PARIKRAMA
Don Bosco College Of Engineering
Student Satellite Club

STUDENT SATELLITE CLUB-PARIKRAMA

Electronics & Telecommunication Engineering Department

Issue 01, Year 2019

Editor: Prof. Mohini Naik

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OBJECTIVES

The idea of Student Satellite Club is to encourage DBCE Students to build their own satellite and earth station and get hands-on experience in developing different systems for the same. This project will also help them to reduce the gap between industry and academia.

This project will also provide a good platform to faculty members to showcase their technical expertise which can be further tap with consultancy work. Establishing Satellite earth station and satellite making based research is an important aspect of showing research strength to the outside world. In order to develop practical hands on communication, it is essential to study the operation of satellite experiments under realistic conditions. The main objectives of this research proposal are multi-folds as follows:

- To develop the basic infrastructure for the earth station and student satellite.
- To integrate simulation, theoretical, and experimental study.
- To develop mechanical, electrical and power system for the satellite.
- To impart training to faculty members and students to have hands on training in running earth station and developing satellite system.
- To develop remote sensing sub systems.
- To develop software module in tracking satellite and analysing the data.
- To develop telemetry-communication system.
- To develop the visualization tools/modules for satellite system management and analysing.

Source: earth.google.com

Inaugural Function - Student's Satellite Club Parikrama

The Don Bosco College of Engineering, Fatorda, Goa established a Students Satellite Club named "Parikrama" under the guidance of Dr. Varsha Turkar& Prof. Mohini Naik as Principal Investigators and Prof. Sweta Morajkar& Prof. Ramnath Prabhu as Co – Principal Investigators. The inaugural ceremony was held on 1st February 2019 in the Seminar Hall of the college.

The Chief Guest for the function was Mr. Shashank Krishna; Director & CEO of Katmal Info Technology, Padma Shri 2019 Nominee (Science and Engineering field) and the Guest of honor was Dr. B. Satyanarayana, IEEE Bombay section Secretary and Scientific Officer (H), TIFR, Mumbai.

The function commenced with the unveiling of the logo of Students Satellite Club designed by Mr. Siddesh Nayak, followed by lighting of the traditional lamp.

Prof. Mohini Naik then gave a brief introduction of Student Satellite Club to be installed and informed the gathering about the journey that includes the club member's rigorous selection procedures and criteria. Out of 83 candidates, a total of 17 student members were selected with Mr. Musab Shaikh, Mr. Everard Leitao and Ms. Krupashri Koli as the Project managers of the club. The Chief Guest, Mr. Shashank Krishna inaugurated Student's Satellite Club and handed over the badges to all the members of the club.

Welcome to the Members

Committee:

Principal Investigators:

Dr. Varsha Turkar, Head ETC, Don Bosco College of Engineering
Prof. Mohini Naik, Assistant Professor ETC, Don Bosco College of Engineering
Prof. Sweta Morajkar, Assistant Professor COMP, Don Bosco College of Engineering
Prof. Ramnath Prabhu, Assistant Professor MECH, Don Bosco College of Engineering

Congratulations to all the following students for getting selected under Parikrama. All the best!!!

No	Programme	Year	Name of the student	Designation
1	ETC	SE	Rahul Kothru	Member
2			Saurabh Prabhu	Member
3			Simran Vernekar	Member
4			Vaishabh Jalmi	Member
5			Musab Shaikh	Project Manager
6			Raj Kubal	Member
7	COMP	FE	Cyndroy Rebello	Member
8			Krupashri Koli	Project Manager
9			Manesh Borkar	Member
10		SE	Tanvi Shetye	Member
11			Sakshi Kadam	Member
12			Yash Diniz	Member
13	MECH	SE	Everad Leitao	Project Manager
14			Vivian Viegas	Member
15			Benecia Colaco	Member
16			Aloysius	Member
17			Johan Silveira	Member

STUDENT'S CORNER

Workshops/Seminars/ Trainings

Skill and Knowledge Enhancement Program- Talk on HAM RADIO

Student satellite Club members attended An expert talk on "HAM Radio", was conducted Dr. Saurabh Mehta (Ph.D., South Korea), IEEE Bombay Section Execom member on 2nd February 2019. Dr. Saurabh Mehta, commenced the session by introducing to various wireless technologies. He made his session more interesting by making the audience identify various International as well as National Celebrities who used HAM technology. Terminology used is HAM radio, known as HAM Lingo was creatively put up. Q – Codes, Phonetics, Frequency bands & various devices needed in HAM radio were discussed. He encouraged students to design their own device and be a part of HAM Fest, held every year in India.

WORKSHOP ON "GROUND STATION DEVELOPMENT"

Prof. Mohini Naik, PI and Prof. Sweta Morajkar CO-PI attended one day workshop on ground station development organized by Student satellite club at IIT Bombay on 13th January 2019 at IIT Bombay campus. In this training program, the members explained about the procedure of developing student satellite. They also gave information about IIT Bombay's 1st satellite Pratham: success story.

VISIT AT PES UNIVERSITY BANGALORE

Members of student satellite club along with Prof. Mohini Naik, PI visited PES University Bangalore, which was organized by IEEE student branch on 8th February 2019. The Students were taken to the ground station in the satellite control room. Dr. V.G. K. Bangararaju explained about the different satellites that they launched and how signals had been received and monitored. He also introduced on different equipment like cable swap mechanism, 70 MHz FM modem; facilities present in the campus about providing problem statements for which the students to come up with their innovative ideas.

All were than guided to the ESD lab where we were shown the different equipment used to integrate the satellite. Various antennas used in the satellite were shown. This was followed by demonstration of the 3.7 m paraboloid antenna placed on the rooftop with its proper positioning to receive the signal.

In the conference room of PES University, Dr. V Sambasiva Rao presented the various test equations, introducing PISAT as their first satellite build in ESD lab, its 13W power consumption and TT&C S-band operation and the various research projects that were undertaken, funded by government as well as various agencies. RSAT is one of such projects, funded by DRDO to track the ships globally. In addition, library maintenance robot, PIPO to sort out the books is few to be listed. This was coupled with a short video of Chandrayaan-II, IRS sub-satellite point and Real Time Imaging for Downlink. Later, Students were taken to the exhibition of projects from various departments where there was interaction with the students of PES & Don Bosco College of Engineering, Goa.

WORKSHOP ON "ANTENNAS"

The Antenna Research Group in association with student satellite club (Parikrama) group organized a one day workshop for the students of TE ETC on 10thAugust 2019. The topics covered in the sessions includes basics of Antenna principles, parameters, design of micro strip patch antenna, literature review on the types of antenna used for different applications, antennas used for wireless applications, Roadmap to 5G, Antenna design for 5G. The Coordinator for the workshop was Prof. Mohini N. Naik. Project Manager Musab Shaikh and Rahul Kotru member of Parikrama gave demonstration of crossed yagi antenna to the students and explained its

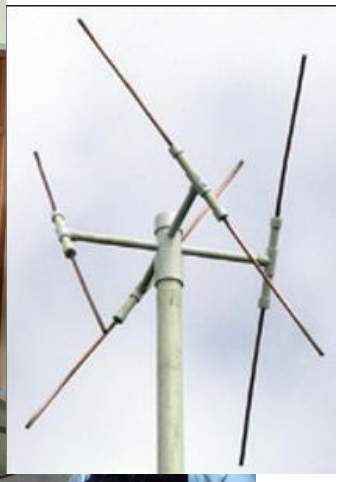
working, construction in detail. Crossed Yagi antenna can be used to track NOAA ISS satellites in the future.

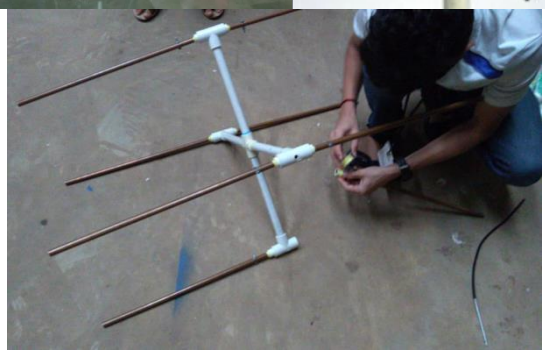
WORKSHOP ON "SATELLITE COMMUNICATION AND GROUND STATION DEVELOPMENT"

Parikrama-student satellite club organized workshop on satellite communication and ground station development for the students of First year ETC on 17/12/2019. In regards to this, Prof. Mohini N. Naik, Asst. Professor of ETC Engineering, DBCE, took sessions from basics to the design of satellite. Prof. Mohini Naik started the session with various projects under space technology and satellite missions. Various other topics which were addressed were Satellite communication using artificial intelligence (AI), earth station development, design of transmitter and receiver, and antenna system.

Projects

Ground Station Development: Crossed Yagi Uda Antenna





Design and fabrication of crossed Yagi antenna is done by the students to receive the satellite signals. This project was handled by ETC students lead by Musab Shaikh under the guidance of Prof. Mohini Naik. One beneficial aspect of this Double Cross antenna is that it is quite tolerant of construction variations. That is, an antenna in this configuration will almost always work well even when the dimensions are only close to the optimum design. The only thing critical is the proper connection of the harness to the dipoles.

A Double Cross Yagi antenna is built by constructing a dielectric support as shown in Figure and attaching the dipoles and harness to the dielectric support. Build four dipoles from a convenient conductor, each about 38 inches long, and attach them to the supports. The dipole supports numbers 1 and 2 are separated by about 20 inches. The dipoles number 3 and 4 are also separated by 20 inches. Each of the four dipole supports is tilted 30° from vertical. Dipoles 1 and 2 are fed in phase and with the proper polarity, so the upward pointing end of dipole #1 has the same polarity as the downward pointing end of dipole 2. The upward pointing end of dipole 3 has the same polarity as the downward pointing end of dipole 4.

Ground Station Development: Tripod Stand

Tripod stand is one of the important requirements for the antenna setup to track the satellite. This Project was done by Mechanical students lead by Everald Leitao under the guidance of Prof. Ramnath Prabhu. Design and fabrication was done by the students for the duration of 2 months from August-September 2019.

Upcoming Projects

- Tracking satellite data using websdr
- Design of 3D Model of the student satellite
- Design and fabrication of antenna's for the ground station
- Receiving satellite data using RTL SDR