International Council of Scientific Unions

SCIENTIFIC COMMITTEE
ON
SOLAR-TERRESTRIAL PHYSICS

79-9

President: Prof. K. D. Cole *Vice-President:* Dr. J. W. King *Secretary:* Dr. E. R. Dyer

INTERNATIONAL MAGNETOSPHERIC STUDY
J. G. Roederer, Chairman, IMS Steering Committee
JOE H. ALLEN, HEAD, IMS CENTRAL INFORMATION EXCHANGE OFFICE
MAURIZIO CANDIDI, EUROPEAN SPACE AGENCY, IMSCIE ASSOCIATE
WORLD DATA CENTER-A FOR STP, D64, NOAA, BOULDER, COLORADO, 80303, USA

IMS NEWSLETTER

I'm sorry for the delay; it's evidence of the importance of having international IMSCIE Associates at this office to help with the services, particularly the day to day contacts with experimenters. Of course, this NL also contains important last-minute information. See Dowden's query for those who might be disturbed by an active VLF experiment near Tromso, Norway (pg 3). Especially see Juan Roederer's letter on pg. 7 and the six extra "STOP PRESS" pages (8-13) which excerpt the Fourth and final IMS Steering Committee Report and also give the current listing of papers/authors for the IMS Symposium in Melbourne.

08:00 UT 79/09/17 JHA

IMSCIE Office: Telex 45897 SOLTERWARN BDR
Telephone: 303-499-1000 x6501 (FTS 323-6501)
IMS Satellite Situation Center (J. Vette): Telex 89675 NASCOM GBLT
Telephone: 301-982-2354
European Information (P. Simon): Telex 200590 CNET OBS B MEUDO
Telephone: 534-75-30
USSR Coordination/Information Office (I. Zhulin): Telex 7523 SOLTER SU

PROGRAM PLANS FOR SEPTEMBER 1979 - NOVEMBER 1979

SPECIAL IMS HIGH-ALTITUDE SATELLITE PERIODS - 1979

Special IMS High-Altitude Satellite Intervals for Sep - Nov 1979 are given below. This NL 79-9, page 4, gives a detailed listing of all the SSC - selected Special Satellite intervals for July - December 1979 and the satellite configurations that were the basis for selection of these periods. As is always done for these intervals, start and end times were extended from the model calculations to allow for boundary fluctuations during disturbances. Details for the first half of 1979 were published in NL 79-3, pg 7.

#11	29 Sep	272/1300 UT	to	30 Sep	273/0800 UT
#12	28 Oct	301/0400 UT	to	29 Oct	302/0900 UT
#13	13 Nov	317/2300 UT	to	15 Nov	319/0500 UT

SPECIAL LOW-ALTITUDE SATELLITE CONJUNCTIONS

The IMS Satellite Situation Center prepares a weekly forecast of times of satellite magnetic field line conjunctions for the principal high-altitude IMS satellites (ISEE-1&2, GEOS-2 and SCATHA), 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. Those interested in addition of other satellites 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.

Because of the introduction of SCATHA, the number of conjunctions has become so vast to suggest a change of format. Time intervals of special significance are now selected. These, numbered sequentially, include all conjunctions between target satellites (ISEE, GEOS-2, SCATHA) and those conjunctions between target satellites and low altitude satellite or ground based station which fall in the selected interval. These periods are called " special periods of magnetic conjunction ". In addition to these times two tables are given; the first shows additional information about conjunctions between target satellites, including altitudes, geomagnetic separation and separation along the magnetic flux tube; the second shows the total number of conjunctions between each target satellite and the other satellites and ground stations. Additional information about these conjunctions is available directly from the SSC.

GROUND-BASED, BALLOON AND ROCKET CAMPAIGNS:

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

Aug 12 to Sep 15; G. Witt;; "S27 Twilight"; Kiruna; ROCKET - Launched 79/08/21 @ 01:14:16 UT, successful
Sep 1 to Sep 30; E. Zipf ; "33.005UA" ; White Sands ; ROCKET -
Sep 13 to Oct 10; G. Holmgren ; "S29 Ba-GEOS" ; Kiruna ; ROCKET - see NL 79-7, page 3
Oct 3 ; A. B. Christensen ; "25.046UEX" ; White Sands ; ROCKET - see NL 79-8, page 2
Oct 15 to Oct 30; J. C. Ulwick ; "EXCEDE 2" ; Poker Flat ; ROCKET - see NL 79-8, page 2
Nov 1 to Jan 31; D. L. Matthews; " 18.203/205UE "; Antarctica; ROCKETS (3) -
Nov 10 to Nov 28; J. R. Winckler; " ECHO V "; Poker Flat ; ROCKET - see NL 79-9, page pg 2
Nov 12 to Nov 26; J. A. Holtet; " Ferdinand 49 Pulsaur "; Andoya; ROCKET - see NL 79-9, page ...
Nov 23 to Dec 9; F. Soraas; " Ferdinand 50 Corobier "; Andoya; ROCKET - see NL 79-9, page ...

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

Monthly; Wright & Hilsenrath; "OZONESONDE"; Various Sites; ROCKETS - See Actualities, NL 77-10, pg 3

REGIONAL IMS SAT/GBR PROGRAM DETAILS, SEPTEMBER - NOVEMBER 1979

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

SATELLITES

Unless overlooked in the transition due to departure of the last IMSCIE Associate, there are no IMS satellite program updates. We encourage satellite project scientists and/or experimenters to inform this office about program news that is appropriate to share with the IMS community. Due to our reduced staff, we are not always able to telephone or telex all potential sources of information and now must rely more heavily upon your submission of unprompted contributions.

ROCKETS

Poker Flat, Alaska

ECHO-V --- John Winckler informs us that this is the 5th and largest in the continuing series of "ECHO" rocket launches. This STRYPE-powered rocket carries a 1500 lb payload including a 32 KW electron accelerator system. It will inject electron pulses of 37 KV energy at 0.8 amps. Purpose of the experiment is to study large scale magnetosphere storage during quiet-arc auroral phase before substorm onset. The full array of Poker Flat ground-based support equipment will be operating for this launch including optical and radio recording instruments. Onboard instruments include optical, plasma, X-ray, and EM fields monitors. The payload will inject about 75 moles of Neon gas to be excited by the e- beam. This will be used to study effects of plasma created by the energetic beam from cold neutral gas.

Dr. Winckler is currently preparing a review paper on e- beam experiments for Reviews of Geophysics and Space Physics. Three recent papers resulting from experiments carried by the ECHO-4 rocket are listed here. These illustrate the applicability of this type of rocket experiment to IMS studies and contain references to earlier work in this series.

Hallinan, et. al. JGR 83, 3263, 1978, TV Observations of artificial auroral streaks from ECHO-4.

Israelson and Winckler, JGR 84, 1442, 1979, Neutral N2 cloud effect on e- beam emitting rockets.

Monson and Kellogg, JGR 83, 121, 1978, Ground observations of waves generated by an e- beam in the ionosphere.

GROUND-BASED

Boulder, Colorado, USA

HF-RADAR --- K. Davies and G. Adams, NOAA/ERL/SEL, provided a brief update on the HF-Radar (digital ionospheric sounder) program that is nearing operational actuality as we approach the end of the observational phase of the IMS. This program is like the many new and innovative programs that have emerged during the IMS (often around new instruments) and which will continue into the future as research and/or monitoring programs.

Last year Gene Adams prepared a "Tentative 5-Year Plan for HF Radar" which described the six instruments then in preparation and early planning for their initial disposition. As of this time, 5 of the 6 new instruments are in a semi-operational testing phase ("Open House" for the SEL unit is being held this week). After the current total preoccupation with bringing this latest HF Radar on the line is behind them (a few weeks), we have been promised a completely revised schedule of disposition for these instruments and will share this through a later IMS NL.

Meanwhile, Ken Davies has circulated figures showing critical frequencies (extraordinary wave) derived directly from digital data using a technique developed by A. Paul and D. Mackison. These figures are to be used in a paper and may not yet be copied in these NLs. They show the effect on the F2 layer of the solar eclipse of 6 Feb 1979 as monitored at Boulder. This substantial first step in using one of the new instruments to perform automatically a function that before could only be done by a tedious visual scaling process is very encouraging. Comparisons with locally-obtained hand scalings from the Boulder C-sounder are in generally good agreement with differences usually arising from disappearance of the ionogram trace below the critical frequency. Details concerning this new technique are to be given in a special UAG Report (in the UAG series published by WDC-A for STP) on the eclipse observations. Future plans call for extending the automatic scaling program to other parameters such as fmin.

Tromso, Norway

Ionosphere Heating Experiment --- R.L. Dowden, Univ. of Otago, Box 56, Dunedin, New Zealand, wrote to inform us about an "active" experiment which may impact other experiments. He requests: (1) If we are interfering with other workers' plans, or; (2) if some workers would like advice immediately prior (hours, say) to transmission, such should contact him and give their telex and telephone numbers.

"VLF and Micropulsations by RF Heating of the Ionosphere"

The partly completed MPAe ionospheric heating facility near Tromso, Norway, will be used next October to attempt generation of VLF and micropulsation signals by modulating the ionospheric temperature, and thus the conductivity,

(PROGRAM DETAILS continued on pg 4)

ACTUALITIES

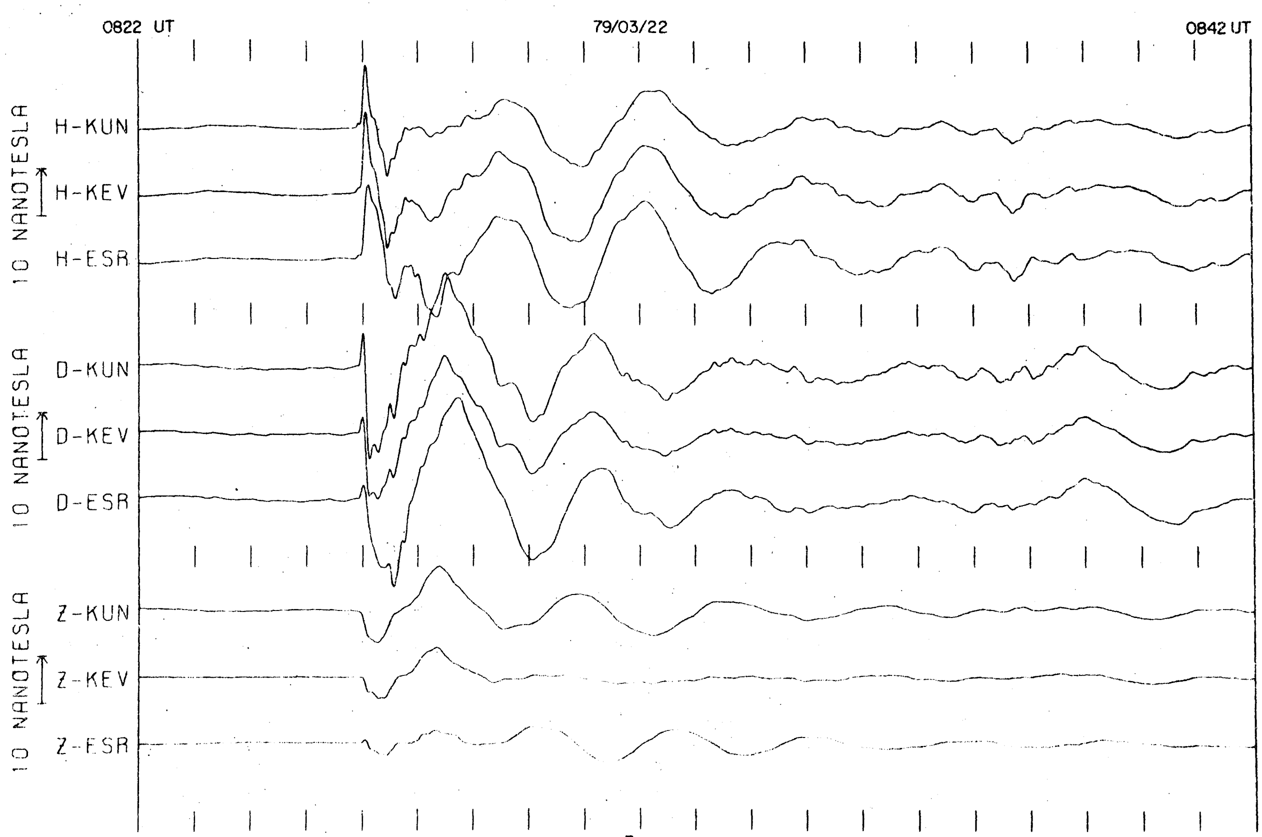
Northern Scandinavia

Gottingen Magnetometer Chain --- Udo Wedeken, Institut fur Geophysik, Universitat Gottingen, wrote in April 1979 to tell us that their group had begun their last 6-station campaign to record geomagnetic pulsations in Northern Scandinavia. Frequent IMS NL items on observations at these sites have appeared; obviously, we cannot quickly find all of them. Anyone interested in earlier reported work may check: IMS NL's 79-7, pgs 2 & 4 (map); 79-5, pgs 4-5; 79-1, pg 3; 78-10, pgs 4 & 6 (map); and 78-6, pg 11. The instrument which was recording pulsations at ESRANGE (till 7 April 1979) was relocated to Kuhmo.

****** CALL FOR COOPERATIVE STUDY ******

In a preliminary check of early data from the 1979 campaign, Wedeken discovered an interesting pulsation event associated with the ssc at 79/03/22, 08:26 UT. He plotted the data for the three stations Kunes (KUN, L=6.4), Kevo (KEV, L=6.1), and ESRANGE (ESR, L=5.4). Data for the other stations will soon be processed. As shown in the data plots below, the sharp onset at 08:26 UT was preceeded by a step-like precursory impulse recorded at all three stations. Wedeken requests that any other IMS groups interested in this event, especially those with pulsation data, contact him at Gottingen.

(ACTUALITIES continued on pg 6)



(PROGRAM DETAILS continued from pg 3)

in the path of the auroral electrojet. This in turn modulates the current distribution, rather than the total electrojet current, at the desired frequency (millihertz to kilohertz). In the completed system, 12 transmitters of 130 kW each and each feeding a set of six dipoles will radiate a total of 1.5 MW in the frequency range 3-8 MHz. This facility is situated on the same site as EISCAT at Ramfjordmoen, south of Tromso, and will be used for a variety of ionospheric modification studies in conjunction with EISCAT."

"For the modulation experiment planned for next October we expect only four transmitters and their associated two rows of crossed dipoles of the low frequency (3-5 MHz) array will be available. Thus the total RF heating power will be about 500 kW, most of which will heat a region 50 km N-S by 20 km E-W. Although this heating powwer density is about an order of magnitude below the design value and the case analysed by Stubbe and Kopka (1977), VLF (~1 kHz) power radiated in the ionosphere should be at least a few watts and may be around 100 W."

"Even the lowest estimate is more than adequate for reception of the VLF signal on the ground by synchronous detection using the transmitter modulation as reference. Recorded amplitude and phase variations should be interpretable in terms of electrojet current variations. For magnetospheric injection we should have enough too, for a watt in the ionosphere is worth ten on the ground. During about the first half of October at least, GEOS-2 will be near Tromso's field line while SCATHA will drift through it several times during 13th to 20th October. Reception of both VLF and micropulsation signals will also be sought at Mawson, Antarctica, which is within about 600 km of conjugate."

"Stubbe, P. and H. Kopka, JGR, 82, 2319 (1977)."

LAST-MINUTE SATELLITE PROGRAM DETAILS

On the facing page of this NL (pg 5) are shown the orbital projections for several high-altitude satellites during the August-September period designated STIP Interval VII (79/08/01-79/09/30).

MAGNETOSPHERIC RESEARCH CONTINUING IN 1980

The next Program Detail was contributed by John Walker, DEMR-Canada, who is the Principal Scientist responsible for operation of the Fort Churchill magnetometer chain which is part of the North American IMS array. We note that this campaign is perhaps typical of those which will continue IMS-like programs beyond the end of the designated observational phase of IMS, December 1979. Of course, there have been rocket and balloon campaigns such as are described elsewhere in this Newsletter which were in existence before the IMS began in January 1976 and which will continue. For such programs the IMS has been a very helpful focal point or umbrella international scientific program. However, we note that from IMS has emerged a great emphasis on the coordinated observational programs (or campaigns) that are planned on the basis of known complementary data collection opportunities between satellite, ground-based, rocket, balloon, aircraft and shipboard instruments. Often these are in globally meaningful arrays (sometimes planned but also sometimes fortuitous). Such campaigns are most characteristic of the IMS and, hopefully, will continue to be conducted in pursuit of data to answer remaining unanswered questions related to the magnetosphere.

This topic is addressed in the excerpts from the Fourth IMS Steering Committee Report which begins on page 8 of this Newsletter. We call your attention to this report summary and to the following 1980 campaign information. Later issues of these NLs will have much to say about such campaigns if we continue to report on the stream of information that continues to come to the IMSCIE Office.

Saskatchewan, Canada

Pulsating Aurora Campaign --- This item is from a note by John Walker and memoranda by Project Scientists D.J. McEwen and C. Duncan. Walker

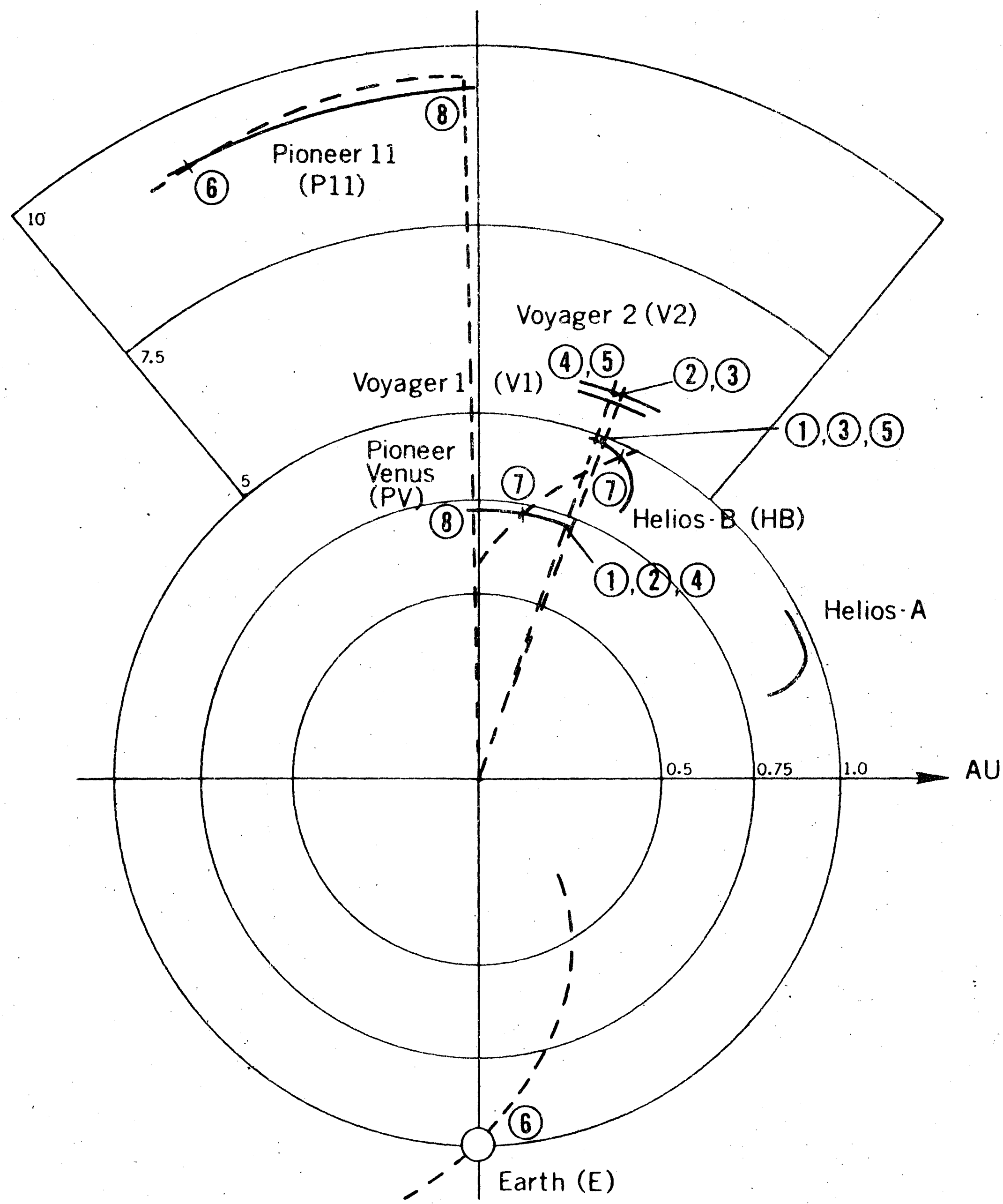
(PROGRAM DETAILS continued on pg 7)

IMS/SSC Special Periods for High-Altitude Satellites Days 182-365 1979

Special Period No.	Approx. Time (d/h)	Satellite Regions							Comments
		Vela 5A	Vela 5B	Vela 6A	Vela 6B	IMP-J	ISEE 1	Prognoz 7	
8	183/8	I	**Sh**	**MT**	**HT**	**I**	DS	**C**	
	183/10	I	**Sh**	**Sh**	NM	**I**	DS	DM	
9	215/10	DS	I	**P**	HT	**I**	**P**	**P**	Boundary Encounters within 3 h.
	216/2	I	DS	**Sh**	**HT**	**I**	DS	**C**	
10	235/5	I	DS	HT	**P**	NS	**S**	**S**	Boundary Encounters within 1 h.
	235/9	I	**NS**	HT	**NS**	**NS**	**I**	**NS**	4 in Magnetosheath for 4 h.
11	272/19	I	DS	HT	**P**	**P**	**P**	**P**	Boundary Encounters within 1-1/2 h.
	273/2	I	NS	**HT**	NS	**HT**	DM	NM	Tail pass for 11 h.
12	301/10	**P**	DS	MT	I	**S**	**S**	**P**	Boundary Encounters within 1-1/2 h.
	302/3	DS	**P**	**P**	S	**I**	**P**	**P**	Boundary Encounters within 4 h.
13	318/5	**Sh**	**P**	I	NS	**I**	**P**	**C**	
	318/12	MT	DS	DS	**P**	**I**	NM	**P**	
	318/19	DM	**DS**	**DS**	NM	**I**	**DS**	**DS**	
	318/23	DM	I	DS	HT	**I**	**S**	**S**	
14	347/7	**P → NS**	I	**NS**	MT	**NS**	DM	**P → NS**	4 in Magnetosheath for 3 h.
	347/17	S	I	**HT**	**Sh**	**MT**	DS	S	} Tail pass for 4 h.
	347/19	I	I	**HT**	**Sh**	**Sh**	DS	**I**	
15	358/14	I	NS	NM	I	**S**	**S**	DS	
	358/18	I	**P**	**P**	I	NS	DS	**P**	
	359/11	**P**	**Sh**	I	I	NS	NM	**C**	

STIP INTERVAL VII

(8/1 - 9/30 1979)



Special Conjunctions

1	PV & HB;	RA	8/06	2.0h	5	HB & V2;	RA	8/08	3.5h		
2	PV & V1;	RA	8/06	3.0h	6	E & P11;	IMF	8/13	18.0h	τ =	0.0d
3	HB & V1;	RA	8/06	4.0h	7	PV & HB;	IMF	8/22	15.0h	τ =	11.5d
4	PV & V2;	RA	8/07	0.0h	8	PV & P11;	RA	9/09	14.0h		

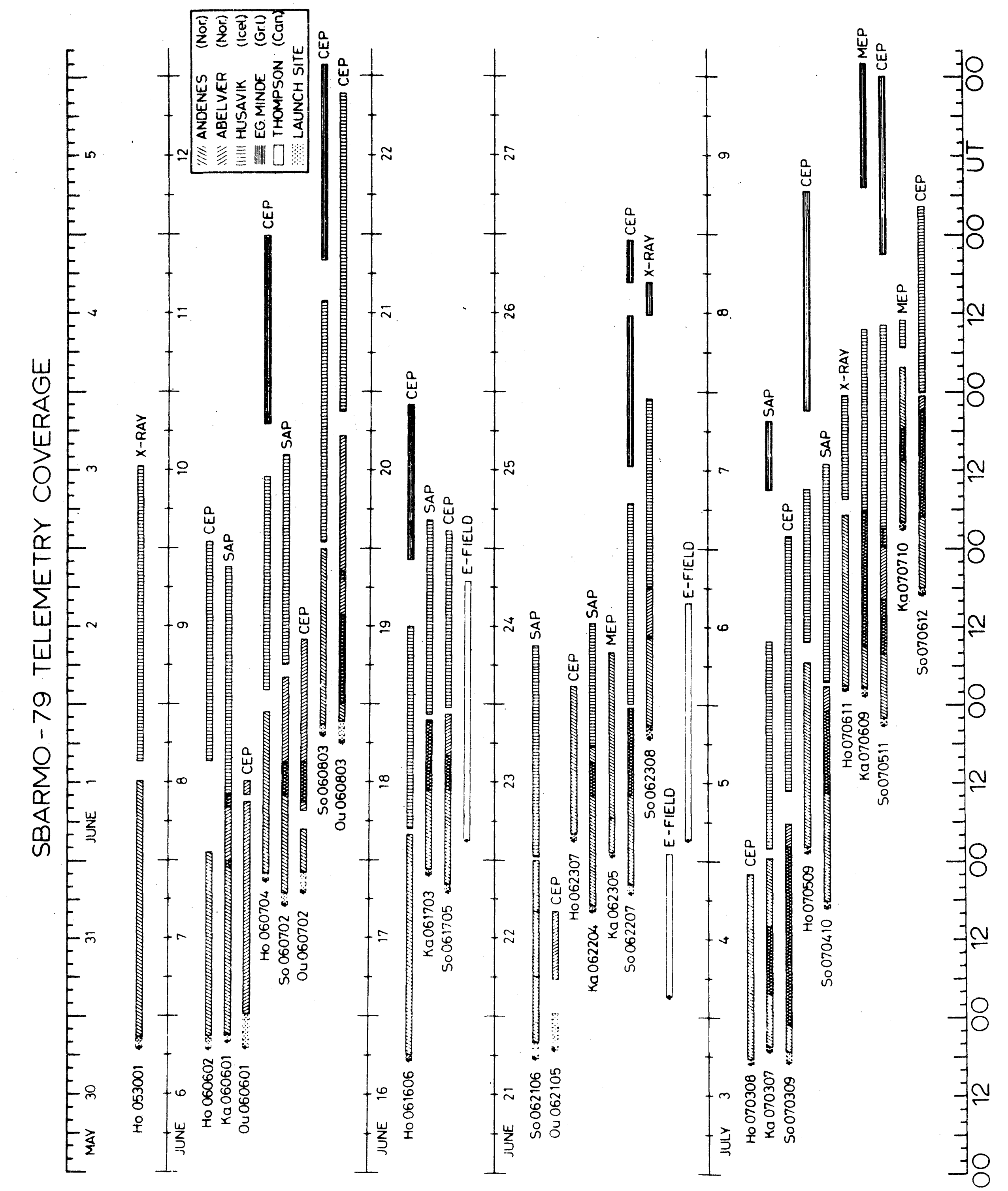
(ACTUALITIES Continued from pg 3)

SBARMO-79 --- The figure below, showing telemetry coverage of the SBARMO-79 balloon flights, was sent by Project Scientist Stein Ullaland with more details for this program of 29 balloon launches.

Five different types of payloads were used (CEP, MEP, SAP, E-field only and X-ray only) as described under "BALLOONS" in IMS NL 79-4, pg 2-3. In addition to the principal investigators/institutes mentioned there are, for the MEP E-field experiment, Iversen and Madsen, DSRI.

In the diagram the nomenclature for the Scandinavian flights are:
NnXXYY79II: Nn=Launch site (Honningsvag, Karasjok in Norway, Sodankyla and Oulu in Finland); XX=month; YY=day of month XX; II=number of flights launched from site Nn. Arrows mark launch times, balloons reached ceiling about 2 hours afterwards.

The program was reorganized at the end of June so that the Oulu-group went to Sodankyla and launched the remainder of their balloons there. Thus, for the last launching period only 3 sites were used. About 45 persons took part in the field operations.



Saskatchewan, Canada

Pulsating Aurora Campaign --- This item is from a note by John Walker and memoranda by Project Scientists D.J. McEwen and C. Duncan. Walker comments that this campaign is scheduled to take place in northern Saskatchewan from 7-26 January and 6-29 February 1980. It consists of coordinated ground-based and rocket observations in a region around 103 deg W (corresponding to about 115 deg W at geostationary altitude). He notes that a valuable addition to the campaign would be complementary satellite data taken on the fluxtube connecting to the site. In particular, PAC participants hope that it may be possible to relocate GOES-2 and/or ATS-6 along the campaign meridian. Forecasts and real time data from the SMS/GOES satellites and from the North American IMS magnetometer chains will be of value to the investigators for optimizing observing intervals and launch criteria.

In their descriptions of the Pulsating Aurora Campaign, McEwen and Duncan specify that the following are among the scientific investigations to be undertaken by participants for the reasons outlined and using data from the instruments mentioned (not an all-inclusive listing):

GROUND-BASED MEASUREMENTS ---

Physical characteristics of pulsating aurora: patch sizes, coherence, periodicities, motions, occurrence - TV cameras (Oguti, Kokubun, Vallance Jones, McEwen).

Spectral studies of pulsating aurora: spectral intensities and ratios, periods, electron energy inferences - Zenithal and meridian scanning photometers (Creutzberg, Gattinger, Harris, R. Koehler, Duncan).

VLF measurements and optical phenomena - VLF data from network, TV, all-sky cameras (Oguti, Lyon, Kokubun).

Micropulsations and optical correlations - magnetic measurements from station chain and TV cameras (Watanabe, Oguti, Paulson).

Height and wave motions - Tweedsmuir scanning photometers, La Ronge zenith photometers (Paulson, Gattinger).

Temperatures, winds and pulsating aurora - Michelson interferometer, TV, photometers (Shepherd, Gattinger, Oguti).

ROCKET MEASUREMENTS ---

Electron spectra and modulations during pulsations - electron spectrometers (Whalen, McEwen).

Auroral emission profiles - rocket photometers (Llewellyn, Harris).

Ionospheric plasma and field parameters - Langmuir probes, beacons, ram sensors (McNamara, Forsyth, Lyon, J. Koehler).

INTEGRATED ROCKET, SATELLITE AND GROUND MEASUREMENTS ---

Electron flux and spectra, directly measured and inferred - rocket electron spectrometers, ground zenithal photometers (McEwen, Whalen).

Electron density profiles and irregularities - ionosonde, Langmuir probes, beacons (J. Koehler, McNamara, Forsyth).

Auroral X-rays and optical aurora - Black Brant VI or balloon detectors, TV, photometers (Venkatesan, Oguti, Vallance Jones).

Comparison of ground optical observations and satellite particle/optical observations - ground photometers, TV, ISIS-I and II and DMSP (Anger, Shepherd, Burrows, Duncan).

The operating schedule calls for a solar depression angle >12 deg and the dates and times are: 7-26 Jan 1980 (1810 LT - 0615 LT) and 6-24 Feb 1980 (1905 LT - 0525 LT). Ground operations will be conducted on all clear nights during these times. Pre-midnight hours are relatively free for other auroral studies. Post-midnight hours will be devoted to post-breakup pulsating forms. Rocket launch window hours are: 2300 - 0500 LT. Launch will abort if no auroral substorm activity is observed by 0100 LT.

Related activities during the campaign are: Hydrogen aurora studies (particularly in early evening hours and up to midnight or later if possible); and Diffuse auroral studies (largely pre-midnight).

As of June 1979, sites for the PAC were firmly established as:

	Rabbit Lake	Southend	La Ronge	Saskatoon
Geogr Lat	58.20° N	56.32° N	55.17° N	52.18° N
Long	103.67° W	103.46° W	109.27° W	107.20° W
Inv. lat @ 100 km	67.83°	66.04°	64.59°	61.26°
L-shell	7.02	6.06	5.43	4.33
Elev. and	80.88°	81.31°	78.37°	75.66°
Azim.	199.54°	198.11°	199.00°	198.74°

of field line from ground at 100 km altitude.
Additional scanning photometer site:
Waskesiu (53.93° N, 106.08° W).

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LETTER FROM CHAIRMAN, IMS STEERING COMMITTEE

International Magnetospheric Study, 1976-79: Fourth Report, Progress and Status (July 1979)

--- "This last of the series of Progress and Status Reports is the IMS Steering Committee's "swan song", composed at its meeting in Vienna, April 30-May 4, 1979. A characteristic (and alarming) sign of our times, SCOSTEP was unable for financial reasons to proceed rapidly with its printing and distribution. This is now finally under way. Nonetheless, it may be helpful to reproduce key parts in this IMS Newsletter."

"The full Fourth Progress and Status Report includes the following sections:

I. Overview and Summary Recommendations
II. Milestones in the IMS III. Summary of IMS Project and Program Coordination
    a. The Satellite Situation Center
    b. The IMS Central Information Exchange Center
    c. IMS Workshops
IV. Magnetospheric Research after the IMS
    a. Data Analysis Phase
    b. Transition Period
    c. Long-term Phase
V. Acknowledgements"

Appendices:
1. International Data Analysis Workshop Center
2. Expected Achievements and Major Outstanding Questions
3. National Committees and Correspondents

Juan G. Roederer
Chairman
IMS Steering Committee

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The referenced excerpt from the Fourth Report begins on the following page (pg 8) of this IMS Newsletter. It is followed by a summary listing of the tentative program for the FIRST INTERNATIONAL SYMPOSIUM ON IMS RESULTS.

OVERVIEW AND SUMMARY OF RECOMMENDATIONS

The discipline of Solar-Terrestrial Physics is concerned with the interactions of the variable components of solar energy emissions (particles and electromagnetic waves beyond the visible domain) with the earth's magnetic field and atmosphere. In spite of carrying only a small fraction of the total power emitted by the sun, these variable components exert an important, though indirect, influence on man's immediate environment, perhaps even on terrestrial life itself. In general, their immediate and most drastic action affects the regions above the stratosphere, i.e., the upper atmosphere and near-earth space environment.

Since the start of the "space age" with the launch of the first artificial satellite in 1957, Solar-Terrestrial Physics has been focussing on the direct effects exerted by solar particle emissions, particularly the solar wind, on the earth's outer environment. This effort has culminated in the International Magnetospheric Study 1976-79 (IMS), a cooperative enterprise guided by the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), with 50 countries participating in coordinated measurements carried out simultaneously with satellites, rockets, balloons and from ground observatories.

The IMS emerged as the first program of international scientific cooperation to be based on: (i) a set of complex dedicated spacecraft missions flown by several agencies with participation from many countries; (ii) an extended program of ground-based, balloon, aircraft, and rocket observations tightly interlocked with the spacecraft missions; (iii) a systems approach with quick-response information feedback to achieve active, real-time coordination of observations with the flexibility to make adjustments if needed.

New international computerized information systems exemplified by the Satellite Situation Center (SSC) and the Central Information Exchange (IMSCIE) Office, with several regional counterparts, were put into operation for the IMS. New real-time data systems such as the Data Acquisition and Display System (SELDADS) were implemented. New approaches to a cost-effective means of achieving scientific results, such as data analysis workshops, are being conducted.

Taking a realistic and cost-conscious approach in formulating recommendations that emphasized the coordination of already existing or planned facilities and missions, IMS planning and management have led to a massive international research program at minimum incremental cost to the participating countries. It is fair to say that *the operational phase of the IMS has been an impressive success, well beyond all expectations, as measured by the quantity and quality of missions, programs and human effort dedicated by the participating countries to this unique international program.* Yet the real scientific value of the program will only come to full fruition once the formidable data base acquired during the IMS has been analyzed and interpreted.

In the final Progress and Status Report, the IMS Steering Committee summarizes the experimental programs and coordination activities accomplished during the operational phase of the IMS and makes some recommendations to SCOSTEP, to the participating countries and to the scientific community at large on the upcoming Post-IMS Data Analysis Phase and, more generally, on the future of magnetospheric research during the next decade.

In making these recommendations, the Steering Committe has taken into account the following circumstances:

1) The need to fully exploit the formidable data base acquired during the IMS;

2) The shift during the upcoming Middle Atmosphere Program period (1982-85) of the focal point of experimental Solar-Terrestrial Physics toward the study of the middle atmosphere and the coupling between magnetosphere, ionosphere and lower atmosphere;

3) The need to maintain during the early eighties a base-line experimental program of magnetospheric research built around already approved missions and programs, using the existing international information and coordination services;

4) The need to provide for a renewed intensive experimental effort of magnetospheric research after the MAP period during the second half of the next decade, based on outstanding problems that will have remained unsolved.

The following is a brief summary of the Committee's recommendations. The detailed rationale is given in the next sections (discussed in a slightly different order).

Post-IMS Data Analysis Phase (4-5 years, starting in 1980):

- *Give highest priority to the analysis and interpretation of data.*
- *Establish an international Data Analysis Workshop Center (DAWOC).*
- *Continue operation of the IMS Central Information Exchange office (IMSCIE) and distribution of the IMS Newsletter at reduced frequency.*
- *Maintain operational at least one high-resolution meridional magnetometer chain.*
- *Continue the operation of ISEE 3 to ensure continued and, if possible, real-time data acquisition on solar wind parameters.*
- *Provide adequate support to approved experimental programs scheduled for the early eighties such as EISCAT, Dynamic Explorer (DE), SpaceLab, MAGSAT, etc.*
- *In terms of scientific meetings, give highest priority to regional topical symposia, workshops and summer schools on magnetospheric physics.*
- *Organize one major international symposium on IMS results toward the end of the Post-IMS Data Analysis Phase.*

Long-Term Future of Magnetospheric Research (approximately 1985 onwards):

- *Develop an experimental program focussing on topics such as: cusp and high latitude boundary layers; the distant tail and the polar cap; auroral zone field-aligned electric fields; anomalous plasma processes, etc.*
- *Carry out multi-satellite programs such as the proposed OPEN mission (Origin of Plasmas in the Earth's Neighborhood).*

In order to carry out the coordination of the Post-IMS Data Analysis Phase and the planning for the Long-Term Phase of magnetospheric research, *it is recommended that SCOSTEP establish a small ad hoc committee on post-IMS programs.*

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MAGNETOSPHERIC RESEARCH AFTER THE IMS

It is not the Steering Committee's mandate to draw elaborate plans for international cooperation in magnetospheric research during the next decade. This should be the task of SCOSTEP, working in close consultation with the affiliated Unions and COSPAR. However, based on the Committee's experience of six years of close interaction with the scientific community, the participating space agencies, Unions and COSPAR, it perceives as one of its last duties to make recommendations on some critical issues. These recommendations pertain to magnetospheric research activities during three partially overlapping time spans. First, the IMS Data Analysis Phase (1980-1985), proposed by the Steering Committee at its 1978 meeting in Moscow. Second, an intermediate transition period, partly overlapping with the Data Analysis Phase, dealing with experimental programs such as EISCAT, Dynamic Explorer (DE), MAGSAT, SPACELAB, etc., some of which are tied to the Middle Atmosphere Program scheduled to begin in 1982. Third, the Long-term Phase of magnetospheric research, a period tentatively assumed to comprise the second half of the next decade.

In order *to implement international coordination of magnetospheric research during the Data Analysis Phase and the planning for the Long-term Phase, the Steering Committee recommends that SCOSTEP establish as of January 1, 1980, a small ad hoc Committee consisting of a chairman appointed by SCOSTEP; three members representing COSPAR, IAGA and URSI, respectively; and three ex officio members* (chairman of ex IMS Steering Committee; a liaison member from the MAP Steering Committee; the Director of DAWOC, once this center has been established).* This ad hoc Committee should be assisted, at no cost to SCOSTEP, by two liaison members from IUPAP and IAU, respectively, and a board of representatives from the participating space agencies.

Data Analysis Phase

The observational phase of the International Magnetospheric Study is now drawing to a close. By all accounts, the data suite acquired during the IMS is far superior to anything to which the scientific community had access in the past, thanks in large measure to the degree of coordination achieved among the various missions carried out by the participating countries. All that remains now is for the many researchers to address their data suites, both as individuals and in collaboration with colleagues who have acquired complementary data bases. The IMS Steering Committee feels strongly that researchers who have participated in the data acquisition phase must take every opportunity to exploit and interpret their data, and that national funding agencies should give a high priority to this effort. Indeed, the acquisition of the IMS data base has been an expensive endeavour both in researchers' efforts and in terms of funding and the agencies should make every effort to capitalize on the experimental phase by ensuring speedy and comprehensive interpretation of the data base.

Already in the 1977 Progress and Status Report the IMS Steering Committee noted that to consolidate the success of the IMS, a level of continued funding will be necessary throughout and after the IMS, earmarked specifically for reduction and analysis of data, and for the theoretical research necessary to interpret these data. Consequently, *the Steering Committee recommends to individual IMS researchers, research institutions involved in the IMS, and to the funding agencies responsible for IMS programs that priority be given to the analysis and interpretation of data obtained during the IMS, vis a vis the alternatives of either embarking in a new, or continuing an ongoing, high-resolution-type experimental program.*

In making this recommendation, the IMS Steering Committee is fully aware of the fact that a hiatus in experimental programs may pose problems to some experimental groups. However, if such retrenchment is duly compensated with an adequate increase in support of data analysis, theory and modelling activities, the pressure of overcommitment on the individual investigators should ease, thus benefitting the progress of magnetospheric research and increasing the overall cost-effectiveness of the IMS program.

*The SCOSTEP Bureau at its August 29-30, 1979 meeting decided not to implement this recommendation in full. It agreed to establish a small committee to deal with the Data Analysis Phase, leaving long-term planning in the hands of the SCOSTEP Discipline Representatives.

The IMS Steering Committee also realizes that a temporary curtailment of experimental activities may pose problems concerning retention of the existing cadres of specialized technical personnel, and it is aware of the consequences of an eventual mothballing of existing equipment and the disruption of observations of synoptic value. However, the Steering Committee believes that funding agencies and academies will find ways to strike a judicious balance between enhanced support of data analysis and the maintanence of an experimental program at an appropriate level to ensure continuity where such continuity is justified, later leading naturally into the intermediate and long-term phases of magnetospheric research.

The IMS Steering Committee strongly recommends that the IMSCIE Office continue in operation throughout the next decade. While recognizing the need for the IMSCIE Office to devote a maximum effort to the MAP and SMY programs, *the Steering Committe further recommends that the IMS Newsletter continue to be distributed, perhaps on a less frequent basis, and it urges that continued manpower support be provided for that purpose from participating countries to the IMSCIE Office.*

The IMS Steering Committee has recommended in the 1977 Progress and Status Report that a new mode of team-oriented computer-interactive data analysis and interpretation be introduced at the international level, in order to successfully deal with a data-intensive program such as the IMS. Based on recent experience (see Section IIIc), the IMS Steering Committee has verified that collaborative research conducted in a workshop environment will indeed play a fundamental role in the exploitation of the data base. This is particularly important in order to bring spacecraft and ground-based instrumentation experimenters and their data together. The Steering Committee has thus conceived the idea of an international center dedicated to facilitate quantitative understanding of magnetospheric processes through computer-interactive analysis of large data sets furnished by individual investigators and institutions from participating countries. More specifically, the concept of an International Data Analysis Workshop Center (DAWOC) is being proposed as a facility in which an acquired IMS data base is assembled, integrated, stored and available for computer-interactive display and graphics. Small groups of scientists would gather at the DAWOC during prearranged periods to conduct cooperative on-line data analysis. Data would be retained for a given limited period of time, during which they would be available by telephone link or in hardcopy form to satisfy requests received by mail. It is believed that, quite generally, an international DAWOC will help make relevant IMS data readily available for research to a large community of scientists with interest in magnetospheric physics. In order to assure the possibility of equal participation to scientists from East and West, *the IMS Steering Committee recommends the establishment of an international Data Analysis Workshop Center.* One suggested way that would give the DAWOC a fully international status is to establish it as a facility affiliated with the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, financially supported by interested agencies from countries that are contributing to the IMS data base.* A more immediately feasible, though less "international," arrangement would be the establishment of one or several regional DAWOCs at the computer facilities of participating space agencies, academies or research institutions.

Concerning general meetings on magnetospheric research, *the IMS Steering Committee recommends that priority be given to regional IMS symposia and workshops, summer schools to train the new generation of magnetospheric scientists that will be needed for the long-term phase, and small international symposia on specific and well-defined problems. One major international conference on IMS results is recommended to take place toward the end of the Data Analysis Phase.*

Transition Period

Although expeditious study of the IMS data base must proceed with maximal efficiency, the Steering Committee recognizes that a base-line of experiments and synoptic measurements of the magnetospheric environment should and must continue right after the IMS period. In this respect, it is noted that several major satellite and ground-based studies are scheduled within the next few years, such as DE, MAGSAT, SPACELAB and EISCAT to name a few. In addition, two major programs, the Middle Atmospheric Programs (MAP) and the Solar Maximum Year (SMY), are due to start during the first half of the next decade. Two components of the IMS data acquisition and information system are of critical importance in terms of the potential success of these programs. *The Steering Committee strongly recommends continued operation of ISEE 3, if possible real-time data transmission (to facilitate a continuous measure of the energy input from the interplanetary medium), and of at least one of the high-resolution magnetometer chains (to facilitate a continuous measure of the energy dissipated in the near-earth environment) during the transition period covering the MAP and SMY programs.*

Long-term Phase

As pointed out earlier, the IMS alone will not provide sufficient data to solve in a comprehensive, quantitative way the problems of solar-terrestrial interaction. Two regions of space--the high altitude polar cusp and the distant magnetotail--have not been adequately probed during the IMS; yet these two regions feature processes which are of crucial importance to understanding the transfer of energy from the interplanetary medium to the near-earth environment and associated magnetospheric driving mechanisms, the transport and acceleration of particles, and the response of and feedback from the ionosphere-atmosphere system. It is hence clear that *multi-satellite programs of the magnitude and scope of the proposed OPEN mission (Origin of Plasmas in the Earth's Neighborhood), complemented with another round of intensified ground-based, balloon and rocket program, will be necessary to help progress towards the ultimate goal of solar-terrestrial physics.*

*Informal contacts with key agencies have revealed that no such support would be available in the near future.

A long-range plan in magnetospheric research for the mid and late eighties must be based on the scientific results of the IMS and on outstanding problems that will remain unsolved. The IMS Steering Committee has polled selected participants of the IMS program to find out what the community perceives as major expected results and major remaining questions.

There seems to be general agreement on the following areas of expected achievements:

- Convection Electric Fields and Three-Dimensional Current Systems
- Low Latitude Magnetopause and Boundary Layer
- Origin and Propagation of Pc4-5 Waves
- The Propagation Characteristics of ULF and VLF Waves
- Wave Particle Interactions
- Composition of the Low-energy Tail of the Ring Current
- Time-sequence of Events in a Substorm

It was generally conceded that the IMS would not succeed in solving the following outstanding problems (listing does not imply order of priority, nor is it supposed to be exhaustive):

- *Cusp and High Latitude Boundary Layers*
- *The Distant Tail and the Polar Cap*
- *Auroral Zone Field-aligned Electric Fields*
- *Anomalous Plasma Processes*
- *Composition of the Bulk of the Ring Current Population*
- *Trigger and Development Mechanisms of Substorms*

The rationale for the identification of the topics listed above under expected achievements and outstanding problems is given in the next section.

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EXPECTED ACHIEVEMENTS AND MAJOR OUTSTANDING QUESTIONS

1. Expected Achievements of the IMS

1a. Convection Electric Fields and Three-Dimensional Current Systems

From the IMS data base it appears reasonably sure that the gross electric field configuration in the magnetosphere, particularly in the magnetotail, will be defined. This is of vital importance as it will allow the construction of sensible convection patterns in the nightside magnetosphere--a necessary ingredient in our understanding of the energy transport and dissipation associated with magnetospheric substorm activity. Closely allied to the definition of the electric field configuration is the question of the overall three-dimensional current system linking the high latitude ionosphere to the distant magnetosphere. It appears at this time that the vastly upgraded quality of ground-based magnetometer coverage, coupled with magnetic field measurements obtained by dedicated IMS satellites together with various low altitude polar orbiters, will permit a comprehensive global picture of ionospheric and field-aligned currents in the near earth environment to be synthesized. The location and characteristics of the generator regions in the distant magnetosphere will, in all probability, not be observationally confirmed during the period of the IMS. However, the wealth of information on the complete configuration of the currents in the near-earth environment together with our existing knowledge of the particle and field environment in the magnetosphere should permit theoreticians to more effectively evaluate the many potential physical mechanisms which may operate in the various generator regions where the three-dimensional current systems are driven.

1b. Low Latitude Magnetopause and Boundary Layer

One of the major contributions of the IMS is the exploration of the boundary layer that extends almost continuously along the inside of the magnetopause, with substantial variation in thickness, density, plasma flow velocity and spatial stability. It is the low latitude portion of this layer of which we have good reason to expect that, by interpretation of the data obtained with ISEE 1, 2 and through occasional encounters by GEOS 1 and 2, its nature will receive a far-reaching illumination. The most urgent task in this context is the clarification of the role of magnetic merging, a process that in spite of its extensive theoretical treatment has remained controversial. This is mainly due to the disturbing scarcity (so far) of events with plasma signatures that clearly conform to the theoretical expectations. Other properties of the low latitude boundary layer that should become known are the respective plasma contributions from solar wind and ionosphere, local heating processes, gross mass flows and electric current distributions. The plasma wave properties, their generation and role in achieving anomalous plasma transport are at present under study and promise to become further elucidated. Concerning the shape of the magnetopause, ISEE 1 and 2 are well suited to deduce deformations due to surface waves or turbulent processes. Such waves have since long been suspected to contribute substantially to the momentum and energy transfer from solar wind to magnetosphere.

1c. Origin and Propagation of Pc4-5 Waves

These waves have been detected at the magnetopause boundary (ISEE), in the magnetosphere (GEOS), in the ionosphere (STARE), and on the ground (magnetometer chains). One cannot yet ascertain the respective roles of the solar wind disturbances and of the inner magnetosphere currents in the generation mechanism of these waves. But their polarization and spectral characteristics will be known as a function of latitude, local time and radial distance. The resonant properties of the field lines and the transfer function of the ionosphere will be largely understood.

1d. The Propagation Characteristics of ULF and VLF Waves

The existence of improved techniques for measuring both the E and B components of the electromagnetic field in a wide frequency range, as well as the implementation of ground-based observatories for recording waves at the feet of the field lines passing through magnetospheric satellites, has allowed us to understand the spatial extension, the polarization and propagation characteristics of many natural as well as artificial (ground VLF transmitters, power lines) electromagnetic waves.

1e. Wave Particle Interactions

Simultaneous measurements of the wave field, of the cold plasma parameters (density, temperature, composition) and of the high energy particle distributions (GEOS-ISEE-JIKIKEN) have allowed us to verify theories for the generation of natural waves, both electrostatic and electromagnetic. However, the time resolution of particle detectors is not yet adequate to solve the problem of the fast-growing electrostatic waves. New discoveries concern the common existence of harmonically related ULF emissions above the proton gyrofrequency and the role which is played by the presence of cold He ions in the generation of most of the ULF waves.

1f. Composition of the Low-energy Tail of the Ring Current

With new instrumentation orbited on GEOS 1, 2 and ISEE 1, the composition of the lower energy portion ($\lesssim$ 17 Kev/q) of the ring current and the plasma environment throughout the magnetosphere to 23 R_e will be determined. Composition is a very important parameter in determining the origin of such particles; however the composition of the bulk of the ring current energy density will remain unknown. In addition, the plasma densities outside the plasmasphere have been measured satisfactorily by both active wave and impedance experiments and by low energy particle experiments on GEOS 1, 2 and ISEE 1,2. The temperature of the cold plasma is also determined in these measurements. The complementary nature of the wave and particle experiments will also provide knowledge about the sheath effects around the spacecraft and the validity of the various measurements in each plasma regime encountered within the magnetosphere.

1g. Time Sequence of Events in a Substorm

In past years the understanding of the processes by which interplanetary particle and field changes influence the various types of magnetospheric activity has been severely limited by our inability to be sure of the time at which the magnetosphere and ionosphere start to respond to a given well-defined change in the interplanetary medium. It is confidently expected that such timing problems will be resolved thanks to the significant upgrading of ground-based instrumentation coverage and the ability to resolve spatial and temporal variations in the magnetotail afforded by the ISEE 1 and 2 satellites. Such a development is bound to have an important impact on the study of substorms, as the erratic and localized development of substorm-disturbed region has led, in the past, to controversy and disagreement, largely fostered by the failure of the monitoring arrays to definitively establish the times of the various phases of substorm development.

2. Some Major Questions That Will Remain Unanswered After the IMS

2a. Cusp and High Latitude Boundary Layers

It is fair to say that the role of the magnetospheric boundary layers and the physical processes occurring therein will not be fully revealed through the data collected during the IMS. This is mainly due to a lack of measurements with high temporal resolution on eccentric polar orbiting satellites capable to explore the distant cusp and high-latitude boundary regions. This will, therefore, remain one of the prominent tasks of future magnetospheric research. In these regions much is to be learned about m.h.d. turbulence, eddy convection, and other anomalous plasma processes. As long as the detailed properties of these regions are not understood, we will not be in a position to assess their role as internal generators of electric currents. For the momentum transfer from the solar wind and the gross transport of magnetic flux, it is important to verify the existence or absence of impulsive reconnection and "magnetic erosion" events, which have been postulated on the basis of very limited data sets. With these problems carried to further solution one will also be enabled eventually to assess the role of the cusp regions for the overall mass budget and mass transport of the magnetosphere. This subject comprises the still largely unknown origin of the plasma mantle, its relation to the plasmasheet, and disturbances of the tail lobes and the polar cap.

2b. The Distant Tail and the Polar Cap

Although the dynamics of the near-earth tail during substorms will be widely investigated using IMS data, it is to be expected that the more distant portions of the tail will remain unexplored for many years. This shortcoming may hold up a full understanding of the substorm, the overall magnetic flux transport, the origin of the plasmasheet and the acceleration processes occurring in the tail. One of the most intriguing questions in this context is the extent of closed field-lines in the tail, the existence and motions of an X-type neutral line, and the formation and ejection of plasmoids, i.e., of magnetically isolated regions. Because of the fundamental nature of these processes for the understanding of other astrophysical plasmas, their further experimental study can hardly be overemphasized.

2c. Auroral Zone Field-aligned Electric Fields

While the nature and configuration of convection electric fields is expected to be understood on the basis of analysis of the IMS data suite, the origin and morphology of parallel electric fields, known to exist on auroral zone field lines in the region from the topside ionosphere up to a few thousand kilometers above the earth's surface, will not be adequately addressed using IMS data. It is clear that this gap in our knowledge will militate against our ability to understand the physics of auroral processes, particularly those of a transient nature such as substorms. It will be necessary, in the future, to plan a mission whose task will be to carry out high time resolution studies of the key plasma and field parameters in these vitally important regions of near-earth space.

2d. Anomalous Plasma Processes

Anomalous processes play an essential role in the gross transport of mass, momentum, energy and magnetic flux not only in the magnetosphere, but in virtually all dilute plasmas. Magnetic merging, damping of surface waves, eddy convection, and maintenance of strong potential drops along magnetic field lines probably involve such anomalous transport processes. Their detailed modelling in the geophysical context--guided by comprehensive wave and particle measurements--represents one of the major theoretical tasks of future magnetospheric research.

2e. Composition of the Bulk of the Ring Current Population

In spite of the great advances that are expected to be made through the detailed analysis of the IMS particle data suites, plasma composition measurement must be extended to cover the bulk of the ring current energy density distribution--a distribution which represents one of the two main energy storage systems ($\sim 10^{23}$ ergs) in the magnetosphere. This knowledge is essential for the determination of the origin and cause of the ring current.

2f. Trigger and Development Mechanisms of Substorms

Despite the expected advances in timing of substorm phases and the expected ability to separate spatial and temporal effects in the substorm-disturbed region of the magnetotail, it is highly unlikely that the physical processes which lead to the triggering of substorm activity will be fully understood using the IMS data base. There are at least two obvious reasons for this. Firstly, the acceleration region between the topside ionosphere and altitudes of a few thousand kilometers will not be addressed by the IMS data suite; yet it probably plays an important role in the whole substorm process, as it appears to be a site of acceleration of auroral electrons. Secondly, the clear localization of regions of intense substorm activity, and the rapid temporal and spatial variation of particle and field parameters inside such regions, make the few satellite point measurements relatively ineffectual in determining the large-scale substorm phenomenology in the magnetotail. It may well be true that inherent limitations in the existing techniques for observing substorm variations may make further programs realistically impossible. It can then only be hoped that the theoreticians will be able to use the IMS data to upgrade their models of the substorm process to the point where an optimum model can be agreed on.

2g. Magnetospheric Effects on Climate and Weather

This subject remains of great interest and controversy; however, understanding of the physical processes has not yet emerged. The three effects most widely accepted are the association of the solar magnetic field structure with the intensity of tropospheric circulation on a time scale of days, the influence of the 22 year solar magnetic cycle on drought occurrence, and the relation between solar activity and world-wide temperature changes on a time scale of hundreds of years. The currently most discussed physical mechanism is the relationship between the ionospheric electric potential at high latitudes, which is influenced by the interplanetary magnetic field, and thunderstorm and cloud formations. The study of sun-weather relations represents a combination of magnetospheric research with the Middle Atmosphere Program.

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IMS Symposium Outline, Papers and Authors --- The following material, through page 13, gives the present tentative program listing for the forthcoming IMS Symposium in Melbourne, Australia. Program Committee for this effort was: P.L. Dyson, C.G. Falthammar, C.T. Russell, B.A. Tinsley, V.A. Troitskaya, K.D. Cole, G. Haerendel, G. Rostoker, D.J. Williams and J.G. Roederer, Chairman. The Final Program and abstract booklet will be available to participants at registration.

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FIRST INTERNATIONAL SYMPOSIUM IMS RESULTS

SCOSTEP - IAGA*

La Trobe University, Melbourne, Australia

November 27 - December 1, 1979

November 27

Keynote Lecture

PLASMA IN THE LABORATORY AND IN SPACE
H. Alfvèn

Session I: Magnetopause and boundary layers

SOLAR WIND PLASMA ENTRY MECHANISMS (Review)
G. Haerendel

PLASMA STRUCTURE OF THE DAYSIDE MAGNETOPAUSE AND BOUNDARY LAYER
G. Paschmann, N. Sckopke, B. U. O. Sonnerup, I. Papamastorakis, G. Haerendel, S. J. Bame, J. R. Asbridge and C. T. Russell

OBSERVATIONS OF COMPOSITION AND ENERGY CHARACTERISTICS OF THE PLASMA IN THE HIGH LATITUDE BOUNDARY LAYER BY MEANS OF THE PROGNOS-7 SATELLITE
R. Lundin, I. Sandahl, B. Hultqvist, O. Likin, N. Pissarenko and A. Zacharov

ISEE 1 AND 2 MAGNETOMETER OBSERVATIONS OF FLUX TRANSFER EVENTS
C. T. Russell and R. C. Elphic

MAGNETOPAUSE ELECTRIC FIELD STRUCTURE OBSERVED IN ISEE-1

A. Pedersen, A. Gonsalong, F. S. Mozer, R. B. Torbert, C.-G. Fälthammar and P. A. Lindqvist

WAVE-PARTICLE INTERACTIONS AT THE MAGNETOPAUSE: ISEE 1 AND 2

B. T. Tsurutani, E. J. Smith, G. K. Parks, C. K. Lin, R. P. Lin, K. A. Anderson, R. R. Anderson and D. A. Gurnett

SMALL-SCALE SPACE-TIME STRUCTURES IN THE SOFT PARTICLE INJECTION PATTERN IN THE DAYSIDE CUSP

Yu. I. Galperin, F. K. Shuiskaja, T. M. Muliarchik, Yu. V. Lissakov, O. M. Raspopov and I. A. Kuzmin

ON THE MAGNETIC FIELD PERTURBATIONS PRODUCED BY PLASMA IRREGULARITIES ENGULFED IN A PLANETARY MAGNETOSPHERE

J. Lemaire and M. Roth

ON THE NATURE OF THE MAGNETOPAUSE AND BOUNDARY LAYER

L. C. Lee and J. R. Kan

RELATIONS BETWEEN ELECTRIC FIELDS, CURRENTS, AND PLASMA IN THE POLAR MAGNETOSPHERE-IONOSPHERE SYSTEM

A. Bahnsen and A. M. Hansen

REMOTE SENSING OF THE MAGNETOSPHERE

D. J. Williams

FIELD ALIGNED PARTICLE ASYMMETRIES INDICATIVE OF OPEN FIELD LINES

D. J. Williams and L. A. Frank

MAGNETOSPHERIC-LIKE PARTICLE BURSTS IN THE DAYSIDE MAGNETOSHEATH

P. W. Daly and E. Keppler

PLASMA ACCELERATION AT THE MAGNETOPAUSE: A SIGNATURE OF RECONNECTION

I. Papamastorakis, G. Paschmann, B. U. O. Sonnerup, N. Sckopke, G. Haerendel, S. J. Bame, J. R. Asbridge and C. T. Russell

LOCALIZED RECONNECTION REGIONS AT THE MAGNETOPAUSE - GEOS 2 AND STARE RESULTS

G. Sofko, R. A. Greenwald, A. Korth and G. Kremser

PATCHY RECONNECTION AS A POSSIBLE SOURCE FOR IPCL PULSATIONS

V. A. Troitskaya and O. V. Bolshakova

THE RELATIONSHIP OF THE BOUNDARY LAYER TO IPRP EVENTS

K. D. Cole, R. J. Morris, E. T. Matveeva, V. A. Troitskaya and O. A. Pokhotelov

CHARACTERISTICS OF ENERGETIC PARTICLES NEAR THE DAYSIDE MAGNETOPAUSE OBSERVED ON GEOS 1 AND GEOS 2

A. Korth, G. Kremser and B. Wilken

MICROSTRUCTURE OF THE MAGNETOPAUSE DURING A MAGNETIC STORM

R. Gendrin, J. Echeto, K. Knott, J. Johnson, D. Young, B. Aparicio, A. Korth, E. Amata, and A. Bahnsen

CORRELATION OF MAGNETOSPHERIC PARTICLE FLUX VARIATIONS AND CHANGES IN THE MAGNETIC FIELD NEAR THE MAGNETOPAUSE DURING A MAGNETIC STORM

B. Aparicio, H. Borg, B. Hultqvist, and E. Amata

November 28

Session II: Aurora, substorms and magnetotail

DYNAMICAL FEATURES OF AURORAL SUBSTORM OBSERVED BY KYOKKO

E. Kaneda and K. Hirao

CHARACTERISTICS OF AURORAL ELECTRONS OBSERVED BY KYOKKO

T. Mukai and K. Hirao

SUBSTORMS DURING THE IMS PERIOD OBSERVED BY SOUNDING ROCKETS

T. Nagata, T. Hirasawa, H. Fukunishi, H. Yamagishi and I. Kimura

SBARMO-79 AURORAL ZONE BALLOON FLIGHTS

J. Bjordal, K. Brønstad, T. Moe, J. Stadsnes, S. Ullaland, L. P. Block, I. B. Iversen, M. M. Madsen, J. Kangas, P. Tanskanen, G. Kremser, K. H. Saeger, W. Riedler, and H. Slamanig

PROTON AND ELECTRON AURORA IN MAGNETOSPHERIC SUBSTORMS

F. Creutzberg, R. L. Gattinger, F. R. Harris and A. Vallance Jones

DAY-TO-DAY AND AVERAGE MAGNETIC VARIATIONS ALONG THE IMS ALASKA MERIDIAN CHAIN OF OBSERVATORIES

S.-I. Akasofu, G. J. Romick and H. W. Kroehl

MODELING OF THREE-DIMENSIONAL CURRENTS ON THE BASIS OF THE IMS ALASKA MERIDIAN CHAIN DATA

S.-I. Akasofu, J. Kisabeth, and Byung-Ho Ahn

THE S_q^p MAGNETIC VARIATION, EQUIVALENT CURRENT AND FIELD-ALIGNED CURRENT DISTRIBUTION OBTAINED FROM THE IMS ALASKA MERIDIAN CHAIN OF OBSERVATORIES

S.-I. Akasofu, J. Kisabeth, Byung-Ho Ahn and G. J. Romick

CHARACTERISTICS OF POLAR GEOMAGNETIC DISTURBANCES

T. Iijima, J. S. Kim and M. Sugiura

THE TEMPORAL AND SPATIAL DISTRIBUTION OF AURORAL-ZONE ELECTRIC FIELDS, CONDUCTIVITIES, AND CURRENTS

J. F. Vickrey, R. R. Vondrak, and S. J. Matthews

SIMULTANEOUS TWO-DIMENSIONAL OBSERVATIONS OF MAGNETIC AND ELECTRIC FIELDS ASSOCIATED WITH CURRENTS IN THE EVENING SECTOR AURORAL OVAL

W. Baumjohann, J. Untiedt, and R. A. Greenwald

THE λ5577A AND λ6300A DEFFUSE AURORA AS OBSERVED FROM THE BATTELLE OBSERVATORY MOBILE AUTOMATIC SCANNING PHOTOMETER LATITUDE AND LONGITUDE CHAIN OF STATIONS

L. L. Smith and D. W. Slater

THE DETECTION OF ORTHOHELIUM EMISSIONS AT 3889A AND 5876A IN AURORA

K. Henriksen, G. G. Sivjee and C. S. Deehr

STRUCTURE OF IONOSPHERIC CURRENTS IN THE REGION OF THE DAYSIDE POLAR CUSP

B. M. Kuznetosov and V. P. Vasiljev

THE INVESTIGATION OF A COMPLEX OF GEOPHYSICAL PHENOMENA DURING THE MAGNETOSPHERIC SUBSTORM DEVELOPMENT

E. A. Ponomarev, K. I. Gorely, G. A. Zherebtsov, E. I. Nemtsova, and V. D. Urbanovich

THE CONDITIONS OF THE AURORAL IONOPSHERE IN THE PRE-MIDNIGHT SECTOR

G. A. Zherebtsov, N. F. Blagoveshchenskaya, K. I. Gorely, O. M. Pirog, V. D. Urbanovich and B. A. Ferberg

LOCAL CURRENT SYSTEMS BEFORE AND DURING THE ONSET OF MAGNETOSPHERIC SUBSTORMS

W. Baumjohann, H. Hopf, H. J. Opgenoorth, R. J. Pellinen and W. J. Heikkila

DISAPPERANCE OF PLASMA FROM THE DAYSIDE MAGNETOSPHERE IN THE EXPANSIVE PHASES OF MAGNETOPSHERIC SUBSTORMS AND STORMS

B. Hultqvist, B. Aparicio, R. Arnoldy, and T. E. Moore

OBSERVATION OF AN AURORAL BREAK-UP BY GROUND BASED MAGNETOMETERS AND OTHER INSTRUMENTS

B. Theile and H. Maurer

EXISTENCE OF A COMPONENT IN SUBSTORM MAGNETIC DISTURBANCE CO-RATING WITH THE EARTH

A. Suzuki and J. S. Kim

THE IMF B_Y EFFECTS OBSERVED BY THE IMS ALASKA MERIDIAN CHAIN

S.-I. Akasofu, G. J. Romick and H. W. Kroehl

IMF FLUCTUATIONS AND COUNTER ELECTROJET EVENTS

V. V. Somayajulu, C. A. Reddy and K. S. Viswanathan

DEPENDENCE OF MAGNETIC STORMS ON SOLAR WIND AND MAGNETOSPHERIC CONDITIONS

P. Ochabová

THE PARAMETERS OF THE IMF AND SHORT-TERM PREDICTING OF THE MAGNETIC SUBSTORMS

L. T. Metlyev, O. A. Troshichev and N. A. Dmitrieva

INFLUENCE OF SOLAR WIND PARAMETERS ON DP_{11} AND DP_{12} GEOMAGNETIC DISTURBANCES

B. M. Kuznetosov

RESPONSE OF THE MAGNETOTAIL PLASMA SHEET AT 20 R_E TO MAGNETOSPHERIC SUBSTORMS

R. L. McPherron, L. Frank, G. Paschmann, G. Rostoker and C. T. Russell

STORM-ASSOCIATED HOT PLASMA GRADIENTS OUTSIDE SYNCHRONOUS ORBIT: SIGNATURE OF FIELD LINE DISTORTION AT LOCAL DAWN

T. E. Moore, R. L. Arnoldy, B. Hultqvist, and B. Aparicio

PARTICLE BOUNDARY STRUCTURES AT THE MAGNETOPAUSE AND PLASMA SHEET

G. K. Parks, C. Gurgiolo, C. Lin, K. A. Anderson, R. P. Lin and H. Reme

HIGH TIME RESOLUTION CORRELATION BETWEEN THE MAGNETIC FIELD BEHAVIOUR AT 30 R_E DISTANCE IN THE MAGNETOTAIL AND GROUND PHENOMENA DURING SUBSTORM EXPLOSIVE PHASE

V. A. Sergeev

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COMPUTER SIMULATION ON PARTICLE ACCELERATION BY RECONNECTION IN THE TAIL OF THE MAGNETOSPHERE

H. Matsumoto, K. Nagai and T. Sato

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Session III: Auroral arcs, pulsations and hiss

AURORAL ARCS AND PARTICLE PRECIPITATION

P. Rothwell and H. L. Collin

RELATIONSHIP BETWEEN DISCRETE AURORAL ARCS AND ELECTRON SPECTRA AS OBSERVED WITH DMSP-SATELLITES ON DEC. 1 AND DEC. 4, 1977

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P. Rothwell and H. L. Collin

A LATITUDE EFFECT IN THE PERIODICITY OF AURORAL PULSATING PATCHES

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PULSATING MAGNETOSPHERIC EVENT OBSERVED FROM GEOS-2 AND WITH BALLOONS

U. Fahleson, R. Grard, M. M. Madsen, I. B. Iversen, P. Tanskanen, J. Niskanen, A. Korth, G. Kremser, K. Torkar, W. Riedler, S. Ullaland and K. Brønstad

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T. Nagata, T. Hirasawa, H. Fukunishi, N. Sato and R. Fujii

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T. Nagata, T. Hirasawa and M. Nishino

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N. G. Kleimenova, Yu. V. Golikov, H. Fukunishi and N. Sato

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T. Nagata, T. Hirasawa, H. Fukunishi, N. Sato and H. Yamagishi

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D. A. Melrose and S. M. White

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K. G. Bhatia and G. S. Lakhina

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K. G. Bhatia and G. S. Lakhina

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J. A. Gledhill, D. G. Torr and R. A. Hoffman

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A. K. Agarwal, B. P. Singh and R. G. Rastogi

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M. I. Pudovkin

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SAMBO EXPERIMENT SPATIAL DISTRIBUTION AND ORIGIN OF MAGNETOSPHERIC ELECTRIC FIELDS

I. A. Zhulin, L. L. Lazutin, and M. I. Pudovkin

AURORAL ZONE CONVECTION FROM $60^{o} \leq \Lambda \leq 75^{o}$ OBSERVED WITH THE MILLSTONE HILL INCOHERENT SCATTER RADAR

R. H. Wand, J. V. Evans, J. M. Holt, and W. L. Oliver

THE RESPONSE OF THE DAYSIDE HIGH LATITUDE IONOSPHERIC CONVECTION PATTERN TO CHANGES IN THE INTERPLANETARY MAGNETIC FIELD

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QUANTITATIVE DEPENDENCE OF THE POLAR CAP ELECTRIC FIELD ON THE IMF Bz COMPONENT AND SOLAR WIND VELOCITY

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THE IONOSPHERIC ELECTRIC FIELD MEASURED SIMULTANEOUSLY FROM A BALLOON AND FROM THE GROUND

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GENERATION OF LARGE-SCALE REGIONS OF AURORAL CURRENTS, ELECTRIC POTENTIALS, AND PRECIPITATION BY THE DIVERGENCE OF THE CONVECTION ELECTRIC FIELD

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INDUCED MAGNETOSPHERIC ELECTRIC FIELDS

W. P. Olson, K. A. Pfitzer and G. J. Mroz

ON THE FORMATION OF PARALLEL ELECTRIC FIELDS IN THE MAGNETOSPHERE

J. R. Kan and L. C. Lee

NUMERICAL MODELS OF IONOSPHERIC ELECTRIC FIELDS AND CURRENTS ASSOCIATED WITH FIELD-ALIGNED CURRENTS

Y. Kamide and S. Matsushita

ROLE OF FIELD-ALIGNED CURRENTS IN GENERATION OF HIGH-LATITUDE MAGNETIC DISTURBANCES

O. A. Troshichev, V. A. Gizler, I. A. Ivanova and A. Yu, Merkuryeva

PLASMA SHEET DYNAMICS, KINEMATIC SUBSTORM MODEL

E. A. Ponomarev, K. I. Gorely, G. A. Zherebtsov and V. D. Urbanovich

A SIMPLE SEMIEMPIRICAL MODEL FOR THE MAGNETOSPHERIC SUBSTORM

V. S. Semenov and V. A. Sergeev

Session VI: Plasmas and energetic particles

SYNOPTIC STUDIES OF MAGNETOSPHERIC ION COMPOSITION BELOW 16 KeV/e

D. T. Young, H. Balsiger, J. Geiss and L. Weber

HOT PLASMA COMPOSITION OBSERVATIONS DURING THE 2 AND 11 DECEMBER 1977 MAGNETIC STORMS

R. D. Sharp, R. G. Johnson, and E. G. Shelley

MULTIPLE SATELLITE OBSERVATIONS OF THE HOT PLASMA COMPOSITION DURING THE 21-22 FEBRUARY 1979 GEOMAGNETIC STORMS

R. G. Johnson, W. Lennartsson, R. D. Sharp, E. G. Shelley, H. Balsiger, P. Eberhardt, J. Geiss and D. T. Young

PROPERTIES OF THE THERMAL PLASMA OBSERVED ON THE SATELLITES GEOS 1 AND 2 BY THE MUTUAL IMPEDANCE EXPERIMENT

P. M. E. Decreau, C. Beghin and M. Parrot

STUDY OF PLASMA PARAMETERS AND DC-AC ELECTRIC AND MAGNETIC FIELDS IN THE UPPER IONOSPHERE BY MAG-IK SATELLITE

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T. Obayashi

ISEE ENERGETIC PARTICLE OBSERVATIONS IN THE INTERIOR OF THE GEOMAGNETIC TAIL

T. A. Fritz and W. N. Spjeldvik

OBSERVATION OF ENERGETIC PARTICLES BY JIKIKEN

T. Mukai, H. Kubo and N. Kawashima

MULTI SPACECRAFT OBSERVATIONS OF SSC ASSOCIATED EFFECTS IN THE TRAPPED PARTICLE POPULATION

B. Wilken, D. N. Baker, P. R. Higbie, T. A. Fritz, ST. M. Kaye, and P. H. Smith

JULY 29, 1977 SUBSTORMS: AN OVERVIEW

R. H. Manka, T. A. Fritz, R. G. Johnson and R. A. Wolf

A MULTI-SPACECRAFT STUDY OF PHASE SPACE DENSITY VARIATIONS DURING THE 1200 UT JULY 29, 1977 SUBSTORM

D. N. Baker, P. R. Higbie, T. A. Fritz, T. E. Moore, P. H. Smith and B. Wilken

A MULTI-SPACE STUDY OF THE INJECTION PROCESS AND MORPHOLOGY OF THE 1200 UT JULY 29, 1977 SUBSTORM

T. A. Fritz, A. J. Masley, D. N. Baker, T. R. Higbie, S. M. Kaye, T. E. Moore, P. H. Smith and B. Wilken

INITIAL COMPARISON OF ENERGETIC PARTICLE OBSERVATIONS WITH A TIME-DEPENDENT ELECTRIC FIELD CONVECTION MODEL

P. H. Smith, B. Wilken, T. A. Fritz, N. K. Bewtra, D. N. Baker, P. R. Higbie and S. Kaye

SUBSTORM-GENERATED MAGNETOSPHERIC PROTONS ($E > 0.3$ MeV) AT GEOSTATIONARY ORBIT AND IN THE MAGNETOTAIL

D. N. Baker, R. D. Belian, P. R. Higbie, and E. W. Hones Jr.

OBSERVATIONS OF PLASMA ACCELERATION PROCESSES IN THE HIGH LATITUDE PLASMA MANTLE

R. Lundin, I. Sandahl, B. Hultqvist, N. Pissarenko and A. Zackarov

AN ELECTROSTATIC AURORAL ELECTRON ACCELERATION MODEL INFERRED FROM HIGH TIME AND SPACE RESOLUTION ROCKET OBSERVATIONS OF THE ENERGY AND ANGULAR DISTRIBUTIONS ACROSS AN AURORAL ARC

M. H. Rees and K. Stamnes

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Session VII: Waves and wave-particle interactions

SAMBO EXPERIMENT MAGNETOSPHERIC DISTURBANCE AND ENERGETIC ELECTRONS

I. A. Zhulin and L. L. Lazutin

SUBSTORM RELATED ELF-VLF CHORUS EVENTS: 1. LOCAL-TIME DEPENDENCE OBSERVED AT TWO L=4 ANTARCTIC STATIONS

T. W. Thomas and M. G. Morgan

SUBSTORM RELATED ELF-VLF CHORUS EVENTS: 2. RELATIONSHIP TO NEWLY-INJECTED CLOUDS OF DRIFTING ENERGETIC ELECTRONS

T. W. Thomas and M. G. Morgan

SELECTED RESULTS OBTAINED AT SYOWA, ANTARCTICA, BY RECEPTION OF KYOKKO AND ISIS SATELLITE DATA

T. Nagata, T. Hirasawa, H. Fukunishi, N. Sato and T. Yoshino

VLF WAVES AND KeV ELECTRONS IN THE MAGNETOSPHERE OBSERVED BY EXOS-B SATELLITE

H. Matsumoto, K. Hashimoto, M. Morikura, I. Kimura and T. Mukai

STUDY OF WHISTLERS USING GEOS-1 DATA

R. N. Singh and N. Cornilleau

MAGNETOPSHERIC VLF LINE RADIATION OBSERVED AT HALLEY, ANTARCTICA

J. P. Matthews and K. Yearby

WAVE PARTICLE INTERACTIONS NEAR THE PLASMAPAUSE OBSERVED BY JIKIKEN (EXOS-B) SATELLITE

H. Oya, A. Morioka, and H. Miyaoka

THE SOURCE OF ENERGY FOR SAR-ARCS, AND WAVE-PARTICLE INTERACTIONS

K. D. Cole and O. A. Pokhotelov

ON THE POSSIBLE MECHANISM OF THE ION ACCELERATION IN THE DIRECTION NORMAL TO THE GEOMAGNETIC FIELD IN THE AURORAL REGION

A. V. Zakharov and V. A. Liperovsky

A WHISTLER STUDY OF THE BULGE REGION OF THE PLASMAPAUSE

M. Lester and A. J. Smith

A SIMULATION OF THE ORIGIN OF QUIET-TIME PLASMAPHERIC HISS

R. M. Thorne, S. R. Church and D. J. Gorney

SOURCES AND CHARACTERISTICS OF AURORAL KILOMETRIC RADIATION OBSERVED BY JIKIKEN (EXOS-B) SATELLITE

A. Morioka, H. Oya and S. Miyatake

ARTIFICIAL STIMULATION OF THE PLASMA WAVES AND THE USAGE FOR THE DIAGNOSTICS OF THE PLASMA PHENOMENA---SPW EXPERIMENTS BY JIKIKEN (EXOS-B)

H. Oya and T. Ono

ISEE-1 OBSERVATIONS OF VLF EMISSIONS TRIGGERED BY NON-DUCTED COHERENT VLF WAVES FROM GROUND TRANSMITTERS

T. F. Bell, U. S. Inan and R. A. Helliwell

PRECIPITATION OF RADIATION BELT PARTICLES INDUCED BY COHERENT WAVES FROM VLF TRANSMITTERS

U. S. Inan, T. F. Bell and R. A. Helliwell

MAGNETOSPHERIC MODIFICATIONS OF GROUND-BASED TRANSMITTER SIGNALS OBSERVED ON GEOS-1

E. Ungstrup, T. Neubert and A. Bahnsen

CHARGED-PARTICLE PRECIPITATION IN THE HIGH LATITUDE REGION OF THE SOUTH ATLANTIC ANOMALY

J. R. Benbrook, W. R. Sheldon, E. A. Bering, III, J. L. Roeder, and H. Leverenz

Closing Session

COORDINATED DATA ANALYSIS WORKSHOP ON 29 JULY 1977 EVENTS (CDAW-2)

The report below is summarized from a letter by R.H. Manka, US IMS Coordinator, to inform participants about final details for this workshop. The events around which this study has grown have been the subject of individual and working group consideration for over two years. It evolved from the joint data acquisition effort involving the ESA-GEOS-1 and a number of N. American spacecraft, European and N. American ground arrays.

Participation in the analysis of this event has been open to all interested scientists and has been described in a number of IMS NLs, with the understanding that attendance at the general workshop, CDAW-2, was dependent upon participation in one of the Subgroups. Through the Subgroups specific aspects of the event have been given preliminary analysis; similar types of data or models have been compared in each of the subgroups in preparation for the combined analysis.

CDAW-2 is another step in the development of new techniques for large-scale data analysis that will be important for the 5-year period of IMS data analysis. Also, in connection with this study we have observed the close collaboration between experimenters, theorists and modelers. Due to this excellent cooperation it now seems likely that a highly successful workshop will result.

Final Announcement of CDAW-2 Workshop on the 29 July 1977 Substorms --- As a result of a meeting with the Workshop Convenor (Manka), Co-Chairmen (Fritz, Johnson and Wolf), Chairman Subgroup 8 (Olson), and representatives of the NASA Space Science Data Center (IMS SSC: Teague, Sawyer), the following final plans were established.

Workshop Dates: Wednesday-Friday, 24-26 Oct 1979
Workshop Place: NASA Goddard Space Flight Center
Building 26, Room 205
Greenbelt, Maryland USA
(Conference room used by the SSC for CDAWs)

Subgroup leaders are asked to arrive Monday night, if possible, so that Tuesday, 23 Oct, can be spent getting familiar with the workshop facilities, checking their subgroup data and participating in the final planning for the workshop. Also, if there is a Subgroup that has had difficulty in getting together and feels the need for additional interaction prior to the workshop, then it might be possible for them to meet at the Data Center on Tuesday. Some access to their Subgroup data base will then be possible. If any Subgroup plans to do this, their leader should contact Dr. Vette or Dr. Teague at the SSC as soon as possible (before 30 Sept) at telephone (703) 344-7354.

Workshop Objectives:

1. Develop, test and investigate accuracy of the large-scale magnetospheric models.
   a. Identify shortcoming in the models
2. Synthesize a large data set for the specific magnetospheric event.
   a. Identify shortcoming in the data available (in the data base or derived parameters)
3. Study the physics of selected magnetospheric phenomena, such as:
   a. Present concepts of injection, energization, and drift of ring current particles, and other particle drifts.
   b. Effects of a large shock wave impinging on the magnetosphere; sudden commencement.
   c. Magnetic field configuration and boundary positions during a storm.
   d. Waves, micropulsations and instabilities.
   e. Energetics of the magnetospheric storm
      - Solar wind plasma and field inputs
      - Ring currents and plasma sheet
      - Joule heating, electrojets and other currents
      - Field changes, E- and B-fields
   f. Non-adiabatic particle acceleration, effects of parallel electric fields.

Data Verification and Standardization:

In past CDAW's, considerable time has been spent during the actual workshop ensuring that a given data set has been loaded onto the disk correctly and reducing comparable data sets to common sets of units, time scales, and coordinate systems. In order for CDAW-2 to run as smoothly as possible, the Co-Chairmen have adopted the following guidelines:

1. Units. The following standard units have been adopted:
   Density: number/cm3
   Magnetic Field Magnitude: nTesla (1 nT= 1)
   Electric Field Magnitude: mV/m
   Particle Flux: particles/cm2 ster. keV sec

2. Coordinate Systems. The standard coordinate system for data should be the Solar Magnetic system (i.e. z-axis containing the north magnetic pole and x-axis toward the Sun). This will facilitate mode/data comparisons within the magnetosphere. The Olson/Pfitzer storm magnetic field model will generate on-line output in this system.

3. Time Scales. Model output will be available to a maximum time resolution of five minutes. In order to avoid excessive time being expended in the generation of appropriate time averaged data sets for comparison with the models, these data sets should be a priori available on disk at 5-minute intervals approximately (1-minute would be acceptable). Also, some data is not suitable to average (e.g. low altitude spacecraft measurements).

4. Verification. It is important that the data disk have been verified by the responsible participant before the beginning of the workshop since the capacity of the SSC to correct errors during the workshop is limited. In many cases the SSC has either mailed verification material to participants or has received verification material from them. In order to expedite verification, we would ask that participants who are in neither of these categories send verification material to Mike Teague at the SSC as soon as possible.

NOTE --- The SSC is able to effect much of the standardization (units, time scales, etc.) in the above items without input from the participants. However, in some cases input will be solicited by the SSC and we ask that the necessary information be supplied as promptly as possible.

Request for Suggestions on Data Summary Plots:

As part of the preparation for the workshop, the SSC will prepare a packet of copies of summary plots (probably 24 hours per page) of some of the data sets that are likely to be frequently referred to by participants. These plots, of perhaps 20 or so data sets, will be distributed to each participant at the beginning of the Workshop. (Because of the large number of data sets, it probably is not practical for the SSC to include a summary plot of each set; also, some experiments have complicated formats.) The SSC would like to have your suggestions on which data sets should be included in the package and they will try to incorporate the most frequently requested data sets.

Subgroup Presentations at the Workshop:

As mentioned in the initial announcement of the Workshop, at the start each Subgroup leader will be asked to give a brief summary of his Subgroup's analysis of the 29 July event. This summary can include major features and key times during the event. A Vu-graph (transparency) projector will be available.

As an added feature, I have asked the SSC to prepare a large, timeline chart for the event, upon which we can begin to fill in notes on key times and interesting features. The initial entries on this chart can come from the Subgroup talks.