



Indian Society of Remote Sensing

Ahmedabad Chapter

NEWSLETTER

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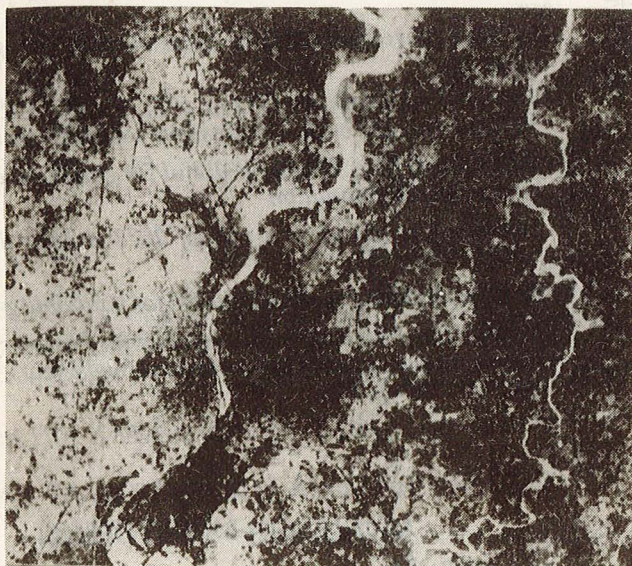
September 1, 1992

Dear Members,

We are overwhelmed with your response, to our attempt at improving the quality of newsletter, in form of co-operation, encouragement, suggestions and constructive criticism. Please continue to be alert as this is the only way to make further improvements. We have tried to incorporate some of your suggestions in this issue itself. Others having long term implications would be adopted in due course.

We propose to release the Jan 1, 1993 issue as a special annual issue giving thematic coverage to the events and developments in the remote sensing world. Themes could be the different application areas, computer software and hardware, sensors, instrumentation and the related technologies like GIS. We are sure that you would be as generous as ever in your contributions to this effort. Wishing you a happy reading.

-Editor



Ahmedabad and its environment as depicted by IRS-IA-LISS-II

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and above all T T medhavy, S D Naik and B S Munjal at thier creative best.

Editor : R K Goel

RESEARCH NOTES

LOCATING POTENTIAL MINERAL BEARING AREAS

B P Pathole, Sr. Geologist, Remote Sensing Laboratory, DGM, Ahmedabad

Directorate of Geology and Mining (DGM), Government of Gujarat, took up a project, in collaboration with RRSSC - Bangalore, to locate potential mineral bearing areas in the Kachchh district using Remote Sensing, GIS and the wealth of Geo-information gathered over a century on this area.

IRS and Landsat data were used for preparing the geological, structural and geo-morphological maps at 1: 250,000 scale and the maps rasterised into the GIS system. Simultaneously, the attribute data related to the exploration of bauxite was documented in order to generate Prognostic maps and Geo-model for bauxite mineral by utilising INGIS, software developed by RRSSC, Bangalore. The exploratory data included the characteristics of the ore bodies comprising of the location, elevation, thickness with chemical analyses, petrographic characteristics and the details of grade including classification in terms of industrial utility, etc. The exploratory data preparation for bauxite involved transferring of bauxite bearing areas, demarcated on 1:4,000 scale, during the detailed exploration conducted over two decades on to 1:50,000 scale SOI topo-sheets, initially, and then to 1:250,000 scale, sheets and also documenting all the attribute data, mentioned above, in a specified format for entries into the GIS. The integrated data base thus created in GIS have found wide ranging utility at various levels of planning.

While the geological map shows a close correspondence with the maps prepared by various earlier workers, the structural map reveals wealth of new lineament details which were hitherto unknown. The extension of lineaments from the outcrop areas into the area covered by younger tertiary sediments, identification of higher lineament concentration that is responsible in the formation of zig-zag coastal configuration of north-western parts of the Kachchh, trace of lineament along the eastern coast of Saurashtra and Kachchh into Rann and another one along the southern coast of Kachchh to the foot-hills of Mount-Abu are the significant revelations which have helped in further supporting the view

held in respect of evolution of present day configuration of Kachchh.

The Geomorphological map reveals evolution of Landsystems as products of endogenic and exogenic processes operating in the Kachchh region. It has been possible to conform, from the geomorphological studies, various land-systems with the erosion cycles related with the regressive phases of sea levels observed during early-mid and late tertiary (Ranging from 65 MY to 37 MY) to early Quaternary periods (Ranging in age from 2 MY to 0.01 MY).

The Geo-physical data available with ONGC Vadodara is acquired recently and is under evaluation to identify relevant data for integration with other geo-information. Simultaneously, the data related with genetic aspects of bauxite are also being worked out as important elements of total GIS so as to integrate them with other data to create Geo-model and prognostic maps to guide mineral exploration of the department.

GRASSLAND MAPPING/ MONITORING OF BANNI, KACHCHH

R N Jadhav, M M Kimothi & A K Kandya - SAC

In India, 12.15 million ha of land, i.e. 3.7% of the total geographical area has been recorded as permanent pasture and grazing land. In recent years, the factors responsible for gradual loss of grassland are: expanding agriculture, overstocking of domestic animals and improper pasture and grazing land management.

A pilot study was conducted in the Banni grassland area of the Kachchh district. Banni, at one time considered the largest grassland of its kind in Asia, has been degraded in the last decade. The main aim of this study was to standardise the methodology for mapping and monitoring of grassland through satellite data. Using multi-temporal satellite data belonging to the years 1980, 1985 and 1988, the status of grassland spread, invasion of *Prosopis juliflora* and salinity ingress were critically observed. The major findings are

October-November data is most suitable for grassland mapping

TM band combination (542 or 431) and IRS LISS-II (PC 321 and 341) are better for grass/Prosopis differentiation

MIR data (1.55-1.75 μ m) is useful for grassland and other vegetation discrimination

Prosopis has spread at a rate of 2673 ha/year during the period 1980-1988

Prosopis is invading areas suitable for palatable grass

Rainfall is no more a significant factor for Prosopis juliflora, since even during three consecutive drought years, Prosopis showed a steady rise.

Salinity ingress rate during 1980 to 1988 is 1611 ha/year

INSAT-VHRR DATA UTILISATION AT SAC FOR MONSOON MONITORING

P C Joshi, SAC

In order to disseminate weather information to district

ISRS-AC EXECUTIVE COUNCIL 1992-94

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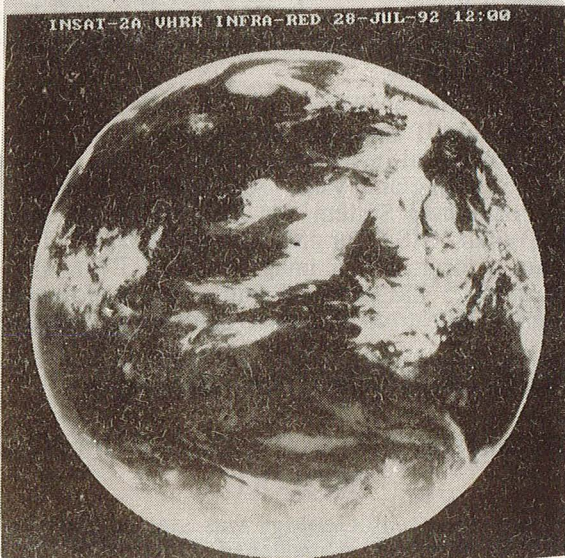
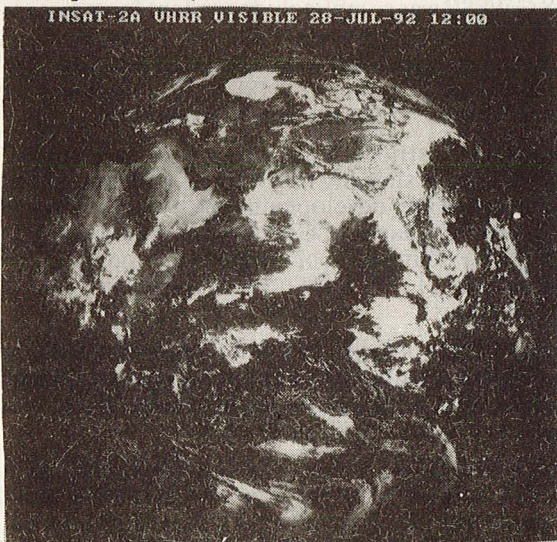
Dr J P Aggarwal Prof A B Vora Shri P S Thakkar

Shri A K Shukla Shri A S Rajawat Shri B P Pathole

Shri K M Saini Shri R N Shukla Shri Arun Kumar

authorities and Agriculturists the Department of Agriculture of Gujarat Government has set up a weather watch group (1991) consisting of personnels from IMD, SAC, Gujarat Agricultural University besides the personnels from department of Agriculture of Gujarat Government. These personnel meet frequently during the monsoon season and discuss the rainfall conditions in various districts and the likely weather situations in the coming week. The group also discusses the adequacy of rainfall for various crops in different districts.

INSAT VHRR data are received and recorded at AES/SAC. This data is processed at ISROVISION, by first density slicing of the image and then classified in different colours according to cloud top temperatures. The infrared data is useful in demarcating the cold and thick cloud. According to the classification, clouds having temperatures less than 233°K are likely to be rain bearing. The movements of the high convective zones are clearly discernible, in INSAT-VHRR IR data, when seen along with the surface and upper air charts provided by IMD.



FIRST INSAT-II VHRR IMAGERY - Courtesy Photolab-IPDPG/RSA/SAC

હવામાન

ઉપગ્રહ

૧ મેપીસ ૧૯૬૦ના રોજ અમેરિકાનો પહેલો હવામાન ઉપગ્રહ ૭૦૦ કિ.મી.ની ઊંચાઈએ પુલેપિલ કરતાં મા' આપ્યો હતો.

TELEVISION AND INFRA RED OBSERVATION SATELLITE

ઉપરથી લેનું ટુકડું નામ **TIROS** રાખવામાં આવ્યું હતું. નામ પુમાણે, લેના ટેલિવિઝન કેમેરા ધારી દૃશ્યમાન અને પાર-રક્ત પુકાશમાં વાદળોની છબીઓ મેળવી હતી. આ છબીઓની મદદથી પહેલો જ વખત પૃથ્વીના જુદા જુદા વિસ્તારો પર ઇલાયેલા વાદળોનાં ચિત્રો હવામાન વિજ્ઞાનીઓને ઉપલબ્ધ થયાં અને તેથી સમગ્ર વાવાવરણના પરિશ્રમથી વિશેષ પછી સચોટ ખ્યાલ મળ્યો. આ ઉપરાંત, ખાસ કરીને ઉષ્ણ-કટિબંધના સમુદ્ર પર ઉભાવવા વિનાયકારી વાવાઝોડો વિશે પછી ધણી ઉપયોગી માહિતી મળી શકી. વાસ્તવિક દૃષ્ટિએ જોઈએ તો ટાઈફાઇસ પણ એક પુકારનો દર - સંવેદન ઉપગ્રહ જ હતો, પરંતુ લેનો ઉપયોગ ભૂમિ સ્પર્શિત માહિતી માટે નહોતો, પરંતુ વાદળોની છબી મેળવવા પૂરતો જ સમિત હતો. વળી, લેનું વિશેષ - માપ લે-હચેટ કે ચાઈ. ચાર. એસ દર - સંવેદન ઉપગ્રહોના વિશેષ માપ નેટવર્ક સાર નહોતું, પણ કિ.મી. ના માળામાં જ હતું, જે હવામાનના માહિતી માટે યથાસર હતું.

વાદળો સૂર્ય - પુકાશનું ઘણું મોટું પુમાણમાં પરાવર્તન કરે છે, આથી, દિવસ દરમિયાન ઉપગ્રહોના દૂર-સંવેદન ઉપકરણો દૃશ્યમાં પુકાશમાં વાદળોની છબી લઈ શકે છે. ખાસ કરીને "ઉષ્માકી" ઉત્સર્જનના સિદ્ધાંત અનુસાર, ભૂમિ, સમુદ્ર, વાવાવરણ અને વાદળો લેમના વર્ણમાન પુમાણે પાર - રક્ત પુકાશનું ઉત્સર્જન કરે છે, આથી પાર-રક્ત પુકાશમાં દિવસ લેમજ રાત્રિ દરમિયાન ઉપગ્રહોના ઉપકરણો વાદળોની છબીઓ મેળવી શકે છે. આ ઉપરાંત, ઉષ્માકીય ઉત્સર્જનના પાર-રક્ત લેમજ સુક્ષ્મ-વરણ માળામાં કાર્ય કરવા અન્ય ઉપકરણો પણ કેટલાક હવામાન ઉપગ્રહોમાં રાખવામાં આવ્યા છે, જેની મદદથી હવામાનના અન્ય પરિબલો વિશે માહિતી મેળવી શકાય છે.

બધા હવામાન ઉપગ્રહોમાં વાદળોની છબી મેળવવાના ઉપકરણો હોય છે. ટેકનોલોજીના ઉત્તરોત્તર પ્રગતિ સાથે, આ ઉપકરણો વધારે સંવેદનશીલ અને વિશેષતાશીલ બન્યાં છે. હવામાન ઉપગ્રહો સૂર્ય - સમક્રિયિક અથવા ભૂ-સમક્રિયિક ઊંચાઈમાં રાખવામાં આવે છે, જેથી અમુક ખાસ લાભ મળે છે. જુલાઈ-૧૯૬૨માં ભૂ-સમક્રિયિક ઊંચાઈમાં પુકવામાં આવેલાં ચાપણાં "ઈનસેટ-૨એ" ઉપગ્રહમાં પણ "અધિક વિશેષતાશીલ ચિત્રિત્વમાપક" (VHRR) નામનું ઉપકરણ રાખેલું છે, જેની મદદથી દૃશ્યમાન અને પાર-રક્ત પુકાશમાં ભારતીય ઉપ-ખંડ વધા આસપાસના વિશાળ પ્રદેશ ઉપર ઇલાયેલા વાદળોની છબી મળે છે.

- ડૉ. પરવશ પાઠક.

ABOUT THE INSTITUTIONS

CENTRAL GROUND WATER BOARD (WCR)

For further details contact Director, CGWB (WCR), Ahmedabad

The Central Ground Water Board is the apex organization at National Level entrusted with the responsibilities of hydrogeological surveys, ground water exploration, assessment, development, management and regulation of ground water resources of the country. It has two main wings i.e. hydrogeological drilling. The hydrogeological wing is responsible for carrying out hydrogeological surveys, ground water exploration, ground water resources assessment, monitoring of behavior of ground water systems and water quality, assistance to technology mission on drinking water and related water management, assistance to drought affected states for location of sites and design of tubewells and application of new technologies for planning the development of resource in various parts of the country, production of reports, maps, development plans, and coordination with State etc. The drilling wing provides the necessary support by drilling boreholes for ground water exploration and is also responsible for procurement, operation and maintenance of drilling equipment.

The Board operates through 12 Regional Directorates, 14 Engineering Divisions and 9 State Unit Offices. In addition, there are number of special study directorates for ground water pollution studies, conjunctive use of surface and ground water, map production and publication, remote sensing and mathematical modeling, data base management, basin wise study and development and artificial research studies. The Regional office at Ahmedabad has its jurisdiction over the state of Gujarat and the UT of Daman and Diu. As on March 1990 the entire state of Gujarat and the UT of Daman and Diu have been covered by the systematic hydrogeological surveys. Furthermore, 75,000 sq. km area has been covered by re-appraisal surveys and 526 bore holes have been drilled for assessment and evaluation of the hydrogeological parameters of different aquifers.

The annual action programme of the current year envisages regional reappraisal hydrogeological surveys in the drought prone Kutch district, ground water exploration in hard rock and alluvial areas in Valsad, Junagadh and Kheda districts and Piezometer construction programme in Ahmedabad and Mehsana districts. Special studies in Lignite bearing areas of Surat district and urban hydrogeology of Ahmedabad city and its environs with special reference to ground water development have also been taken up. In the Mahi right bank canal command, special project on conjunctive use of surface and ground water is currently under progress. About 900 permanent national hydrograph stations are being monitored four times a year for the study of ground water regime in the different hydrogeological formation in the state.

The regional office has a small remote sensing cell which provides remote sensing inputs for various field activities. Digital image processing and GIS applications are planned in the area being covered under conjunctive use project in the Mahi right bank canal. The other scientific facilities available in the regional office are a regional chemical laboratory and a geophysical unit equipped with resistivity survey and borehole logging equipments.

REMOTE SENSING CELL, GUJARAT JALSEVA TRAINING INSTITUTE, GANDHINAGAR

As skilled and trained manpower in adequate numbers is an important pre-requisite for efficient operation and maintenance of water supply and sanitation, Government of Gujarat through Gujarat Water Supply and Sewerage Board has established a remote sensing cell in Gujarat Jalseva Training Institute at Gandhinagar. This centralised Remote sensing Cell is proposed to cater the training needs of geologist, hydrologist and engineers working in GWSSB, other departments of Government of Gujarat and other state officers, as well as to locate a probable site for ground water development and rain water harvesting structures for villages. Till 1987-88 GWSSB was completely dependent for remote sensing work on Space Application Centre, Ahmedabad. The efforts for creating the cell were started in the year 1986-87 and it started working in April 1989. The following activities are being done in the Remote Sensing Cell.

Preparation of districtwise and village wise geomorphological maps and plans showing major lineaments and potential sites for ground water development. By the end of July 1992; 1002 numbers of villages of Gujarat state have been studied individually for delineation of ground water potential zones and 104 number of sites have been proposed for water harvesting structures.

Training officers of GWSSB and other states : Till now 18 training courses (including four national courses, two international courses) pertaining to geohydrological and remote sensing have been arranged successfully.

Research and Development : In the initial stage remote sensing cell had started research and development activities and at present it has undertaken a research project on demarcation of ground water potential zones and probable water harvesting structures in Dharampur taluka, Valsad district which has been sponsored by Technology Mission; Government of India.

Various facilities available with the remote sensing cell include Procom-II Enlarger with lenses, Mirror Stereoscopes, Geophysical instruments - ABEM-SAS-300 Terra-meter for profiling and VES, ABEM Wadi with printer, Global Positioning System and Geographic Information System Toolkit (GIST) for data base management. The satellite data in form of FCC imagery and CCT for , IRS-1A LISS, Landsat 5 TM & SPOT and aerial photographs of some problematic areas of Gujarat state are also available.

For further details contact Shri R N Shukla, Remote Sensing Cell, Gujarat Jalseva Training Instt, Gandhinagar.

M G SCIENCE INSTITUTE, DEPARTMENT OF GEOLOGY

The Department of Geology was started first in the M.G.Science Institute, Ahmedabad, Gujarat, in the year 1948, under Bombay University. In the beginning geology subject was not known to the students, however, the depart-

ment started with three to four students. In the year 1952 the Institute started to impart education in geology as a principal subject at B.Sc. with 5 students every year. The department was recognised as a post-graduate centre for geology in the same year. With coming up of the Directorate of Geology and Mining and ONGC in Gujarat students could find some prospects for employments. This led to an increase in the strengthening of the students reach to 30 years every year.

The teaching at M.Sc. is managed by local teachers of the department, inviting outside teachers and experts of different branches of the earth sciences.

At present two teachers are working for their doctorate degree. The department has started teaching the subject of remote sensing and its application in the field of geology. Department invites scientists from Space Applications Centre for delivering lectures on remote sensing techniques and its applications in the field of natural resources.

For further details contact Shri G B Pandya, Head, Deptt Of Geology, M G Science Instt.

INDIAN INSTITUTE OF REMOTE SENSING

The Indian Institute of Remote Sensing (IIRS), a premier institution under the Department of Space for training of scientific and technical personnel in the application of re-

mote sensing and photo-interpretation techniques, celebrated its silver jubilee in February 1992. The celebration was inaugurated by Prof. U R Rao, Chairman, Space Commission. Dr. Beek, Rector, International Institute for Aerospace Survey and Earth Sciences (ITC), Netherlands, was also present on the occasion.

IIRS, formerly known as Indian Photo-Interpretation Institute (IPI), was established in 1966, in technical collaboration with the Government of The Netherlands through ITC, under the aegis of Survey of India, Department of Science and Technology. The IPI was brought under National Remote Sensing Agency in July 1976 to meet the growing demands of trained manpower in the application of remote sensing. It was renamed as Indian Institute of Remote Sensing (IIRS) in June 1983.

A new training division 'Human Settlement Analysis Group' was formed in 1982 at IIRS, again with the active collaboration of the Government of The Netherlands through ITC. Courses on applications of aerial photographs and remote sensing techniques in Human Settlement Analysis and Planning were introduced in 1983. New courses on Water Resources and Coastal Processes and Marine Resources were added in 1985.

Source : SPACE india

A LOOK AROUND STORM OF BRAINS

... On Marine Fisheries

A storm of brains is reported to have been occurred on June 23, 1992 at Space Applications Centre, Ahmedabad. On further inquiries it was learnt that the storm was essentially an aftereffect of achievements (or a precursor to further achievements) in the area of using satellite remote sensing for marine fisheries. A reliable source has revealed that this storm was further intensified by circulation of a report entitled Remote Sensing of Marine Fisheries : State-of-the-art cum Indian Experience by the project team of Marine Fisheries. About 44 representative brains, working in the field of marine resources, contributed to this storm. Representatives were from various organizations like CMFRI, FSI, state fishery departments, universities and NRSA, DOD and SAC.

The direction and intensity of this storm was guided and modulated by Shri Pramod Kale, Director, Space Applications Centre and Dr. George Joseph, Deputy Director, (RS). Ultimately the storm subsidised and ended leaving behind (recommending) considerable amount of work to be done as follows

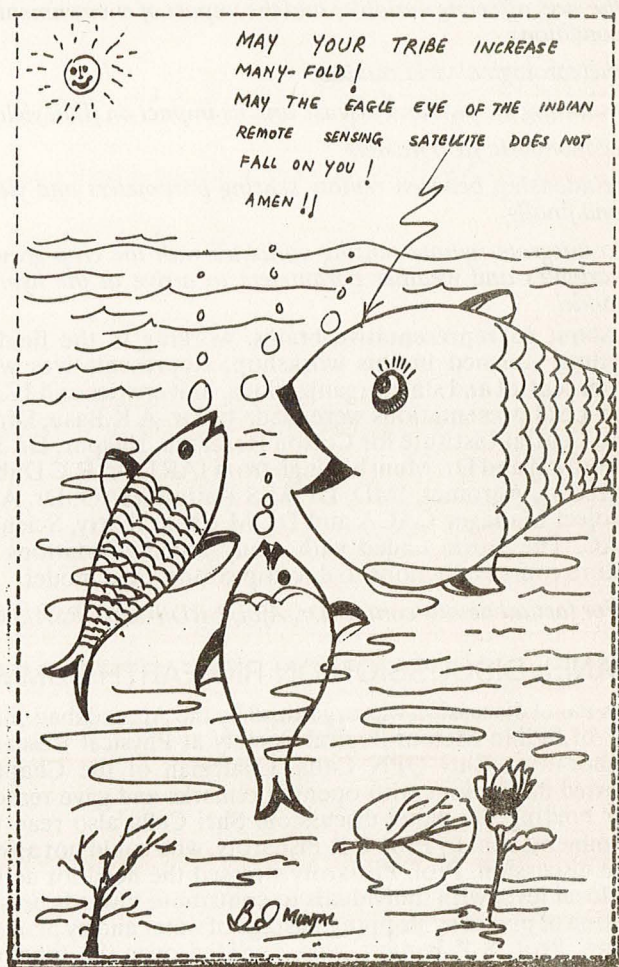
Fishery forecasts using SST should continue and efforts can be made to add more parameters as and when possible.

Validation for the forecast should be carried out.

FSI should take a lead role and join with SAC and NRSA in taking validation exercise.

Sagar Sampada cruise can be made use of for the validation. Information could be communicated to the areas close to Sagar Sampada.

CMFRI is trying to collect all parameters in good areas of



fishing. Data were collected in pre-monsoon, monsoon and post-monsoon season. After six months a similar exercise will be taken up. Requirement for this can be sent to CMFRI.

In order to validate the technique, the percentage area covered by the forecast and the fishermen should be considered. Also, percentage of fishermen who have gone to the suggested area and normal area should be taken into account. In addition to the catch with and without SST information should be analysed.

Exploited, underexploited and unexploited area should be identified. Which state can increase how much fishery potential should be worked out?

Forecast outside 50 m depth range is also required.

Delay in communication of information should be minimized.

For factual details contact Dr A Narain, MWRD/RSAG/RSA/SAC

... On Cotton Yield Model Development

Another storm was building up while the experts were assessing the aftereffects of the storm on June 23. It ultimately surfaced on June 28 at Space Applications Centre. This time the cause was to bring together the scientists working in the field of cotton yield modeling in the country and to have in-depth discussions on the important issues such as

the existing conventional cotton yield models

the yield affecting variables and the impact of environmental conditions

meteorological yield models

modeling for pest and disease and its impact on final yield

econometric yield models

relationship between remote sensing parameters and yield and finally

to integrate remote sensing variables with the crop grown variables and weather parameters to arrive at the hybrid model.

About 65 representative brains, working in the field of cotton, stormed in this workshop. Representatives were from central and state organizations, universities and ICAR etc. Lead presentations were made by Dr. A K Basu, Director, Central Institute for Cotton Research, Nagpur, Dr. S N Bhardwaj and Dr. Munshi Singh from IARI, Dr. R C Dubey, Director, Agromet, IMD, Dr. M S Kairon, HAU, Dr. Ajai, Project Manager CACA and Dr. M Chakraborty, Scientist SAC. The storm ended with many recommendations on future course of actions to develop cotton yield model.

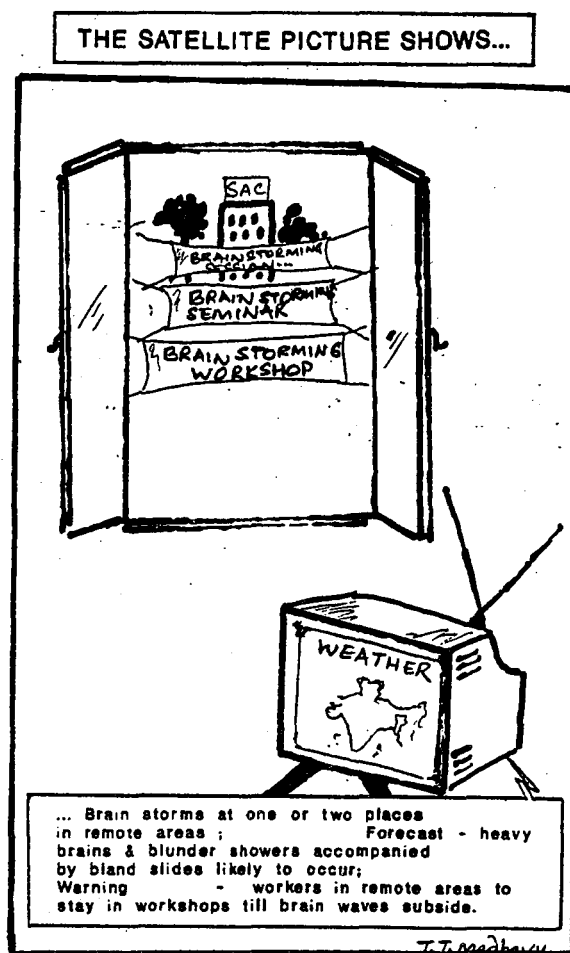
For factual details contact Dr. Ajai, LRD/RSAG/RSA/SAC

PANEL DISCUSSION ON RIO EARTH SUMMIT

A Panel discussion was organized by the Ahmedabad chapter of Indian Meteorological Society at Physical Research Laboratory. Shri OPN Calla, Chairman of the Chapter, started discussions with opening remarks and gave reasons for holding the panel discussion. Shri Calla also read the comments sent by Prof. P R Pisharoty, who could not attend the discussion. Prof. Pisharoty stressed the need for action at local level with individuals to contribute towards preservation of planet by stopping wastage of water and by planting trees. Prof. S P Pandya, who presided over the function,

expressed that development of science is quite fast, however change in our society is not that much fast. On the other side, it is human desire and greed, which is resulting in environmental crisis. This greed has benefited the rich nations however the bad effects will be faced by all the nations. He emphasized that unless we change our social structure and make scientific developments towards that, this problem can't be solved. Prof. B H Subbaraya of PRL described various scientific issues those led to Rio summit. He said that change in climate is always there but recently this is so rapid that system can't adopt it. At current rate, it has been observed and modeled that atmosphere will be getting hotter and hotter. The high latitude regions are more likely to be effected but it is very difficult to pinpoint quantitative amount of warming at different regions.

Mr. Kartikeya Sarabhai, Director, CEE said that India could have achieved much more if government and nongovernment organizations had worked out a strategy to suit developing nations. He said that he was amazed to see around 600 Indians attending Government and Non Government summit. There were mainly three conventions. First was on Biodiversity, which was to take steps towards preserving plants and animal life. Second one on Climate Change



was to commit countries to agree on plans to reduce levels of green house gases. Third treaty was on protection of Forest. He told, it was a great achievement by India by letting down the Forest convention which was initiated by United States and was towards control of North over the forests of South. He said Agenda 21, an 800 pages document, describing do's and don'ts for each country to have environmental balance was accepted by all nations. The Agenda also describes that developed nations should give 0.7% of their GNP for developing nations. While many countries said they will try their best to follow it but none of them committed.

(Contributed by Shri Rajkumar, Secretary, India Meteorologi-

cal Society, Ahmedabad Chapter.)

the creation of a systematic spatial and non-spatial database.

demonstrate integrated analysis of spatial/non-spatial data in the GIS environment for specific district planning problems. This has been oriented towards providing inputs to planning.

The GIS database for the district consists of spatial data - multi-date landuse from Remote Sensing, soil associations, Groundwater potential, village boundaries from Census, Settlements, Road and rail network, slopes derived from contours etc. The non-spatial data consists of details on demography, occupational structure, facilities and services,

FORTHCOMING EVENTS

Workshop on coastal zone management in Bangladesh, 30 Nov - 4 Dec, 1992, sponsored by UNESCO & BNCU, organized by BNCU.

National symposium on the international Geosphere-Biosphere programme, at Madras, Dec 14 - 17, 1992, organised by the Indian National Committee for IGBP, Anna Univ and Central Leather Research Instt.

Seminar on Geology of Maharashtra : Environmental and Economical Aspects, at Solapur, first week of Jan, 1993, organised by Deptt of Geology, Shivaji Univ, Centre for P.G.Studies.

IMPACT OF MINING ACTIVITIES AND SUPER THERMAL POWER STATIONS ON ENVIRONMENT

A project report, summarising the work carried out in this project, has been brought out by Space Applications Centre. The report describes the analysis of the environmental impact on land, air and water using remotely sensed satellite data in Kudremukh, Dehradun-Mussoorie mine belt, Korba and Talchar.

For further details contact Shri J K Garg, MWRD/RSAG/RSA/SAC

GIS BASED REGIONAL INFORMATION SYSTEM FOR BHARATPUR DISTRICT

As part of the demonstration of the Natural Resources Information System (NRIS) and the implementation of the Urban and Regional information System (URIS), a pilot-project has been completed by Space Applications Centre (SAC), Ahmedabad and Town and Country Planning Organisation (TCPO), New-Delhi. The major aim of this pilot-project has been to demonstrate and implement an information system for regional planning at district level around a GIS package - ARC/INFO. The broad framework of the project has been as follows:

design and organisation of a spatial information system for Bharatpur on 1: 50,000 scale around a GIS and to serve as a regional level database for district planning. This included

landuse and irrigation details etc. for the 1451 villages in the district.

A variety of GIS analysis/modeling methods have been adopted. As part of the planning, the pilot-project has addressed the following aspects:

Land utilisation, where the major emphasis was to identify the changes in the landuse/cover and also to determine the capability of land.

Agriculture, where the stress has been to identify the relative levels of development of agriculture on a village-wise basis.

Services, where a settlement hierarchy has been determined based upon an assessment of education, medical, transport/communication and general facilities for each settlement

Intra-district disparities, where the settlement-wise assessment of various developmental indicators has been made. These indicators have also been assessed in an integrated manner to define a relative level of development for each village, thus bringing out the intra-district disparities.

An inter-agency review of the project was held at TCPO, New-Delhi on August 14, 1992. The review panel consisted of eminent planners from different central and state departments. Shri K Dharmarajan, Additional Secretary, Ministry of Urban, Government of India and Chairman, TCPO; Shri P P Kale, Director, SAC; Dr George Joseph, Associate Director, SAC and Shri D Meshram, Chief Planner, TCPO also participated in the review meeting.

A set of presentations were made by the SAC-TCPO project-team. The detailed report on the project - **A GIS BASED REGIONAL INFORMATION SYSTEM - A CASE STUDY FOR BHARATPUR DISTRICT** was also circulated.

(Contributed by Shri Mukund Rao, SPUCC/RSA/SAC)

TECHNOLOGY TRENDS

JAPANESE ERS-1 SATELLITE

The Japanese earth resources satellite JERS-1 was

launched into a sunsynchronous orbit at an altitude of 568 km and an inclination of 98° on February 11, 1992 from

JERS SENSOR DETAILS

Spectral bands (Micro Meters)

VNIR 1. 0.52-0.60

2. 0.63-0.69

3. 0.76-0.86

4. 0.76-0.86 (Stereo)

SWIR 5. 1.60-1.71

6. 2.01-2.12

7. 2.13-2.25

8. 2.27-2.40

Stereo angle 15.33 deg.

Ground Resolution 18.30 m (cross track)

24.20 m (along track)

Swath width 75 Km

is the second highest available from spaceborne SAR for remote sensing, compared to 15 m from ALMAZ and 30 m from ERS-1. The L band SAR has a look angle of 35° (compared to 23° for ERS-1 and 20.5° for SEASAT) to the right of the flight direction. Through reduced quantisation levels (3 bits each for I and Q channels compared to 5/6 bits per channel for onboard/ground range compression for ERS-1, the data rate is kept down to 60 Bbps, enabling the use of onboard tape recorders for collecting data out of sight of ground stations.

JERS-1 OPS consists of two high resolution sensors in the visible and near infrared band (VNIR) and the short wavelength infrared band (SWIR). The VNIR telescope can look 15.3° forward in the flight direction in addition to the nadir look, enabling the generation of stereoscopic images. Both VNIR and SWIR systems use 4096 element CCD (charge coupled device) sensors. The SWIR PtSi IRCCDs (infrared CCD) are maintained at 77-82° K by a Stirling cycle cryo cooler which has a design life time of 2000 hours.

Source : *International Remote Sensing News*

REMOTE SENSING OF CROPS

Satellite derived false colour imageries have been used for the assessment of cotton crop condition. Areas of moderate (50 per cent crop loss) and severe (80 per cent crop loss) damage by the white-fly have been easily identified. The damaged crop area estimated from the satellite data was found to be close to that of the area reported by the Directorate of Agriculture to within 12 per cent. The report suggests that the remote sensing techniques could be used to monitor & manage the outbreak by monitoring cotton growing, to demarcate areas requiring crop rotation and to estimate the acreage under alternate hosts (tomato, chilli, tobacco, etc.).

Source: *SPACE india*

NEWSPIX

Bhaskara-II

One of the the early Indian experimental remote sensing satellites, Bhaskara-II, launched on November 20, 1981, re-entered earth's atmosphere on November 30, 1991. The 440 kg satellite, launched by the USSR on board an Intercosmos rocket, carried a two-band TV camera system and a three-frequency passive microwave radiometer system. The satellite was successfully used for more than two years for conducting remote sensing experiments related to ocean, forestry, hydrology, water and land masses.

Bhaskara-II experiment was important in that it paved the way for developing the operational Indian Remote Sensing Satellites, IRS- 1A and IRS-1B, which are in service today. Bhaskara-II was last tracked by the ISTRAC at 0715 hours UT on November 30, 1991.

Source: *SPACE india*

Aryabhata

The first Indian satellite, Aryabhata, launched on April 19, 1975, re-entered atmosphere on February 10, 1992 after being in orbit for almost 17 years. The signals during Aryabhata's 92,875th orbit, the last around the earth, were re-

ceived by the Sriharikota ground station of ISRO Telemetry, tracking and Command Network (ISTRAC), at 1827 hours Universal Time (UT) for a duration of about 30 seconds before the satellite became silent.

Aryabhata was launched on board the Soviet Intercosmos rocket from the USSR into an initial 619 x 562 km orbit with an inclination of 50.64 deg. The primary objectives of the Aryabhata mission were (a) to indigenously design and fabricate a space-worthy satellite system and evaluate its performance in orbit; (b) to evolve the methodology of conducting a series of operations on the satellite in its orbital phase; (c) to set up ground-based telemetry, tracking and telecommand systems; (d) to establish infrastructure for the fabrication of spacecraft systems. All these objectives were more than met by Aryabhata before the end of its designed operating life of six years. The satellite also carried three scientific experiments in X-ray astronomy, solar physics and aeronomy. Aryabhata was being tracked from sriharikota ground station regularly even after its six-year operating life.

Source: *SPACE india*

CHAPTER ACTIVITIES

Regional Planning through Remote Sensing

A lecture by Shri D G Pandya, Chief Town Planner, Govt of Gujarat.

ISRS-AC organised this popular lecture at Space Applications Centre on July 9, 1992. Dr Pandya stressed the need for proper end use of the planning exercise. Integration of the data from a variety of sources is a must while carrying out the planning exercise for development of an area. In this context, he underlined the need for integrated look at the physical, industrial and demographic aspects for effective planning at regional level. The data on forest, landuse and groundwater etc. plays a vital role in such an exercise specifically for perspective planning. These data elements are of dynamic in nature and hence remote sensing technology has a very important place. He presented the work done on planning for south Gujarat region, wherein he suggested alternatives for alignment of coastal highway and railway line considering the likely environmental and socio-economic impacts. He urged the researchers and experts working on different aspects of remote sensing to contribute to the development planning exercise for south Gujarat region.

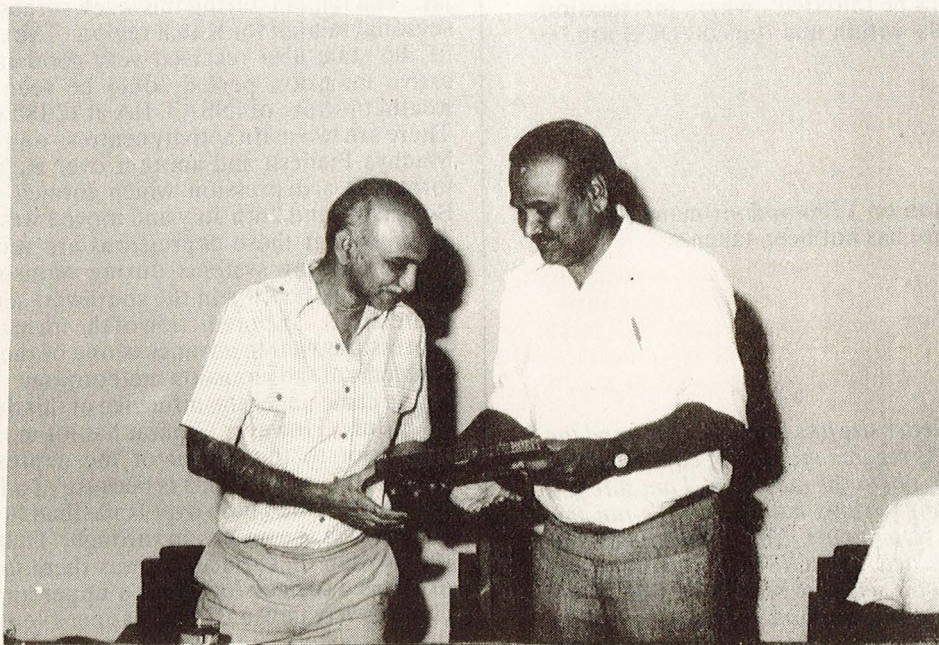
Dr D G Pandya is M. Tech (Regional Planning). During 1961 to 1967 he worked for Bokaro city and new city near Ranchi and Govt of Orissa. He was at UK in one of the Boroughs during 1967 to 1969. Thereafter he is with Govt of

Gujarat. In the intervening period during 1980 he was employed by UN at Bangladesh for 6 1/2 months. He participated in seminars at Paris and Bangkok during 1981 and 1992. Currently he is Chairing the Ahmedabad Regional chapter of the Institute of Town Planning India for period 1991- 1993

Van Mahotsav

Chapter organised a Van Mahotsav during 3rd and 4th week of July 1992. A total of 350 saplings were distributed to about 100 members. Species included Asopalav, Peltaforam, Gulmohar, Gauva (fruit), Cassia and Kasid. The organisers thank the Forest Department, Gujarat for providing the saplings. The special efforts made by Shri J P Aggarwal, Conservator of Forests, Gandhinagar circle are gratefully acknowledged.

It was decided by the ISRS-AC Executive Council that the growth of the plantations will be inspected by a committee after an year and a prize will be given to the members whose plants are healthy, and well grown.



A memento of remembrance to Shri Pandya - presented by Shri R C Garg

A DISCUSSION ON THE NEWSLETTER

R R Navalgund, SAC

While appreciating the excellent work done by the Editorial Staff of the Newsletter for introducing a new format and for introducing innovative sections on technology trends, about the members. I have a few suggestions/remarks to make to further improve its readability. The print-letter size should be bigger. The section on research notes read more like status report. It should highlight new ideas/innovative work done. The members outside SAC may be encouraged to contribute. Could you also confirm whether the emblem of ISRS that is being printed on the Newsletter does show the 'islands'? The cartoons are excellent. Wishing you all the best and extending my cooperation.

Mukund Rao, SAC

I congratulate the Editorial Board on the *new-look* newsletter. The contents are also informative and make a good reading. I felt the character size to be too small and maybe a larger character size would make a comfortable reading. The section on the activities of the members is welcome and a good forum for knowing more about the members. While, the present issue seems to be SAC heavy on members's achievements, I am sure this will be expanded to include other members also in the future issues. The cartoons also are excellent and the one on Bush is *TOPS*. I also suggest that a separate section on GIS be initiated - where information and the activities of GIS - within and outside DOS can be reported.

P C Joshi, SAC

In the newsletter (section on) *Promotions* many (names) are missing. Sufficient care has not been taken.

Editor

As suggested by you, the letter size has been increased and the emblem has the islands. As regards the lack of coverage from outside SAC in the section 'about the members', I am sure you would find a positive change in this issue itself. We run this section largely based on your inputs. You would have also noticed the presence of articles on GIS in the current and previous issue. Inclusion of a separate section on GIS would require further reformatting with thematic coverage to all the other aspects. This is not found feasible at present for all the issues. However, we plan to release a special annual issue giving thematic coverage to different aspects of remote sensing and related technologies.

SPECIAL ANNUAL ISSUE - APPEAL FOR CONTRIBUTIONS

We propose to release the Jan 1, 1993 issue as a special annual issue giving thematic coverage to the events and developments in the remote sensing world. Themes could be the different application areas, computer software and hardware, sensors, instrumentation and the related technologies like GIS. We are sure that you would be as generous as ever in sending your contributions to this effort.

....Continued from page 3 column 1

INSAT-II VHRR UTILISATION

The monsoon was active during the last week of July around the country in general and Gujarat in particular. The rainfall during this week surpassed the total seasonal rainfall for Kutch region. The other regions of the state also received very good rainfall. The active monsoon period could be seen in the first weather picture of INSAT-IIA at 12 IST on 28th July. There are two main activity centres - one over the east Madhya Pradesh and another over Rajasthan. The former is a depression which formed over Bay of Bengal around 26th July and moved west-northwest. As is evident these depressions are very important rain producing systems during monsoon seasons. More rainfall occurs in the southwest sector of these depressions. The prediction of the formation of these depressions well in advance is one of the challenging problems of the monsoon meteorology. The Gujarat region came under the influence of this depression on 29-30 July. However Gujarat has lot more rain a few days prior to the arrival of the depression in the vicinity of Gujarat. This is because of a low pressure system (the cloud blob over Rajasthan in the picture) formed over the monsoon trough. This formed as a low pressure in surface and was there for three days either as a surface low or as a upper air circulation. This was very unusual. This happens very rarely. The understanding of such formation is much more difficult than the formation of the monsoon depressions.

ABOUT THE MEMBERS

WELCOME TO ISRS-AC

Our strength has increased to 232. We introduce herewith the names of the new entrants to the ISRS-AC family.

Life Members

Shri Lalit Bhalotia, Ahmedabad
Shri A S Arya, SAC, Ahmedabad
Dr. Satyendra Bhandari, SAC, Ahmedabad
Dr. Shabbar F. Barodawala, Ahmedabad

Annual Members

Shri Ananth Rao, SAC, Ahmedabad
Shri Sujay Dutta, SAC, Ahmedabad
Shri Pradip Kumar Parchure, CGWB (WCR)
Shri B M Rao, SAC, Ahmedabad
Shri I C Matieda, SAC, Ahmedabad

HONOURED

Dr P C Pandey, Scientist, Space Applications Centre, as fellow of the National Academy of Sciences, Allahabad.

VISITS ABROAD

Shri Pramod P Kale, Director, SAC visited Boulder, Colorado, USA and participated as a panel expert in an international conference Satellite Remote Sensing for Resource Management, Environmental Assessment, and Global Change Studies : Needs and Applications of developing Countries, organized by the United Nations in cooperation with the Government of the United States during Aug 17-20, 1992.

A TALK BY SHRI R C GARG AT DEAL, DEHRADUN

Shri R C Garg from SAC delivered a talk *Microwave remote sensing in India, its past present and future* under the aegis of Institute of Electronics and Telecommunications Engineers at Defence Electronics Applications Laboratory (DEAL), Dehradun. He briefly told about the advantages of Microwave remote sensors over optical remote sensors in having day and night and all weather capability, capable of measuring soil moisture and depicting well, surface and subsurface features. He discussed optimum parameters for microwave remote sensing namely frequency band, polarization, look angle, resolution both spatial and radiometric for relevant applications finalized by inter-departmental committee set up for the purpose in the country.

In past, work began in mid-seventies at the Space Applications Centre with the development of 3 channel (19, 22 and 31 GHz) SAMIR (Satellite Microwave Radiometer) on-board Bhaskara-1 and later on Bhaskara-II gave useful data for application in estimation of sea-surface temperature, water vapour and liquid water. Scatterometer (1982-89) was completed for soil moisture estimation experiment at Navgaon in Gujarat. Technical consultancy agreement with Rajasthan Communications Ltd was signed to develop such

equipment, for measuring backscatter co-efficient for different type of applications in agriculture and its possible applications for defence.

Technical details of Real aperture Radar at X-band developed at SAC during 1980-88 was given. To demonstrate its application as an imaging radar an imagery of a Meteorite crater at Lonar near Aurangabad was shown.

C-band Airborne Synthetic Aperture Radar being developed at Space Applications Centre was discussed giving its comparison with SPOT. It was also indicated that the future scenario is to use spaceborne platform to make use of full capability of microwave sensors at reduced operational cost. To begin with, there is likelihood of putting C-band scatterometer for oceanographic application onboard PSLV sometime in 95-96 timeframe and if resources crunch are not faced, a Microwave Remote Sensing Satellite (MRS-1), may be put in orbit by 97-98. On application front with other satellite there is a plan to utilise SIR-C data which are multi-frequency and multi-polarisation data for many applications in the field of agriculture, geology and forestry.

PROMOTIONS

On behalf of ISRS-AC, we congratulate the following member colleagues who have achieved an important milestone in their career by gaining departmental promotion.

Shri B P Pathole as Sr. Geologist DGM
Shri J V Bhatt as Sr. Geologist, DGM
Shri S D Kapse as Asstt. Geologist, DGM
Shri R C Jain as Sr. Hydrogeologist, CGWB
Shri Arunkumar as Sr. Hydrogeologist, CGWB
Dr. P C Joshi as Scientist/Engineer SF, SAC
Shri H I Andharia as Scientist/Engineer SE, SAC

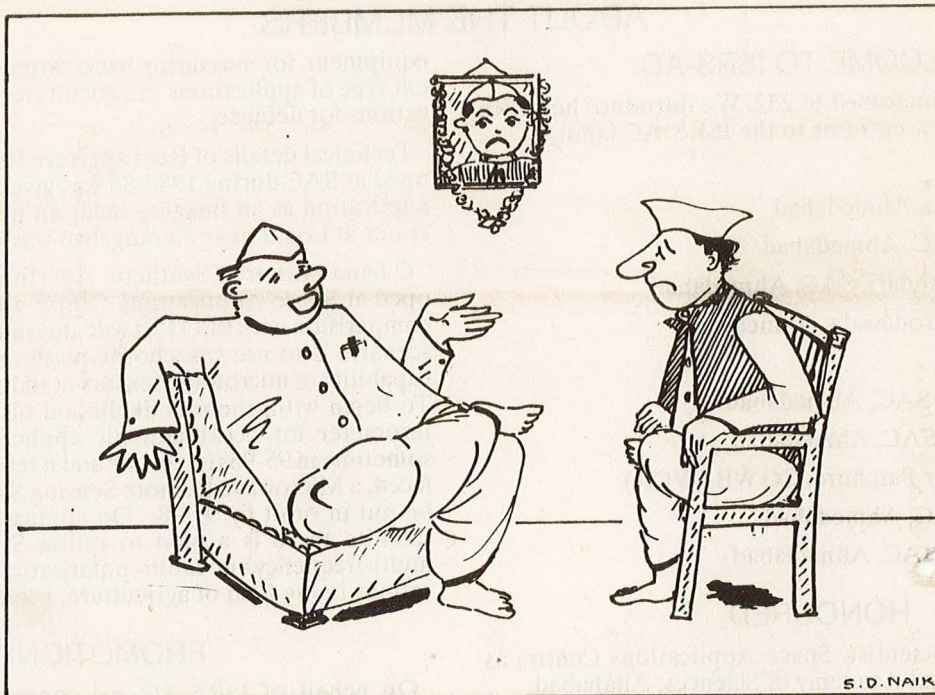
ELECTED

Dr P C Pandey, Scientist, Space Applications Centre, has been elected as President, national executive council, Indian Meteorological Society for years 1991-93 and as member, national executive, Indian Geophy. Union, Hyderabad for years 1991-92.

Dr P C Joshi, Scientist, Space Applications Centre, has been elected as member, national executive council, Indian Meteorological Society for years 1991-93.

CONTRIBUTIONS TO THE SECTION ABOUT MEMBERS

This section is about the members of ISRS-AC. This can be maintained only with members active support. Please continue to send notes about yourself or about your member colleagues on promotions, appointments, transfers, awards, visits abroad, publications outside ISRS, personal memorabilia or on any other event highlighting the professional-cum-personal life. Please send your notes to the editor or secretary, ISRS- AC.



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Secretary
ISRS-Ahmedabad Chapter
C/O. Remote Sensing Area
Space Applications Centre
Ahmedabad 380 053

Edited by

R.K.Goel, V.K.Dadhwal, Parul Patel, K.N.Padia, A.K.Mathur, R.K.Dave, B.S.Munjaj, Space Applications Centre, Ahmedabad.

G.B.Pandya, M.G.Science College, Gujarat University, Ahmedabad.

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