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**CENTRE FOR EXCELLENCE IN MICROWAVE ENGINEERING**  
**DEPT. OF ELECTRONICS & COMMUNICATION ENGINEERING**

**UNIVERSITY COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**OSMANIA UNIVERSITY HYDERABAD 500 007.**

*Mwaves*

BULLETIN

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*From Director's Desk*

The Centre for Excellence in Microwave Engineering takes pride in being part of **Department of Electronics & Communication Engineering**, Osmania University, which is celebrating its Golden Jubilee during 2009-2010. The Centre organized Microwave Workshop as part one of the major academic event in association with IEEE MTT/AP – Hyderabad Chapter. This Microwave Workshop was linked with TENCON 2008, another major international event in Hyderabad city. More than 55 Scientists, Engineers, Faculty and Students attended this workshop. Economic slowdown has hit all industries and as such financial inputs for the Centre in current year also got affected. But we did not allow this to affect our training and research activities and received major project from RCI, DRDO. Intensive Course on Smart Antennas was a great success. Training KIT that can perform many experiments for Strip Microstrip Components was added to Microwave Lab. This product of SICO-developed by IIT Delhi will be very useful for post graduate students to support their course in Microwave Integrated Circuits.

I am lucky to have received two major awards, one from IETE (Prof. SVC. Aiya Memorial Award) and the other from ISTE New Delhi (Anna University National Award for Outstanding Academic 2008) in the same year that completes my Silver Jubilee of Teaching & Research in Osmania University. These 25 glorious years have been very fruitful for me with deep sense of professional satisfaction of rich contribution in the Electronics and Communication Engineering in general and Microwave Engineering in particular. I dedicate these awards to my great teachers who taught me how to teach and to my students who contributed to my academic growth. My active association with DRDO Labs need special mention, as I learned lot while participating in their project review meetings, assessment boards etc.

I am sure that the Centre for Excellence in Microwave Engineering will grow further and students, next generation of young faculty members will continue to contribute towards this goal of Excellence. I thank all my colleagues in the Department of Electronics and Communication Engineering and Centre for Excellence in Microwave Engineering for their valuable support since last two years. Our Vice Chancellor, Registrar and Principal have taken keen interest in establishment and growth of the Centre, with motivated support in our all activities. This administrative support is our real strength. I am sure, Astra Microwave Products Ltd will continue to support this growth in years to come.

**Dr. V.M. Pandharipande**

## Objectives of the Centre

- ❖ To encourage UG & PG students/research scholars to enter in the field of RF Circuit Design, Microwave Circuit Design, simulation, Numerical methods in Electromagnetics, Antenna Analysis & Design, Microwave Communication System Design.
- ❖ To improve teaching skills in the area of Electromagnetics & Microwave Engineering by producing Quality course material, Design tutorials.
- ❖ To carry out R & D projects on practical problems originating from Defence R&D Labs, Industries, R & D Institutions.
- ❖ Organize short term & long term courses in the broad field of RF and Microwave Circuits, Antennas, Phased Arrays, Radar Systems.
- ❖ To strengthen Institute - Industry interaction on mutual basis.

## Advisory Committee

Following advisory Committee has been constituted to monitor the progress and guide the activities of the Centre.

1. Prof.A.Venu Gopal Reddy, Principal, University College of Engineering, Chairman
2. Prof. R.Ramesh Reddy, Dean Faculty of Engineering, OU
3. Prof. V.M.Pandharipande, Director of Centre, Professor of ECE
4. Prof. P. Ananthraj, Head, ECE, OU
5. Dr. AD Sharma, Director, NERTU
6. Mr. G. Boopathy Director DLRL, DRDO
7. Dr. V. Borkar, Research Centre Imarat, DRDO
8. Mr Malla Reddy, M.D., Astra Microwave Product Limited
9. Ms. Prameelamma, Director (Tech) Astra Microwaves
10. Mr. P.A. Chitrakar, C.O.O. Astra Microwaves

## ❖ Short term course

1. An '**Intensive Course on Smart Antennas**' was conducted by the Centre on 4<sup>th</sup> & 5<sup>th</sup> August 2008

Number of Participants	: 69
From educational Institutions	: 23
From R & D Institutions	: 19
Students	: 27
Number of Resource Faculty	: 10

Dr. R. Shree Hari Rao, Director, DLRL was the Chief Guest of Inaugural function. He highlighted the contribution of DRDO in the field of Electronic warfare systems.



Invited lectures were delivered on the state of the art topics by Distinguished Scientist and Academicians:-

Title	Speaker	Organization
Electronically Scanned Arrays for Radar and Communications	Dr. V.M. Pandharipande	Director, CEME
Beam forming for multiple Beam Arrays	Dr. M. Laxminaryana	Scientist, DLRL
Smart Antennas for Mobile Communications	Dr. Y. Ravinder	Sr. Consultant, CEME
Antenna Synthesis and Reconfigurable Antennas	Dr. N.V. Koteswara Rao	Professor, CBIT
Phased Array Radars	Ms. Beenamole	Scientist LRDE, Bangalore
Electromagnetic Simulation Of Radiating Structures	Dr. V.S. Prasanna Rajan	Scientist, CEME
Printed Antennas for Defence Applications	Dr. Jhagirdar	Scientist DLRL, RCI DRDO
Broadband Antennas for Electronic Warfare	Dr. Ashwin Kumar	Scientist, DLRL
Application of Smart Antennas in GNSS	Dr. A.D. Sharma	Director, NERTU
Agilent Product Demo Case Studies	Mr. Kshitij Duggal	Engineer, Agilent Technologies

2. One day course on 'Microwave Workshop' organized by the CEME, Dept. of ECE, OU, in association with IEEE MTT/AP/EMC Joint Chapter Hyderabad.

Number of Participants	:	62
From educational Institutions	:	26
From R & D Institutions	:	30
Students	:	6
Number of Resource Faculty	:	8

Invited lectures were delivered on the state of the art topics by Distinguished Scientist and Academicians:-

Title	Speaker	Organisation
Miniaturized RF Components	Samir El-Ghazaly	Univ. of Arkansa, USA
RF and Low-Frequency Noise models for Si CMOS devices	Madhu Gupta	Univ. of California, San Diego and San Diego. State Univ USA
Trends in Mixed Signal RF and Integrated Microsystems	Berry Perlman	U.S. Department of Defense, USA President Elect MTT - Society, 2009
Heterogeneous Network Communication Devices Present and Future	Vijay Nair	Intel, Phoenix, USA
Evolution of Antenna Technology for Indian Space Program - A Technological And Historical Perspective	Dr. Surendra Pal	Dy. Director, ISAC, Bengaluru
RF MEMS	Prof. S.K. Koul	IIT Delhi
Use of Artificial Intelligence Technique Microwave Antenna Research	Prof. Bhaskar Gupta	Jadavpur University, In Kolkata

## Invited Lectures & Training Programmes

Title	Delivered by	Date
Active Phased Array Elements	Ms. Beenamole	10/03/08
Gyro Device Activity	Dr. V.S. Prasanna Rajan	16/06/08
Orientation Programme for Astra Engineers	Prof. V.M. Pandharipande Prof. P. Chendrashekhar	23/07/08
Orientation Programme for Astra Engineers	Dr. Prasanna Rajan Ms. Hemalatha Ms. Nirmala Devi	12/09/08
Microwave Techniques	Prof. V.M. Pandharipande at Aurora College of Engineering Chandrayanagutta	01/01/09

- ❖ ME 2<sup>nd</sup> year students visited Astra Microwave Units on 18<sup>th</sup> September 2008 to discuss about their projects along with faculty members. Seven students have been chosen to work for their thesis at Astra. Six students are working in DRDO labs on various Defence projects.
- ❖ Prof. S.V.C. Aiya IETE Award memorial Lecture on Electronically Scanned Smart Antenna Arrays by Prof. V.M. Pandharipande at IETE - Auditorium, OU Campus on 1<sup>st</sup> November 2008.
- ❖ Ms. Divya Krishnamurthy got the best project award for her project "Design and Development of 2-18 GHz Microwave Receiver" implemented at Astra Microwaves. She also received Prof. K.K. Nair Gold Medal 2008.
- ❖ The Centre assisted Astra Microwaves in screening evaluation of their engineers for internal assessment. The centre also organized special orientation training programmes for newly recruited Astra Engineers
- ❖ Our association with DRDO Laboratories continues. Prof. V.M. Pandharipande participated as an Expert member for the following ongoing projects of DRDO Labs.



1. Microwave Communication Link - ANSP/DLRL
2. Project 'ORANGE' - RCI DRDO



3. AESA Radar (Uttam) LRDE Bangalore
4. Communication System on chip for – data and Voice Application ANURAG – DRDO
- Dr. V.S. Prasanna Rajan, Scientist, CEME and Mr. D. Ramakrishna, Assistant Professor, Dept. of ECE were invited by Research Centre Imarat, DRDO, Hyderabad to attend the two day Technical Lecture Series (16.2.2009 - 17.2.2009) on "High Power Electromagnetic - Generation and Measurement" organized by the DRDO lab.
- Mrs. J.V.L.N. Mani, Office Secretary, CEME, Dept. of ECE attended One day workshop on "Hardware and Software Aspects of Computers" in the Department on 22nd & 23rd October'08.

### Research Publications

1. 'Polarization Sensitive Antennas for Polarization Diversity in Mobile Communication' International Conference on RF and Signal Processing Systems, IEEE Hyderabad Section, 1-2 Feb. 2008, KL College of Engineering, Guntur.
2. 'Cavity backed micro strip antenna element for use inactive phased arrays' International Conference on RF and Signal Processing Systems, IEEE Hyderabad Section, 1-2 Feb. 2008, KL College of Engineering, Guntur.
3. 'Techniques for solving EM boundary value problems – critical review' International Conference on RF and Signal Processing Systems, IEEE Hyderabad Section, 1-2 Feb. 2008, KL College of Engineering, Guntur.
4. Wide Band Wide Beam Antenna Elements for Active Phased Array Applications", IETE Journal Special Issue on Microwave Circuits and systems, March – April – 2008
5. Design of a Corner fed square patch array antenna for X band surveillance Radar with wide bandwidth and lower side lobe. IETE Conf. on RF & Wireless(I con RFW-08) 24-26 April 08, IETE Bangalore
6. R.F. Couplers, Transformers, Filters and Antenna Arrays: Unique Formulation IETE Conf. on RF & Wireless (Icon RFW – 08) 24<sup>th</sup> – 26<sup>th</sup> April 2008, IETE Bangalore
7. "Resonant Microstrip Meander Line Antenna Element for wide Scan Angle Active Phased Array Antenna" Microwave and Optical Technology Letters July 2008, John Wiley Sa Sons Inc. USA (Accepted).
8. Microstrip Antenna Array With Embedded BITE Network", Radar 2008, Sept, 4-5., Adelaide, Australia 2008.
9. "Microstrip offset Slot Radiator and Series fed off set Slot Arrays" IEEE International Symp on Microwaves, 3-6 December 2008, Nimhan's Convention Centre, Bangalore.
10. " Wide band monopole antenna for Wireless Communication" International Conference on Recent Advances in Communication Engineering, RACE 2008, December 21-23, 2008, Dept. of ECE, College of Engineering (Autonomous) Osmania , Hyderabad.



## Academic Activities

### Ph D Award

- ◆ Mr. Y. Ravinder, Scientist from CEME was awarded PhD for his thesis “Polarization Diversity Smart Antennas with Genetic Algorithm” under the guidance of Prof. V.M Pandharipande



### Awards & Recognition:

Prof. V.M. Pandharipande Received **Prof. SVC Aiya Memorial Award** from Institute of Electronics & Telecommunication Engineers, New Delhi for distinguished contribution in Man power Development in specific area of Microwaves and Radar Engineering, Curricula Design and planning of Electronics & Communication Engineering education at UG and PG level.

Prof. Pandharipande also received **Anna University National Award** for outstanding Academic 2008 from Indian Society of Technical Education, New Delhi.

The Centre has established state of the art laboratories with following software and Hardware equipment facilities

### Software

- ◆ Agilent Advanced Design Systems (ADS)
- ◆ AWR Microwave Office (VSS, MWO, Sonnet)
- ◆ Zealand IE3D
- ◆ Ansoft HFSS
- ◆ Empire

### Hardware

- ◆ Agilent 8720ET Vector Network Analyzer (50 MHz- 20 GHz), S- Parameter Test Set
- ◆ HP 85047A Scalar Network Analyzer (300 KHz- 6 GHz), S- Parameter Test Set
- ◆ Agilent E4418B EPM Series Power Meter, HP 437B Power Meters - 2
- ◆ Advanced Microstrip Trainer Kit AMTK - 9000C- SICO Gaziabad/IIT Delhi Product

### Research Project:

A project on the electromagnetic simulation design and optimization of a parabolic dish antenna is currently undertaken by the centre and it is funded by the Research Centre Imarat, DRDO, Hyderabad. The duration of the project is for one year with a funding of Rs.4.73 lakhs. The project involves the design of the feeds and the reflectors for the given specifications along with the theoretical estimation of the far field pattern. Accordingly, a user friendly software module is currently under development which will enable quick and accurate realization of the dish antenna by specifying the key antenna parameters.



## M.E. (MRE), Full Time (III Sem) : Details of Project Works

Academic Year : 2008-09

Sl.No.	Name Of the Student	Project Title	Place of Work
1	A.Bhargavi	Method of Modeling Target Scattering Characteristics For Simulation of Radar in Outdoor Range	RCI
2	Jeevan Krishna.B	High Power Design of Conical Tem Feed and Reflector for an Impulse Radiating Antenna”	CEME
3	Jeevan Kumar. k	C-Band RF Transmitter and Receiver”	ASTRA
4	K. Kumara Swamy	Multiple Beam Smart Antenna For Mobile Communication Applications”	DLRL
5	P. Lakshminarayana	Design& Development of Microstrip Patched Antenna Array	ASTRA
6	T. Manju Vani	RCS Acquisition and Analysis Software with Extrapolation Technique for Focussed 2D Imaging	RCI
7	Niveditha.M	RCS Acquisition and Analysis Software with Interpolation technique for Focussed 2D Imaging	RCI
9	Omje.V	Design& Development of Broadband LPDA	ASTRA
10	Rajeshwar. V	Simulation of clutter effects on pulsed radar performance in outdoor range	RCI
11	B. Ramaraju	FM Telemetry Transmitter for X Band	ASTRA
13	P. Sridevi	Radar Cross Section Evaluation of An Aircraft	RCI
14	Ch. Sujatha	A 3 - D Ionospheric Tomographic Time delay Model for GAGAN”	NERTU



## M.E. (MRE), Full Time (III Sem) : Details of Project Works

Academic Year : 2008 - 09

Sl.No.	Name Of the Student	Project Title	Place of Work
15	K. Suresh	Design & Development of Broadband Active antenna System for Scattering estimations of complex targets	RCI
16	N. Swarajya Laxmi	Design, Fabrication & Testing of Transmitter & Receiver for Ku Band beam former”	ASTRA
17	I. Vidya Sagar	Quasi Optical Mode Converter for a Coaxial cavity Gyrotron	CEME
18	S. Swetha	Microstrip Constrained lens antenna	RCI
19	A. Ravi Kumar	Simulation Study of Microwave Communication Link	RCI
20	G. Aravind Kumar	Design Implementation and Testing of Digital Transceiver Card	ASTRA
21.	A. Suresh	Design Implementation and Testing of Ethernet & SFPDP protocol using FPGA in a COMMUNICATION TRANSCSEIEVER MODULE	ASTRA
22.	A.Santhosh Kumar	Suspended Stripline Band Pass Filter	ASTRA





Chief Guest Shri Malla Reddy, MD Astra Microwave released the Microwave Research & Training Activities booklet 1983-2008 on the occasion of Golden Jubilee Celebrations of the Department of ECE



Prof. Joseph Modelsky, President MTT-S giving keynote address



Dr. D. N. Reddy, Principal College of Engineering Addressing On Stage from left Prof. V.M. Pandharipande, Dr.R. Shree Hari Rao, Dr. K. Subba Rao,



Distribution of Certificates to the participants by Dr. D.N. Reddy



Prof. Samir El-Ghazaly, University of Arkansas & Dr. Vijay Nair Intel, Phoenix, delivering lecture in Microwave Workshop



Dr. Surender Pal, Dy Director ISAC, Bangalore delivering lecture in Microwave Workshop



Dr. D.N. Reddy, Principal College of Engineering Presenting Memento to Dr. P. Shree Hari Rao, Director DRDL Hyd.



Dr. Ashwin Kumar, DLRL, DRDO delivering lecture in Intensive Course on Smart Antennas



Prof. S.K. Koul, IIT Delhi, delivering the lecture on 'RF MEMS' in Microwave Workshop.



Prof. Madhu Gupta, University of California, San Diego & San Diego State University delivering the lecture in Microwave workshop.



Prof. V.M. Pandharipande addressing the gathering in Intensive Course on Smart Antennas. On stage from left Dr. R. Shree Hari Rao, Dr. D.N. Reddy, Dr. K. Subba Rao



Lecture Session on Smart Antenna Course



Dr. Berry Parfman, US Department of Defence delivering lecture in Microwave Workshop



Prof. Bhaskar Gupta, Jadavpur University, Kolkata delivering lecture in Microwave Workshop



Vice Chancellor Lightening the lamp for RACE 2008



Prof. V.M. Pandharipande receiving Anna University National Award for outstanding Academic 2008 from Prof. D.N. Reddy, Vice Chancellor, JNTU, Hyd