

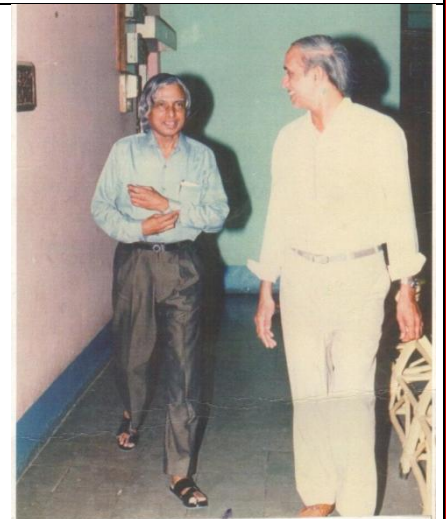
# RESEARCH AND TRAINING UNIT FOR NAVIGATIONAL ELECTRONICS (NERTU) OSMANIA UNIVERSITY: HYDERABAD 500007



## INTRODUCTION

The Department of Electronics (DoE), Government of India, recognizing the importance of Navigational Electronics to the country and the specific needs of the Department of Civil Aviation and the Indian Air Force, decided to create a national centre for expertise in this area. Proposals were invited, and the one submitted by the Department of Electronics and Communication Engineering, Osmania University was selected. Thus the Research and Training Unit for Navigational Electronics (in brief NERTU) came into being on 1<sup>st</sup> April, 1982 as a sponsored project of the DoE. It continued to enjoy this status until September 1992.

In recognition of the excellent services rendered by it to the user organizations, then the Government of Andhra Pradesh has made it as permanent establishment, a research centre of Osmania University by funding its recurring expenditure. The first Advisory Committee (1982-1987) was headed by the former President of India, Bharata Ratna Dr. A.P.J. Abdul Kalam, who was then the Director of Defence Research Development Laboratory (DRDL), Hyderabad. Today, NERTU is the focal point for research and training, in the frontier areas of Navigational Electronics in India. It is the first University centre to work in the area of Global Positioning System (GPS) and GPS Aided Geo Augmented Navigation (GAGAN) System. Dr.A.P.J.Abdul Kalam referred the "Development of Signal processing algorithms for NAG missile by NERTU", in his autobiography – "Wings of Fire".



## OBJECTIVES

- 1) Conducting research in the frontier areas of Navigational Electronics, Signal Processing and Communication, covering the current state-of-the art technologies.
  - Propose the projects for funding from government agencies and industries and then execute the sponsored and consultancy projects.
  - Publication of Research Results in Technical Reports and Journals.
  - Presentation of Research Results in Conferences.
- 2) Development of manpower in the area of Navigational Electronics, Signal Processing and Communication, by imparting training.
  - Organizing short term courses, workshops, symposia and conferences for engineers, scientists, academicians and students at PG and PhD level.
  - Guiding B.E., M.E., and Ph.D. students by Identifying of research topics based on the requirements of the sponsoring agencies and on-going research work at national and international level in the areas of Signal Processing, Communication and Navigation.

**For further Details and Queries Contact  
Director, NERTU, Osmania University, 500007**

Ph No: 27098066, 27682362 Fax: 27091762, +91 9490805486

**Email:** [director.nertu@osmania.ac.in](mailto:director.nertu@osmania.ac.in), [laxminarayana@osmania.ac.in](mailto:laxminarayana@osmania.ac.in), [plaxminarayana@yahoo.com](mailto:plaxminarayana@yahoo.com)

## INFRASTRUCTURE : LABORATORIES

NERTU has excellent laboratory facilities in Microwave, Navigation and Communication, Image and Signal Processing. These are enriched with sophisticated equipment. The laboratories are equipped with latest computers and internet facilities. The details are as follows:

1.	Two IRNSS Hardware Receivers	Accord Software and Systems	
2.	Single Frequency GPS Receiver	Micrologic, CA, USA	ML-250
3.	Dual Frequency GPS Receiver	Novatel, Canada	DL-4 plus RT2W
4.	Dual Frequency GPS Receiver	Allen Osborne Associates, CA	ICS-4000Z
5.	Dual Frequency GPS Receiver	-	-
6.	Hand held Receiver	Trimble	Juno SA
7.	GPS/LRF Integration Kit	Survey Labs	IKE 305
8.	GPS/GSM Integration Kit	Keil software	MCB-1750
9.	GPS Trainer Kit	Kencraft	KE-GPS-01
10.	Automatic Vehicle Tracking Kit	-	-
11.	Rover Base Station VHF/UHF System	SoKKIA	GRX1w/DIG UHF
12.	Spectrum Analyzer	IFR	2398
13.	Bernese software for processing GPS data	Bern University, Switzerland	-
14.	Oscilloscope	Tectronics	7854
15.	Digital Storage Oscilloscope	Tectronics	468
16.	Digital Signal analyzer	HP	3561A
17.	Port Spectrum Analyzer	HP	853A
18.	Measurement Plotting System	HP	7090A
19.	Power Meter	HP	435B
20.	Microwave Frequency Counter	HP	5342A
21.	Synchoscope	IWATSU Electric Co. Ltd	5321
22.	Digital Regulated Power Supply	Pacific Electronics	302D
23.	Pulse Generator	HP	8013B
24.	Sweep Oscillator	HP	A8350B
25.	Synthesizer/Function Generator	HP	3325A
26.	Word Generator	HIL	2040
27.	Variable Attenuator	HP	X382A
28.	Data Acquisition System	NI	PXIE-1062Q
29.	16-bit Microprocessor Kit	Computech Associates	CTA-86
30.	CDMA-DSSS-Trainer Kit	Scientech	2131A
31.	Satellite communication Trainer Kit	Scientech	ST2271
32.	PC based Logic Analyzer 32 Channel		

## INFRASTRUCTURE: LIBRARY

NERTU has a well-furnished library equipped with international editions and reference books. The library has rich collection in subjects like GNSS, Antennas, Mobile Communications, Signal Processing and Image Processing. Conference proceedings and the lecture notes of short term courses conducted by NERTU are also available. Books are lent on inter-library loan to Navy, Air force officers, trainees of Navigation and Signals School, Air force station, Begumpet. Also students, staff and scientists of various departments of O.U., JNTU, DRDO labs, Airports Authority of India, NRSA, NGRI and affiliated engineering colleges of twin cities avail our library facility.

S.No.	Item	1982-1992	1993-2010	2011-2017
1.	No. of Books in Library	971	1637	1954
2.	Total No. of Volumes in library	1257	3055	3280

## ACHIEVEMENTS

NERTU has completed around **60** sponsored and consultancy research projects, funded by government organizations like DoE, MIT, CSIR, SERB, DST, UGC, AICTE; DRDO labs like RCI, DRDL, DLRL, CABS, ADA, ITR, DTSR; ISRO labs like SAC, VSSC, ISAC and Industries like HAL, ECIL, BEL, NAA/AAI, Lantiq Communication India Pvt. Ltd. Similarly around **61** short term courses/workshops/conferences were organized by NERTU and participants are spread throughout India from all states. NERTU scientists have guided more than **34** PhD and **125** ME/MTech. students. NERTU staff has published around **127** Journal papers, **340** Conference Papers and **125** Technical Reports of the sponsored Projects and 80 General Technical Reports.

	Task	1982-1992	1993-2010	2011-2017
1.	No. of Projects Completed	15	38	09
2.	Amount of the Projects Completed Rs. In Lakhs	260.54	191.56	149.76
3.	No. of Books Published	-	-	02
4.	No. of Journal Publications	10	98	19
5.	No. of Conference Publications	43	258	39
6.	No. of Technical Reports for Sponsored Projects	32	76	17
7.	No. of Short Courses/Workshops/Seminars Organised	13	33	15
8.	No. of PhDs Awarded	03	18	13
9.	No. of M.E./M.Tech. projects Guided	12	63	47
10.	No. of Invited Lectures by NERTU staff	-	73	20

## COLLABORATION WITH DIFFERENT ORGANIZATIONS

NERTU scientists are closely interacting with labs of DRDO, ISRO, CSIR labs, PSUs, government agencies and academic institutions with their collaboration in executing several projects and organizing workshops/ conferences. All the present and previous scientists of the NERTU are members and chairmen of the many Preliminary Design Review (PDR) and Critical Design Review committees of the projects executed by the labs of DRDO, ISRO and PSUs. NERTU signed a Memorandum of Understanding with Satellite Application Centre, ISRO, Ahmadabad, on 15th September 2016, on "IRNSS Navigation Receiver Field Trial and Data Collection". Till now NERTU has executed around 10 research projects funded by ISRO.



## ABOUT DIRECTOR



Dr.P. Laxminarayana (PLN) is the Professor and Director of NERTU, OU. He has got his M.E. and Ph.D. from the Department of Electronics and Communication Engineering, Osmania University in 1994 and 2000 respectively. He has been working for NERTU, Osmania University, since 1994. His passion is Technology Development, industry-institute interaction and start-ups. He is involved in executing **Six** sponsored and **Five** Consultancy projects from public and Private Organizations as Principal investigator and co-investigator. He has taken lien from university from July 2003 to June 2005 to establish and lead a **13-member** team of "DSP and Audio Processing Technology" group at Hyderabad Development Centre (HDC) of

Analog Devices Inc.(ADI). Later he was also consultant to ADI and Lantiq Communications India Pvt. Ltd. By recognizing his services at HDC-ADI, ADI funded Department of ECE to establish a Multimedia and ADSPs laboratory at Osmania University. Three groups of students/alumni members of OU are working in collaboration with him to develop new products and planning for start-ups.

He was faculty cum coordinator in organizing **20** short term courses in the areas of Signal Processing, Communication and Navigation. He has published **40** Journal and conference papers and Technical reports. He has guided **40** ME students and **2-PhD** Students. At present he is guiding 8 PhD Students. His areas of research interest are development and implementation of Signal and Image Processing algorithms for Communications, Navigation and Object Recognition. At present he is working for development of GNSS software Receiver, Integration of GNSS with other navigation systems, ASR and TTS systems, Face Detection and Recognition, and Instruments for Biotech Industries.



PARTICIPANTS of GNSS-14



PARTICIPANTS of RSP-16



Communication & Navigation Lab-1



Communication & Navigation Lab-2



SIGNAL & IMAGE PROCESSING LAB



AUDITORIUM



PARTICIPANTS of ASR-14

**SCIENTIFIC STAFF AND RESEARCH SCHOLARS**

1. **Prof.P.Laxminarayana, M.E., Ph.D., Professor and Director.**  
Navigation Systems, Signal Processing (GNSS, Speech, Image, Radar, Bio), Development of Real time Systems (ASR, TTS, Speech and Audio Codecs, Face Recognition, GNSS Software Receiver, Instruments for Biotech Industries)
2. **Mr.B.Balnarsaiah**, SRF, Research Scholar, SAR Image Processing,
3. **Mr.Ch.Srinu, JRF**, Research Scholar
4. **Mr.Praveen Kumar**, Research Scholar
5. **Mr.V.Mahendar**, Part Time Research Scholar, KU
6. **Mr.Mythilisharan**, Part Time Research scholar, Coffee Media, ASR
7. **Prof.J.V.Sarma**, Part Time Research Scholar, CVSR
8. **Mrs.P.Hema Sree**,Part Time Research Scholar,CVRCE,(KSR-Guide)
9. **Mr.Narsimulu**, Part Time Research Scholar, Sri Indu Engg. College
10. **Mr.K. Ram Mohan Rao**, Part Time Research Scholar, Sri Indu.
11. **Mr.P.Chiranjeevi**, Part Time Research Scholar, KITSW
12. **Mr.C.Laxmi Prasad**, Part Time Research Scholar, DVR CET

**NERTU SUPPORT STAFF**

1. **Dr.Achala Munigal**, Asst. Prof. (LIS) /Asst. Librarian
2. **Mr.S.Shyamsundar Rao**, Technician
3. **Mr.T.Sharat Babu**, Office Superintendent
4. **Mr.K.Mallesh**, Lab Attender
5. **Mr.Pratap**, Kamati
6. **Mr.K.Rajesh**, Watchman
7. **Mr.Abdul Majid Khan**, Watchman
8. **Mr.Ch.Bhaskar**, Watchman
9. **Mr.Rakesh**, Scavenger
10. **Mrs.Renuka**, Mali