International Council of Scientific Unions

SCIENTIFIC COMMITTEE
ON
SOLAR-TERRESTRIAL PHYSICS

78-12

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IMS NEWSLETTER

Copies of this "Holiday Issue" of the IMS Newsletter will be passed around at the Fall AGU Meeting in San Francisco. Hopefully, most IMS participants who will attend the computer-intensive Coordinated Data Analysis Workshop (CDAW) from 11-15 Dec 1978, at NASA's Goddard Space Flight Center, will have received their copies before leaving their homes. We expect to have much to share via these NLs about this new workshop concept and possibilities for a Data Analysis Workshop Center (DAWOC). --- The IMSCIE Office staff wish everyone the best of appropriate holiday greetings. We look forward to continuing fruitful exchanges during the last year of the observational phase of IMS.

78/11/30 JHA

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SPECIAL IMS HIGH-ALTITUDE SATELLITE PERIODS - 1978

Special IMS High-Altitude Satellite Intervals for December 1978 are given below. Page 4 of NL 78-8 has a detailed listing of all the SSC - selected Special Satellite intervals for July - December 1978 and the satellite configurations that were the basis for selection of these periods. As was done for such earlier intervals, start and end times were extended from the model calculations to allow for boundary fluctuations during disturbances. Details for the first half of 1978 were published in NL 78-2, pg 4.

#17	3 Dec	337/1600 UT	to	6 Dec	340/0600 UT
#18	17 Dec	351/0500 UT	to	17 Dec	351/2200 UT
#19	28 Dec	362/0400 UT	to	29 Dec	363/0900 UT

SPECIAL LOW-ALTITUDE SATELLITE CONJUNCTIONS

The IMS Satellite Situation Center prepares a weekly forecast of times of satellite magnetic field line conjunctions for principal high-altitude IMS satellites, selected low-altitude satellites and selected ground-arrays. This information is telexed by the IMSCIE Office, upon request, to some 20 locations for use by project scientists, satellite tracking controllers and administrators. The service was started for those interested in the position of their experiments relative to the orbit foot-track of GEOS-1 and was expanded with the successful launch of ISEE-1&2. It is expected that many of the original interested persons will wish to continue receiving such information to facilitate special data acquisition in connection with the newly-launched GEOS-2 satellite. We will continue to feature conjunction intervals between the ISEEs and GEOS-2. Those interested in addition of other satellite or ground-based experiments to these forecasts should contact J. Vette, IMS SSC (see NL letterhead for address) and anyone wishing to receive the weekly telexes should contact the SSC or the IMSCIE Office. A conjunction forecast telex was shown in NL 78-4, pg 3.

GROUND-BASED, BALLOON AND ROCKET CAMPAIGNS:

----------Phenomena-related Campaigns----------

Nov 13 to Dec 10; Machlum, Martelli, Maynard; "Ferdinand 40,41"; Andoya; ROCKETS (2) - see NL 78-11 pg 2
Nov 25 ---------; J.R. Winkler; "ECHO V"; Poker Flat; ROCKET - Strypi - see NL 78-10 pg 2
Dec 11 ---------; E. Nier; "18.1024UA"; White Sands; ROCKET - Nike/Tomahawk - see NL 78-12 pg 3
Dec 13 ---------; J.H. deLeeuw; "Electron Beam Fluorescence Probe"; Ft Churchill; ROCKET-Black Brant
Jan 14 to Feb 8; A. Bryant; "P215K, P216K"; ESRANGE; ROCKETS (2) - Petrel II - see NL 78-12 pg 3
Jan 14 to Mar 9; R. Lundin; "S23 Substorm GEOS"; ESRANGE; ROCKETS (2) - see NL 78-11 pg 2
Jan 16 ---------; R. MacQueen; "27.033AS/US"; White Sands; ROCKET - 27.033AS/US - see NL 78-10 pg 3
Jan 18 to Feb 5; H. Anderson; "29.013UEX"; Poker Flat; ROCKET - Terrier Malemute - see NL 78-11 pg 3
Jan 24 to Mar 4; I. Zhulin; "SAMBO II"; ESRANGE; BALLOONS (25) - see NL 78-11 pg 3
Jan 27 ---------; W. Sharp; "29.041UEX"; Ft Churchill; ROCKET - 25.041UEX - see NL 78-12 pg 3
Jan -- to Mar --; L.J.C. Woolliscroft; "VLF"; ESRANGE; ROCKET - Petrel II - see NL 78-11 pg 3
Feb 24 to Feb 26; L.G. Smith; "Eclipse"; Red Lake; ROCKETS (3) - Nike/Tomahawks - see NL 78-12 pg 2
Feb 24 to Feb 26; L.C. Hale; "Eclipse"; Red Lake; ROCKETS (2) - Astrobee D - see NL 78-12 pg 3
Feb 26 ; M. Kelley; "Eclipse"; Red Lake; ROCKET - Taurus Orion - see NL 78-12 pg 2
Feb 26 ; E.C. Zipf; "Eclipse"; Red Lake; ROCKET - Taurus Orion - see NL 78-12 pg 2
Feb 26 ---------; G. Rottman; "27.028US"; White Sands; ROCKET - see NL 78-12 pg 3
Mar ----------; T.N. Davis; "12.1003, 12.1004"; Poker Flat; ROCKETS - 12.1003, 12.1004 - plasma physics
Mar ----------; Moore; "27.038UEX"; White Sands; ROCKET - 27.038UEX
Mar ----------; J.P. Heppner; "18.217-8GEX, 29.011-2GEX"; Poker Flat; ROCKETS (4) - plasma physics
Mar ----------; J.H.U.; "S-27 Twilight"; ESRANGE; ROCKET - Nike Orion

------Quasi-synoptic Observations involving Balloons, Rockets, Aircraft, Selected Surface Campaigns------

Dec 13; Bauer, Evans; IISN; Global Network; SURFACE - See NL 78-2, pg 2 for details
Monthly; Wright & Hilsenrath; "OZONESONDE"; Various Sites; ROCKETS - See Actualities, NL 77-10, pg 3

----------Observing Plans for Temporary Surface Stations----------

Dec 1 to Jan 31; C. S. Deehr; Norwegian - Alaskan Spitsbergen Expedition; Spitsbergen - see NL 78-9 pg 3

REGIONAL IMS SAT/GBR PROGRAM DETAILS, DECEMBER - FEBRUARY

Program details for many brief listings given above appeared, as indicated, in earlier IMS NLs.

ROCKETS

RED LAKE, CANADA

Below are described some of the rocket-borne experiments to be launched during the total solar eclipse of 26 February, 1979.

33.004UE --- This Taurus Orion rocket will be launched during the eclipse. Objectives are to study electrodynamics and ionospheric chemistry during an eclipse in conjunction with incoherent scatter measurements at Millstone Hill (R. Wand) and Chatanika (M. Baron). Electric field and gravity waves will be measured by the latter facility. Instrumentation will include a DC/AC electric field experiment (M. Kelley, P. Kintner, Cornell U.) and pulsed plasma probe and IMS spectrometer (Szuszczewicz, Naval Research Laboratory). M. Kelley is the project scientist.

33.003UA --- E. C. Zipf is the project scientist for this Taurus Orion rocket carrying as the primary experiment a cryogenically cooled mass spectrometer for ion and neutral composition measurement. Supporting probes for electron and ion density measurements will be augmented by photometers recording visible airglow. A scanning photometer will be used to measure UV radiation. It is hoped to make the first direct measurement of photoionization rates of specific ions, O+ and N2+, for comparison with models, taking advantage of eclipse geometry. The photoionization phase of the experiment will look for the occurrence of chemically associative ionization.

18.102D/22UE --- L. G. Smith, University of Illinois, is the project scientist for these three rocket launchings, a joint U. of Illinois/ U. of Bern, Switzerland experiment. One rocket will be launched two days before the eclipse and two during totality. The University of Bern experiment (Kopp) will carry a cryogenic pumped ion mass spectrometer. The U. of Illinois experiment will

measure energetic particles, record the electron density profile of the ionosphere, solar radiation in the visible, UV and X-ray spectrum, and there will also be a propagation ion probe experiment. One rocket will carry a negative ion mass spectrometer and two will carry a positive ion mass spectrometer, one of these being fired two days before the eclipse.

23.009UE, 23.010UE --- L. C. Hale, Penn State University is project scientist for the two Astrobee D rockets. One will be fired at night before the eclipse to test new instrumentation and the other will be launched during the eclipse totality. They will both carry parachute borne electrical conductivity probes - visible and UV lamps looking for ionization, detachment. Electric field measurements will be made. A new type of Gerdian probe will be flown during the eclipse, but if the pre eclipse flight indicates it is unsuccessful, then the experimenters will revert to a type of probe which has already had a series of successful flights.

WHITE SANDS, USA

18.1024UA --- E. Nier, University of Minnesota, is the project scientist for this two stage Nike Tomahawk rocket due to be launched on 11 December 1978. The object of experiments will be the study the composition and temperature of the thermosphere from 95km upwards, both atomic and molecular oxygen, and will attempt to get information on the location of the transition region into the thermosphere.

27.028US --- Due for launching on 26 February 1979, this rocket will carry out high resolution spectrometer recordings of outflow in coronal holes and also measure solar irradiance in the range 1200 - 2600 A. Project scientist is G. Rottman, University of Colorado.

ESRANGE, SWEDEN

P215K, P216K --- A. Bryant, Appleton Laboratory, Slough, is the project scientist for these two Petrel II rockets to be launched at Esrange between 14 January and 8 February 1979 to study pulsating aurora. Electrons in the range 0.5 to 100KeV will be monitored to measure the angular distribution of electron flux in auroral pulsations, in conjuncton with satellite (GEOS-2) and ground based observations (TV and photometric) along field lines traversed by rockets.

FORT CHURCHILL, CANADA

Electron Beam Fluorescence Probe --- Project scientist for this Black Brant VB is J. H. deLeeuw, Institute for Aerospace Studies, University of Toronto. Scientific objective of the program is the use of an electron beam fluorescence probe for rotational and vibrational temperature measurement of molecular nitrogen, oxygen and atomic oxygen. Instrumentation/experimenters are:- Electron beam fluorescence probe - J. H. deLeeuw, UTIAS; ion gauge - J. H. deLeeuw, UTIAS; magnetic fields/ion bulk motion, magnetic fields/vector, ram sensors - J. A. Koehler, University of Saskatchewan. Scheduled launch date is December 13, 1978 with launch requirements of moon and little or no aurora. Peak altitude is expected to be 250km.

25.041UEX --- This rocket will carry particle experiments to measure electron energy and pitch angle distribution from the range zero to 20KeV, UV and visible radiation monitors and an instrument to measure atomic oxygen concentration by resonance scattering. Project scientist is W. Sharp, University of Michigan and launch date is planned to be 22 January, 1979.

GROUND-BASED

ARCTIC

Norwegian - Alaskan Spitsbergen Expedition --- The Canadian IMS Newsletter reports that in response to an invitation from Dr. Sivjee, U. of Alaska, to take part in planned U.S. - Norwegian ground-based studies of daytime aurora at Svalbert, Spitsbergen, (see IMS NL 78-9 pg 3), J. Gilmer will spend the month of December 1978 at Spitsbergen and will be replaced by C. Duncan for January 1979.

This was not a scheduled part of Canadian IMS activities but the opportunity to make photometric observations through the mid-day (λ=78°, Λ=75°) was too good to miss. While the weather at Spitsbergen is not particularly good for for observing it is hoped that in the two month period a representative sampling of the entire period of cleft emissions will be obtained. The expedition has been made possible through the active support of the Alaskan and Norwegian groups involved.

LA RONGE, CANADA

While no major activity is planned in 1979 at La Ronge it is hoped that it will be possible to make particular measurements on pulsating aurora there for a 7 - 10 night period in February 1979.

ACTUALITIES

SATELLITE

ISEE 1/2 --- This pair of satellites has continued gathering data without major problems. The line of apsides of the orbit lies by now 45 degrees to the dawn of the subsolar point. The electron gun was fired for the first time on November 18/19, during the inbound leg of a high bit rate orbit; 1810-1940 UT in the solar wind, 2310-0040 UT in the magnetosheath and 0410-0540 UT in the magnetosphere.

ISEE 3 --- The heliocentric satellite has made its way to the final position at the libration point between the earth and the sun where it was stopped on November 21. The status of the satellite shows all experiments performing well. The z axis antennae are not yet fully extended, they will be deployed during January. Results from the observations already performed show lots of ion nuclei erupting from the sun in coincidence with the 23 September 1978 flare and, for the first time, observations of negative H ions in the solar wind, by the experiment of U.C. at Berkeley.

The data flow from the three ISEE satellites has been slowed down by the necessity of sharing ground facilities at Goddard with the Skylab and Seasat missions.

GEOS-1 and GEOS-2 Status --- K. Knott, ESTEC, Noordwijk, has sent us the following report on the two GEOS satellites.

GEOS-1 was reactivated on 27 October 1978 and is since operating for three hours daily around apogee which presently occurs at 46 degrees east. Wave experiment and four particle experiments are switched on. On November 17 a manoeuvre to drift apogee to the west at a rate of 1.5 degrees per day was executed.

GEOS-2 continues to generate good data. The impact of solar array anomaly on the long boom electric field and low energy particle experiments is to a large degree correctable by ground based software. Daily summary distribution was started in October. Data back to 15 August will be regenerated. GEOS-2 will remain at 37 degrees longitude at least until the end of March 1979. Data acquisition from GEOS-2 is 24 hours per day.

ALASKA - N. SCANDINAVIA

CAMEO --- Nimbus G satellite was successfully launched on 23 Oct 1978. J. P. Heppner, GSFC, reports that the first part of the CAMEO experiment (see NL 78-8 pg 3) was carried out on Oct 29 and was successful. Barium was released north of Alaska and was observed by Alaskan, Canadian and many mid latitude stations, including California and Hawaii. It was tracked from release at an altitude of about 900km out to about 5 earth radii during a one hour period. This implies rapid movement of the cloud

along field lines and the possibility of parallel E-field acceleration. Data analysis will be necessary to confirm details.

The second release (lithium) was over southern Sweden on Nov 6. The release was somewhat west of GEOS-2 magnetic footprint and positioned so that there was some detection possibility by both GEOS-2 and ISEE 1. The lithium release was in daylight and was seen by scanning differential photometers operated at Tromso and Skibotn, Norway, by D. Rees. Heppner feels this illustrates the utility of a powerful new technique to study ion acceleration at altitudes of the order of 900km and above.

GROUND BASED

ALASKA

EXCEDE II, FWIF and TMA/SWIR/IR --- J. C. Ulwick. AFGL, has reported on these rocket launchings (see NL 78-8 pg 3). TMA/SWIR/IR were successfully fired on 25 October. EXEDE II Spectral was fired on 28 October. Everything went well with the exception of the doors covering the instrumentation package, which failed to open. FWIF was fired on 11 November and was unsuccessful due to an indeterminate problem with instrumentation.

INDIA

Joint Indian - Bulgarian Program --- B. M. Reddy, National Physical Laboratory, New Delhi,has reported a joint program between the National Physical Laboratory, New Delhi and the Central Laboratory for Space Research of the Bulgarian Academy of Sciences. The objective is to investigate precipitation of KeV range protons and electrons into the equatorial atmosphere and to study the consequent effects like ionization and airglow emissions, using two rockets whose instrumentation includes particle detectors, retarding potential analyzers and airglow photometers. One rocket was launched on October 31 in quiet magnetic conditions. The second launching will be during the main phase of at least a moderately severe geomagnetic storm.

WHITE SANDS

MAP-2 --- W. Sharp, University of Michigan, was the project scientist for this Aerobee rocket launched successfully at White Sands on 2 November. Experiments on board included optical measurement of the night-time mesosphere emissions and the night-time thermosphere UV radiation from nitric oxide. The rocket also carried an instrument to measure the concentration of atomic oxygen by resonance scattering.

SYOWA

Syowa Aust Winter Rocket Program --- H. Fukunishi, NIPR, Tokyo has sent the following information to the IMSCIE office. The campaign for this year is completed, with two rockets being launched. For details of project scientists and experiments see NL 78-3 pgs 4 and 5. S-310JA-4 was launched 0032.43UT 18 Aug 1978, apogee 195km, launch was during a substorm breakup event. S-310JA-6 was launched 2156.00UT. 27 Aug, 1978 during an active aurora, apogee 234km.

Conjugate Points, Syowa-Iceland --- This experiment was successfully carried out at Husafell, Iceland from Aug 20 to Sep 27,1978. For details of experiments see NL 78-8 pg 3.

Future plans --- There will only be ground observations at Syowa next year, with no rockets or balloon observations planned. In addition to the Syowa and Mizuho stations, observations will be carried out at unmanned station A1, mid point Syowa/Mizuho. A new unmanned station A3 will be constructed about 100km east of Mizuho.

ANDOYA - ANDENNES

U.K. Andoya Campaign 1978 --- Skylark 12 SL1424 was launched successfully at Andoya on November 10/0414.22UT. There is no news about F6, the second rocket in the programme. The campaign is now over. (for details see NL 78-10 pg 3).

BOULDER, COLORADO

IMSCIE Head Honoured ---Here is one actuality which the IMSCIE Associates hope to squeeze past the censor. We are proud to announce that Joe Haskell Allen, Head, IMS Central Information Exchange Office, has been awarded the Silver Medal of the U.S. Department of Commerce for his services to the IMS. The citation reads - "For spearheading the worldwide exchange of timely information and programs of the International Magnetospheric Study". Congratulations Joe.

LA RONGE, CANADA

Coordinated Photometric Studies --- The La Ronge auroral data obtained during the February and March 1978 periods in conjunction with the NRC chain of measurements has been largely processed by C. Duncan and L. McClusky. There were several good nights of data and collaboration with A. Vallance on its full interpretation is anticipated.

MEETINGS AND CONFERENCES

5th EGS MEETING: BOW SHOCK SYMPOSIUM --- As part of the fifth European Geophysical Society meeting in Strasbourg, France, J. Lemaire and M.J. Rycroft convened a symposium reviewing theoretical and experimental studies on the magnetospheric bow shock (31 Aug - 1 Sep 1978). The proceedings of this symposium will be published in Il Nuovo Cimento C.

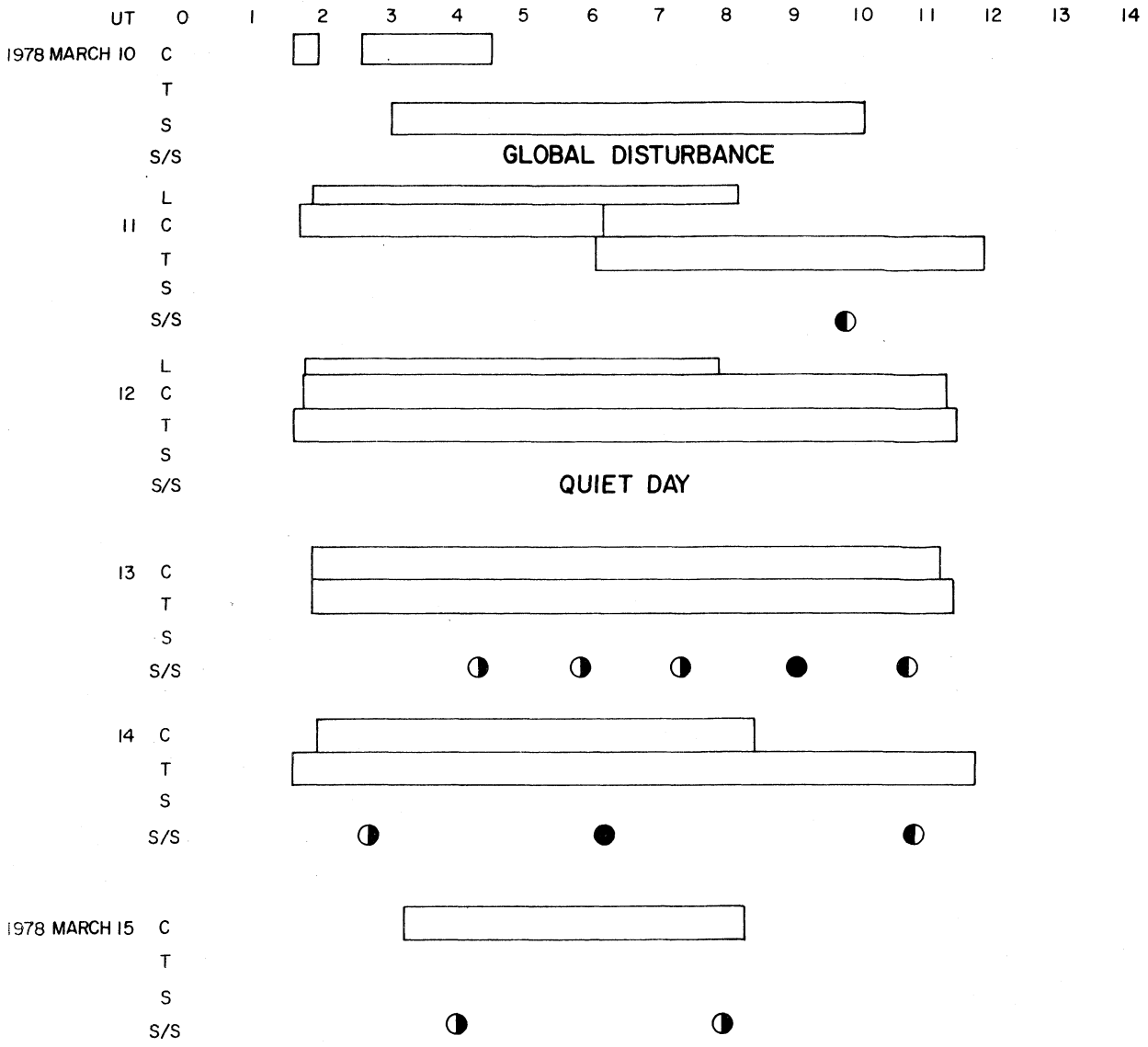
REPORT ON QUANTITATIVE MODELING CONFERENCE --- A Chapman Conference on Quantitative Modeling of Magnetospheric Processes was held in La Jolla, California, September 19-22, 1978. It was attended by some ninety scientists representing interests in modeling,theory, and experiment. There was a considerable amount of discussion about the present status of modeling and its ability to describe real magnetospheric processes. In order to illustrate this, there was a special review of the substorm event of July 29, 1977 (which will be the topic of a workshop in May 1979) and a discussion by the modeling community about which aspects of this event can and should be modeled.

A summary of the Conference will be published in EOS and made available to everyone in the IAGA Division III Working Group 3 on Quantitative Magnetospheric Models mailing list. The proceedings of the meeting, including lists of available quantitative models of magnetospheric features and processes, will be published as an American Geophysical Union Geophysical Monograph Series Volume 21. Any reader of this newsletter requiring additional information or desiring a copy of the meeting summary may request it by writing to the conference Chairman, W. P. Olson, A3-204-AATO-13-3, McDonnell Douglas Astronatics Company, 5301 Bolsa Avenue, Huntington Beach, California 92647.

2nd EUROPEAN IMS WORKSHOP --- Toward the end of October 1978, this meeting was held in Bad Lauterberg, FRG (see NL 78-7, pg 8 for details). Two items arising from that meeting are given here: (1) CCOG Committee Recommendation --- At a meeting on 25 Oct 1978, a recommendation was passed to the CCOG Committee that it continue work as a forum for coordination of ground-based scientific activity in Northern Europe. Organizational details for future operation will be given later. Dr. R. Pellinen, Helsinki, has accepted to be the new CCOG Chairman (note - CCOG = Committee for Coordination of Observations Associated with GEOS, see IMS NL 77-5, pg 3 for details on CCOG). (2) Second Auroral Breakup Campaign (ABC-II) --- A second ABC Campaign has been adopted for the dates 14 Jan to 8 Feb 1979. Because of the great success in arranging cooperative observations between different institutions during the first ABC campaign, a

(Continued on pg 6)

CANADIAN MERIDIAN SCANNING PHOTOMETER COVERAGE 10-14 MARCH 1978



L LaRONGE
C FT. CHURCHILL
T THOMPSON
S SWAN RIVER
S/S SUBSTORMS FROM BOULDER SUBSTORM LOG

◑ TO EAST
● CENTRED
◐ TO WEST

STATION RECORDING DATA AND SKY CLEAR.

(Continued from pg 4)

second such period was adopted at Bad Lauterberg. This time interval will overlap several other activities already scheduled during IMS: SAMBO-II, rocket campaigns, etc. Also, coordination with at least the ISIS-2 satellite has been arranged and other satellite groups may be interested in joint studies. A separate circular will be sent to potential participants in mid-December. Anyone interested in more details may contact either W. Stoffregen, Alvagen 28A, S-752, Uppsala,Sweden or R. Pellinen, Finnish Meteorological Inst, Box 503, SF-00101, Helsinki, Finland.

AMERICAN GEOPHYSICAL UNION FALL MEETING, San Francisco, 4-8 Dec 1978 --- On Tuesday afternoon, 5 December, there will be a session devoted to the International Magnetospheric Study, and three invited papers will be presented. Titles/authors are:- Scientific Problems of the IMS: Are They Worth the Taxpayers Money? - J. G. Roederer, Geophysical Institute, University of Alaska; Coordinated Observations and Information Exchange in the IMS: New Systems in International Scientific Cooperation - D. J. Williams, J. N. Barfield, both at NOAA/ERL, Boulder, Colorado; The IMS Spacecraft Program - F. L .Scarf, Space Sciences Dept., TRW DSSG, One Space Park, Redondo Beach, California.

29-30 JULY 1977 SUBSTORMS --- A catalog of data abstracts for the 29-30 July substorms is being prepared, following a suggestion by participants at the workshop on this event held at Innsbruck. R.H. Manka, US IMS Coordinator, has requested that scientists send him a very brief abstract describing their data for this event, and he in turn would compile them and redistribute them to everyone involved as a reference document. The report should be brief, perhaps only one paragraph, mentioning a few of the key features and times seen in the data. A figure (summary data plot) would be useful. Abstracts should be sent to Dr. R. H. Manka, IMS Coordination Office, National Science Foundation, 1800 G Street, N. W., Washington, D. C. 20550. U. S. A. Planning is going ahead for an IMS workshop on the substorm event, and it will probably be held at the SSC prior to the spring AGU meeting, in May 1979.

INTERNATIONAL WORKSHOP ON SELECTED MAGNETOSPHERIC TOPICS --- A. Nishida, Tokyo, has recently distributed the SECOND ANNOUNCEMENT for this workshop to be held at the International House of Japan from 13 through 16 March 1979. Contributed papers for this workshop must be submitted to Dr. Nishida before 20 Dec 1978. A tentative program listing invited speakers who have indicated that they will attend is given in the announcement. The four topics around which 8 sessions are formed are: Magnetospheric Disturbances; Magnetospheric ULF Waves; Wave-Particle Interactions in the Magnetosphere; and Magnetospheric Physics Topics - (a) Solar wind & Magnetosphere Interactions, (b) Planetary Magnetospheres, and (c) Plasmasphere. Round-table discussions are planned on interpretation of data from KYOKKO and global morphology of ULF waves. Except when otherwise requested, authors are asked to report specifically on their own recent work.

PUBLICATIONS

SSC Reports --- The IMSCIF office has received a copy of the IMS/Satellite Situation Center Report No. 11, August 1978 - "A Summary of IMS/SSC Special Periods and the Position of IMS High Altitude Satellites, Days 1-181, 1978", and also the "IMS/SSC Directory of Spacecraft and Experiment Scientific Contacts".

With the recognition that many relevant satellite experiments did not appear in the IMS Bulletin No.2, it was suggested by Dr. Paul Simon, head of the European information office, at an ad hoc meeting of the service elements of the IMS held at the Satellite Situation Center in October 1976, that a directory of satellite experimenters would be extremely useful to nonsatellite scientists participating in the IMS to facilitate the initiation of diverse analysis projects. This suggestion was adopted at the ad hoc meeting chaired by Dr. Juan Roederer, Chairman of the IMS Steering Committee, and the first such Directory appeared as IMS/SSC Report No. 9 in January 1977. Updates to that report have occurred with the issuance of individual sheets. The present issuance is complete, although some of the sheets have no new entries and bear a date earlier than June 1978.

The reports were published by the National Space Science Data Center/World Data Center A for Rockets and Satellites, NASA/GSFC, Greenbelt, Maryland 20771, U.S.A.

Alaskan Instrumentation --- The Geophysical Institute, University of Alaska, has published a report titled "Alaskan Diagnostic Instrumentation for Aeronomy Experiments", compiled by Robert D. Hunsucker. The report includes a list of instrumentation projects and their principal scientists, and a section on the "Central Alaskan Aeronomy Laboratory", a term coined to describe the unique and sophisticated array of instrumentation assembled near the geomagnetic meridian spanning approximately 300km north and south, centered near Poker Flat Rocket Range. This array of ground based instruments and instrumented rockets is capable of measuring ionosphere/thermosphere parameters from the bottom of the ionosphere D-region to the top of the F-region in the "heart" of the auroral zone. Also included is a table and map showing special IMS instrumentation sites, and a map of the Geophysical Institute field sites in Alaska, which is reproduced on page 7 of this NL.

NETWORK NEWS

CANADA

Edmonton Magnetometer Array --- Extracted from the October 1978 issue of the Canadian IMS newsletter is the following report by G. Rostoker. "Periods from the first of September 1977 to various dates in the summer of 1978 when good data were obtained from Fort Providence, Hay River, Fort Smith, Uranium City, Fort Chipewyan, Fort McMurray and Leduc were shown in an attached diagram (printed in NL 78-10 pg 5). Data from Fort Smith since June has been received at NOAA in Boulder via satellite.

Tapes from Hay River (since mid August), Leduc (since early August) have not been received as of September 12th. The tapes from Uranium City from early August are still being processed, again as of September 12.

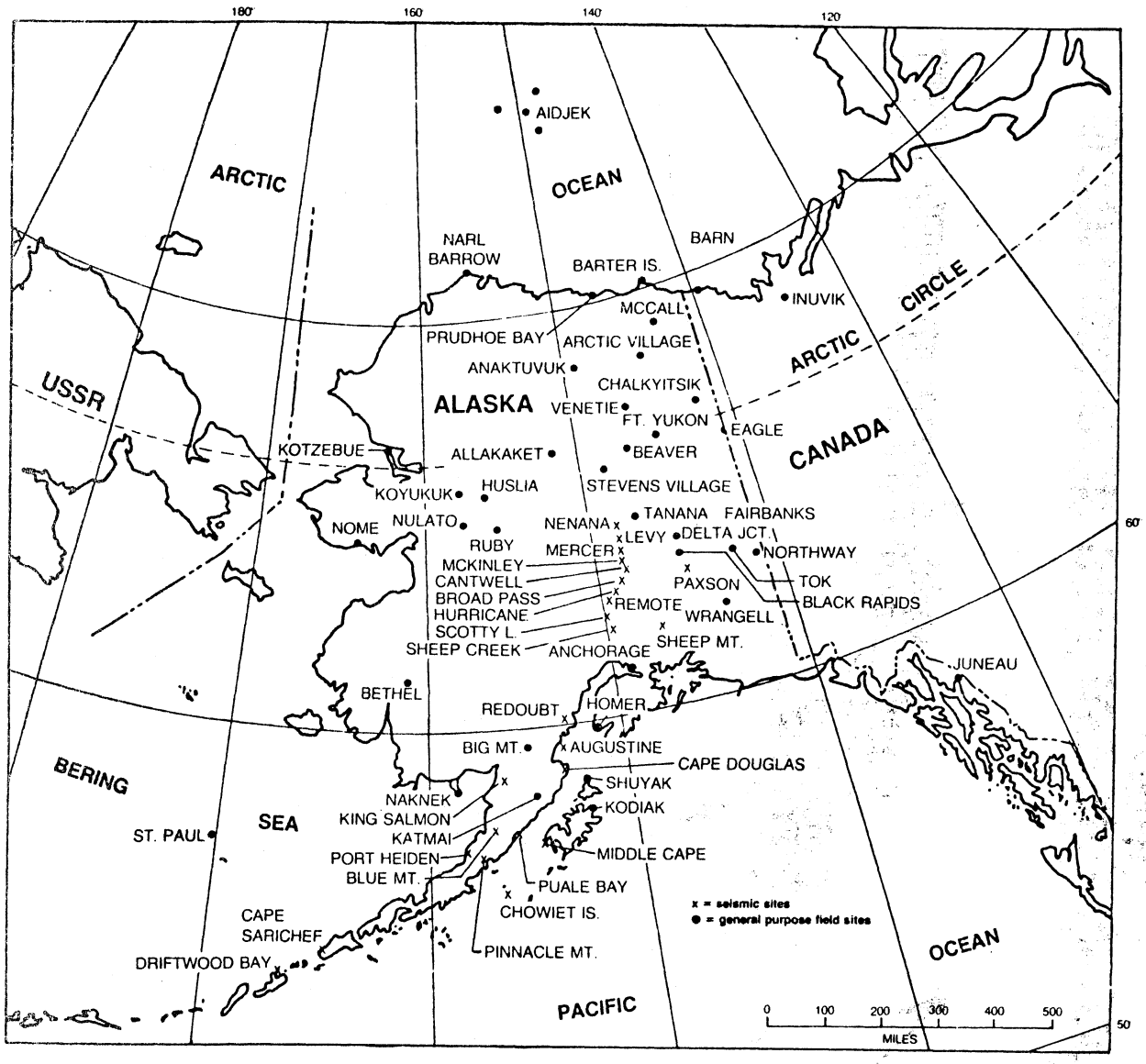
The proposal to operate a magnetometer station at Lethbridge could not be done. The available staff were fully occupied with the operation of the other seven stations.

All the stations except the one at Fort Smith may have to be closed down by August 1979. Operation of the array was made possible by the incremental funding from the National Research Council. Funds so provided run out at the end of March 1979.

The installation of the automatic scanning photometer at Leduc by the Batelle Research Laboratory was anticipated by the end of September".

Also in the Canadian Newsletter was a graphical exhibit by A. V. Jones, Herzberg Institute of Astrophysics, related to the operation of the meridian scanning photometers during the 1978 campaign at La Ronge, Fort Churchill, Thompson and Swan River (January 31 to March 14 inclusive). The La Ronge operation is a collaborative project by the Institute of Space and Atmospheric Studies, U. of Saskatchewan (R. Montalbetti, K. V. Paulson and D. J. McEwen). The exhibit shows periods when the instrumentation was apparently working well and the sky clear. Location of the substorms according to the Boulder substorm log is also shown. From the diagrams it appears there were several nights on which substorms occurred and the sky clear when all four stations were operating. One of the diagrams is reproduced on page 5 of this newsletter.

Geophysical Institute Field Sites in Alaska

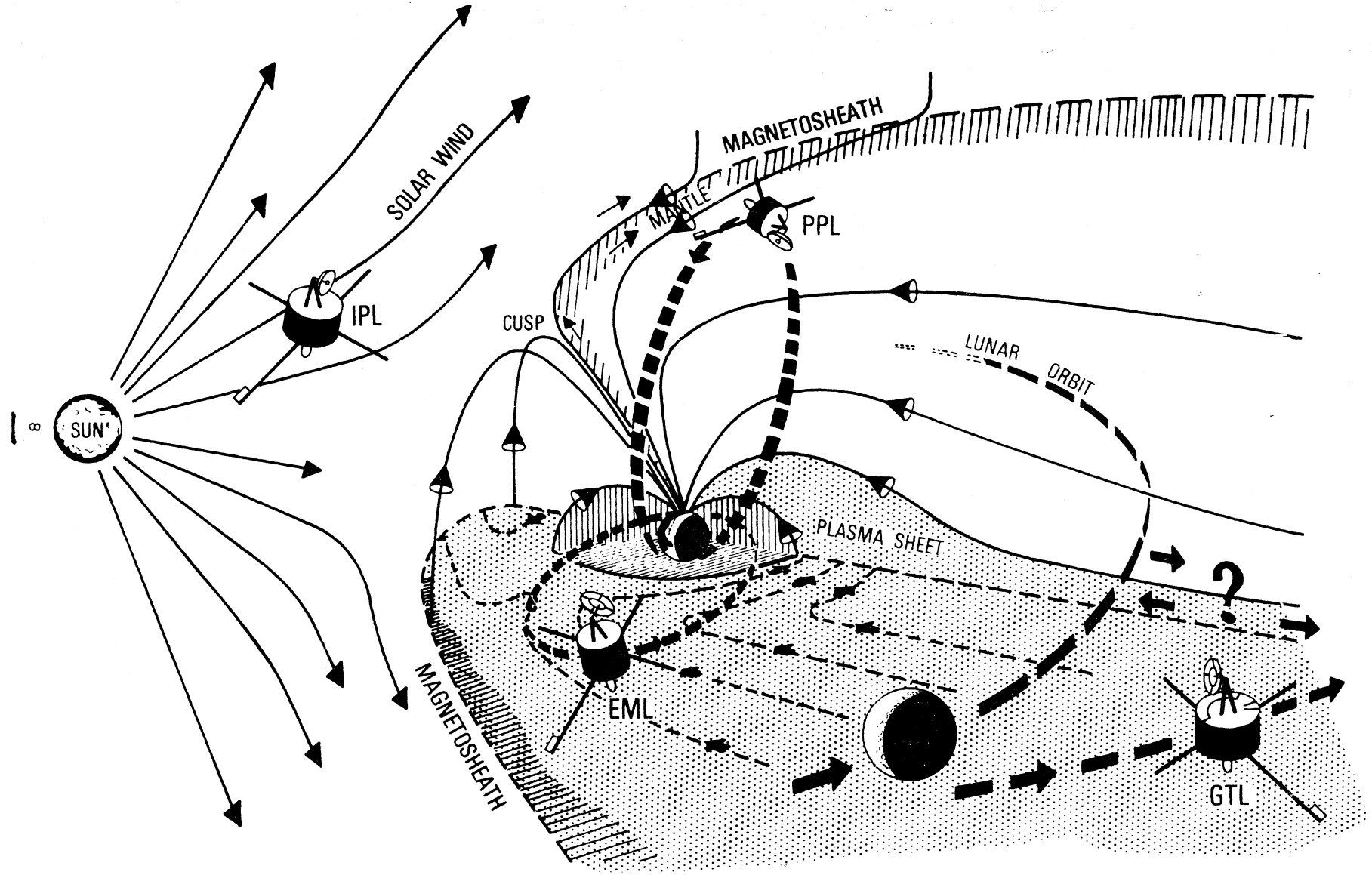


LATEST IMS NEWS FROM JAPAN

T. Kamei, our IMSCIE Associate from Kyoto, has returned home. During his nearly two years in Boulder, Toyo became an almost "indispensable" part of the IMSCIE Office staff. We have always had excellent cooperation from the IMS national contacts in Japan thanks primarily to the work of Dr's T. Obayashi and A. Nishida. However, having Toyo here (sponsored jointly by the Japan Society for the Promotion of Science and Kyoto University) has greatly improved our ability to use the information about IMS programs coming from Japan. Besides serving in this role, Toyo updated and greatly improved our IMS NL directory/distribution list. He worked on the preparation of text and figures for each issue of the NL, solicited program information from our various sources, and prepared chronological files of campaign and program information for the IMSCIE Office. Each month he was part of the IMSCIE gang who tried to make stuffing newsletters in envelopes a less boring task but never quite succeeded. In his "spare time" he continued research on variations in geomagnetic indices, learned the NOAA-Boulder computer system better than many permanent staff, prepared a variety of computer programs to analyze solar variations, AE indices, ... Of course, the remaining IMSCIE staff will miss his regular contributions to our work. We'll also miss him as: tennis partner, mountain climber, ranch hand, photographer extraordinary, willing visitor to many restaurants, and guide to the joy of Green Tea prepared in ceremonies late at night at the IMSCIE Office when we faced monthly publication deadlines together. The IMSCIE staff are pleased to take this opportunity to acknowledge the contribution of Toyohisa Kamei to the work of this office and to thank the Japanese government and institutions for this contribution to the International Magnetospheric Study. --- J.H. Allen

Latest news about specific Japanese IMS programs is: Reports on both EXOS-A&B (KYOKKO & JIKI-KEN) will come from Dr. Nishida before the end of 1978; KYOKKO Summary Data Plots are prepared for special intervals of interest and sent to the IMSCIE Office (see NL 78-9; pgs 2,3, & 5). Details on both EXOS-A&B are in the journal "Solar Terrestrial Environmental Research in Japan", Vol 2, (148-152 & 153-158), July 1978. Other information sources are the IMS SSC Reports and these NLs. Coordinated observations between the two EXOS satellites have already begun. Cooperative experiments are also planned with ISIS-2 and the Siple VLF station. Failure of the EXOS-B antenna to spread to full length is no problem for experiments. Daily summary data plots from EXOS-B are planned (NL 78-10, pg 2).

OPEN
ORGINS OF PLASMA IN THE EARTH'S NEIGHBORHOOD



REPORTS FROM LOS ALAMOS

Today, by telephone, S.-I. Akasofu confirmed that he submitted a report to the AGU summarizing the recent Chapman Symposium on Magnetospheric Substorms held at Los Alamos. A copy of this report will soon be at the IMSCIE Office and we may extract portions to share with IMS participants who were not there. Syun said that he has received only favorable comments about the usefulness of the symposium in spite of the long hours.

Viewgraphs from two papers were shared with IMSCIE staff for summarization in these NLs.

OPEN --- "Origins of Plasma in the Earth's Neighborhood" is a proposed NASA STP program for the mid-1980's. It was described in some detail in D.P. Stern's NASA Report "Solar Terrestrial Programs: A Five Year Plan," ST Program Office, August 1978. The following is taken from text and figures used at Los Alamos by D. Cauffman.

OPEN is a developing program of NASA's Solar Terrestrial Division. Goals of this division which will be supported by OPEN are: To understand the generation of energy in the sun, how it is changed into different forms and transported into interplanetary space, and its interactions with earth's magnetic and atmospheric environment. To understand the physics and chemistry of the upper atmosphere and to detect any global changes in stratospheric ozone. To understand the plasma processes which characterize earth's magnetosphere and thereby to provide new insights about other planetary magnetospheres and high energy astrophysics. And to understand the sun as a star.

Perceived major needs in ST space plasma research are: To improve understanding of plasma processes important in controlling earth's near-space environment and tracing the cause & effect relationships on global scales. To determine energy flows through coupled heliosphere - magnetosphere - ionosphere system and changes with time. And to assess the importance of changes in energy input to earth's atmosphere caused by heliospheric or magnetospheric plasma processes.

OPEN includes satellite and GBR elements. The 4-spacecraft programs are sketched on the facing page of this NL (pg 8). Included are: IPL, the Interplanetary Physics Laboratory to be located at the sunward libration point (as is ISEE-3) and provide near real time and longer-term monitoring of solar wind composition and interplanetary magnetic field. PPL, the Polar Plasma Laboratory to vary its polar orbiting apogee from 4 to 15 Re and measure field aligned particle beam accelerations, terrestrial kilometric radiation from above the auroral zone, and auroral imaging. EML, the Equatorial Magnetospheric Laboratory with 12 Re apogee to distinguish interjections of ions from the solar wind, ionosphere, and plasmasphere. And GTL, the Geomagnetic Tail Laboratory to study the magnetotail from 10 to 235 Re using gravitational encounters with the moon to change its orbit. Other elements of OPEN include analysis system for theory, modelling and data interpretation; ground-based observations; and correlative observations with the Solar Polar Mission (SPM, formerly Out of the Ecliptic) and the Upper Atmosphere Research Satellite (UARS) program.

Some of the "firsts" which should be realized by OPEN are: Global assessment of solar wind - magnetosphere - ionosphere energy flow. Comprehensive measurements of cause-effect relations among plasma processes controlling near-earth space environment. Determination of total non-radiative solar energy input to the earth's atmosphere and its time variations. Global measurements of time-varying plasma composition. Survey of distant geomagnetic tail. Comprehensive study of magnetospheric dynamics incorporating global auroral imaging. High resolution study of plasma entry and field topology in polar cusps. Study of sub-solar (equatorial) magnetopause. And survey of equatorial auroral field line properties. Special capabilities which will characterize OPEN are: Theory, modelling and ground-based correlative measurements to be integrated into program planning. Sophisticated data handling system to make ALL processed data available to investigators, mission theorists and guest investigators. On-board propulsion to allow dual spacecraft roles by moving to different apogee orbits. Use of lunar "swing-bys" to maintain the GTL in the magnetotail for long times. 3-D particle energy and angular distribution measurements and high-time resolution measurements to determine acceleration mechanisms in key regions. Plasma composition measurements to distinguish particle histories and their sources. X-ray imaging to determine energy deposition in the auroral zone by precipitating energetic particles. And remote sensing of electric fields in the outer magnetosphere with techniques recently demonstrated successfully by GEOS-2.

Key milestones of the OPEN mission are: Science definition working group report by March 1979; Announcement of opportunity release by June 1979; Investigator selection by May 1980; Congressional New Start Approval Oct 1980; and Launch 1984-85.

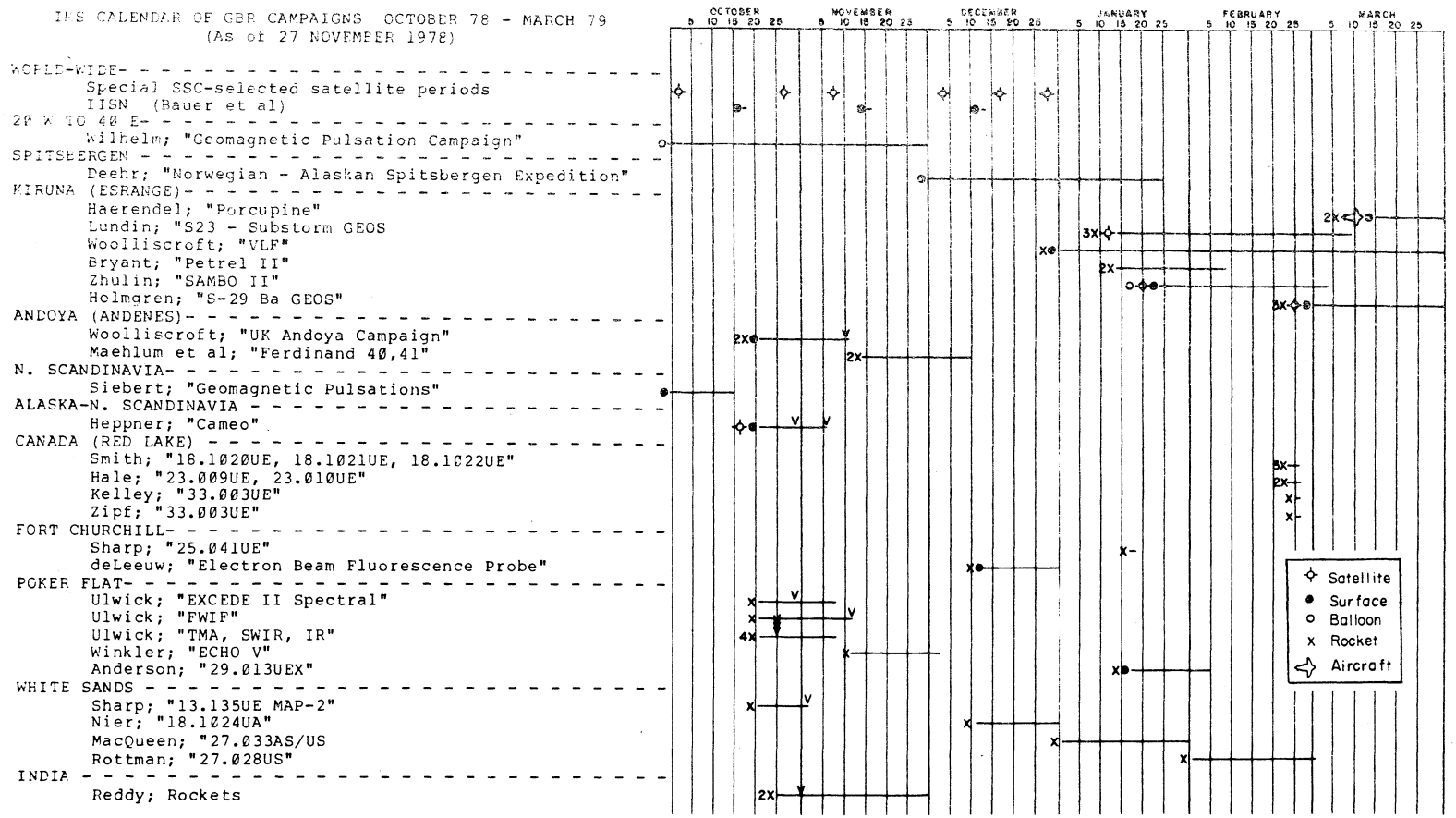
We are aware that OPEN planning has included consideration of non-US spacecraft programs planned for the same decade. Considerable international cooperation is anticipated for participants in this program. Anyone interested in greater detail may contact Dr. D.P. Cauffman, Physics and Astronomy Programs, NASA/Code SG, Washington, DC 20546, USA.

D. Winningham, U. Texas, gave a review of electron measurements in the magnetosphere. He surveyed the older satellites still providing such data and reviewed satellite payload launches into less-than geosynchronous orbit by "Western Nations" in the past year (none except for Japan's EXOS satellites). His conclusion: "The only new activity in the electron measurement field is in geosynchronous orbit (GEOS) and magnetotail (ISEE), and on Japanese satellites. IMS will have no highly advanced set of electron measurements. Future prospects for low-altitude auroral satellites are: Canada - POLAIRE program cancelled Oct 1978; USA - OPEN does not yet include such a satellite but some shuttle proposals may help; Europe - There may be a joint Franco-USSR particle satellite but no details are known; and Japan - future plans not known (to Winningham). Conclusion: The space community needs to impress on their agencies the need for low alt measurements.

"Most significant new measurements or results reported in the past 12 months:" 1. Concurrent measurements of auroral electrons and X-rays from USAF DMSP - great potential for global electron measurements by X-ray imaging. 2. Measurement of e- and ion phase space distributions by USAF S3-3 in region of parallel E-field plus concurrent E-field measurements. 3. UV imaging by Japanese (not yet published in English language journals). Conclusion: US Air Force has made possible most new low-altitude results over last few years. Hope for future is space shuttle (cluster studies).

Conclusions of the remaining question & answer dialog of the paper relate mainly to the morphology of auroral electrons, their role in substorm triggering, energy input-output exchanges, theoretical predictions vs. observed features and small scale structures. He finally lists insufficiencies in past and planned missions: Insufficiency of missions and compromises among conflicting instruments and goals on the few flown. Limited satellite telemetry rates which impact e- measurements by eliminating good phase-space measurements on small scale size. And insufficiency of multi-satellite missions (a la ISEE-1&2) to resolve space & time structure. Final conclusions: the e- measurement community has necessary analyzer hardware but (1)lacks a low cost way of implementing particle and field payloads, and (2)apparently lacks the ability to convince the "political" system that new missions, especially satellite clusters, are needed.

IMS CALENDAR OF GBR CAMPAIGNS OCTOBER 78 - MARCH 79
(As of 27 NOVEMBER 1978)



SOLAR AND GEOMAGNETIC ACTIVITY SEPTEMBER 11 - NOVEMBER 3

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