



**THIRD POST GRADUATE COURSE
IN SATELLITE COMMUNICATIONS**
(August 1, 2001 - April 30, 2002)
MEMOIRS



**Study Of Ku-Band VSAT Network Of
Satellite Communication for DPR Korea**

Name of the Participant:
Mr. Ri Chol (DPR Korea)

Project Supervisor:
Mr. K. Bandyopadhyay, Group Director, SAG,
Space Applications Centre, Ahmedabad, India

Country Supervisor:
Mr. Mun Beng Su, General Manager, International
Satellite communication Earth Station,
Ministry of Post and Telecommunication, DPR Korea.

The current trend in domestic satellite communication is toward the Ku-Band VSAT network. Development of Ku-Band VSAT network is becoming important in satellite communication system.

The scope of the work for the project is to study VSAT technology and different multiple access techniques. The propagation effect in Ku band, and the reason for selection of Ku band would be studied while designing VSAT network for DPR Korea.



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MEMOIRS



Study of Satellite Based Meteorological Data Reception System

Name of the Participant:

Mr. Ro Myong Bok (DPR Korea)

Project Supervisor:

Mr. A. S. Durai, Head, AES/SGSTG/SITAA,
Space Applications Centre, Ahmedabad, India

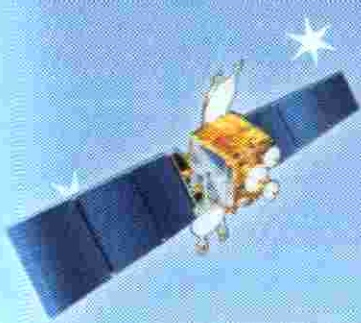
World Meteorology Organization (WMO) is directly providing the real time data to various users. This data is utilised for social and economic development which is brought about through environment studies.

The objective of this project is to study present meteorological data reception system from meteorological satellite for DPR Korea.



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MEMOIRS



SSPA using Hybrid Power Modules.

Name of the Participant:

Mr. R. J. Doshi (India)

Project Supervisor:

Mr. R.V. Singh, Head, SPAD/TRG/MISA,
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Mr. R.V. Singh, Head, SPAD/TRG/MISA,
Space Applications Centre, Ahmedabad, India

The SSPAs are used in transmit chain of earth station and satellite. The SSPA has become a competitor of Traveling Wave Tube Amplifier (TWTA). As in case of SSPA, the power requirement is low. Due to better linearity, low voltage requirement and compactness, SSPA is becoming more popular for On Board applications.

The aim of the project is to design compact C-Band 20 Watt Solid State Power Amplifier Using Hybrid Power modules.



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MEMOIRS



Design of Ka-Band Electronic Beam Squint Tracking System

Name of the Participant:

Ms. Rupal Yagnik (India)

Project Supervisor:

Mr. S. S. Valdiya, Head, SEID/SGSTG/SITAA,
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Mr. S. S. Valdiya, Head, SEID/SGSTG/SITAA,
Space Applications Centre, Ahmedabad, India

Modern satellites have spot beams at Ka-band for communication applications. The spot beams are required to focus on a small defined area on earth & must not be disturbed. To meet this requirement an antenna pointing mechanism is required to be used in satellites.

Use of spot beams in satellite for communication purpose will demand accurate pointing of satellite and hence the requirements of an on board tracking system. The electronic beam squint (EBS) technique has been selected for on board Ka -band tracking system because of its high accuracy, simplicity and low cost design. As a part of project, apart from study of different techniques used for tracking system, design of EBS tracking system will be undertaken. The optimization and verification of the design of EBS controller will be undertaken by simulation of algorithm & generating antenna beam switching pattern using 'C' language computer program.



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MEMOIRS



Study and selection of suitable encryption scheme for Satellite based Data Communication

Name of the Participant:

Mr. Deval Chitranjan Mehta (India)

Project Supervisor:

Mr. V.S. Palsule, Head, ACDT/ADCTG/SITAA
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Mr. V.S. Palsule, Head, ADCT/ADCTG/SITAA
Space Applications Centre, Ahmedabad, India.

Secure communication for prevention of unauthorized interception of sensitive information is a legitimate need, not only of military and government, but also of the business sector. If a non interceptable means for data storage and transmission were available, then all messages and data including data in storage units would obviously be secured. One such possible system is a cryptographic cipher system, which can conceal the contents of every message by transforming (enciphering) it before transmission or storage.

The project titled "**Study and selection of suitable encryption scheme for Satellite based Data Communication** " will explain and compare various encryption schemes and will suggest suitable scheme for Satellite based data communication system.



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MEMOIRS



Satellite Based Meteorological Data Collection System for Land and Sea

Name of the Participant:

Mr. Chusnul Tri Judianto (Indonesia)

Project Supervisor:

Mr. M. Jeyamani, Head, SATD/SGSTG/SITAA
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Mr. Soewarto Hardhienataa, Director, Aerospace
Electronics Technology Centre, Rancabungur,
PO Box-13, Semplak Bogor 16310, Indonesia.

Indonesia (The land of islands) has difficulty in collection of environmental/ weather data due to wide spread topology. Also the terrain has hills and forests. Weather data is acquired using NOAA and GMS/MTSAT. Some times remote areas remain without data acquisition.

This Project is focused on to study the Data Collection System through Indonesian satellite by using DCP and data re transmitting system. The data collection system under study will have collection of environment data from remote areas using DCP, transmitting it to the satellite in UHF band, re-transmitting DCP data to primary ground station for processing in L band and finally dissemination to users.



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MEMOIRS



Communication Payload for Low Earth Orbit Satellite System

Name of the Participant:

Mr. Minto Suwarjo (Indonesia)

Project Supervisor:

Mr. S. M. Srivastava, Head, FCD/TRG/MISA
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Mr. Soewarto Hardhienataa, Director Aerospace
Electronics Technology Centre, Rancabungur,
PO Box-13, Semlak Bogor 16310, Indonesia.

Low Earth Orbit (LEO) satellite network for communication is alternate to Geo Synchronous Satellite network. The disadvantages of GEO like large propagation delay, higher G/T for receive terminal etc. could be overcome by using LEO Network. The LEO based satellite Networks have been planned by ICO, Teledesic, Orbcom etc.

The scope of this project is to study the communication Payload for Low Earth Orbit satellite systems and applications, as a prelude for establishment of Low Earth Orbit based satellite system for data communication for Indonesia.



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**Web Based Interactive Training Programme
for Satellite Communications**

Name of the Participant:
Ms. Oyun Battumur (Mongolia)

Project Supervisor:
Dr. K.S. Dasgupta, Group Director, ADCTG/SITAA
Space Applications Centre, Ahmedabad, India

Country Supervisor:
Dr. G. Sharavdemberel, Director,
Training center of Mongolia Telecom, P.O.24 Ulanbaatar, Mongolia.

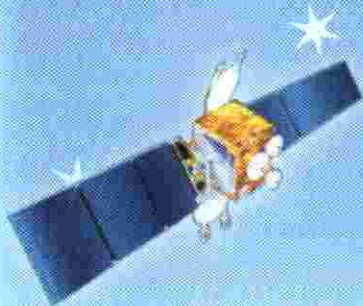
Satellite Communications can be studied through various medias. Internet media is the one of the most appropriate to reach the people. As a part of project, a detailed study of HTML, Macromedia Flash, Java applets will be done. The study will have following components.

- Publish all materials in HTML format with appropriate links
- Include Macromedia Flash animation objects to help visualization.
- Intend to include Self Evaluation Tests
- Provide Glossary of Terms encountered in Satellite communications
- Provide List of Important links to online references
- Provide List of Interesting Books and Articles on Satellite Communication



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MEMOIRS



Study and Simulation of Satellite-based Multimedia Distance Education System

Name of the Participant:

Mr. Ram Krishna Maharjan (Nepal)

Project Supervisor:

Dr. K.S. Dasgupta, Group Director, ADCTG/SITAA
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Prof. Jagan Nath Shrestha, Head, Department of
Electronics and Computer Engineering, Pulchowk Campus,
Institute of Engineering, Tribhuvan University, Nepal.

Satellite Based Multimedia distance education system provides a real time, easy to access and cost effective ideal solution to the mountainous country like Nepal.

The project is aimed in finding out the cost effective, efficient and easy to access communication methodology for point to multi-point and multi-point to point for distance education. The project also aims in finding out different options for data transmission from teaching end to classrooms and vice versa.



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MEMOIRS



Design of Optimum Remote Area Communication System for Nepal

Name of the Participant:

Mr. Amar Nath Jha (Nepal)

Project Supervisor:

Mr. M.K. Sharma, Head, DCTD/SGSTG/SITAA
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Mr. Shaktiman Singh, Director,
Nepal Telecommunication Corporation, Western
Regional Directorate, Siddharthanagar, Nepal.

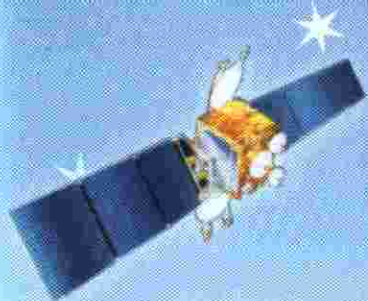
Rural Nepal situated in Himalayan Region has many hurdles in developing communication systems. Repeaters have to be located in high altitude areas making access difficult in general and impossible during winter and rainy season. Such repeaters, may not be cost effective in rural areas as traffic is low.

Satellite based communications system happens to be only solution for remote areas in Nepal. The aim of the project is to study different communication systems and select the optimum for remote areas of Nepal. Effective use of VSAT-WLL techniques will also be explored.



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MEMOIRS



Design of Transportable SATCOM Terminal for TV Broadcasting

Name of the Participant:

Mr. Bishnu Ram Neupane (Nepal)

Project Supervisor:

Mr. S. S. Valdiya, Head, SEID/SGSTG/SITAA
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Mr. Dinesh Dev Pant, Executive Engineer, Nepal Telecom.
P.O. Box. 2665, Nepal

Television is widely acknowledged as a powerful medium for mass communication. Television broadcasting has spread its influence among people of all countries. In order to have live coverage of events, Transportable Satellite Communication Terminal is essential. Such terminal can be transported to the place of event in a short span.

The aim of the project is to have detailed study and system design of Transportable Satellite Communication Terminal for TV Broadcasting in Nepal with special emphasis on Digital Satellite News Gathering Terminal.



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MEMOIRS



Feasibility Study on Secure Ship-borne Composite Satellite Communication System

Name of the Participant:

Mr. Deepthi K. N. Peiris (Sri Lanka)

Project Supervisor:

Mr. V.S. Palsule, Head, ACDT/ADCTG/SITAA
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Commodre AV Abeysena, USP, Naval Head Quarters,
Post Box No. 593. Colombo-01, Sri Lanka.

HF communication has been widely used in ship borne communication system to provide long distance, ship-to-shore communication links. It has been observed that HF communication does not provide a reliable link. VHF and UHF communication that depends on LOS also does not provide high reliable links.

Satellite communication provides a simple and reliable solution. However Commercial Satellite Communication System like INMARSAT may not be able to provide effective solution to Sri Lankan Navy due to reasons of cost, data security, network re-configurability etc.

The objective of this project is to develop a set of standards that will enable integration of multiple services such as voice, data, fax and SMS etc. through a common satellite based communication interface. The proposed system will consider CDMA as the multiple access scheme; link and data security being of the primary concerns. The project will focus on the designing of physical data-link and network layer of the OSI model that will ensure inter operability with existing services based on PSTN and HF/VHF/UHF links in the Sri Lankan Navy.



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MEMOIRS



Design of Shaped Cassegrain Antenna for Satellite Earth Station

Name of the Participant:

Mr. Pavel Radicovich Safin (Uzbekistan)

Project Supervisor:

Dr. Arun Kumar, Group Head, AFG/MISA
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Dr. Igor Ibragimov, 2-Borovsky Str, Taskent,
700060, Uzbekistan.

Uzbekistan is developing an enhanced nationwide communication system using satellite. In the development program, it is envisaged to develop earth station technology and antenna system indigenously.

The project aims in Design of Shaped Cassegrain Antenna for Earth Station in which design problems will be analysed. Study of latest antenna production technology, optimization of antenna fabrication in line with existing technology will be taken up.



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MEMOIRS



Satellite Based VSAT Business Network for Vietnam

Name of the Participant:

Mr. Nguyen Manh Thang (Vietnam)

Project Supervisor:

Mr. Shymal Mehta, ADCTG/SITAA,
Space Applications Centre, Ahmedabad, India

Country Supervisor:

Mr. Hoang minh Thong, Technical Expert, Vinasat
Project Department Vietnam Posts and Telecommunications Corp..

Vietnam has planned to launch its own satellite. It will have its business network through VSATs linking home, business centers etc with the capabilities of providing voice, data, fax. It is planned to link corporations, communities and government agencies using VSAT based business networks.

The scope of the project is to study the present communication using satellite in Vietnam, expansion of telecommunication infrastructure in Vietnam. VSAT access techniques and services and design proposal for VSAT network in Vietnam will also be covered.



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