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URSI

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RÉUNION DU BUREAU

(Bruxelles, 7-9 février 1967)

Rapport

Le Bureau de l'URSI s'est réuni à Bruxelles les 7, 8 et 9 février 1967 pour examiner certaines questions ressortissant à l'activité générale de l'Union, et plus particulièrement pour résoudre quelques points déterminés en tenant compte des suggestions faites à Munich par le Comité Exécutif et confirmées par l'Assemblée Générale.

Etaient présents à la réunion :

Prof. S. Silver, *Président.*

Prof. I. Koga, *Président sortant.*

Prof. W. J. G. Beynon, *Vice-président.*

Prof. M. Boella, *Vice-président.*

Prof. J. Groszkowski, *Vice-président.*

Prof. Ch. Mannebach, *Trésorier.*

Ing. E. Herbays, *Secrétaire général.*

M. B. Decaux et le Dr R. L. Smith-Rose, Présidents d'honneur, avaient été invités à participer aux séances pour conseiller le Bureau respectivement sur la question de la collaboration avec le CCIR et sur la rédaction des modifications aux Statuts, au Règlement intérieur et aux Règles pour les Commissions.

Les principales décisions prises par le Bureau font l'objet du résumé ci-dessous.

1. — Collaboration avec le CCIR.

Après avoir examiné le rapport présenté à l'Assemblée Générale par le Comité de l'URSI pour les Travaux du CCIR ainsi que les résultats de différentes consultations, le Bureau a décidé de nommer

un Coordonnateur pour la collaboration avec le CCIR, qui s'inspirera des directives suivantes :

a) Le Coordonnateur est autorisé à organiser (en consultation, ou en collaboration avec les Présidents des Commissions et Comités) des groupes de travail qui traiteront les questions soumises par le CCIR. Etant donné que certains groupes de travail devront peut-être comprendre des membres de plusieurs Commissions et Comités, l'organisation doit se faire à partir d'un niveau supérieur à celui des Présidents de Commission et de Comité.

b) Pour autant qu'il s'agisse d'échange de documents, les Présidents des Commissions d'études du CCIR doivent pouvoir communiquer directement avec les Présidents des Commissions, des Comités et des Groupes de travail de l'URSI (en conformité avec la procédure établie par la Direction du CCIR pour ses propres Commissions d'études), mais ils seront tenus d'adresser copie de leur correspondance au Coordonnateur et au Secrétaire général. De même les Groupes de travail de l'URSI doivent pouvoir communiquer directement avec les Commissions du CCIR au sujet des questions qu'ils traitent, en faisant également parvenir copie de leur correspondance au Coordonnateur. Cependant la réponse officielle à transmettre au CCIR sera préparée par le Coordonnateur et le Secrétaire général de l'URSI, qui tiendra les membres du Bureau au courant. Cette dernière condition vise à développer chez les officiels de l'Union le sens de responsabilité dont ils doivent faire preuve dans ce genre d'activité.

c) Etant donné que de nombreux membres de l'URSI sont également membres des Commissions d'études du CCIR, le Coordonnateur convoquera, au cours des réunions du CCIR, une séance des membres de l'URSI pour examiner, du point de vue URSI, les questions préparées par le CCIR; ce groupe pourra également discuter d'autres questions relatives au CCIR dont il lui semblera qu'elles doivent être portées à l'attention du Secrétaire général; celui-ci, à son tour, en informera les membres du Bureau.

Le Dr D. K. Bailey, qui avait été officieusement pressenti, a accepté les fonctions de Coordonnateur pour la collaboration avec le CCIR.

2. — Commission Inter-Unions de Physique Solaire-Terrestre (IUCSTP).

Le Bureau a révisé la Constitution de l'IUCSTP. Ce texte révisé sera communiqué au Dr Friedman, Président de la Commission Inter-Unions, et des copies seront adressées au CIUS, aux autres Unions et au COSPAR. Le Bureau a adopté les deux résolutions suivantes :

I. Le Bureau de l'URSI, en sa réunion du 8 février 1967, confirme la volonté de l'URSI d'appuyer la Commission Inter-Unions de Physique Solaire-Terrestre du Dr Friedman, ainsi que le mandat de cette Commission tel qu'il a été établi lors de sa création.

II. Le Bureau de l'URSI, en sa réunion du 8 février 1967, exprime son appréciation des efforts que le Dr Friedman et les représentants des Unions ont déployés pour organiser et mettre en route la Commission Inter-Unions de Physique Solaire-Terrestre, et adresse à ce groupe ses félicitations.

3. — Commission VIII. — Bruit radioélectrique d'origine terrestre.

Aucune objection n'ayant été soulevée à ce sujet par les Comités nationaux, le Bureau a décidé de confirmer le mandat de la Commission VIII, tel qu'il fut établi à Munich.

Le Comité exécutif avait proposé, comme démarche suivante, l'élection par correspondance d'un Président et d'un Vice-Président. Cependant, estimant que telle procédure prendrait trop de temps, les membres du Bureau ont décidé de nommer :

M. F. Horner (Royaume Uni) comme Président par interim, et le

Prof. R. Rivault (France) comme Vice-Président par interim de cette Commission. Les élections statutaires auront lieu au cours de la XVIe Assemblée Générale.

Le Secrétaire général a été invité à adresser au Prof. A. Kimpara une lettre de remerciements pour ses fécondes activités en tant que Président de la sous-Commission IVa (Bruit radioélectrique d'origine terrestre).

4. — Représentants de l'URSI auprès des organisations scientifiques.

La liste établie par le Comité exécutif a été confirmée comme suit :

CIUS : Prof. S. Silver (suppléant : Dr R. L. Smith-Rose).

Commissions et Comités du CIUS :

— Comité spécial de recherches antarctiques (SCAR) : Dr F. J. Hewitt.

— Comité international de géophysique (CIG) : Prof. W. Dieminger, Correspondant pour l'ionosphère.

— Comité spécial des AISC : Prof. W. J. G. Beynon.

— Comité de la recherche spatiale (COSPAR) : Prof. S. Silver (suppléant : M. J. Voge).

— Comité international pour les données pour la science et la technologie (CODATA) : M. B. Decaux.

— Commission inter-unions de radiométéorologie (IUCRM) : Dr R. Bolgiano (EUA), Dr K. Brocks (Allemagne), Dr F. K. Eklund (Suède), Dr K. Naito (Japon), Dr J. A. Saxton (Royaume Uni), M. P. Misme (France).

— Commission inter-unions pour l'attribution de fréquences pour la radioastronomie et la science spatiale (IUCAF) : Dr J. W. Findlay (EUA), Dr A. J. Higgs (Australie), Dr H. Sterky (Suède), Prof. V. V. Vitkevitch (URSS).

— Commission inter-unions de physique solaire-terrestre (IUCSTP) : Prof. W. J. G. Beynon.

— Fédération des Services astronomiques et géophysiques (FAGS) : Ing. E. Herbays, M. A. H. Shapley (suppléant : P. Simon).

Comité directeur de l'IUWDS : Dr A. P. Mitra.

Comité de l'UGGI pour les sciences atmosphériques : M. J. Voge.

Sous-commission de l'UAI pour la lune : Dr E. J. Blum, Dr Troitskii.

Bureau international de l'heure (BIH) : M. B. Decaux.

Le Secrétaire général a été chargé d'inviter les représentants de l'URSI à faire rapport sur les réunions auxquelles ils assistent au nom de l'Union.

5. — Réunions scientifiques.

Le Bureau a approuvé les réunions scientifiques suivantes, suggérées par les Commissions. Il a également décidé d'accorder le patronage de l'URSI à certaines autres réunions.

Commission I. — Colloque sur les mesures par laser, Varsovie (Pologne), 1968.

Commission II :

— Colloque sur les surfaces et atmosphères planétaires, 1968.

— Colloque sur les modèles de troposphère : distribution spectrale des différents paramètres et techniques électromagnétiques pour la mesure des vents et de la turbulence, 1968.

Commission III. — Colloque sur la signification des données sur les vents ionosphériques, St. Gallen (Suisse), 1967.

Commission IV. — Colloque sur la physique de la magnétosphère, Washington, D. C., 1968.

Commission VI :

— Colloque sur la théorie des ondes électromagnétiques, Italie, 1968.

— Colloque international sur la théorie de l'information, Athènes (Grèce), septembre 1967.

— « Summer school » sur la théorie des circuits, Prague, 1968 (il a été souligné que ce cycle de cours avait le caractère d'un colloque et était considéré de ce fait comme un cas exceptionnel).

Commission VII. — Mesure des champs magnétiques et quantisation du flux.

6. — Modifications aux Statuts, au Règlement intérieur et aux Règles pour les Commissions.

Suite aux recommandations formulées par l'Assemblée générale de Munich, le Bureau a adopté les nouveaux textes des Statuts, du Règlement intérieur et des Règles pour les Commissions. Ces textes seront soumis à l'approbation de la XVI^{e} Assemblée générale. Entretemps ils seront portés à la connaissance de tous les intéressés.

7. — Organisation future du Secrétariat général.

Le Secrétaire général a présenté sa démission pour faciliter les pourparlers avec un nouveau candidat à ce poste, en soulignant qu'il continuerait à assumer ses fonctions pendant la période de transition.

Au nom du Bureau, le Prof. Silver a exprimé sa gratitude au Colonel Herbays pour son dévouement à la cause de l'URSI et pour tous les efforts déployés en vue du renforcement de l'Union.

Le Bureau a ensuite décidé à l'unanimité :

1. de garder le Secrétariat de l'URSI à Bruxelles,
2. d'attribuer un traitement mensuel aux fonctions de Secrétaire général,
3. d'autoriser le Président à mener les pourparlers nécessaires pour la nomination du nouveau Secrétaire général.

8. — Organisation des Assemblées générales.

Considérant qu'il était souhaitable d'éviter tout malentendu en ce qui concerne les principaux objectifs des Assemblées générales, le Bureau a décidé d'attirer l'attention sur la définition qui en fut donnée par le Dr R. L. Smith-Rose à l'Assemblée générale de l'URSI en 1960. Cette définition est reproduite ci-dessous :

« Le but des Assemblées de l'URSI consiste essentiellement à promouvoir la recherche scientifique en radio science sur le plan international. Ce but peut être atteint :

1) par l'examen des progrès accomplis dans les différentes questions d'intérêt général;
2) par la mise au point des principes de nature à influencer le développement des recherches futures;
3) par l'établissement de méthodes de travail communes dans les domaines où une meilleure coordination des observations, des expériences et des techniques est requise à l'échelle internationale;
4) par l'établissement de nomenclatures et de notations communes dans les disciplines déjà fixées;
5) par l'échange et la comparaison d'étalons sur lesquels reposent les mesures quantitatives ».

Les Membres du Bureau ont examiné les résultats d'une consultation par correspondance faite par le Président de l'URSI. Des suggestions ont été faites au sujet de la structure des séances scientifiques, de la distribution des documents aux Assemblées générales, et de la participation des jeunes chercheurs aux Assemblées générales. Le Comité de Coordination sera invité à formuler des recommandations à ce propos.

En outre, dans le but (i) de combiner l'aspect scientifique et l'aspect administratif des Assemblées générales et (ii) d'assurer une meilleure continuité en permettant aux membres nouvellement élus de prendre contact avec leurs prédécesseurs, le Bureau a décidé

1) de consacrer les matinées aux séances scientifiques, et les après-midi aux séances administratives, aux réunions des groupes de travail et aux visites techniques, et
2) de tenir des réunions du Bureau et du Comité exécutif avant l'ouverture de l'Assemblée générale pour procéder à la nomination des candidats aux élections statutaires; ces nominations seront présentées à la séance plénière d'ouverture de l'Assemblée.

MEETING OF THE BOARD OF OFFICERS

(BRUSSELS, FEBRUARY 7-9, 1967)

Report

The Board met on February 7-9, 1967 to consider several topics relevant to the general activity of the Union, and particularly those topics on which final decision had to be made taking into account the suggestions made by the Executive Committee and confirmed by the General Assembly at Munich.

The following Officers attended the meeting :

Prof. S. SILVER, *President.*

Prof. I. KOGA, *Past President.*

Prof. W. J. G. BEYNON, *Vice-President.*

Prof. M. BOELLA, *Vice-President.*

Prof. J. GROSZKOWSKI, *Vice-President.*

Prof. Ch. MANNEBACK, *Treasurer.*

Ing. E. HERBAYS, *Secretary General.*

Mr. B. Decaux and Dr. R. L. Smith-Rose, Honorary Presidents, had been invited to attend the sessions to advise the Board respectively on the co-operation with the CCIR and on the drafting of new Statutes, Bylaws and Rules for Commissions.

The main actions reached by the Board are summarized hereunder :

1. — CO-OPERATION WITH CCIR.

After consideration of the report submitted to the General Assembly by the URSI Committee for CCIR Work, and of the results of various consultations, the Board decided to appoint a

Co-ordinator for co-operation with the CCIR. The directives given to the Co-ordinator are as follows :

(*a*) The Co-ordinator is given authority to organize (in consultation, or collaboration with, the chairmen of the Commissions and Committees) working groups to deal with questions submitted by the CCIR. Some working groups may require members from several Commissions and Committees, and, therefore, the organization must proceed from a level above that of the Commission and Committee Chairmen.

(*b*) As far as the exchange of material is concerned, the Chairmen of the CCIR study groups should be free to communicate directly with the chairmen of URSI Commissions and Committees and with chairmen of the URSI working groups (subject to whatever procedures the CCIR directorate sets down for its study groups) with only one requirement that copies of correspondence be sent to the Co-ordinator and the Secretary General. Conversely, the URSI working groups should be free to communicate with the CCIR groups on the questions to which they are addressing themselves, again with copies to the Co-ordinator. The formal response to be transmitted to CCIR should, however, be prepared by the Co-ordinator and the Secretary General of URSI who should keep the Board informed. This last point is made to try to develop the sense of responsibility the Officers of the Union should have for such activities.

(*c*) In view of the fact that many URSI members are also members of CCIR groups, the Co-ordinator should call a meeting of URSI people at CCIR meetings to review from an URSI point of view the questions being prepared by the CCIR; the URSI group may also have other CCIR matters to discuss which it feels should be brought to the attention of the Secretary General, who shall keep the Board informed.

Dr. D. K. Bailey, informally consulted, accepted to serve as Co-ordinator for co-operation with the CCIR.

2. — Inter-Union Commission on Solar-Terrestrial Physics (IUCSTP).

The Board decided to draft a revised text of the IUCSTP Constitution and to send it to Dr. Friedman, Chairman of the Inter-

Union Commission, with copies to ICSU, the other Unions and COSPAR. The Board agreed to the following resolutions :

I. The Board of Officers of URSI, at its meeting dated February 8, 1967 reiterates the position of URSI in supporting Dr. Friedman's Inter-Union Commission on Solar-Terrestrial Physics, and the terms of reference as stipulated when the Commission was established.

II. The Board of Officers of URSI, at its meeting dated February 8, 1967 expresses its appreciation for the efforts Dr. Friedman and the Union representatives have made in getting the Inter-Union Commission on Solar-Terrestrial Physics organized and started, and the Officers wish to commend the group for their accomplishments.

3. — Commission VIII on Radio Noise of Terrestrial Origin.

Considering that the terms of reference circulated to National Committees by the Secretary General did not raise any objections, the Board decided to confirm them.

The next action proposed by the Executive Committee was the election by correspondence of a Chairman and a Vice-Chairman for this Commission. However, considering that such procedure would take too much time, the members of the Board agreed to appoint:

Mr. F. Horner (UK) as interim Chairman, and

Prof. R. Rivault (France) as interim Vice-Chairman of the Commission. Statutory elections will be held at the XVIth General Assembly.

The Secretary General was directed to send a letter of thanks to Prof. A. Kimpara for his fruitful activities as Chairman of Sub-Commission IVa on Radio Noise of Terrestrial Origin.

4. — Representation of URSI on scientific organizations.

The list agreed to by the Executive Committee has been confirmed as follows :

ICSU : Prof. S. Silver (alternate : Dr. R. L. Smith-Rose).

ICSU Commissions and Committees :

— Special Committee on Antarctic Research (SCAR) : Dr. F. J. Hewitt.

— International Committee on Geophysics (CIG) : Prof. W. Dieminger, Ionosphere Correspondent.

— Special Committee for the IQSY : Prof. W. J. G. Beynon.

— Committee on Space Research (COSPAR) : Prof. S. Silver (alternate : Mr. J. Voge).

— International Committee on Data for Science and Technology (CODATA) : Mr. B. Decaux.

— Inter-Union Commission on Radio Meteorology (IUCRM) : Dr. R. Bolgiano (USA), Dr. K. Brocks (Germany), Dr. F. K. Eklund (Sweden), Dr. K. Naito (Japan), Dr. J. A. Saxton (UK), Mr. P. Misme (France).

— Inter-Union Commission for Allocation of Frequencies for Radio Astronomy and Space Science (IUCAF) : Dr. J. W. Findlay (USA), Dr. A. J. Higgs (Australia), Dr. H. Sterky (Sweden), Prof. V. V. Vitkevitch (USSR).

— Inter-Union Commission on Solar-Terrestrial Physics (IUCSTP) : Prof. W. J. G. Beynon.

— Federation of Astronomical and Geophysical Services (FAGS) : Ing. E. Herbays, Mr. A. H. Shapley (altern. : P. Simon).

IUWDS Steering Committee : Dr. A. P. Mitra.

IUGG Committee on Atmospheric Sciences : Mr. J. Voge.

IAU Sub-Commission on the Moon : Dr. E. J. Blum, Dr. Troitskii.

Bureau International de l'Heure (BIH) : Mr. B. Decaux.

The Secretary General was requested to invite the URSI representatives to send summary reports on the meetings they attend on behalf of the Union.

5. — Scientific meetings.

The organization of the following scientific meetings suggested by the Commissions has been aproved. The Board agreed also to give URSI sponsorship to some scientific meetings.

Commission I. — Symposium on Laser Measurements, Warsaw (Poland), 1968.

Commission II :

— Planetary Atmospheres and Surfaces, 1968.

— Models of the troposphere : spectral distribution of various parameters and electro-magnetic techniques for measuring winds and turbulence, 1968.

Commission III. — Significance of ionospheric drift data, St. Gallen (Switzerland), 1967.

Commission IV. — Physics of the magnetosphere, Washington D. C., 1968 (co-sponsorship of URSI).

Commission VI :

— Electromagnetic wave theory, Italy 1968.

— International Symposium on Information Theory, Athens (Greece), Sept. 1967.

— Summer School on Circuit Theory, Prague, 1968 (It was emphasized that this Summer School has the nature of a symposium, and is thus considered as an exceptional case).

Commission VII. — Measurement of magnetic fields and flux quantization.

6. — Modifications to the Statutes, Bylaws and Rules for Commissions.

Considering the recommendations of the Munich General Assembly, the Board adopted new texts for the Statutes, Bylaws and Rules for Commissions. Such texts should be approved by the XVIth General Assembly : in the meanwhile they will be circulated to all those interested.

7. — Future organization of the General Secretariat.

The Secretary General offered his resignation in order to facilitate negotiations with a candidate to this post, and stated further that he would continue to carry out his duties during the transition period.

On behalf of the Board, Prof. Silver expressed his thanks to Colonel Herbays for his long devotion to URSI and all the efforts he has made in strengthening the Union.

The Board then decided unanimously :

1. to keep the Secretariat of URSI in Brussels,
2. to have a paid Secretary General, and

3. to authorize the President to proceed with the recruiting of a Secretary General.

8. — Organization of General Assemblies.

The Board, considering that it is desirable to avoid any misunderstanding concerning the main objectives of the General Assemblies, decided to call the attention of all those concerned to the definition given by Dr. Smith-Rose at the 1960 General Assembly of URSI. This definition reads as follows :

« The object of URSI Assemblies is essentially the advancement of scientific research in radio on an international basis. This object may be attained :

(1) by examining the progress made on the different problems of general interest;

(2) by drawing attention to the factors likely to influence the development of future research;

(3) by establishing common methods of working in the fields where a better coordination of observations, experiments and techniques is required on the international scale;

(4) by establishing an agreed nomenclature and notation for subjects already well developed; and

(5) by the exchange and comparison of standards on which quantitative measurements are based ».

The Board considered the results of a consultation initiated by correspondence by the President of URSI. Suggestions were made concerning the structure of scientific sessions, the distribution of documents at the General Assembly, and the participation of young scientists in General Assemblies. The Co-ordinating Committee will be invited to advise the Board on those items.

Moreover, in order (i) to combine the scientific and the administrative aspects of General Assemblies, and (ii) to ensure continuity and to allow newly elected Officers to take contact with their predecessors, the Board agreed :

(1) to devote mornings to scientific sessions of the Commissions, and to devote afternoons to administrative sessions, meetings of working groups, and technical visits, and

(2) to organize meetings of the Board and of the Executive Committee before the General Assembly to make nominations for the statutory elections; such nominations should be submitted to the General Assembly at the Plenary Opening Session.

NATIONAL COMMITTEES

Brazil

MEMBERSHIP

The Board of Councillors of the Brazilian National Research Council, at its meeting on March 28, 1967 resolved to create the Brazilian National Committee to URSI, with the following members :

Dr. Fernando de Mendonça (Co-ordinator).

Prof. Luiz de Queiroz Orsini.

Pierre Kaufman.

J. W. Bautista Vidal.

Luiz Gonzaga Rios.

A. F. Major Pedro Ivo Seixas.

The address for the Committee Members is as follows : Comissao Nacional de Atividades Espaciais, Sao José dos Campos, Sao Paulo, Brazil.

France

RESEAU GEODESIQUE EUROPEEN PAR OBSERVATION DE SATELLITES

(Symposium de Paris, 14-16 Décembre 1964)

Au cours du mois de décembre 1964, un symposium s'est tenu à Paris, sous l'égide du Centre National des Etudes Spatiales (CNES) et de l'Institut Géographique National (IGN), sur l'organisation d'un réseau géodésique européen par observation des satellites artificiels. Dix-neuf nations, représentées par 117 délégués y ont participé.

Les communications qui y ont été présentées, ainsi que les discussions qu'elles ont suscitées, ont été rassemblées dans un volume publié par les soins de l'Institut Géographique National.

Cet ouvrage donne une vue d'ensemble sur l'état actuel des problèmes de Géodésie Spatiale tant en Europe qu'aux Etats-Unis. On y trouve en effet :

— un exposé sur les caractéristiques des satellites géodésiques passifs et actifs, en service ou en projet et l'organisation du programme de lancements envisagé par les Etats-Unis ;

— les projets de réseau géodésique mondial par satellites dans le cadre duquel viendrait s'intégrer le réseau géodésique européen ;

— le compte rendu des travaux de géodésie déjà exécutés, dont certains de vaste envergure (en particulier aux Etats-Unis et en France) ;

— la description des instruments d'observation optiques ou électroniques déjà en service (chambres balistiques IGN, appareils Transit ou Secor, caméra BMK ou Baker-Nunn, etc...) ou encore au stade expérimental ;

— enfin un aperçu des méthodes de réduction des observations et de calcul des coordonnées.

Le volume broché 21 × 27 cm de 282 pages, 80 figures et 33 photographies peut être obtenu au prix de Fr. Fr. 38 plus frais de port en s'adressant au Service de Vente, Institut Géographique National, 107 rue de La Boétie, Paris VIII-225-87-90.

Japan

MEMBERSHIP

Name	Organization	Position
Akabane, Kenji	Tokyo Astronomical Observatory, University of Tokyo	Associate Professc
Asami, Yoshihiro	Faculty of Engineering, Seikei University	Professor

Name	Organization	Position
ushima, Naoshi	Faculty of Science, University of Tokyo	Professor
o, Motinori *	Faculty of Engineering, Meiji University	Professor
ıi, Masaichi	Radio Research Laboratories, Ministry of Posts and Telecommunications	Section Chief
ɔse, Hideo	Tokyo Astronomical Observatory, University of Tokyo	Director
ɡami, Fumio	Electrical Communication Laboratories, Nippon Telegraph and Telephone Public Corporation	Section Chief
da, Toru	Radio Research Laboratories, Ministry of Posts and Telecommunications	Senior Research Officer
i, Akira	Research Institute of Atmospherics, Nagoya University	Professor
ıiyama, Hiroshi	Geophysical Institute, Tohoku University	Associate Professor
niyama, Masahide	Faculty of Engineering, University of Tokyo	Professor
vakami, Masamitsu	Tokyo Institute of Technology	Professor
ıpara, Atsushi ***	Department of Electronic Engineering, Chubu Institute of Technology	Professor
·a, Issac	Research Laboratory, Kokusai Denshin Denwa Co. Ltd.	Professor Emeritus, University of Tokyo
ıo, Tetsuo	Radio Research Laboratories, Ministry of Posts and Telecommunications	Deputy Director
da, Kenichi	Faculty of Engineering, Kyoto University	Professor
ita, Kiyoshi	Oki Electric Industry Co.	Chief Engineer

Name	Organization	Position
Nagata, Takeshi	Faculty of Science, University of Tokyo	Professor
Obayashi, Tatsuzo *	Faculty of Engineering, Kyoto University	Professor
Oguchi, Bunichi	Electrical Communication Laboratories, Nippon Telegraph and Telephone Public Corporation	Director of reseai
Okamura, Sogo *	Faculty of Engineering, University of Tokyo	Professor
Omori, Shunichi	Electrotechnical Laboratory, Ministry of International Trade and Industry	Section Chief
Saito, Shigebumi	Institute of Industrial Science, University of Tokyo	Professor
Shimoda, Koichi	Faculty of Science, University of Tokyo	Professor
Shinkawa, Hiroshi	Research Laboratory, Kokusai Denshin Denwa Co. Ltd.	Director
Takahashi, Hidetoshi	Faculty of Science, University of Tokyo	Professor
Takakura, Tatsuo	Tokyo Astronomical Observatory, University of Tokyo	Professor
Taki, Yasuo **	Faculty of Engineering, University of Tokyo	Professor
Tanaka, Haruo	Research Institute of Atmospherics, Nagoya University	Director
Ueda, Hiroyuki	Radio Research Laboratories, Ministry of Posts and Telecommunications	Director
Yonezawa, Toshiyuki	Radio Research Laboratories, Ministry of Posts and Telecommunications	Section Chief

*** President ** Executive Secretary * Secretary

Republic of South Africa

CSIR-ANNUAL REPORT 1965-1966

The National Institute for Telecommunications Research, Council for Scientific and Industrial Research, has issued the Annual Report 1965-1966.

We quote from that report some parts which are related to URSI Commissions or Committees :

The propagation of radio waves

Ionospheric soundings at vertical incidence and forecasts of optimum traffic frequencies.

Routine ionospheric measurements at Cape Town and Johannesburg have continued. Early this year the Post Office withdrew the staff of the radio station at Kommetjie, where the Cape Town ionosonde is installed, and since then the instrument has been serviced on a weekly basis by Post Office technicians from Milnerton. An unsuccessful attempt was made to find an alternative site; the present arrangement, however, has not led to any marked deterioration in the operation of the instrument.

During the past year some nine per cent of the records have been lost and a further five per cent have been affected to some extent by power failures and equipment faults. These figures are much the same as those for the previous three years. The corresponding figures for the ionosonde at Johannesburg are seven and six per cent.

Measurements are normally made at quarter-hour intervals but on days of special geophysical significance an accelerated schedule is followed.

The values of thirteen ionospheric characteristics are read from the hourly ionograms and are published monthly in bulletins which are distributed on a world-wide basis. The data also provide material for a number of research projects in this country.

The institute has recently acquired graph-reading equipment which, when used together with a computer, enables most of the processing of ionospheric data to be carried out automatically. This system will be in operation shortly, and it is expected that not only will this reduce the delay in the production of data

bulletins, but in addition it will enable the staff of the data section to spend more time on work in support of the ionospheric research programme.

Regular forecasts of optimum traffic frequencies are made for use in short-wave radio communication, mainly within Southern Africa and over certain circuits between South Africa and other parts of the world. These forecasts are based on ionospheric data from Johannesburg and Cape Town together with data and reports of propagation from other organizations in this country and elsewhere. A programme has been written which will enable these forecasts to be made by a computer, and this will be put into operation soon.

Ionospheric research.

The experimental investigation of the lower ionosphere, which formed the main part of the Institute's contribution to the IQSY, continued until the end of 1965. Regular measurements were made of absorption and virtual height at 1.55, 1.83, 2.20, 2.63 and 5.25 Mc/s, and partial reflections were recorded at 1.83 and 2.63 Mc/s. The recorded data are now being read, and it is expected that in the near future when semi-automatic equipment is used that this work will be accelerated.

Towards the end of last year the ionospheric research section was strengthened by the recruitment of an ionospheric physicist who had previously been engaged, at Rhodes University, in research into the ionospheric effects of particles precipitated from the outer Van Allen belt in the region of the South Radiation Anomaly. This work has continued in collaboration with Rhodes University, and has led to a number of publications. It has been established beyond reasonable doubt that all ionospheric disturbances of a particular type are associated with the precipitation of particles from the radiation belts, and it appears that many features of the world-wide pattern of ionospheric disturbances can now be explained.

Radio Noise Levels Below 30 Mc/s.

The Institute has continued to participate in the long-term, world-wide programme of measurement of atmospheric radio noise, organized and supervised by the Institute for Telecommunication Sciences and Aeronomy of the United States Environ-

mental Science Services Administration (formerly the Central Radio Propagation Laboratory of the Department of Commerce).

The South African station is installed at the Post Office Receiving Station at Derdepoort, near Pretoria, and its operation and routine maintenance are carried out by the South African Post Office. The Institute, however, is responsible for supervision, major repairs, special calibration, and the handling of data. In order that the information may be immediately available, preliminary reduction of the data is done in the Institute before their despatch to the United States.

The station near Pretoria is one of sixteen stations spread over the world; the other stations in Africa are in Morocco and Nigeria.

The recorder used at this station was supplied by the National Bureau of Standards. It has an effective noise bandwidth of 200 c/s and a fifteen-minute sample is made on each of eight frequencies over the range 13 kc/s to 20 Mc/s, two at a time, during each hour.

Studies of natural phenomena

Radar echoes from precipitation.

During the past year work on this project has been devoted mainly to the acquisition and installation of an improved radar system. The old equipment had become unsuitable, and it was essential for the continuation of the project that a more adequate radar facility should be acquired. The Council for Scientific and Industrial Research has provided the funds for this purpose, and all the components of the proposed system have been ordered, and in some instances have been installed. A parabolic antenna with pedestal and the associated control equipment have been acquired on loan for an indefinite period from the Jet Propulsion Laboratory, and a transmitter has been purchased from the Department of Defence. Although the complete system will not be available until next year, owing to the long delays in delivery, it is hoped that some observations will be possible during the coming summer.

A theoretical study has been made of the relation between the distribution of the sizes of drops and the polarization and intensity of radar echoes from precipitation. This distribution varies for different types of precipitation and so reduces the correlation between the rate of rainfall and the intensity of echoes.

It is thought that by measuring the polarization as well as the intensity of echoes a more accurate measure of the rainfall may be obtained.

Techniques for obtaining accurately circular polarization have been investigated at a wavelength of 8 mm, and the results of this work will be applied to the design of a circularly polarized feed for the 10 cm radar.

Advanced radio techniques

The « Telluromeler » system of distance measurement.

Last year the Institute completed its work on the development of an 8 mm « Tellurometer » instrument, and a paper describing the performance of the system was presented at the symposium on electromagnetic measurement of distance in Oxford. The new instrument has a modulation frequency of 75 Mc/s, which gives it a tenfold increase of resolution over earlier models, while its narrow beamwidth affords considerable protection against the effects of reflections from the ground. Plessey South Africa (Pty) Limited are now preparing for the production of the new instrument, which is to be known as the « MRA 4 ».

Investigations into the use of higher modulation frequencies in 3-cm « Tellurometer » instruments have been carried out. An MRA 101 was modified by the addition of a 75 Mc/s modulation and a tenfold increase in resolution, together with an appreciable reduction of ground effects, has been demonstrated.

Some further work has been done on the investigation into a system of distance measurement in terms of the phase of a carrier at 10 Gc/s.

A fundamental study of the limitations to the accuracy of radio distance measurement due to atmospheric and ground effects is in progress. The use of a system of vertical racking, instead of carrier tuning, to reduce the errors caused by ground effects is being investigated, and some preliminary results are now available.

The Institute has continued its co-operation with Plessey South Africa (Pty) Limited in all aspects of distance measurements and position fixing. Towards the end of last year a symposium, open to the staff of both organizations, was held in Cape Town. This did much to promote the exchange of ideas, and it is intended to arrange similar symposia in the future.

Distance measurement using infra-red beams.

Further work on the laboratory prototype showed that the limitation in range which had previously been experienced was not of a fundamental nature, and it has been demonstrated that with suitable optical components a range of 1 km can readily be achieved. Work is now in progress on the construction of a second model with improved electronic circuitry and a more adequate optical system. Considerable difficulty is being experienced in obtaining the necessary optical components.

Radio astronomy

A sensitive radiometer has been developed for use at 13 cm in conjunction with the tracking equipment at DSIF. The system makes use of the travelling wave maser, which forms the low noise front end of the tracking receiver, and the 85-ft antenna. The noise temperature of the system is 40° K and the sensitivity is 0.092° K. A noise injection system is used to remove fluctuations in gain.

Using this equipment the flux of the radio source CTA 102 was observed over a period of 75 days in an attempt to detect a periodic variation of 25 per cent over 100 days which was reported by Sholomitskii to exist at 31 cm, and which had been predicted at shorter wavelengths. No such variation was found, and it was concluded that any such variation must have a peak-to-peak amplitude of less than 6 per cent at 13 cm.

A region in the constellations of Vela and Puppis has been surveyed. The beamwidth of the system was 22 minutes of arc, giving a twofold improvement in resolution over previous surveys and extending the range in wavelength.

A contour map in which the contour interval is 0.45° K has been drawn. In all eleven sources were observed; one of these, Vela X, exhibits a shell structure consistent with its identification as a supernova remnant.

A similar structure is observed for Puppis A, a well established supernova remnant. Two sources which were discovered in the survey at 31 cm in 1963 have been confirmed in this survey. An additional source, which has not previously been catalogued, has been detected and identified with a hydrogen emission region. Detailed studies of the structure and spectra of sources are now in progress.

USA

1966 FALL MEETING

Stanford University, Stanford
7-9 December 1966

PAPERS SUBMITTED TO THE VARIOUS SESSIONS

COMMISSION I

Electromagnetic Standard

1-1. Commission I highlights at the 1966 General Assembly — Mostly time and frequency — J. M. RICHARDSON, National Bureau of Standards, Boulder, Colo.

1-2. Commission I highlights at the 1966 General assembly — Mostly electromagnetic measurement standards — R. W. BEATTY, National Bureau of Standards, Boulder, Colo.

1-3. Automatic tuning of hydrogen masers — H. HELLWIG and E. PANNACI, Electronic Components Laboratory, US Army Electronics Command, Fort Monmouth, N. J.

1-4. A wide range cw power measurement technique — R. A. LAWTON, C. M. ALLRED and P. A. HUDSON, US Department of Commerce, National Bureau of Standards, Boulder, Colo.

1-5. A high-accuracy microwave phase standard for use in primary calibration laboratories — A. V. JAMES, Standards Development Engineer, Measurement Sciences, Grumman Aircraft Engineering Corp. Bethpage, N. Y.

1-6. A technique for absolute temperature measurement at microwave frequencies — G. G. HAROULES and W. E. BROWN, Microwave Radiation Laboratory, Electronics Research Center — NASA, Cambridge, Mass.

Electromagnetic Measurements

1-7. Dual wavelength optical distance measurement — J. C. OWENS and K. B. EARNSHOW, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

1-8. The approximate magnetic fields near a horizontal electric dipole over a conducting medium — E. L. MAXWELL, L. BALL and A. D. WATT, DECO Electronics Inc., Westinghouse Electric Corp., Boulder, Colo.

1-9. A perturbation field probing technique for determining the current distribution on large antennas — T. S. CORY and C. R. FENWICK, Collins Radio Co., Dallas, Texas.

1-10. Effects of a grounded parasitic line on earth conductivity measurements — L. BALL, DECO Electronics, Inc., Westinghouse Electric Corp., Boulder, Colo.

1-11. A statistical analysis of siting error in radio direction-finding — L. A. LYONS, Syracuse University Research Corp., and A. T. ADAMS, Syracuse University, Syracuse, N. Y.

1-12. Measurements of the time-frequency correlation function of fading channels using short wave broadcast stations as signal sources — A. M. MANDERS, Dept. Electrical Engineering, University of Florida, 300 University Drive, Cape Canaveral, Florida.

COMMISSION II

Atmospheric Refraction

2-1. Some spectral characteristics of the radio refractivity in the surface layer of the atmosphere — B. R. BEAN, C. B. EMMANUEL and R. W. KRINKS, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

2-2. An analysis of the correction of range errors due to atmospheric refraction by microwave radiometric techniques (MARCOR) — E. R. WESTWATER, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

2-3. Some advances in airborne water vapor measurements at NRL — D. L. RANDALL, O. K. LARISON and W. W. CAMPBELL, US Naval Research Laboratory, Washington, D. C. 20390.

2-4. A comparison of the meteorological dependence of radio and optical distance measurements — B. BEAN, R. LAWRENCE, R. MCGAVIN and J. OWENS, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

2-5. The fine scale vertical structure of radio refractivity as measured from a helicopter — R. E. MCGAVIN and R. O. GILMER, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

2-6. Refractive index structure measurements — A. W. STRAITON, A. P. DEAM and J. L. DODD, Electrical Engineering Research Laboratory, University of Texas, Austin, Texas.

2-7. Measurements of the small-scale structure of atmospheric turbulence using miniature high-speed thermometers — G. R. OCHS and R. S. LAWRENCE, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

2-8. Comparison of optical and microwave propagation — J. E. CRAPUCHETTES, C. S. LISTON, P. A. MANDICS and A. T. WATERMAN, Jr., Stanford Electronics Laboratories, Stanford University, Stanford, Calif.

Terrain and Related Topics

2-9. Height gain, location gain, and correlation in irregular terrain at 20, 50 and 100 MHz — A. P. BARSIS, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

2-10. On the theory of diffraction by a curved inhomogeneous body — J. R. WAIT, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo. (Now at Gordon McKay Laboratory, Harvard University, Cambridge, Mass.).

2-11. The Apollo astronaut-to-lunar module transmission loss on the moon's surface — J. F. LINDSEY III, Manned Spacecraft Center, Electromagnetic Systems Branch and H. S. HAYRE, University of Houston, Dept. of Electrical Engineering, Houston, Texas.

2-12. Predicting median tropospheric transmission loss for a wide range of propagation conditions — P. L. RICE and A. G. LONGLEY, Environmental Science Services Administration, Institute for Telecommunication Sciences and Aeronomy, Boulder, Colo. 80302.

2-13. Radio propagation over a gaussian shaped hill — L. A. BERRY, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

2-14. Radio gain — C. R. BURROWS, Radio Engineering Laboratories, Division of Dynamics Corp. of America, 1120 Connecticut Ave., N. W., Room 1144, Washington, D. C. 20036.

2-15. A new look at the wave tilt of groundwaves — R. J. KING, Dept. of Electrical Engineering, University of Wisconsin, Madison, Wisconsin.

2-16. Propagation at 5 GHz in Europe — A comparison of predictions and measurements for various types of paths — C. F. PETERSON, J. E. FARROW, F. M. CAPPS and C. A. SAMSON, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

Millimeter Waves; Rainfall, Vegetation, Chaff

2-17. Absorption measurements at the 5 mm oxygen complex from an aircraft — C. J. CARTER, R. L. MITCHELL and E. E. REBER, Aerospace Corp., El Segundo, California.

2-18. Atmospheric attenuation at millimeter wavelengths — K. N. WULFSBERG, Microwave Physics Laboratory, Headquarters Air Force Cambridge Research Laboratories (OAR).

2-19. Computed attenuation coefficients for New England rain — R. K. CRANE, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, Mass.

2-20. Measurements of rainfall attenuation at 8 and 15 GHz — B. C. BLEVIS, Canadian Defense Research Staff, 2450 Massachusetts Ave., N. W. Washington, D. C.; and R. M. DOHOO and K. S. MCCORMICK, Defense Research Telecommunications Establishment, Defense Research Board, Ottawa, Canada.

2-21. Areal distribution of rainfall as related to propagation of microwaves — D. C. HOGG, Crawford Hill Laboratory, Bell Telephone Laboratories, Inc. Holmdel, N. J.

2-22. A conducting slab model for electromagnetic propagation within a jungle medium — D. L. SACHS, DRC Incorporated, P. O. Box 3587, Santa Barbara, California.

2-23. High frequency lateral and sky wave propagation in forest environments — T. TAMIR, Electrophysics Dept., Polytechnic Institute, Brooklyn, N. Y.

2-24. High frequency backscatter from terrain with trees and buildings — J. R. BARNUM, Radioscience Laboratory, Stanford, California.

2-25. An experimental investigation of digital communication through chaff scatter channels — R. M. LANGELIER, L. H. BAUER, R. E. TOTTY and A. M. BUSH, Advanced Communications Dept., Radiation Incorp., Melbourne, Florida.

General Topics in Tropospheric Propagation

2-26. Propagation reliability of 2 GHz microwave signals as a function of path length, geographical location and fade margin — J. O. HEBERT, Jr. and F. M. INGELS, Mississippi State University, Electrical Engineering Dept., State College, Miss. 39762.

2-27. A comparison and evaluation of correlation bandwidth techniques — D. Y. PRIHAR, Advanced Communications, Martin Company, Orlando.

2-28. Bistatic and monostatic 3-cm radar echoes from dot angels — B. D. WARNER, Tropospheric Telecommunications Laboratory, ESSA, Boulder, Colo.

2-29. Antenna patterns and antenna gain reduction in tropospheric scattering — J. P. VINDING, Monte Sereno, Calif.

2-30. A proposed new method for measuring tropospheric propagation phenomena — R. A. EMMERT and C. D. MCGILLEM, School of Electrical Engineering, Purdue University, Lafayette, Ind.

2-31. A critique of angle-of-arrival measurements by the phase-difference method — R. B. KIEBURTZ, State University of New York at Stony Brook, N. Y.

2-32. Amplitude and phase fluctuations and antenna gain loss in tropospheric propagation upon total internal reflection — J. S. NICOLIS, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo. 80302.

2-33. Modeling the role of elevated reflecting layers in transhorizon radiowave propagation — R. E. POST and D. F. ROST, Dept. of Electrical Engineering, Iowa State University, Ames, Iowa.

2-34. On Rytov's method — L. S. TAYLOR, Case Institute of Technology, Cleveland, Ohio 44106.

Rough Surfaces; Propagation in Inhomogeneous Media

2-35. Surface roughness measurement with random signal radars — G. R. COOPER, School of Electrical Engineering, Purdue University, Lafayette, Ind.

2-36. Depolarization of electromagnetic waves by slightly rough surfaces — G. R. VALENZUELA, Applied Physics Laboratory, The Johns Hopkins University, Silver Spring, Md.

2-37. Bistatic measurements of acoustic waves scattered from a statistically rough known surface at 1 Mghz — W. BOLES, A. K. FUNG and R. K. MOORE, Center for Research in Engineering Science, University of Kansas, Lawrence, Kan.

2-38. Measurements of acoustic backscattering from a known rough surface at various frequencies — A. K. FUNG and R. K. MOORE, Center for Research in Engineering Science, University of Kansas, Lawrence, Kan.

2-39. Perturbation method for electromagnetic scattering from a turbulent over-dense surface — J. JAREM, Electrical Engineering Drexel Institute of Technology, Philadelphia, Pa.

2-40. Polarization and angle-of-arrival fluctuations for a plane wave propagated through a turbulent medium — J. W. Strohbehn and S. S. CLIFFORD, Radiophysics Laboratory, Dartmouth College, Hanover, N. H.

2-41. Liapunov stability of nonlinear time-varying position — Varying electromagnetic media, tapered lines and plasmas — A. K. NEWMAN, Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Pa.

2-42. Simulation of a tropospheric scatter channel — C. C. BAILEY and J. C. LINDENLAUB, Electronic Systems Research Laboratory, School of Electrical Engineering, Purdue University, Lafayette, Ind.

COMMISSION III.

Atmospheric Dynamics and Sporadic-E

3-1. The apparent movement of the spectral components in fading records of ionospherically reflected waves — E. E. GOSSARD and M. R. PAULSON, U. S. Navy Electronics Laboratory, San Diego, Calif.

3-2. Evidence for the presence of atmospheric waves in the ionosphere — T. M. GEORGES and D. M. BAKER, Environmental Science Services Administration, Institute for Telecommunication Sciences and Aeronomy, Boulder, Colo.

3-3. Large traveling ionospheric disturbances observed at mid latitudes utilizing the high resolution HF backscatter technique — R. D. HUNSUCKER and L. H. TVETEN, Environmental Science Services Administration, Institute for Telecommunication Sciences Aeronomy, Boulder, Colo.

3-4. Solar tidal variation of sporadic E — R. D. HARRIS, Utah State University, Logan, Utah.

3-5. Sporadic E and the wind structure of the E region — J. W. WRIGHT, Institute for Telecommunication Sciences and Aeronomy — C. H.

MURPHY, US Army Ballistic Research Laboratories, G. V. BULL, Space Research Institute, McGill University.

3-6. Large-scale atmospheric circulations in the lower ionosphere — R. E. NEWELL and R. E. DICKINSON, Department of Meteorology, Massachusetts Institute of Technology, Cambridge, Mass.

3-7. Acoustic waves in the lower ionosphere — G. KANTOR and A. D. PIERCE, AVCO Space System Division, Wilmington, Massachusetts.

3-8. A general approach to the extraction of ionospheric drifts from radio spaced receiver data — L. S. FEDOR and D. E. MCKINNIS, Institute for Telecommunication Sciences and Aeronomy, ESSA, Boulder, Colo.

Ionospheric Probe Measurements

3-9. A measurement of electrification in the low arctic ionosphere at night — L. C. HALE and D. C. BAKER, The Pennsylvania State University, Ionosphere Research Laboratory, University Park, Penn.

3-10. Electron density growth in an initially tenuous plasma in response to a suddenly applied electromagnetic wave — L. P. BRADLEY, Physics Department, Drexel Institute of Technology, Philadelphia, Pa.; P. P. LOMBARDINI, Moore School, University of Pennsylvania, Philadelphia, Pa.

3-11. VLF electric and magnetic antenna impedance characteristics in the ionosphere — C. E. YOUNG, US Naval Research Laboratory, Washington, D. C.

3-12. Experimental tests of plasma probe theories — W. J. HEIKKILA, Southwest Center for Advanced Studies, P. O. Box 30365, Dallas, Tex. 75230.

HF Propagation

3-13. Direct D-layer reflection as a factor in oblique propagation at the low HF — W. F. BAIN and R. J. BUCKLEY, Page Communications Engineers, Inc. Wash., D. C.

3-14. Focusing of HF radio waves by the electron distribution between ionospheric layers — T. A. CROFT, Radioscience Laboratory, Stanford University, Stanford, Calif.

3-15. Preferred polarizations at high frequencies — L. C. HUMPHREY, D. T. OLMSTED, and C. R. ROBERTS, General Electric Co., Syracuse, N. Y.

3-16. Directional characteristics of ionosonde interference patterns from the Filchner iceshelf — G. G. BOWMAN, Research and Technology Laboratories, Space Systems Division, Avco Corporation, Wilmington, Mass. — Permanent Address, Department of Physics, University of Queensland, Brisbane, Australia.

3-17. The accuracy of backscatter sounding measurements made using HF broadcasts in Southeast Asia — R. B. FENWICK, Radioscience

Laboratory, Stanford University, Stanford, Calif.; G. JACOBS and W. G. RICHARDS, Broadcasting Service, US Information Agency, Washington, D. C.

3-18. Some ionospheric parameters determinable from long-path sweep-frequency soundings — V. R. FRANK, Radioscience Laboratory, Stanford University, Stanford, Calif.

3-19. VHF propagation over a 4800-km transequatorial path — D. L. NIELSON and R. R. Bartholomew, Stanford Research Institute, Menlo Park, Calif.

3-20. Propagation characteristics of the transequatorial F-layer at VHF in the far east — W. J. FAY and E. D. BOWEN, Smyth Research Associates, 3555 Aero Court, San Diego, Calif.

Quiet Lower Ionosphere

3-21. Measurements of VLF amplitude and phase ground patterns — J. L. JESPERSEN and G. KAMAS, US Department of Commerce, National Bureau of Standards, Boulder, Colo.

3-22. An equatorial and low latitude anomaly in ionospheric absorption, results of observations on board the USNS croatan — J. S. SHIRKE, Department of Electrical Engineering, University of Illinois, Urbana, Ill.

3-23. Mobile launch expedition results : latitude variation of the lower ionosphere — M. M. RAO, Department of Electrical Engineering; University of Illinois, Urbana, Ill.

3-24. Lower ionospheric parameters as measured from sounding rockets — R. E. HOUSTON and L. E. LARSON, University of New Hampshire, Durhal, N. H.

3-25. Comparison of numerical full wave solutions — S. HOROWITZ, Air Force Cambridge Research Laboratories, Bedford, Massachusetts, Y. INOUE, University of Pittsburgh, Pittsburgh, Pennsylvania.

3-26. Resonances of the thin-shell model of the earth-ionosphere cavity — D. B. LARGE and J. R. WAIT, Institute for Telecommunication Sciences and Aeronomy, Environmental Science Services Administration.

3-27. Propagation of VLF waves below an anisotropic stratified ionosphere with a transverse static magnetic field — J. GALEJS, Applied Research Laboratory, Sylvania Electronic Systems, A Division of Sylvania Electric Products Inc., 40 Sylvan Road, Waltham, Mass. 02154.

Topside F-Layer

3/4-1. The large-scale anomalies observed in the topside ionosphere — K. L. CHAN, Space Sciences Division NASA, Ames Research Center, Moffet Field, Calif.

3/4-2. Daily response of the upper F region to changes in exospheric temperature — S. CHANDRA and B. V. KRISHNA MURTHY, Laboratory

for Space Sciences NASA-Goddard Space Flight Center, Greenbelt, Md.

3/4-3. Obtaining local values of plasma scale height with the Alouette I topside sounder — T. M. WATT, Autonetics, A Division of North American Aviation, Inc., Anaheim, Calif.

3/4-4. The effect of magnetic declination on the topside ionosphere — R. J. FITZENREITER, R. A. GOLDBERG and B. V. KRISHNA MURTHY, Laboratory for Space Sciences, NASA Goddard Space Flight Center, Greenbelt, Md.

3/4-5. Inward flux of exospheric electrons observed at two stations — J. A. KLOBUCHAR, J. AARONS and R. S. ALLEN, Air Force Cambridge Research Laboratory, LG Hanscom Fld., Bedford, Mass. 01730.

3/4-6. Ionospheric disturbances produced by electron precipitation from the magnetosphere — J. A. GLEDHILL, Department of Physics, Rhodes University, Grahamstown, South Africa.

3/4-7. A group delay technique for ionospheric diagnostics — F. W. CRAWFORD, R. S. HARP and T. D. MANTEL, Institute for Plasma Research, Stanford University, Stanford, Calif.

3/4-8. Propagation characteristics of topside planetary sounding — S. H. GROSS, B. E. MOHR, Airborne Instruments Laboratory, Division of Cutler-Hammer, Inc., Deer Park, L. I., New York.

The F region

3-28. Midlatitude F region densities and temperatures at sunspot minimum — J. V. EVANS, Lincoln Laboratory, Massachusetts Institute of Technology.

3-29. Determination of loss and transport in the night-time F-region from backscatter N-h profiles — S. S. PRASAD, Arecibo Ionospheric Observatory, Arecibo, Puerto Rico.

3-30. The effect of electron temperature and its changes on the F2 region electron density near sunspot minimum — T. R. POUND and K. C. YEH, University of Illinois, Urbana.

3-31. Ionospheric electron content and irregularities deduced from BE-C satellite transmissions — N. NARAYANA RAO, Department of Electrical Engineering, University of Illinois, Urbana, Ill.

3-32. Weak field-aligned scattering at middle latitudes — J. PETRICEKS, R. L. LEADABRAND, M. J. BARON, R. I. PRESNELL, Radio Physics Laboratory, Stanford Research Institute, Menlo Park, Calif.

3-33. Frequency dependence of radio star scintillations — J. AARONS and R. S. ALLEN, Air Force Cambridge Research Laboratories, Bedford, Mass., and T. ELKINS, Wentworth Institute, Boston, Mass.

3-34. Ray-tracing simulation of HF doppler shifts due to large traveling irregularities — D. G. DETERT, Avco Space Systems Division, Wilmington, Mass.

3-35. Observation of F-region disturbances with an ionosonde and remote, synchronized receivers — T. W. WASHBURN, M. G. MORGAN and B. PRATT, Radiophysics Laboratory, Dartmouth College, Hanover, N. H.

The Disturbed Lower Ionosphere

3-36. 1966 solar cosmic ray activity — A. J. MASLEY and A. D. GOEDEKE, Space Sciences Department, Douglas Missile and Space Systems Division, Santa Monica, Calif.

3-37. Analysis of sudden ionospheric disturbances and comparison with solar X-rays — J. A. KOCH, Institute for Telecommunication Sciences and Aeronomy, Environmental Science Services Administration, Boulder, Colo.

3-38. VLF phase perturbations caused by the solar proton event of 5 February, 1965 — T. A. POTEMRA, A. J. ZMUDA, C. R. HAAVE and B. W. SHAW, Applied Physics Laboratory of the Johns Hopkins University, Silver Spring, Md.

3-39. Ionospheric radio studies of solar flare radiation — R. F. DONNELLY, Institute for Telecommunication Sciences and Aeronomy, Boulder, Colo., Environmental Science Services Administration.

3-40. The correlation of radar auroral echoes and precipitating particles — J. C. HODGES and R. L. LEADABRAND, Radio Physics Laboratory, Stanford Research Institute, Menlo Park, Calif.

3-41. Wavelength dependence of radar auroral echoes — R. L. LEADABRAND and J. C. HODGE, Radio Physics Laboratory, Stanford Research Institute, Menlo Park, Calif.

COMMISSION IV

Magnetosphere

4-1. Comments on the applicability of theoretical asymptotic growth (or decay) rates to VLF waves in finite portions of the magnetosphere — T. F. BELL, Stanford University, Stanford, Calif.

4-2. An association between discrete VLF emissions and 40 keV electron microbursts — M. N. OLIVEN and D. A. GURNETT, Department of Physics and Astronomy, University of Iowa, Iowa City, Iowa.

4-3. A study of emissions observed in the magnetosphere and transition region — N. DUNCKEL and R. A. HELLIWELL, Stanford University, Stanford, Calif.

4-4. The TRW electric field experiment on OV3-3 — F. L. SCARF, R. W. FREDERICKS and G. M. CROOK, TRW Systems, Redondo Beach, Calif.

4-5. Digital computer analysis of conjugate duct propagation in the magnetosphere — D. W. SWAYZE, Philco Corporation, Western Development Laboratories, Palo Alto, Calif.

4-6. Generation of radio noise from 0.1 Hz to 1 MHz in the Ionosphere and magnetosphere — Neil Brice, School of Electrical Engineering, Center for Radiophysics and Space Research, Cornell University, Ithaca, N. Y. 14850. Formerly at Faculty of Engineering, Carleton University and Defence Research Telecommunications Establishment, Ottawa, Canada.

Non-Eckersley Whistlers and Noise

4-7. A study of ELF noise bands with the Injun III satellite — T. B. Burns, Department of Physics and Astronomy, University of Iowa, Iowa City, Iowa.

4-8. Non-Eckersley law whistlers received with satellite Injun III — G. W. Pfeiffer, Department of Physics and Astronomy, University of Iowa, Iowa City, Iowa.

4-9. Lower hybrid resonance observations of Alouette II — R. E. Barrington and D. J. McEwen, Defence Research Telecommunications Establishment, Radio Physics Laboratory, Ottawa, Canada.

4-10. Trapping of ULF waves in the ionosphere — D. A. Gurnett and S. D. Shawhan, Department of Physics and Astronomy, University of Iowa, Iowa City, Iowa.

Whistlers

4-11. A study of the phenomenon of whistler precursors — T. Laaspere and C. Y. Wang, Radiophysics Laboratory, Thayer School of Engineering, Dartmouth College, Hanover, N. H. 03755.

4-12. Magnetospherically reflected whistlers in OGO-I — B. C. Edgar and R. L. Smith, Stanford University, Stanford, Calif.

4-13. Observations of whistler-mode signals in the OGO satellites from VLF ground station transmitters — R. L. Heyborne, Stanford University, Stanford, Calif. Now at Utah State University, Logan, Utah.

4-14. Measurements of magnetospheric drift motions associated with a polar substorm — D. L. Carpenter and Keppler Stone, Radioscience Laboratory, Stanford University, Stanford, Calif.

4-15. The location of the whistler knee and bulk motion of the magnetosphere — Neil Brice, School of Electrical Engineering and Center for Radiophysics and Space Research, Cornell University, Ithaca, N. Y. 14850. Formerly at Faculty of Engineering, Carleton University and Defence Research Telecommunications Establishment, Ottawa, Canada.

Commission V

Radio and Radar Astronomy

5-1. A new application of the principal radii of curvature to large low noise antennas — Lyle Purdum, NASA Electronics Research Center, Microwave Radiation Laboratory, Cambridge, Mass.

5-2. The performance of an 85-foot radio telescope at 9.55 mm wavelength — R. W. Hobbs, H. H. Corbett, J. E. Kenney and N. J. Santini, E. O. Hulburt, Center for Space Research, Naval Research Laboratory, Washington, D. C.

5-3. 8-beam receiver system for a 10 MHz antenna array — F. K. Bowers, Electrical Engineering Department, University of British Columbia, and Dominion Radio-Astrophysical Observatory, Penticton, B. C.

5-4. The new Owens Valley observatory array — G. J. Stanley, Calif. Inst. Tech., Owens Valley Radio Observatory, Pasadena, Calif.

5-5. Inversion of line scans — R. N. Bracewell and A. C. Riddle, Radio Astronomy Institute, Stanford University, Stanford, Calif.

5-6. Radio observations of OH emission regions — M. L. Meeks and J. A. Ball, Lincoln Laboratory, Massachusetts Institute of Technology, Boston, Mass.

5-7. Observations of the 94α hydrogen line in four galactic HII regions — M. A. Gordon and M. L. Meeks, Lincoln Laboratory, Massachusetts Institute of Technology.

5-8. High resolution solar observations at a wavelength of 8.6 MM — P. M. Kalaghan, Microwave Physics Laboratory, Headquarters Air Force Cambridge Research Laboratories (OAR).

5-9. RF Scattering from lunar-like terrain — R. L. Chick, NASA Manned Spacecraft Center, Instrumentation and Electronic Systems Division, Houston, Texas.

5-10. Solar corona effects on planetary radar echoes observed near superior conjunction — R. B. Dyce, Arecibo Ionospheric Observatory, Puerto Rico.

5-11. The effects of receiver bandwidth on lunar occultation observations of radio sources — T. Krisham, Stanford Radio Astronomy Institute, Stanford, Calif. 94305.

5-12. Maximized brightness information and other effects depending on the parameters of interferometers used in radio astronomy — S. H. Zisk, Department of Electrical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts. 02139 (Abstract not included).

Commission VI

Radiation in Magnetoionic Media

6-1. Electromagnetic radiation from the viewpoint of time reversal — K. S. H. Lee and C. H. Papas, Department of Electrical Engineering, California Institute of Technology, Pasadena, Calif.

6-2. Thermal radiation in anistropic media — M. A. Deschamps, Department of Electrical Engineering, University of Illinois, Urbana, Ill.

6-3. A review of methods for eliminating the singularity in the radiation resistance in magnetoionic media — S. R. Seshadri, Applied Research Laboratory, Sylvania Electronic Systems, A Divison of

Sylvania Electric Products Inc., 40 Sylvan Road, Waltham, Massachusetts 02154.

6-4. On the justification of the conventional method for calculating radiated power in magnetoionic media — H. STARAS, RCA Laboratories, Princeton, N. J.

6-5. Transient radiation from an electric dipole in a uniaxially anisotropic plasma — S. W. LEE and R. MITTRA, Antenna Laboratory, University of Illinois, Urbana, Illinois. Lee is on leave of absence from Electromagnetics Laboratory, Hughes Aircraft Company, Fullerton, Calif.

Arrays

6-6. Reradiation of the orthogonal port energy in a circularly polarized array antenna element — N. AMITAY, G. D. HOHMANN, R. G. PECINA, Bell Telephone Laboratories, Whippany, N. J.

6-7. Properties of a cylindrical antenna in an infinite planar or collinear array — A. L. VAN KOUGHNETT and J. L. YEN, University of Toronto, Toronto, Ontario.

6-8. On the stored energy of planar apertures — D. R. RHODES, N. C. State University, Raleigh, N. C.

6-9. Analysis of antenna arrays via network theory — A. GATELY, Electrical Engineering Department, Manhattan College, New York, N. Y.; D. J. R. STOCK, Electrical Engineering Department, New York University, New York, N. Y.; B. CHEO, Electrical Department, New York University, New York, N. Y.

6-10. Far-out sidelobe control in planar phased arrays — J. L. EKSTROM, Senior Engineer, Raytheon Company, Microwave and Transmitter Department, Missile Systems Division, Bedford Laboratories, Bedford, Mass.

6-11. Pseudo grating lobes in the patterns of directional circular arrays — D. L. SENGUPTA, The University of Michigan Radiation Laboratory, Department of Electrical Engineering, Ann Arbor, Mich.

Scattering

6-12. An evaluation of several approximate methods for analyzing the scattering from strips (plates) — J. FREELAND and R. G. KOUYOUMJIAN, Department of Electrical Engineering. The Ohio State University, Columbus, Ohio.

6-13. The scattering by a two-dimensional periodic array of plates — R. H. OTT and R. G. KOUYOUMJIAN, Antenna Laboratory, Department of Electrical Engineering, The Ohio State University, Columbus, Ohio.

6-14. Asymptotic theory of electromagnetic and acoustic diffraction by smooth convex surfaces of nonconstant curvatures — SOONSUNG HONG, LindolnL aboratory, Massachusetts Institute of Technology, Boston, Mass.

6-15. Plane wave scattering from a modulated-corrugated structure — A. HESSEL (Electrophysics Department) and H. HOCHSTADT (Mathematics Department), Polytechnic Institute of Brooklyn, New York, N. Y.

6-16. A maximum-signal theorem for the spatially coherent detection of scattered radiation — A. E. SIEGMAN, Consultant, Advanced Technology Laboratory, Sylvania Electronic Systems — West, Mountain View, Calif. 94042 and Professor of Electrical Engineering, Stanford University, Stanford, Calif. 94305.

6-17. Calculation of strong reflections from an inhomogeneous layer — OMAR WING, Department of Electrical Engineering, Columbia University, New York, N. Y. 10027.

Plasmas and Moving Media

6-18. Measurements of the cross-polarized electromagnetic backscatter from a turbulent plasma — D. E. WEISSMAN, H. CUTHART and T. MORITA, Electromagnetic Sciences Laboratory, Stanford Research Institute, Menlo Park, Calif.

6-19. Diffraction by a slit in a compressible plasma — D. T. MANGANO, Bell Telephone Laboratories, Inc., Whippany, N. J. and F. M. Labianca, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

6-20. Interaction of electromagnetic waves with a moving penetrable interface — C. YEH, Electrical Engineering Department, University of Southern California, Los Angeles, Calif.

6-21. Electromagnetic scattering by inhomogeneous circular cylinders — C. D. TAYLOR, Sandia Laboratory, Albuquerque, N. M.

6-22. OHM's law for uniformly moving media — R. M. KALAFUS and C. T. TAI, The University of Michigan Radiation Laboratory, Department of Electrical Engineering, Ann Arbor, Mich.

6-23. Solutions of the eiconal equation in a moving medium — N. KRITIKOS, California Institute of Technology, Pasadena, Calif. On leave of absence from the Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Pa.

Antennas and Waveguides

6-24. Ray-optical methods for modes in guiding and radiating structures — S. MAURER, Electrical Engineering Dept., and L. B. FELSEN, Electrophysics Dept., Polytechnic Institute of Brooklyn, N. Y.

6-25. Propagation constants of traveling waves on a periodic array of dipoles with glide-symmetric excitation — R. B. KIEBURTZ and J. IMPAGLIAZZO, State University of New York at Stony Brook, N. Y.

6-26. The accuracy of finite difference solutions of Laplace's equation — J. W. DUNCAN, Electromagnetics Staff, Hughes Aircraft Co. Ground Systems Group, Fullerton, Calif.

6-27. Iterative solution of waveguide discontinuity problems — W. J. COLE, E. R. NAGELBERG and C. M. NAGEL, Jr. Bell Telephone Laboratories, Whippany, N. J.

6-28. Current distributions on dipole-excited equiangular spiral planes — G. D. BERNARD, Massachusetts Institute of Technology, Dept. of Electrical Engineering and Research Laboratory of Electronics, Cambridge, Mass.

6-29. Radiation characteristics of a side fire helical antenna — J. PERINI, Dept. of Electrical Engineering, Syracuse University, Syracuse, N. Y.

Abstracts of the papers are published in a booklet issued by the USA National Committee.

Adresses provisoires

Pendant la période du 1er avril au 1er septembre 1967, l'adresse du Dr E. J. BLUM, Président de la Commission V (Radioastronomie), sera : N. R. A. O., Edgmont Road, Charlottesville 22901 Va, Etats-Unis.

* * *

Le Dr Olumuyiwa Awe, Secrétaire du Comité national nigérien, sera absent pendant une période de six mois, jusqu'à fin août 1967. Pendant cette période, toute correspondance est à adresser au Prof. N. J. Skinner, Department of Physics, Ahmadu Bello University, Zaria, Nigeria.

COMMISSIONS AND COMMITEES

Commission I on Radio Measurements and Standards

SYMPOSIUM ON LASER MEASUREMENTS

Commission I of URSI, with the co-sponsorship of the Academy of Science of Poland and the Polish National Committee of URSI, will organize a Symposium on Laser Measurements to be held in Warsaw, Poland, in 1968.

Further information will be given in a later issue of the Information Bulletin.

Commission III on the Ionosphere

URSI-IAGA SYMPOSIUM ON UPPER ATMOSPHERIC WINDS, WAVES AND IONOSPHERIC DRIFTS

IAGA Assembly, St. Gallen, Switzerland, 3-4 October, 1967

A number of radio techniques exist for the detection of movements of irregularities in the distribution of ionospheric electrons. There is reason to believe that, in many types of observation, the movements and irregularities are associated with dynamical processes in the neutral gas, such as wind-borne turbulence structure or propagating wave structure. Other interpretations have been proffered from time to time for the same types of observation; and of course other types of observation, particularly at high latitudes, appear to demand interpretations unrelated to the dynamics of the neutral gas.

This symposium is designed to probe the physical significance of ionospheric drift data, in terms of atmospheric winds, waves, or other processes. Possible contributions to the symposium are

hereby solicited, with the request that such contributions be directed to the question of significance, and not merely add to the bulk of undigested data. In order to provide a degree of coherence to the discussions, emphasis may center on middle and low-latitude observations. The final range of topics to be treated will not, however, be determined until proposed contributions to the symposium have been received.

Prospective authors are requested to send abstracts of their contributions to the undersigned, preferably before 15 May 1967. Abstracts should be 300-500 words in length, and should make clear the nature of the contribution to the question of significance. It is possible that provision will be made for the reporting of contributions whose authors cannot be present. Arrangements are being negotiated for the publication of all contributions that are accepted and that are available at the time of the symposium itself. Arrangements for this symposium were made after the program for the IAGA Assembly was published (in November, 1966). Accordingly, recipients of this announcement are requested to bring it to the attention of any of their colleagues who may have an interest in the symposium. All who wish to be kept personally informed of further progress in the development of the symposium are requested to apply to the undersigned :

C. O. Hines
Chairman, URSI Commission III
and Symposium Organizing Committee.

Address to 15 June, 1967 :

Department of the Geophysical Sciences, University of Chicago, Chicago, Illinois, 60637, USA.

Address after 15 June 1967 :

Department of Physics, University of Toronto, Toronto 5, Ont., Canada.

MESURE DES VENTS ET DE LA DIFFRACTION DES ONDES RADIOELECTRIQUES DANS L'IONOSPHERE

M. A. Haubert et Mlle G. Doyen ont publié dans les *Annales de Géophysique*, T. 22 n° 3 — juil.-sept. 1966 un article intitulé « Un perfectionnement des dispositifs de mesure des vents et de la diffraction des ondes radioélectriques dans l'ionosphère ».

SOMMAIRE. — Après avoir rappelé les développements antérieurs des études sur les vents ionosphériques ainsi que les résultats obtenus par la mise en œuvre au cours de l'Année Géophysique de la méthode, dite des trois récepteurs, de S. N. Mitra, les auteurs décrivent le perfectionnement apporté à la méthode de S. N. Mitra par la multiplication des antennes de réception.

La description se rapporte au dispositif réalisé au Centre de Recherches Géophysiques de Garchy : trente six antennes sont réparties sur une surface horizontale carrée de 150 mètres de côté; une transposition optique analogue au procédé utilisé en télévision permet d'observer sur l'écran d'un tube cathodique les mouvements des figures de diffraction produites au sol par l'interférence des rayons hertziens diffractés par les irrégularités de l'ionosphère.

Le principal avantage de cette réalisation est d'éviter tout calcul de corrélation entre les données fournies par les aériens espacés, la cohérence et la continuité des mouvements étant rendues évidentes par la multiplicité des antennes.

L'analyse plus fine des figures de diffraction ainsi obtenues apporte des données nouvelles quant à l'étude des mécanismes géophysiques en jeu dans le plasma ionosphérique.

En ce qui concerne les vitesse et les directions des vents mesurées par cette méthode, d'intéressantes confrontations sont en cours, avec les résultats fournis par une installation voisine, basée sur la mesure par radar des déplacements des traînées météoriques.

L'article comprend aussi un résumé en langue russe.

INDICES FONDAMENTAUX DE LA PROPAGATION IONOSPHERIQUE

(Extrait du *Journal des Télécommunications*, Vol. 34, n° 3, mars 1967)

Les tableaux ci-après, contenant les valeurs des indices fondamentaux de la propagation ionosphérique, ont été établis par le Secrétariat spécialisé du Comité consultatif international des radiocommunications (CCIR) conformément à la Résolution 4-1, à l'Avis 371 et au Rapport 246-1 de la XI^{e} Assemblée plénière du CCIR (Oslo, juin-juillet 1966).

VALEURS OBSERVÉES :

● R_{12} (moyenne glissante sur douze mois du nombre de taches solaires) :

Année \ Mois	1	2	3	4	5	6	7	8	9	10	11	12
1965	12	12	12	13	15	15	16	17	19	21	23	25
1966	28	31	34	37	41	45	50	56				

● I_{F_2} (indice ionosphérique)* :

Mois (année 1966).

1	2	3	4	5	6	7	8	9	10	11	12
15	20	34	37	46	54	54	53	42	46	64	68

Mois (année 1967)

1	2	3	4	5	6	7	8	9	10	11	12
78	93										

(*) Dans le cas où la valeur de l'indice I_{F_2} est suivie de chiffres entre parenthèses, ces derniers indiquent le nombre de valeurs de *fo*F2 qui ne sont pas encore parvenues au Secrétariat du CCIR et dont, en conséquence, on n'a pas tenu compte dans le calcul de cet indice. Pour plus de détails, voir le Journal des Télécommunications (avril 1964, page 119 et janvier 1966, pages 43-47).

● Φ (flux du bruit solaire moyen mensuel) ** :

Année \ Mois	1	2	3	4	5	6	7	8	9	10	11	12
1966	88	84	90	97	98	96	107	106	111	109	113	125
1967	148	147										

(**) Renseignements obligeamment fournis par le « National Research Council », Ottawa.

PRÉVISIONS :

● R_{12} *** :

Année \ Mois	3	4	5	6	7	8
1967	76	80	84	88	92	95

(***) Renseignements obligeamment fournis par le professeur Waldmeier, Observatoire fédéral de Zurich.

Estimation de l'erreur sur les prévisions, six mois d'avance, de R_{12} : $\pm$ 25.

● I_{F_2} ****

Année \ Mois	2	3	4	5	6	7	8
1967	78	81	85	88	92	96	(100)

(****) Renseignements obligeamment fournis par le « Department of Scientific and Industrial Research, Radio and Space Research Station », Slough.

La valeur prévue six mois à l'avance est donnée entre parenthèses.

ERREUR MOYENNE SUR LES PRÉVISIONS DE I_{F_2}, BASÉE SUR LES 12 MOIS PRÉCÉDENTS :

Temps de prévision (mois)	0	1	2	3	4	5	6
Erreur moyenne	—6,0	—7,0	—6,9	—6,4	—5,7	—5,3	—4,4
Ecart-type de l'erreur	$\pm$8,0	$\pm$9,7	$\pm$9,4	$\pm$9,9	$\pm$10,0	$\pm$10,0	$\pm$11,0

● Φ *****

Année \ Mois	3	4	5	6	7	8	9	10	11	12
1967	150	(157)	(163)	(170)	(177)	(185)	(193)	(201)	(210)	(219)

(*****) Prévision selon une méthode d'extrapolation envisagée au Secrétariat du CCIR en application de la Résolution 30 de la XI[e] Assemblée plénière du CCIR (Oslo, 1966). Pour les valeurs mises entre parenthèses, l'erreur dépasse probablement la valeur de ± 10 unités de Φ. La calculatrice électronique de l'UIT a été utilisée pour le calcul de ces valeurs.

Erreur moyenne sur les prévisions de Φ basée sur les 12 mois précédents

Temps de prévision (mois)	0	1	2	3	4	5	6	7	8	9
Erreur moyenne	—2,2	—3,5	—4,8	—6,0	—8,0	—10,7	—13,0	—14,2	—15,4	—15,4
Ecart-type de l'erreur	±7,6	±9,1	±9,8	±10,4	±10.9	±10,4	±11,4	±12,8	±16,5	±21,5

BASIC INDICES FOR IONOSPHERIC PROPAGATION

(Abstract from the *Telecommunication Journal*, Vol. 34, n° 3, March 1967)

The following Tables, giving values of the basic indices for ionospheric propagation, have been prepared by the Specialized Secretariat of the International Radio Consultative Committee (CCIR) in accordance with Resolution 4-1, Recommendation 371 and Report 246-1 of the XIth CCIR Plenary Assembly (Oslo, June-July 1966).

PARAMETERS :

● R_{12} (smoothed mean, over twelve months, of the number of sunspots observed) :

Year \ Month	1	2	3	4	5	6	7	8	9	10	11	12
1965	12	12	12	13	15	15	16	17	19	21	23	25
1966	28	31	34	37	41	45	50	56				

● I_{F_2} (ionospheric index) * :

Month (year 1966).

1	2	3	4	5	6	7	8	9	10	11	12
15	20	34	37	46	54	54	53	42	46	64	68

Month (year 1967).

1	2	3	4	5	6	7	8	9	10	11	12
78	93										

(*) When the value of the I_{F_2} index is followed by figures in brackets, the latter refer to the number of values of *fo*F2 which have not yet reached the CCIR Secretariat and which have not therefore been taken into account in the calculation of the index. For further details, see the Telecommunication Journal, April 1964, page 119, and January 1966, pages 43-47.

● Φ (monthly mean value of solar noise flux) ** :

Year \ Month	1	2	3	4	5	6	7	8	9	10	11	12
1966	88	84	90	97	98	96	107	106	111	109	113	125
1967	148	147										

(**) Data kindly supplied by the National Research Council, Ottawa.

FORECASTS :

● R_{12} ***

Year \ Month	3	4	5	6	7	8
1967	76	80	84	88	92	95

(***) Data kindly supplied by Professeur Waldmeier, Federal Observatory, Zurich.

Estimated error in forecasts of R_{12} six months in advance : $\pm$ 25.

● I_{F_2} ****

Year \ Month	2	3	4	5	6	7	8
1967	78	81	85	88	92	96	(100)

(****) Data kindly supplied by the Department of Scientific and Industrial Research, Radio and Space Research Station, Slough.

The figure in brackets is the value forecasts six months in advance.

MEAN ERROR IN I_{F_2} PREDICTIONS CALCULATED OVER THE 12 PRECEDING MONTHS :

Periods of prediction (months)	0	1	2	3	4	5	6
Mean error	—6,0	—7,0	—6,9	—6,4	—5,7	—5,3	—4,4
Standard deviation of the error	$\pm$8,0	$\pm$9,7	$\pm$9,4	$\pm$9,9	$\pm$10,0	$\pm$10,0	$\pm$11,0

● Φ *****

Year \ Month	3	4	5	6	7	8	9	10	11	12
1967	150	(157)	(163)	(170)	(177)	(185)	(193)	(201)	(210)	(219)

(*****) Prediction by a method of extrapolation devised by the CCIR Secretariat, pursuant to Resolution 30 of the XIth CCIR Plenary Assembly (Oslo, 1966). For the values in brackets, the error probably exceeds the value of ± 10 units of Φ. The ITU computer has been utilized for the calculation of these values.

Mean error in Φ predictions calculated over the 12 preceding months :

Period of prediction (months)	0	1	2	3	4	5	6	7	8	9
Mean error	—2,2	—3,5	—4,8	—6,0	—8,0	—10,7	—13,0	—14,2	—15,4	—15,4
Standard deviation of the error	±7,6	±9,1	±9,8	±10,4	±10.9	±10,4	±11,4	±12,8	±16,5	±21,5

Commission V on Radio Astronomy

THE REGISTRATION OF FREQUENCIES FOR RADIO ASTRONOMY

We call the attention of radioastronomers to the following memorandum (Doc. IUCAF/101) asking their assistance for the protection of frequency bands allocated to radio astronomy.

The present memorandum is being addressed to radio astronomers with the object of assisting them to secure improved protection from interference in the several bands of radio frequencies allocated to radio astronomy in the current Radio Regulations (1963) of the International Telecommunication Union.

1. — The International Registration of Frequencies.

As a result of the circulation of previous requests, this Inter-Union Commission (IUCAF) has received reports of the frequencies in use at many radioastronomy observatories throughout the world. The details received up to 31st January 1967 are listed in Table I.

The frequencies are separated in accordance with their use for observations falling within Classes A and B, where are defined as follows :

Class A : Those observations for which the sensitivity of the equipment is not a primary factor;

Class B : Those observations, which are of such a nature that they can be made only with advanced low-noise receivers using the best techniques.

Most of the details in Table I have been communicated by the respective national administrations to the IFRB at Geneva for appropriate registration. In a few cases, as given in Table II, some observatories have informed the IFRB of frequencies in use, which have not so far been notified to IUCAF.

It will be noted that in Table I there appear several entries of frequencies outside the allocated bands. No protection is available for these frequencies, and IUCAF suggests that their registration with IRFB should only be contemplated if there is a strong scientific reason for their use. For example, observations might be attempted at the frequency of a unique spectral line or to explore the variation of polarisation of background radiation at frequencies spaced closer than one octave.

The IUCAF is anxious to keep in touch with all observational work, and welcomes reports of all frequencies in use, including those unsuitable for registration with IFRB.

2. — Reports of interference.

Interference to radio-astronomical observation should normally be dealt with by the appropriate national administration in each country, who will if necessary ask for help from the IFRB. It is most important to record as many details as possible in all cases

of interference. It is understood that the IFRB has not so far been informed of any cases of interference, even though many radio astronomers have said they have suffered badly from interference.

3. — Observations in the Standard Frequency Bands at 5, 10, 15, 20 and 25 MHz.

This Inter-Union Commission (IUCAF) draws attention to the provision for the use of the guard bands around the standard frequencies detailed above. Bandwidths of ± 5 kHz are available at the two lowest frequencies (5 and 10 MHz) and of ± 10 kHz at the other three. The frequency band around 15 MHz, which is 20 kHz wide, is particularly suitable since it fits well into the harmonic series in use for radioastronomy. While observations at these lower frequencies are becoming increasingly important, we are unable to ask for clear bands unless we can show that these bands are not wide enough, or are unusable because of interference. If radioastronomy observers wish to obtain allocations at any frequency below 30 MHz they should :

(*a*) Report interference in the guard bands to their National Administration and send an account of their experience in the matter ot IUCAF.

(*b*) Make a case, through IUCAF and through the National Administrations, for an allocation in a suitable frequency range with an adequate bandwidth for the observations they wish to make.

4. — Meetings of IUCAF are held approximately twice a year, and the Commission welcomes requests from radio astronomers on any matters concerning the use and protection of frequencies in use at observatories throughout the world.

TABLE I

Summary of Details of Radioastronomy Observatories reported to IUCAF up to 31st January 1967

Country	Administration	Location of Observatory	Frequencies in MHz in use for Observations in Class	
			A	B
stralia	CSIRO } Sydney }	Culgoora, NSW	158.5	80
		Culgoora, NSW	5 to 2,000 (swept)	
stralia	CSIRO } Sydney }	Parkes, NSW	—	153 408 610 960 1,405 1,410 1,420 1,665 2,650 5,000 473 1,400
stralia	University of Sydney	Molonglo, Hoskinstown, NSW	These could be A or B	111.27 408
		Fleurs, St. Marys, NSW	These could be A or B	14.15 20 30 48 85 726.5 1,423
stralia	CSIRO and RCA, NY	Bothwell, TAS	2.1	—
stralia	University of Tasmania	Llanherne, TAS	—	0.004 (4 kHz)
stralia	University of Tasmania	Llanherne, TAS	—	18.5 24.5 28.0 40.0 *20.0 to 40.0 *18.0 to 20.0 *20.0 to 200 *Spectrum Analysers

Country	Administration	Location of Observatory	Frequencies in MHz in use Observations in Class A	Frequencies in MHz in use Observations in Class B
Australia		Sorell		9.6
Brazil	Mackenzie University	Sao Paulo		325
				410
				1,420
				7,000
Canada	Dominion Radio Astrophysical Observatory	Penticton	10.030	408
			22.250	1,413.5
				2,695
Canada	National Research Council	Algonquin	22.5 to 117.5 (20 bands)	1,400
				2,800
				3,200
			74	6,600
			2,830	10,690
			2,770	13,500
				31,250
Canada	Queen's University	Kingston, Ontario	—	146
				222
				858
France	Observatoire de Paris-Meudon	Nancay	169	408
			408	610
			9,150	1,413
				2,695
				4,995
				10,690
Germany	Heinrich Hertz Institute of German Academy of Science (DDR)	Berlin-Adlershof	3,453	775
			3,487	beginning in 1966
			9,456	
			9,522	
Germany	Heinrich Hertz Institute of German Academy of Sciences (DDR)	Aussenstelle, Neustrelitz	557	
			begining in 1966	
			1,457	
			1,523	
			1,967	
			2,033	
			9,106	
			9,172	

Country	Administration	Location of Observatory	Frequencies in MHz in use for Observations in Class	
			A	B
rmany	Bonn University	Bonn	1,400-1,415 10,680-10,700 15,350-15,400	1,418-1,424 2,690-2,700 4,990-5,000
rmany	Radioastronomy Observatory	Kiel	800 1,320 2,695	240 440 1,420
rmany	Astronomical Institute	Tubingen	408 610 1,000 3,750 9,800 and one frequency in each of the bands : 60-80 130-160 300-330	30-46* 46-540* *spectrum analysers
rmany	State Observatory	Bochum	Various frequencies between 20 and 8,400	1,421
ly	Bologna University	Bologna	—	408
pan	University of Kyoto	Kyoto	300	—
pan	University of Niigata	Niigata	500	—
pan	National Science Museum	Tokyo	6,440 6,560	—
pan	Radio Research Laboratories	Kashima	—	1,666 4,170
pan	Radio Research Laboratories	Hiraiso	201 500	—
pan	Nagoya University	Toyokawa	1,000 2,000 3,690 3,810 4,000	2,695 4,995 9,415 15,375

Country	Administration	Location of Observatory	Frequencies in MHz in use Observations in Class	
			A	B
Japan *(continued)*	Nagoya University	Toyokawa	2,000 } 4,000 } 4,995 9,340 } 9,460 } 9,415	
Japan	University of Tokyo	Nobeyama	25 38 58 74 114 160 227.5 408 612 2,695 4,995 15,375	—
Japan	University of Tokyo	Mitaka	227.5 326 408 612 800 300-800 (spectral receiver) 2,695 10,690 19,320 } 19,380 } 31,340 } 31,460 }	— 1,420.4 1,666 2,695 4,995 10,690 19,350
Netherlands	Sterrewacht Leiden	Dwingeloo	—	408 465 610 820 1,418 1,420.4

Country	Administration	Location of Observatory	Frequencies in MHz in use for Observations in Class	
			A	B
therlands	PTT and Utrecht University	Nera, Nederhorst den Berg	136 196 255 610 2,980 9,600	—
rway	University of Oslo	Harestua	140-175 300-340 200 225	—
land	N. Copernicus University	Piwnice	32.5 127 2 Antenna Systems 327	
eden	—	Kiruna	—	27.6 50
eden	—	Onsala Raaoe	—	136 150 960 1,410 1,420 1,612 1,665 1,667 1,720 2,298 4,170 8,872.5 9,793.8
ıited ngdom	University of Manchester	Jodrell Bank	—	38 151.5 408 610 1,420 1,400-1,425 1,664.4 1668.4 2,695 4,995 10,690

Country	Administration	Location of Observatory	Frequencies in MHz in use Observations in Class	
			A	B
United Kingdom	University of Manchester	Wardle	—	38 151.5 408 610 1,420
United Kingdom	University of Cambridge	Cambridge	—	13.05 26.5 (or 26.3) 38.0 81.5 151.5 408 610 1,413.5 2,695 4,995
Unit d Kingdom	Ministry of Technology	Defford	—	38 610 1,421 2,695
USA	University of Texas	Austin, Texas	35,000 70,000 94,000 140,000	—
USA	Stanford University	Stanford, California	3,292.4	425 2,926 3,074 3,213 3,343 3,470 10,690
USA	Ohio State University	Delaware, Ohio	—	1,415
USA	California Institute of Technology	Bigpine, California	—	74 611 960 1,420 1,665 2,840 10,690

Country	Administration	Location of Observatory	Frequencies in MHz in use for Observations in Class	
			A	B
A	Massachusetts Institute of Technology	Haystack, Tyngsboro, Mass.	—	1,420 1,610 1,666 } OH 1,720 } line 5,000 8,000 15,500 35,000
A	University of Colorado	Boulder, Colorado	8.927 17.985 36.1 7.6 to 41	—
A	Harvard University	Radio Astronomy Station, Fort Davis, Texas	63 (25-100 sweep)	210 (100-320 sweep) 920 980 5,000
A	Cornell University	Arecibo (Puerto Rico)	—	40 73.8 195 430 611
A	Pennsylvania State University	Pennsylvania	108 328 960 2,700 10,700 36,000 70,000	5-15 108 2,700 36,000 70,000

TABLE II

Details of Frequencies used by Radioastronomy Observatories, notified to IFRB but not to IUCAF

(as at December 1966)

Country	Name and Coordinates of Station			Frequencies in use MHz
Italy	Medicina	11E39	44N31	408 ± 2
India	Bombay	73E07	19N10	612 ± 4
USA	Danville, Ill.	87W33	40N04	610.5 ± 2.5
USA	Hamilton, Mass.	70W49	42N38	611 ± 1.5
USA	Harvard, Mass.	71W33	42N30	1,667 ± 1
USA	Hamilton, Mass.	70W49	42N38	2,700 ± 5
USA	Ft. Davis, Texas	103W56	30N38	5,000 ± 100
USA	Green Bank, W. Va.	79W50	38N26	1,666 ± 1.25
USA	Green Bank, W. Va.	79W50	38N26	15,380 ± 40
USA	Green Bank, W. Va.	79W50	38N26	31,400 ± 150

FREQUENCIES FOR RADIO ASTRONOMY IN THE BAND 404-410 MHz

The attention of the Members of Commission V is called to the following letter from Prof. F. G. Smith, Chairman of IUCAF (IUCAF Doc./105) :

To all Radio Astronomers.

Dear Colleagues,

Frequencies for Radio Astronomy in the band 404-410 MHz

You will already be aware of the serious difficulties in obtaining frequency allocations for radio astronomy at frequencies below 1420 MHz. My committee was asked by the URSI (Munich 1966) :

> « ... to press for improved and world-wide protection in the frequency bands for observation of the continuum of cosmic radiowaves, and in particular the band 322-329 MHz which is needed also for observation in the natural line radiation from Deuterium ».

We have always hoped to obtain a proper allocation of the Deuterium band 322-329 MHz for radio astronomy; we still hope for this, but our most recent information on the present usage of frequencies in this band suggests that it is not available in many parts of the world, and that it cannot become available in the foreseeable future.

The frequency band 406-410 MHz therefore assumes a great importance, since it is the lowest frequency band above 38 MHz in which there is an allocation to radio astronomy on a world-wide basis. It is already in use in several countries, notably in large installations in Australia, Italy and the U. K., and very strong efforts have been made nationally and internationally to preserve the band for radio astronomy.

We must note, however, that this band is allocated to radio astronomy only in the term of Footnote 317 of the Radio Regulations (1963) of the International Telecommunication Union, which is as follows :

> « The band 404-410 MHz in Region 2 and the band 406-410 MHz in Regions 1 and 3 are also allocated to the radio astronomy service. An appropriate continuous band within these limits shall be designated on a national or area basis. In making assignments to stations of other services to which these bands are allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference ».

Many national administrations have interpreted this uniformly as an allocation of 406-410 MHz to radio astronomy, some existing assignments for other services being continued on a non-interference basis. We have not been informed of any use of 404-406 MHz for radio astronomy.

The importance of world-wide as opposed to regional allocations, needs little emphasis. (The moon, can, and has, reflected interfering signals into radio telescopes. Interferometry using intercontinental baselines is becoming feasible and desirable.) It has been suggested that every national administration should be asked to allocate the same band, 406-410 MHz, to radio astronomy allowing only for the preservation of some existing assignments. We therefore ask you to let us know, possibly through your national

committee of radio astronomers or through your national frequency administrations, the answers to the following questions :

(i) Does your observatory plan to continue, or to start observations in the band 406-410 MHz during the next few years ? If not, are you satisfied with the use of other frequency bands ?

(ii) Are you able to use the band 406-410 MHz with reasonable freedom from interference ?

(iii) Has your national administration allocated the band 406-410 MHz to radio astronomy, and if so, on what basis ?

The IUCAF expects to meet in the USA on 5th June 1967. We would be greatly helped if we could hear from you before then about this matter, and any other which you like us to consider at our meeting.

F. G. SMITH,
Chairman, IUCAF

Commission VI on Radio Waves and Circuits

SYMPOSIUM ON INFORMATION THEORY

Athens, September 1967

MEMBERSHIP OF THE COMMITTEES

1. *Host* : Prof. Dr. H. MARIOLOPOULOS, President, URSI Greek National Committee.
Admiral J. THEOFANIDES.

2. *Organizing Committee* : B. AGIUS.
B. ELSPAS.
R. GALLAGER.
M. PINSKER.
F. STUMPERS, Chairman of URSI Commission VI.
G. THEOPHILOPOULOS, D. ILIAS } URSI Greek National Committee.

3. *Local Arrangements* : S. Boukis.
E. Vourgourakis.
N. Kariambas.
G. Chrysssanthakis
J. Koutos
G. Filokyprou
} URSI Greek National Committee.

Commission VIII on Radio Noise of Terrestrial Origin

MEMBERSHIP

Chairman : Mr. F. Horner, Radio and Space Research Station, Ditton Park, Slough, Bucks, United Kingdom.

Vice-Chairman : Prof. R. Rivault, Faculté des Sciences de Poitiers, Laboratoire de Physique de la Haute Atmosphère, route de Chauvigny, Poitiers, France.

Secretaries : Dr. R. Gendrin, CNET, 3, avenue de la République, Issy-les-Moulineaux (Seine), France.

Dr. M. J. Rycroft, Imperial College of Science and Technology, Prince Consort Road, South Kensington, London S. W. 7, United Kingdom.

Members :

Australia : Prof. H. C. Webster, Physics Department, University of Queensland, St-Lucia, Brisbane, Queensland.

Brazil : c/o Fernando de Mendonça, Scientific Director, CNAE, Sao Jose dos Campos (SP).

Canada : Mr. E. A. Walker, Defence Research Telecommunications Establishment, Defence Research Board, Shirley Bay, Ottawa 4, Ontario.

Czechoslovakia : Ing. F. Jiricek, Geophysical Institute of the Czechoslovak Academy of Sciences, Praha 4, Bočni II, 1a.

Denmark : Dr. Eigil E. Ungstrup, Danish Space Research Institute, Technical University, Lyngby.

France : Prof. R. RIVAULT, Faculté des Sciences de Poitiers, Laboratoire de Physique de la Haute Atmosphère, route de Chauvigny, Poitiers.

Germany : Dr. H. VOLLAND, Sternwarte der Universität, Bonn.

Greece : Mr. DIMITRIOS ELIAS, Dr. Physical Sciences, 31 Evelpidon Street, Athens 812.

Hungary : c/o Hungarian National Committee of URSI, Nador u. 7, Budapest.

India : Prof. S. V. CHANDRASEKHAR AIYA, Indian Institute of Science, Bangalore 12.

Italy : Prof. MAURIZIO GIORGI, c/o CCIG, Consiglio Nazionale delle Ricerche, Piazzale Scienze 7, Roma.

Japan : Dr. HIROSHI SHINKAWA, Research Laboratory, Kokusai Denshin Denwa Co. Ltd., 2-1-13 Naka-Meguro, Meguro-ku, Tokyo.

Netherlands : Mr. J. J. BLOEMSMA, Mient 551, The Hague.

New Zealand : Mr. G. McK ALLCOCK, Physics and Engineering Laboratory, DSIR, Private Bag, Lower Hutt.

Norway : Mr. EIVIND THRANE, c/o Dr. F. LIED, President of the Norwegian National Committee, Norwegian Defence Research Establishment, Kjeller near Oslo.

Poland : Prof. S. JARKOWSKI, Telecommunication Institute, ul. Szachowa 1, Warszawa-Miedzeszyn.

Republic of South Africa : Dr. D. J. MALAN, Bernard Price Institute, Univeristy of the Witwatersrand, Milner Park, Johannesburg.

Sweden : Prof. STIG LUNDQUIST, Uppsala University, Institute of High Tension Research, Uppsala.

United Kingdom : Mr. F. HORNER, Radio and Space Research Station, Ditton Park, Slough, Bucks, United Kingdom.

USA : Dr. E. T. PIERCE, Stanford Research Institute, Menlo Park, Calif. 94025.

USSR : Ja. I. LIKHTER, IZMIRAN, p/o Akademgorodok, Moscow Region.

INTER-UNION COMMISSIONS

IUCAF

NAMES AND ADDRESSES (Doc. IUCAF/102)

URSI :

Dr. J. W. FINDLAY, National Radio Astronomy Observatory, Edgemont Dairy Road, Charlottesville, Virginia, 22901, USA.

Mr. A. J. HIGGS, CSIRO, Division of Radiophysics, University Grounds, Chippendale. NSW, Australia.

Dr. H. STERKY, Sibyllegatan, 43-45, Stockholm, Sweden.

Prof. V. V. VITKEVITCH, c/o Academy of Sciences, Prospekt Marksa 18, Moscow K-9, USSR.

Secretary General : Colonel E. Herbays, 7 Place Emile Danco, Uccle, Bruxelles 18, Belgium.

IAU :

Prof. F. G. SMITH (Chairman), University of Manchester, Nuffield Radio Astronomy Laboratories, Jodrell Bank, Macclesfield, Cheshire, United Kingdom.

Dr. J. F. DENISSE, Directeur, Observatoire de Paris, 61 Avenue de l'Observatoire, Paris, XIV^{e}, France.

Dr. V. A. SANAMIAN, Burakan Astrophysical Observatory, Erevan, Armenia, USSR.

Prof. Dr. A. UNSÖLD, Direktor des Instituts für Theoretische Physik und Sternwarte der Universität, Olshausenstrasse, Neue Universität, Haus 4', Kiel, Deutsche Bundesrepublik, Germany.

Secretary General : Dr. J.-C. PECKER, Observatoire de Nice, Le Mont-Gros, Nice, Alpes Maritimes, France.

COSPAR :

Dr. John P. HAGEN, Pennsylvania State University, 103 Whitmore, University Park, Pennsylvania, 16802, USA.

Prof. H. C. VAN DE HULST, Sterrewacht, Leiden, Netherlands.

Mr. F. HORNER, Radio and Space Research Station, Ditton Park, Slough, Bucks, United Kingdom.

Prof. G. PUPPI, Physics Institute, University of Bologna, Bologna, Italy.

Executive Secretary : Mr. M. J. GAZIN, 55 Boulevard Malesherbes, Paris 8e, France.

Consultants :

Prof. J. H. OORT, Sterrewacht, Leiden, Netherlands.

Dr. E. J. BLUM, Observatoire de Paris, Section d'Astrophysique, Meudon (Seine et Oise), France.

Prof. HARUO TANAKA, Director, The Research Institute of Atmospherics, Nagoya University, Toyokawa, Aichi, Japan.

Ex Officio Advisers :

Mr. J. W. HERBSTREIT, Director, CCIR, Place des Nations, Genève, Switzerland.

Mr. I. J. PETROV, IFRB, Place des Nations, Genève, Switzerland.

Secretary General-IUCAF : Dr. R. L. SMITH-ROSE, 21, Tumblewood Road, Banstead, Surrey, United Kingdom.

Secretary General-ICSU : Prof. D. BLASKOVIC, Virological Institute, Bratislava, Czechoslovakia.

President-ICSU : Dr. J. M. HARRISON, Department of Mines and Technical Surveys, 588 Booth Street, Ottawa, 4, Ontario, Canada.

15th March 1967.

R. L. SMITH-ROSE,
Secretary-General

Inter-Union Commission on Solar-Terrestrial Physics (IUCSTP)

AIDE-MEMOIRE

Discussions held at Unesco Headquarters on 3 April 1967 between officers of UNESCO and of the ICSU Inter-Union Commission on Solar-Terrestrial Physics

At the meeting of the ICSU-UNESCO Coordinating Committee held in Paris on 16-17 January 1967, the question was raised as to the role which Unesco may play in the future, in promoting international cooperation in those branches of geophysics covered by the newly-created Inter-Union Commission on Solar Terrestrial Physics (IUCSTP). In order to explore this question, Dr. H. Friedman and Dr. C. M. Minnis (respectively Chairman and Secretary of IUCSTP), visited Unesco Headquarters on 3 April 1967 on the invitation of Dr. G. Burkhardt, Director of the Department for the Advancement of Science. Dr. E. M. Fournier d'Albe, Acting Director of the Division for International Co-operation in Scientific Research and Documentation, took part in the discussions.

The Unesco representatives explained that in the course of 1967 the Director-General of Unesco would have to take certain decisions regarding the draft programme of the Organization for 1969-70 (to be submitted to the General Conference of Unesco in the autumn of 1968), as well as with regard to the long-term planning of Unesco's activities in the field of science. In the past, Unesco had actively collaborated with and supported the International Geophysical Year and the IQSY programmes, and it was felt that this fruitful cooperation with ICSU might well be continued, provided that there were opportunities for Unesco to make useful and significant contribution, consistent with its character as an inter-governmental organization.

The IUCSTP representatives explained the present state of organization of the Inter-Union Commission and said that the two principal questions being examined at the present time were : (*a*) the long-term planning and co-ordination of international collaboration in the study of the physics of solar-terrestrial rela-

tionships, and (*b*) the need for international co-operation in the rapid collection, analysis and communication of observational data on the physical state of the sun and of interplanetary space.

The second question was discussed at some length in view of its practical implications for the coming generation of high-flying passenger aircraft and for manned space flights. The Unesco representatives suggested that if, after examination of the technical aspects of the problem, it were concluded that some inter-governmental agency would have to be set up in order to organize and operate an efficient International Solar-Terrestrial Service of the kind envisaged, then Unesco could well provide the machinery for the necessary inter-governmental consultation and decision-making prior to the establishment of such a Service. It was agreed that this question should be given further study, with this possibility in mind, and it was noted that opportunities for detailed discussion by many of the persons concerned would occur during the IQSY/COSPAR meetings in London in July. The subject could thus also be examined at the meeting of the ICSU/UNESCO Coordinating Committee which will be held in London on 22 July 1967.

The IQSY/COSPAR meetings in July will also provide an occasion for further examination of the possibilities for future cooperation between Unesco and IUCSTP in the field of research.

In conclusion, it was agreed that a note on these preliminary discussions should be communicated, for information, to the ICSU Secretariat, to the International Ursigramme and World Days Service, to COSPAR and to national institutions known to be interested in this subject.

SERVICES PERMANENTS

Service International des Ursigrammes et Jours Mondiaux

RAPPORT SUR LES ACTIVITES DE 1966

Le Service International des Ursigrammes et Jours Mondiaux (IUWDS) est un *service permanent* de l'Union Radio Scientifique Internationale (URSI) en association avec l'Union Astronomique Internationale (UAI) et l'Union Internationale de Géodésie et Géophysique (UIGG). L'IUWDS adhère à la Fédération des Services d'Astronomie et de Géophysique (FAGS) : par son intermédiaire, il reçoit des subventions de l'UNESCO pour une partie de ses activités et de ses publications.

* * *

Le service s'attache à réaliser une *coopération immédiate et permanente* entre tous les scientifiques intéressés par l'activité solaire et ses conséquences géophysiques. Comme service permanent l'IUWDS apporte aussi son concours à l'UAI et au COSPAR pour des activités épisodiques.

* * *

La surveillance de l'activité solaire et géophysique ne peut se réaliser que par une *coopération volontaire* de tous les observatoires et instituts qui y sont intéressés. L'IUWDS organise cette coopération grâce à ses centres régionaux ou à ses centres associés : ceux-ci réunissent dans une région donnée les informations obtenues et les diffusent soit directement, soit vers les autres centres régionaux en utilisant les moyens de communications les plus rapides. Grâce à cette organisation, la plupart des phénomènes observés sont connus *dans le monde entier quelques heures* après l'événement.

* * *

Cette diffusion rapide a deux buts : d'une part l'information pure et simple, d'autre part l'établissement de prévisions de l'activité solaire ou géophysique à l'intention de tous ceux qui y sont intéressés.

Comme exemple particulièrement caractéristique et exceptionnel de cette diffusion de *l'information*, prenons celui du centre de Stockholm, en Suède. Les messages codés appelés URSIGRAMMES sont diffusés tout d'abord aux instituts directement intéressés : Observatoires d'Astronomie d'Uppsala, de Stockholm (Saltsjöbaden) et station d'Anacapri (Italie), Observatoire Géophysique de Kiruna, Observatoires Ionosphériques de Lulea, de Lycksele et d'Uppsala, mais aussi à la Station Radio d'Enköping, aux Instituts de Technologie de Stockholm et de Göteborg, à l'Institut de Géodésie d'Uppsala, à différents organismes de la Défense Nationale et de la Marine, aux Chemins de Fer Suédois, à deux journaux et à l'Agence Centrale Suédoise d'Information.

Les prévisions concernent des disciplines variées et portent sur des périodes de temps très diverses.

La plupart des centres régionaux ont été établis au départ pour faciliter les transmissions par radio. De ce fait, il existe une tradition assez longue de prévision des *conditions de propagation* : prévision à long terme, c'est-à-dire plusieurs mois à l'avance, compte tenu de l'évolution probable de l'activité solaire complétée par une prévision à court terme, de l'ordre de la semaine et du jour, destinée à tenir compte de la situation réelle et surtout des perturbations occasionnelles liées aux événements solaires. Pour répondre à ce besoin un certain nombre de centres régionaux, notamment ceux de Fort Belvoir (USA), de Moscou (URSS) et de Kokubunji (Japon) travaillent 24 heures sur 24 et sont capables d'envoyer des alertes ou de fournir des prévisions portant sur une période très courte de 6 à 12 heures.

Cette prévision étant liée à la connaissance de *l'activité solaire* et de *l'activité géomagnétique*, on a été amené à faire de la prévision dans ce domaine. Depuis quelques années des progrès considérables ont été faits dans la connaissance des phénomènes solaires; ces progrès sont liés au développement de techniques nouvelles (radioastronomie, mesure des champs magnétiques solaires, etc...) et à l'augmentation du nombre d'observatoires, principalement dans les régions aurorales. Par ailleurs les expériences spatiales ont à la fois apporté des connaissances en ce domaine et posé des

exigences : il n'est pas possible d'envoyer des hommes dans l'espace sans s'assurer que pendant le voyage ils ne risquent pas les véritables tempêtes cosmiques que constitue soit l'arrivée de protons très énergiques (plus de 100 Mev) soit le passage des nuages de plasma solaire lié aux perturbations géomagnétiques. On assiste donc sur le plan des observations à un effort gigantesque de certaines organisations pour assurer par elles-mêmes une surveillance et une prévision quasi permanente de l'activité solaire.

Dans le cadre de l'IUWDS, les scientifiques qui leur fournissent en fait les connaissances dont ils ont besoin, ont eux aussi perfectionné leurs méthodes. C'est ainsi que lors du *Congrès de Belgrade* (31 août 1966), le service a changé ses *normes de prévisions de l'activité solaire*, en se proposant d'alerter les organismes intéressés lorsqu'il identifie sur le disque solaire soit un *centre d'activité particulièrement éruptif* (moins de 10 % des centres observés fournissent les trois quarts des éruptions) soit *un centre capable de donner une éruption à protons* de grande énergie (ce sont des événements particulièrement rares et importants). Dans l'un et l'autre cas la position du centre suspect est donnée et la prévision est renouvelée toutes les 24 heures. Bien entendu les *éruptions à protons*, prévues ou imprévues, sont signalées aussitôt que possible, ainsi que les *orages géomagnétiques* qui rentrent aussi dans le cadre de cette prévision; ces nouvelles normes sont appliquées depuis le 1er janvier 1967.

Dans la plupart des pays, cette activité solaire intéresse aussi les *services de météorologie* qui étudient son influence possible sur les phénomènes météorologiques de sorte qu'il existe une coopération très active avec ces services. En particulier l'IUWDS transmet aux périodes d'équinoxe des messages météorologiques spéciaux (STRATWARM) pour signaler les échauffements de la stratosphère qui se produisent dans les zones aurorales : ceux-ci sont en relation avec les changements de saison et le renversement du régime des vents. D'autre part la météo assure la transmission des Géoalertes de l'IUWDS et des informations concernant les satellites météorologiques.

* * *

L'année 1966 a permis la mise à l'épreuve des possibilités de l'Organisation à propos d'un certain nombre d'expériences soit régionales, soit mondiales. Cette coopération a été un succès qui

marque une évolution dans les possibilités du service et réalise pleinement ses ambitions.

A l'initiative du Dr Svestka, Président de la Commission 10 de l'UAI, un *projet d'étude des éruptions à protons* (PFP) a débuté le 1er mai 1966, patronné par l'IQSY et encouragé par l'IUCSTP. Ce projet proposait d'une part une observation intensive des centres à protons et des éruptions à protons, d'autre part une publication concertée des observations obtenues. La première partie qui devait s'étendre jusqu'à la fin du mois de septembre 1966 nécessitait une prévision des éruptions à protons et sa diffusion immédiate à tous les observatoires coopérants, soit quatre-vingt observatoires répartis dans le monde entier. L'IUWDS a permis la pleine réussite de cette partie du programme qui avait été confiée au secrétaire de l'IUWDS assisté d'un certain nombre d'experts qualifiés. Le centre de Meudon, bénéficiant du concours total de l'observatoire de Meudon et de ses experts et de celui de la plupart des observatoires solaires (en particulier de celui de Toyokawa), a pu prévoir les deux éruptions à protons les plus spectaculaires de cette période. Ce résultat est très encourageant pour un premier essai. Il a montré que les techniques utilisées étaient valables et que le réseau de l'IUWDS pouvait assurer les liaisons rapides nécessaires à ce genre d'expérience.

Sur un plan plus restreint l'IUWDS a apporté au *SPARMO* l'appui de son organisation, lors des deux campagnes de lâchers de ballons pour l'étude du rayonnement cosmique. La première, pendant les deux premiers mois de 1966 se déroulait simultanément dans les zones aurorales arctiques et antarctiques soit à partir de bases fixes, soit à partir de bases mobiles. Malgré les difficultés de liaisons, les bulletins de prévisions sont arrivés en général dans l'heure qui suivait leur émission. La seconde, en juillet-août a permis l'observation complète de l'événement du 7 juillet dans les zones aurorales arctiques.

* * *

De façon organique, mais épisodique, le service permanent prête son concours au COSPAR et à l'UAI.

Le COSPAR a la responsabilité d'identifier tous les satellites et toutes les sondes spatiales et de fournir aux organismes intéressés les éléments de calcul des satellites et des renseignements sur le

fonctionnement de ceux qui peuvent donner lieu à une observation internationale. En fait c'est le centre mondial de l'IUWDS à Fort Belvoir qui joue alors le rôle essentiel en centralisant les informations pour le compte du COSPAR et en les diffusant par télégramme ou par lettre circulaire (tous les quinze jours) selon l'intérêt des expériences.

L'UAI a un service, actuellement à la charge du Smithsonian Observatory de Cambridge (Massachusetts), pour annoncer les observations de comètes, de novae et en général de tout objet imprévu pouvant intéresser les astronomes. L'IUWDS est chargé de transmettre les informations : cette année une vingtaine de télégrammes ont été envoyés et l'année s'est terminée sur un événement totalement imprévu, la découverte d'un nouveau satellite de Saturne qui a pu être confirmée en quelques jours grâce aux Télégrammes Astronomiques.

* * *

Une charge plus routinière est celle de favoriser *l'observation simultanée* dans certains domaines ou de *publier simultanément* des observations relatives à des disciplines très différentes. Dans l'un et l'autre cas, il s'agit d'une coordination originale qui n'est assurée par aucun autre organisme.

Le premier but est atteint par la publication du *Calendrier Géophysique International* dans de nombreuses revues ou par sa diffusion à de nombreux observatoires. Il prévoit suivant le rythme des observations, un jour par semaine (RGD), trois jours par mois (RWD), deux semaines par saison (WGI) et quelques autres jours répartis dans l'année, tous particulièrement propres aux observations ionosphériques, au tir de fusées météorologiques et à toutes mesures locales qui peuvent bénéficier d'une simultanéité avec d'autres observations.

L'« Abbreviated Calendar Record » rassemble pour chaque jour les diverses observations solaires et géophysiques. C'est une compilation unique qui paraît après un délai de quelques mois dans les IQSY Notes. Pour les années 1960 à 1965, l'édition définitive paraîtra dans « Annales de l'IQSY ».

* * *

L'ensemble de l'organisation du service a été décrit en détail cette année dans le n° 19 des IQSY Notes sous le titre « 1966-1967 World Day Program ». Ce fascicule est disponible sans frais auprès du Secrétaire de l'IUWDS (Dr P. Simon, Observatoire, 92 — Meudon — France). Il décrit l'organisation des Jours Mondiaux, les programmes scientifiques recommandés pour ces jours ou périodes, l'organisation des échanges de messages, d'alertes et de prévisions, l'organisation des divers centres, les diverses activités du service et pour conclure donne des informations très complètes sur les centres mondiaux et régionaux, les représentants nationaux et la composition du comité de direction.

* * *

Favoriser cette coopération entre des disciplines parfois très diverses est une tâche ingrate mais cependant très passionnante; *ingrate* car chacun s'intéresse principalement à ses propres problèmes et nul ne peut prétendre à une compétence dans tous les domaines; *passionnante* car elle est indispensable en raison des problèmes que vont poser les voyages de l'homme dans l'espace, et surtout elle permet d'établir des relations exceptionnelles avec un grand nombre de personnes diverses qui apportent volontiers leur coopération active et aimable, ce qui est très réconfortant.

P. Simon,
Secrétaire de l'IUWDS.

CONTRIBUTION OF THE GERMAN NATIONAL COMMITTEE

by B. Beckmann

Since the establishment of the « Arbeitsgemeinschaft Ionosphäre » (Working Group on Ionosphere) in 1950, the Deutsche Bundespost has conducted the affairs of this organization and has also been responsible for the Ursigram Service. From that time on the latter service has been combined with the « Funkwetterdienst » of the Fernmeldetechnisches Zentralamt, which issues routine long- and short-term forecasts of the ionospheric

wave propagation conditions to the Deutsche Bundespost and other administrations and agencies. The appropriate data of the Ursigram Service are evaluated for this purpose. The abovementioned « Arbeitsgemeinschaft Ionosphäre » of the German geo- and astrophysical institutions is comprised of the scientific institutions, observatories, etc. which take part in the Ursigram Service by making available observational data, as well as the scientific bodies interested in the reports. As a rule this Working Group meets once a year at Kleinheubach together with the German National Committee of URSI and the professional group « Wave Propagation » of the Nachrichtentechnische Gesellschaft. The problems of co-operation arising in all fields, including those of the Ursigram Service, are discussed at this meeting. Moreover, a sub-committee on Ursigrams has been set up by the German National Committee of URSI, where questions of co-ordination are dealt with.

Since the International Geophysical Year 1957/1959 the « Funkwetterdienst » of the Fernmeldetechnisches Zentralamt (now Research Group VC « Ionosphere » of the Research Institute) has taken over the « World Days Service » — introduced when planning the IGY — for Western Europe. The work is done together with the centres in Paris and Nera. From that date the Fernmeldetechnisches Zentralamt has been a Regional Warning Center (RWC) of the International Ursigram and World Days Service (IUWDS) which adheres to the Federation of Astronomical and Geophysical Services (FAGS). It took an active part in the establishment of this service both on a national and an international level — European Regional Committee on Ursigrams (ERCU). The International Radio Consultative Committee (CCIR) of the International Telecommunication Union has recommended participation in this service to all telecommunications administrations. The German Administration has thus made a valuable contribution to the work of IUWDS.

The IQSY fell in the period between the last and the present General Assemblies of URSI. The activities of the Darmstadt RWC, for the most part, comply with the proposals made by the IUWDS for the IQSY and laid down in the IQSY Manual No. 1 « World Days » (see paper presented by B. Beckmann, Kleinheubacher Berichte, Vol. No. 9, p. 129, issued by the Fernmeldetechnisches Zentralamt Darmstadt).

All incoming data of priorities I and II are mailed by the Darmstadt RWC as follows :

A. Regional Ursigram of RWC Darmstadt
B. Copy of the interchange Ursigram from WWA
C. Copy of the interchange Ursigram from RWC NERA
D. Copy of the interchange Ursigram from RWC PARIS
E. Copy of the interchange Ursigram from RWC MOSCOW
F. Copy of the interchange Ursigram from RWC TOKYO
G. Copy of the Ursigram from ARWC PRAGUE
H. Copy of the Ursigram from ARWC STOCKHOLM

Priority I data are also distributed by telegraph. A duplication of the data is thus avoided.

There is, as a rule, an interchange of one telegram per day between the Centres. In urgent cases special information follows. The detailed schedule is : In the morning, i.e. before office hours, the Washdarm report from Washington is received. At 1030 UT there follow the reports from France, Prague and Moscow (via Prague), at 1100 UT from Tokyo via Nera, at 1130 UT from Stockholm, at 1245 UT from Nera, at 1515 UT a second report from France and at 2400 UT the observations of the Kanzelhöhe (Austria) as the last report of the day. At 2000 UT the data from India are received by our radiopropagation monitoring station Detmold. These data are available in Darmstadt by the next morning. At 0700 UT the Washdarm report is passed on to Stockholm and Prague. At 1230 UT German telegraph messages are sent to Washington, Moscow, Nera, Stockholm, Meudon, Prague (Pruhonice) and Brussels. Copies of A to H are mailed to Stockholm, Nera, Vienna, Brussels, Meudon, Kanzelhöhe, Prague, Athens, Tokyo, Washington, and ITU Geneva.

In 1964 and 1965 a total of 524 regional Ursigrams was issued which comprised solar, ionospheric and geomagnetic data received from scientific institutions located in the region of the RWC Darmstadt. They were distributed to WWA, 4 RWCs, 2 ARWCs and 3 NWCs. During this period RWC Darmstadt received Ursigrams from 5 RWCs and 3 ARWCs daily. A total of 438 advance alerts (ADALERTS) was interchanged, of which 194 came from our region, 37 from WWA, 128 from RWC Paris, 55 from RWC Nera, and 24 from RWC Tokyo. The IQSY Geoalerts were dis-

tributed to 14 institutions of our region. RWC Darmstadt supplied 565 ADVICEs (ADV), 82 % of which were in conformity with the decision (Geoalert) of WWA. The coast station Elbe-Weser Radio broadcasts the Ursigrams (priorities I and II) and the Geoalerts every day at noon and in the evening. There is close co-operation with the Deutscher Wetterdienst (German Meteorological Service) at Offenbach with regard to the distribution of the regional Ursigrams over the WMO network and the interchange of Geoalerts.

Below is a detailed report on the activities of the Regional Warning Center Darmstadt in the IQSY 1964 and 1965. The 1964 report is contained in the annual report of the IQSY committee of the Federal Republic of Germany which is published in the IQSY Notes No. 14. The abbreviations used therein are explained in IQSY Manual No. 1 « World Days » and in the code booklet « Synoptic Codes for Solar and Geophysical Data », revised edition 1965, issued by the International Ursigram and World Days Service (IUWDS) Secretariat.

At the request of the Committee on Space Research (COSPAR) the Regional Warning Center Darmstadt acts also as a Satellite Regional Warning Center in the SPACEWARN network. It transmits launching announcements and orbital elements of satellites which are of scientific interest. The most essential messages are sent by telegraph or telex to 8 SPACEWARN CONTACTS in Europe and 19 institutions in Germany.

Report on the activities of RWC Darmstadt in the years 1964 and 1965

1. — Collection of solar and geophysical data

(present practice — April 1965)

Observatory Kan- ıe-Austria via Radio oring service Kla- :t	16	USSPE +UPATA	UFLAG	UPATE	(w.e.f. 1-4-66)
agnetic Observa- Fürstenfeldbruck	17	MAGNE			
ıhofer Institut ırg/Breisgau with Schauinsland	17	USSPE	UFLAG		

Solar Observatory Wendelstein		USSPE	UFLAG	UPATE	(w.e.f. 13-4-66)	
	18	UCORA	CORON	UPDIE	(w.e.f. 15-4-66)	
Geomagnetic Observatory, Wingst	24	UMAGA	MAGNE			
Radio Observatory and Institute for Nuclear Physics, Kiel	63	URANA	URANP	+UCOSA		
Measuring Station Predigtstuhl	65	+UCOSA				
Max-Planck-Institut for Aeronomy Lindau/Harz		UFOFA	UFOFE	FODEU	USIDA	
	71	+UCOSA	+UCOSC			
Fernmeldetechnisches Zentralamt, Darmstadt	72	USIDA	ADV	PROPA	PREVI	ADA
Measuring Station Kranzbach	72	+UCOSA				
Ionosphäreninstitut Breisach	73	UFOFA	UFOFE	FODEU	USIDA	

+ not yet available

	1964
Number of regional ursigrams issued.	
No ursigrams are issued on free Saturdays, Sundays and holidays.	268

2. — International Ursigrams

(*a*) *Receipt*

RWC Darmstadt receives daily Ursigrams from the following centres :

RWC AGIWARN
RWC NERA
RWC PARIS
RWC IZMIRAN
RWC TOKYO
ARWC STOCKHOLM
ARWC PRAGUE
ARWC NEW DELHI (by radio)

(*b*) *Distribution*

In addition to the distribution by telegraph of all data with a high priority, copies of them are mailed to all institutions and stations (37) of our region. Data are also distributed to the following centres :

RWC AGIWARN
RWC NERA
RWC PARIS
RWC TOKYO
RWC MOSCOW
ARWC PRAGUE
ARWC STOCKHOLM
NWC BRUSSELS
NWC VIENNA
NWC ATHENS

(*c*) As far as the international interchange is concerned, the information content of the message corresponds generally to that recommended in the « Synoptic Codes for Solar and Geophysical Data 1965 » pages 30/31.

3. — Advance Alerts-Adalerts

	1964	1965
(*a*) STRATWARM messages issued by the Institut für Meteorologie und Geophysik der Freien Universität Berlin	Period of observation Jan.-Apr., Dec. 73 NIL 17 ALERT	Period of observation Jan.-Apr. 72 NIL 29 ALERT
(*b*) SOFLARES The reports of flares were as a rule issued according to the code UFLAR/UFLAG and distributed immediately by telex From 29-8-64 to 10-2-65 no observations were recorded at the Wendelstein Observatory because of repair work on the Lyot filter	3	—
(*c*) ADALERTS Number of messages from other regions (only distributed by RWC Darmstadt if received in good time)	118	126

Origin of message	WWA		RWC PARIS		RWC NERA		RWC TOKYO	
	1964	1965	1964	1965	1964	1965	1964	1965
Types :								
SOLACTIVITY	1	4	43	44	6	12	—	—
SOLCALME	12	—	—	3	4	4	—	—
MAGSTORM	—	—	8	—	4	—	11	6
MAGCALME	—	—	—	—	8	12	—	—
SOFLARE	5	15	13	17	3	—	—	4
PRESTO TENFLARE	—	—	—	—	—	2	—	3

	1964	1965
(*d*) ALERTS Distribution of the IQSY Geoalerts is done immediately after start of work at 0700 UT to... institutions	13	14
(*e*) ADVICE ADV Number of ADVs (except STRATWARM) for solar and magnetic activities (Passed in to WWA together with the radio propagation forecast (PREVI) in the afternoon at about 1600 UT)	311	254
of these there were :		
NIL	68 %	86 %
SOLACTIVITY/SOLCAME	17 %	12 %
MAGSTORM/MAGCALME	15 %	2 %
in agreement with WWA decision:		
NIL	80 %	95 %
SOLACTIVITY/SOLCALME	48 %	58 %
MAGSTORM/MAGCALME	67 %	55 %
Altogether agreement with a WWA decision was reached in :	73 %	90 %

4. — URSIGRAM BROADCASTS

(Priority I and II messages and daily GEOALERT)

Coast station	Call sign	Frequency	Time of Emission	Class of Emission
Elbe-Weser-Radio	DGE 36	5360 kc/s	1230 UT	A 3
near Cuxhaven	DGD 62	4625 kc/s	1700 UT	A 3

5. — CO-OPERATION WITH THE DEUTSCHER WETTERDIENST OFFENBACH

(*a*) interchange of geoalert messages to ensure immediate distribution,

(*b*) distribution of our regional Ursigrams over the WMO network.

GEOALERTS AND ADALERTS

The Japanese National Committee for the IQSY and the IGC, Science Council of Japan, have issued a « Summary report on IQSY Geoalerts and Adalerts arriving at and distributed by Kokubunji, from January to December 1964 ».

Fédération des Services Astronomiques et Géophysiques (FAGS)

A l'occasion de son dixième anniversaire, la FAGS a publié une brochure sur ses activités.

Nous rappelons que la FAGS dont les trois Unions participantes sont l'UAI, l'UGGI et l'URSI, est une fédération de Services permanents et qu'en vertu des statuts les membres sont tenus d'organiser des services chargés :

— de rassembler, de façon suivie, des observations, des renseignements et des données concernant l'astronomie, la géodésie et la géophysique;
— d'en faire l'analyse et la synthèse;
— d'en tirer des conclusions;
— de communiquer des données sur demande;
— de publier les résultats obtenus.

En 1966 la FAGS groupait douze services permanents, à savoir :

— Service international du mouvement du pôle.
— Bureau central international de séismologie.
— Service permanent des indices géomagnétiques.
— Bureau international de l'heure.
— International Seismological Summary.
— Bulletin trimestriel de l'activité solaire.
— Service international des ursigrammes et jours mondiaux.
— Bureau gravimétrique international.
— Service permanent du niveau moyen des mers.
— Service permanent des marées terrestres.
— Service permanent de l'épaisseur de la croûte terrestre.
— Organisation de la surveillance des particules et des radiations solaires.

I. U. G. G.

Committee on Atmospheric Sciences

The IUGG Committee on Atmospheric Sciences (IUGG/CAS) has issued in September 1966 a Second Report which was received by URSI on April 25, with the following letter addressed to ICSU Members, National Committees of IUGG and IAMAP :

« During June and July of 1965 the first report of the Committee on Atmospheric Sciences of IUGG/ICSU was distributed to adhering bodies of ICSU, National Committees of IUGG and to the National Correspondents for Meteorology. This report was accepted by the Executive Committee of ICSU during the spring of 1965, and a summary of the program plans was subsequently presented to the General Assembly of ICSU, Bombay, India, January 1966.

The Committee met for the second time in April 1966, Geneva, during which many detailed matters were deliberated. The developing plans for a Global Atmospheric Research Program necessitated continuing attention by members and officers of the Committee prior to the completion of the Second Report, which is now being distributed.

The Committee, working closely with the World Meteorological Organization (WMO) and with the Committee on Space Research (COSPAR), is continuing its programmatic studies, and is presently arranging a planning conference to be held in Sweden during June and July of this year. During the conference more specific steps will be elaborated for preparatory scientific work and the specification of components of a global observational system for an internationally cooperative meteorological research program to take place several years hence.

It is the intention of the Committee to present a full report of the Planning Conference to the wide international scientific community at the time of the XIVth General Assembly of the IUGG, September-October 1967.

It is the desire and hope of the officers and members of the Committee on Atmospheric Sciences that the views of officers and members of the organizations adhering to ICSU, and of the constituent bodies of IUGG will continue to be communicated to the Committee in order that all appropriate consideration can be given to indicate interests in the developing planning stages and for participation in the various component programs envisioned for the Global Atmospheric Research Program. Several countries are in the process of organizing national committees to foster interest and participation in this program. The IUGG General Assembly in Switzerland later this year would seem to provide an opportunity for the national committees to be in touch with one another if that appears to be desirable.

Sincerely yours,
(sgd) Thomas F. MALONE,
Seeretary-General
ICSU/IUGG/CAS

The report is mostly devoted to the Second Meeting of the Committee, Geneva, Switzerland, April 22-25, 1966.

We quote hereunder the main decisions reached by CAS which may be connected with URSI activities :

1. To propose to WMO, Member Nations, ICSU and IUGG and their Special, Scientific, and other Committees, Commissions and Working Groups, and IUGG National Committees that 1972 be designated as a twelve-month period for an intensive, international, observational study and analysis of the global circulation in the troposphere and lower stratosphere (below 30 kilometers).

2. To propose that observations separated in space by at most 500 km and in time by 12 hours would be required over the entire globe, with the possibility that further study may reveal the need for more frequent and more closely spaced observations in the tropics.

3. To propose that prior to the international program for 1972, the following preliminary studies should be planned and completed :

   (*a*) Studies in the tropics — including the development of appropriate dynamical models, analysis of the role of convection in energy transformation and detailed observational programs in low latitudes.

   (*b*) Theoretical and observational studies of the sea/air and land/air exchange processes in several climatic regimes.

   (*c*) Studies of the global distribution of radiation balance (net flux) and development of improved techniques for incorporating the radiative transfer of energy into dynamical models of the general circulation.

   (*d*) Studies leading to the development of improved dynamical models for the general circulation of the global atmosphere and to the development of scientific design specifications for the program to be conducted during 1972.

   (*e*) Studies of sensors, sensing systems, and other technological developments to insure the most effective and economical observational system for the research program to be conducted during 1972.

Announcement

IAGA SYMPOSIUM ON THE SPECIAL EVENTS OF FEBRUARY 1966 and MARCH 1966

St. Gall, Switzerland
October 3-4, 1966
(may be re-scheduled to October 2)

Sponsored by IAGA Comm. V, Co-sponsored by IAGA Comm. IV, VI, VII, Juan G. Roederer, Convenor

The principal purpose of the Symposium is to discuss the fine structure of the February 1965 and March 1966 events, with emphasis on the intercorrelation of phenomena in geomagnetism, aurora, airglow, energetic particles and ionosphere, and their connection with the original solar and interplanetary perturbations.

The basis of the Symposium will be contributed papers (15 minutes each), with a final 2-hour session of Rapporteur Papers on each event, and a Panel Discussion. Preference for oral presentation will be given to papers with interpretation, not only description of observations, and to papers covering work of several stations and/or space crafts, or several disciplines. It is envisaged that contributed papers crowded off the program will be mentioned in the Rapporteur Papers.

Titles and abstracts of contributed papers for this Symposium should be sent to IAGA Secretary, Leroy Alldredge, ESSA/IER, Institute for Earth Sciences, Boulder, Colorado 80302, USA, prior to *1 June 1967* for screening by the Symposium committee. The special format described on page 10 of IAGA News No. 5 must be used.

Participants are encouraged to publish their papers in *Annales de Géophysique*. Reprints of all the papers so published will then be gathered together into an « IAGA Symposium » publication.

February 1965 : Even though this time was close to minimum epoch of the solar activity cycle, there occurred in almost classical sequence an importance 2 « old cycle » solar flare (Feb. 5, 1750 UT), a noticeable polar cap absorption event (Feb. 5, 1900 UT onwards), a geomagnetic storm (sc Feb. 6, 1414 UT), and a small cosmic ray Forbush decrease (Feb. 6-7 and 8-9). Exceptional D-region absorption occurred on Feb. 8 starting abruptly at 2046 UT and lasting several hours at middle-high latitudes, $L < 8$. Feb. 5-9 is an IQSY Retrospective World Interval; further details are in the Abbreviated Calendar Record, IQSY NOTES No. 13, July 1965, pp. 103-104 and 108-109.

March 1966 : A period of unusual interest occurred about March 12-31 and the first days of April, including the passage of the first major active solar center of the present cycle. Principal flare events took place March 19, 20, 25 and important ones almost daily. A sharp 15-hour sc geomagnetic storm (non-recurrent) with strong auroral and ionospheric disturbance occurred March 23 immediately followed by 24 hours of quiet conditions and then 5 days of moderate disturbance. A cosmic ray decrease began at 1400 UT on March 23 and did not fully recover until the first week in April. An earlier geomagnetic disturbance March 13-14 is perhaps relevant. Many details are given in the Abbreviated Calendar Record, IQSY NOTES No. 18, November 1966.

U. A. I.

13e Assemblée Générale

La 13e Assemblée Générale de l'Union Astronomique Internationale se tiendra à Prague, Tchécoslovaquie, du 22 au 31 août 1967.

ICSU

Committee on Data for Science and Technology (CODATA)

The general purpose of CODATA is to promote and encourage on a world-wide basis, the production and distribution of compendia and other forms of collections of critically selected numerical and other quantitatively expressed values of properties of substances of importance and interest to science and technology.

The first meeting of CODATA was held in Paris, June 16 and 17, 1966. The meeting was opened by the Chairman *pro tem*, Prof. Harrison Brown, who represented ICSU. URSI was represented by Mr. B. Decaux.

The Committee elected for four year terms its Chairman (Prof. F. D. Rossini), two vice chairmen (Prof. B. Vodar, Prof. W. Klemm) and a Secretary-Treasurer (Sir G. Sutherland) who shall constitute the Bureau together with the Executive Director (Dr. G. Waddington) of the Central Office which will be in Washington.

The four following resolutions were adopted :

Resolution 1. — The Committee on Data for Science and Technology resolves that the highest priority among its tasks should be given to the production of a Directory of existing compilations and of the current work on data compilations in all branches of natural science. The Directory should give a clear and critical view of the present situation, including the value of the methods employed to assess data, indicating how and at what cost access can be obtained to these compilations, i.e., whether the dissemination takes place through national, international or private publishing organizations. This Directory should be distributed as widely as possible, especially to libraries and scientists all over the world with a request for suggestions. In this way unfilled needs will become known to the Committee and its position may be strengthened in preventing undesirable overlapping of activities

in the compilation of critical data. The Directory should probably be updated and reissued every two years.

Resolution 2. — The Committee recommends that ICSU and each of the Scientific Unions should collect from their associations commissions, sections, etc. reports on all their available compilations of data and associated current work, and that these should be compiled into an integrated statement for inclusion in the Directory.

Resolution 3. — It is recognized that in the generation, evaluation, storage, retrieval and dissemination of quantitative data increasing use will be made of computers and other aids. Paralleling this development will be the need for the associated software to accomplish such tasks as coding, indexing, correlating, storing and transmission of numerical data. To assure the orderly development of the foregoing matters on a worldwide basis, it is recommended that the Committee establih a small Task Group composed of experts of the highest competence from different countries and disciplines to seek ways of achieving maximum exchange of information about the methodology of handling data, including software, and to stimulate new work in this field.

Resolution 4. — The Committee recommends to national scientific bodies of countries adhering to ICSU and particularly to those scientific bodies of countries represented on the Committee that they extend the maximum scientific support for the encouragement of compilations of data for science and technology, thus showing their recognition of the ever-increasing importance of this work in the promotion of scientific research and industrial development

Further details on CODATA and on the first meeting can be found in IUGG Chronicle, No. 66, Dec. 1966.

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS

Nécrologie

M. B. SARWATE

Nous avons appris avec regret le décès survenu le 19 février 1967, du Dr. M. B. Sarwate, Secrétaire Général de l'Union Internationale des Télécommunications.

Avant d'être élu vice-secrétaire général de l'UIT en 1959, le Docteur Sarwate avait déjà derrière lui une brillante carrière dans le domaine des télécommunications de son pays. Il avait assumé de hautes responsabilités au ministère des transports et des communications de l'Inde, particulièrement dans le domaine des radiocommunications, sur le plan national et sur le plan international.

En 1965, les représentants des pays Membres de l'Union, réunis à la Conférence de plénipotentiaires à Montreux, l'élisent secrétaire général. Maintenant, M. Sarwate peut faire valoir toutes ses qualités dans le domaine de l'organisation comme dans celui de la conduite du personnel. Nombreux sont donc aujourd'hui ses collaborateurs qui regrettent un chef juste, digne et vénéré.

Au nom de l'URSI nous présentons nos condoléances aux Membres de l'UIT et plus particulièrement aux Membres du Conseil d'Administration.

Utilisation du terme « Hertz » pour désigner l'unité de fréquence

(Extrait du *Journal des Télécommunications*, Vol. 34, n° 3, 15 mars 1967)

La Federal Communications Commission (FCC) des Etats-Unis a officiellement adopté le terme « Hertz » parmi les définitions figurant dans la Partie 2 (tableaux des fréquences) de son règle-

ment. La FCC note que l'utilisation de ce terme pour définir l'unité de fréquence, comme synonyme de « cycle(s) par seconde » a été admise récemment par le Bureau international des poids et mesures; elle constate que l'emploi du terme « Hertz » (Hz) se répand de plus en plus dans les documents techniques et scientifiques.

D'autre part, l'adoption de ce terme a été notifiée récemment par le Département des transports du Canada, qui utilisera dorénavant et d'une manière générale le terme Hertz (Hz) au lieu de cycle par seconde. En revanche, aucune modification terminologique n'est envisagée pour l'instant dans la législation ni dans les règlements officiels.

Le terme « Hertz » a été adopté officiellement par la 11e Conférence générale des poids et mesures qui s'est tenue à Paris en 1960, ainsi que par d'autres organisations internationales et nationales ayant des activités techniques et scientifiques dans le domaine de la radio. Depuis cette époque, l'emploi du terme « Hertz » s'est généralisé dans la plupart des pays anglophones.

Rappelons à ce sujet que, lors de sa XIe Assemblée plénière qui s'est tenue à Oslo en juin et juillet 1966, le CCIR a émis à l'unanimité l'Avis *que l'on utilise pour désigner l'unité de fréquence dans les publications de l'UIT le terme Hertz* (Hz) (Avis 431-I).

Rappelons également qu'à la Conférence administrative des radiocommunications, Genève 1959, les délégués, au cours de la septième séance plénière, avaient décidé que l'*expression « cycle par seconde (c/s) » serait utilisée dans les textes anglais et espagnols et que l'expression « Hertz (Hz) » serait utilisée dans les textes français. — Industrial Communications, Département des transports du Canada, UIT.*

Use of « Hetrz » as unit of frequency

(Reprint from the *Telecommunication Journal*
Vol. 34, nº 3, 15 March 1967)

The United States Federal Communications Commission (FCC) formally adopted the use of the term « Hertz » as a regular definition within Part 2 (frequency tables) of its rules and regulations. The Commission has noted that the term, « defined as a unit of

frequency synonymous with cycle(s) per second » and « interchangeable with » cycles per second, has been endorsed recently by the International Bureau of Weights and Measures and is being « employed increasingly in many technical and scientific documents ».

Furthermore, the adoption of this term was announced recently by the Canadian Department of Transport. In future, the Department of Transport generally will define frequencies in terms of Hertz instead of cycles per second. However, no alterations in the terminology of legislation or government regulations are contemplated at present.

The term Hertz was given official status by the 11th General Conference of Weights and Measures held in Paris in 1960, and by other international and national organizations concerned with scientific and technical work in radio. Since that time there has been a general trend towards use of the term in English-speaking countries.

It will be recalled that the XIth Plenary Assembly of the CCIR (Oslo, June-July 1966) unanimously adopted a Recommendation *that the Hertz (Hz) be accepted for use in publications of the ITU as the name for the unit of frequency* (Recommendation 431-I).

Previously, at the Administrative Radio Conference (Geneva, 1959), it was decided at the seventh plenary meeting *that « cycle per second (c/s) » should be used in English and Spanish, and « Hertz (Hz) » in French. — Industrial Communications, Canadian Department of Transport, ITU.*

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE (C.E.I.)

Publications

La CEI a publié un catalogue de ses publications parues au 31 décembre 1966.

Ce catalogue peut être obtenu au prix de Fr. S. 3,75 au Bureau Central de la CEI, 1, rue Varembé, Genève, Suisse.