
141.Pico/ Nano/Micro Satellite(PNMSats)

Two Day Workshop on Pico/Nano/Micro-Satellites (PNMSats)

(Life cycle of a PNMSat mission, Hands on experience using Classroom Satellite Kit)

Goal/Purpose

The goal of this workshop is to initiate a PNMSat program and facilitate a roadmap of ~3 years to successfully execute a space mission at KLE Technological University. The underlying intent of the workshop is to emphasize the integration of education, research and development to sustain a PNMSat program.

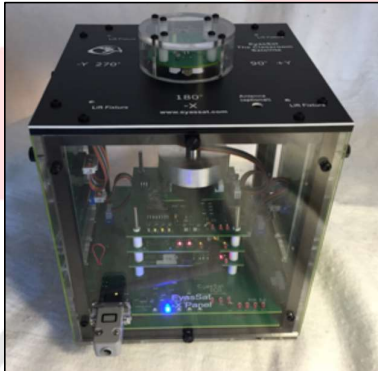
Objectives

The specific objectives of the workshop are as follows:

- Provide an overview of a typical PNMSat Mission Life Cycle
- Review principles of Orbital Mechanics relevant to the design of PNMSats.
- Understand the functions of various subsystems of a PNMSat through hands on experience using a classroom satellite kit.

The workshop will provide rudimentary hands on training using a classroom satellite kit (Figure 1a), which is a functional representative of a PNMSat and time permitting, demonstrate packet radio communication (Figure 1b).

- Electrical Power System (EPS)
- Command & Data Handling (CDH) System
- Tracking, Telemetry, & Command (TT&C) System
- Attitude Determination & Control System (ADCS)
- Structural & Thermal (S&T) System
- Ground Station Communication Emulation



(a)



(b)

Figure 1 - (a) Classroom Satellite Kit, (b) Packet Radio Communication

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Workshop Agenda

To facilitate the above goal and achieve the stated objectives, the workshop is planned in 3 sessions:

Session I (Day 1)

The first session will present an overview of a custom developed Mission Life Cycle for PNMSat, including CubeSat class of satellites and an introduction to the various subsystems of a PNMSat. As part of this session, ham radio communication, including packet radio, exercise may be planned.

- Provide an overview of a typical PNMSat Mission Life Cycle
 - Pre-Stage I — Mission Concept and Preliminary Mission Design
 - Stage I — Systems Engineering Training for Mission Execution
 - Stage II — Mission Design, Design Validation, and Virtual Assembly
 - Stage III — Development, Unit/Integration Level Testing
 - Stage IV — Assembly, System Level and Environmental Testing
 - Stage V — Post Launch Operation
- Review of Orbital Mechanics and Overview of Satellite Subsystems
 - Electrical power system
 - Command and data handling system
 - Telemetry, tracking and command
 - Attitude determination & control system
 - Structural & Thermal System
 - Propulsion system
 - Ground operations
- Overview of PNMSat payloads developed as part of a short course offering.

Session II (Day 2)


The second session will focus on providing hands on experience (**Figure 2**) in assembly/integration and conceptual operation of a PNMSat using the Classroom Satellite Kit (**Figure 1**). As part of this exercise, participants will be divided into groups to experience Classroom Satellite Kit in an ESD laboratory:

- Gain an understanding of the various constituents of a subsystem (visual inspection)
- Experience the integration/assembly and functioning of the Classroom Satellite Kit
- Experience the concept of ground station to satellite communication
- Telemetry and telecommand operation



Figure 2 – A Typical Hands on Activity Involving the Classroom Satellite Kit

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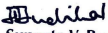



 **KLE SOCIETY'S**
KLE TECHNOLOGICAL UNIVERSITY
BVB Campus, Vidyanager, Hubballi -580031, Karnataka, INDIA

KLE Society's
B. V. Bhoomraddi College
of Engineering & Technology

Two days Workshop on
Pico / Nano / Micro Satellite (PNM Sat)
27th & 28th June, 2017

Certificate of Appreciation

This is to certify that Mr./Ms. ANIL M. KABBUR
of KLE TECHNOLOGICAL UNIVERSITY has participated in
"Pico / Nano / Micro Satellite (PNM Sat)" held on 27th & 28th June, 2017 at KLE Technological University, BVB Campus, Hubballi

 Prof. Suneeta V. Budihal Co-ordinator KLE Technological University, Hubballi	 Dr. Nalin C. Iyer Head, School of Electronics KLE Technological University, Hubballi	 Prof. B.L.Desai Registrar KLE Technological University, Hubballi	 Dr. Ashok Shettar Vice Chancellor KLE Technological University, Hubballi
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141.Pico/ Nano/Micro Satellite(PNMSats)



BVB Campus, Vidyanagar, Hubballi – 580 031, Karnataka, INDIA.

Two days Workshop on on 27th and 28th June, 2017 Pico / Nano / Micro Satellite (PNM Sat)

Organized by School of Electronics

Attendance

Sl.No.	Name	Department	27 th June	28 th June
1.	Jyoti Bali Sushma D. Pappaswelu	A & R		
2. r	Swapna Patil	"		
3. r	Shreedhar	"		
4.	Suneeta V. Budihal	E & C		
5.	Shivashankar Huddar	"		
6.	Ramkrishna S. Joshi	"		
7.	Rohini S. Hongal	"		
8.	Supriya Katwe	"		
9.	Anil M. Kabbur	"		
10.	Aruna Nayak	CS		
11.	Namrata Hiremath	"		
12.	Priyadarshini Patil	"		
13.	Umadevi F.M	"		
14.	Sanjeev KAVALE	Mechanical		

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15.	R. S. Savadi	"		
16.	C. N. Shet	"		
17.	Ashwin R. Kubasadgoudar	"		
18.	Ravi Guttal	"		
19.	Aravind Bernal	Physics		
20.	G.V.Muddapur	"		
SI.No.	Name	Department	27 th June	28 th June
21.	Sangeeta Kolvekar	Physics		
22.	Varsha Koppal	Physics		
23.	Vinayak Kulkarni	IP		
24.	J Satish	"		
25.	Minal Salunke	E & E		
26.	Sushma V	"		
27.	Anupama Itagi	"		
28.	Leah S Joshi	"		
29.	Rajeshwari	E & C		
30.	Sourya Bakale	E & C		
31.	Shruti Kunalappanava	E & C		
32.	Lalitha Medanbhavi	E & C		
33.	Nagarathna D.K	CSC		
34.	Anoopkumar Patil	E & E		
35.	Hareesh, Hebballi	DJE		
36.	Sachin S Shetty	CSE		
37.	y. M. Umthas	Maths		
38.	Shashidhar S.N.	E & C		
39.	Jyoti Macha	Mathematics		