof. R.L. Dowden and the Co-Conveners are Drs H. Matsumoto
and U.S. Inan. The proposed deadline for abstracts is
1 November 1988.

The aim of this conference is to bring together investi-
gators interested in magnetospheric wave-particle inter-
actions and wave-induced particle precipitation effects, in-
cluding interactions between electrons and whistler-mode
waves, electrostatic and electromagnetic ion-cyclotron waves
and ions, nonlinear electron and ion cyclotron wave growth,
wave-particle-wave interactions such as ULF/VLF and VLF/VLF,
the role of such interactions in the acceleration and loss of
the radiation belt particles, ionospheric phenomena asso-
ciated with wave-induced particle precipitation, and new
techniques for measuring wave spectra and particle precipi-
tation effects.

This will be a conference of specialists to talk and
interact with one another. There will be sufficient time and
space to allow somewhat more papers than attendees, so each
can reasonably assume that he/she will be able to present one
or more papers. Both oral and poster papers will be presented.

If a large enough proportion of authors prefer posters, the preference of authors will determine the oral/poster form! At this early stage (May 1987) we are open to suggestions about policy and structure of the meeting.

The Conference site will be at Knox College, one of the Residential Halls of the University of Otago, about 20 mins walk from the centre of Dunedin. The time is mid summer, temperatures will average 20°C (68°F) by day, 12°C (54°F) by night. Sights (lakes, fiords, glaciers, etc.) are within a day's drive. Full accommodation at Knox College, including all meals not paid for by the Registration Fee, will cost about NZ\$55 per day in 1989. We hope all will choose Knox but alternative accommodation in hotels and motels can be arranged. A mid-range motel convenient to the conference site will probably cost (room only) about NZ\$120 per day for two persons (NZ\$105 for single) in 1989. Cheaper accommodation can be found for families. Some low cost motels have full cooking facilities and sleep 4-6.

Registration fee will be about NZ\$200, but this includes abstract book, lunch, morning and afternoon tea/coffee each day, and the Conference Banquet - all for a little over US\$100! Accompanying persons will find much of interest in Dunedin and will pay only incurred expenses (e.g. Conference Banquet if attended). There will be financial help for some young scientists on application.

I assume that respondees to the notice about "ICWIPP88" are intending to come to URSI-WIPP89. If you intend to come and want the next info, but have not responded previously, please write with your preference for Knox or motel:

Professor R.L. Dowden
Physics Department
University of Otago
Dunedin, New Zealand.

ICTP/TWAS DONATION PROGRAMME

The International Centre for Theoretical Physics (ICTP) and the Third World Academy of Sciences (TWAS) have ever since their establishment been engaged in promoting and sustaining research activities in different scientific disciplines carried out in developing countries, by setting up a number of specific programmes designed to achieve this purpose.

As far as the problem of scientific infrastructures is concerned, the needs in developing countries are very great. The scientists living and working in developing countries are faced with the difficulty of obtaining scientific literature and adequate laboratory facilities. For this reason, the ICTP has initiated a scheme for providing Mathematics and Physics libraries in developing countries with books, journals and equipment through the channels of its "Book and Equipment Donation Programme". The Centre has made several appeals to libraries, publishing companies, laboratories and individuals requesting them to donate any books, journals, proceedings and equipment they do no longer need, with the ICTP acting as a broker. The response to these appeals has been very encouraging.

As a result, the ICTP has, over the past three years, distributed a yearly average of approximately 14,000 journals, 4,000 proceedings and 2,000 Mathematics and Physics books to over 200 Mathematics and Physics Institutes in 80 developing countries, and it is hoped that from 1986 onward the ICTP will be able to increase distribution to over 50,000 books, journals and proceedings annually. During this same time, the ICTP has also forwarded to laboratories in developing countries a large number of different items of equipment which have been generously donated by various European laboratories.

The Third World Academy of Sciences has recently joined this Donation Programme with the purpose of expanding it to the fields of Biology and Chemistry, so as to help in providing Biology and Chemistry libraries and laboratories in developing countries with scientific literature and equipment. Together with ICTP, TWAS has agreed to cover transportation

costs of material which has to be sent to Institutions in Third World Countries.

Although ICTP and TWAS are making every effort to alleviate the drastic situation in Universities in the Third World, still more can be done. These countries require assistance, and there is no need to stress how useful our Donation Programme is and how precious your help can be. Those interested in helping by providing us with material in the fields of BIOLOGY, CHEMISTRY, MATHEMATICS and PHYSICS should kindly Contact:

H.R. Dalafi
International Centre for Theoretical Physics (ICTP)
P.O.Box 586
I - 34126 Trieste, Italy.
Phone: (040)2240-1
Telex: 460392 ICTP I
Cable: CENTRATOM.

Thank you.

THE EWALD PRIZE OF THE INTERNATIONAL UNION OF CRYSTALLOGRAPHY

The first Ewald Prize for outstanding contributions to the science of crystallography has been awarded jointly to

Professor J.M. Cowley and Dr. A.F. Moodie (Australia)

for their outstanding achievements in electron diffraction and microscopy, especially for their fundamental contributions to the theory and technique of direct imaging of crystal structures and structure defects by high resolution electron microscopy.

Their pioneering work on the dynamical scattering of electrons was reported in a series of papers in Acta Crystallographica and other journals from 1957 onwards. A theory of Fourier images led them to the multi-slice formulation of the scattering of an electron wave in its passage through a crystal. This formulation is able to take into account many hundreds of scattered beams, and has become the basis of widely-used computer programmes. The theory allows the electron micrographs, obtained with modern high resolution instruments, to be reliably and quantitatively interpreted, and used for the determination of the structures of both perfect crystals and crystals containing defects.

Prof. Cowley and Dr. Moodie, together and separately, have made further contributions to theory, methods and results in electron diffraction and microscopy. Their work has often stressed a unified approach to diffraction and microscopy through physical optics. An overview of the whole field may be found in Prof. Cowley's book Diffraction Physics (1981).

The presentation of the Ewald Prize will take place at the Opening Ceremony of the XIV International Congress of Crystallography at Perth, Western Australia, on 12 August 1987.

RECENTLY PUBLISHED PROCEEDINGS

SOLAR-TERRESTRIAL PREDICTIONS, Proceedings of the Workshop held at Meudon, France, 18-22 June 1984. Published by the National Oceanic and Atmospheric Administration, 325 Broadway, Boulder, CO. 80303, USA.

INTERNATIONAL BEACON SATELLITE SYMPOSIUM AND TECHNICAL WORKSHOP, Oulu, Finland, 9-14 June 1986. Published by the University of Oulu, 2 Parts, ISBN 951-42-2256-3.

URSI INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC THEORY, Budapest, Hungary, 25-29 August 1986. Proceedings edited by T. Berceci, 850 pages (2 vols.), published by Elsevier, Price: US\$275.50. ISBN 0-444-98986-2.

EIGHT COLLOQUIUM ON MICROWAVE COMMUNICATION, Budapest, Hungary, 25-29 August 1986. Proceedings edited by T. Berceci, 524 pages, published by Elsevier. Price: US\$173.25. ISBN 0-444-98989-7.

LIST OF URSI OFFICERS AND OFFICERS OF MEMBER
COMMITTEES: AMENDMENTS

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President: Prof. K. Géher, Technical University of Budapest,
Stoczek u. 2, H-1111 Budapest, Hungary.

Secretary: Dr. L. Zombory, Technical University of Budapest,
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2. URSI Commissions

Commission A on Electromagnetic Metrology

Egypt: Prof. Ahmed Lofty Elsayed, c/o Prof. I.A. Salem,
Academy of Scientific Research and Technology,
101 Kasr El Ainy Street, Cairo, Egypt.

Commission B on Fields and Waves

Egypt: Prof. Smair Fahmy Mahmoud, c/o Prof. I.A. Salem.

Commission C on Signals and Systems

Egypt: Prof. Abdel Samie Moustafa Houssein, Faculty of
Engineering, Electronics and Communications Eng.,
Alexandria, Egypt.

Commission D on Electronic and Optical Devices and
Applications

Egypt: Prof. Essmat Abdel Fattah Abdellah, c/o Prof. I.A.
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Commission F on Wave Propagation and Remote Sensing

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Commission G on Ionospheric Radio and Propagation

Egypt: Prof. Ibrahim Ahmed Salem, Academy of Scientific Research and Technology, 101 Kasr El-Ainy Street, Cairo, Egypt.

Commission H on Waves in Plasmas

Egypt: Prof. Mohamed Ezzat Abdel Aziz, c/o Prof. I.A. Salem.

Commission J on Radio Astronomy

Egypt: Prof. Baligh Beshara Baghouz, Helwan Institute of Astronomy and Geophysics, Egypt.

3. Change of Address

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