Prof. Dr. V.S.N. RAO TATAVARTI **M.S.** (IIT Madras), **PhD** (Dalhousie University, Canada), **DRDS, FOSI, FAPAS**

Office

Director, Dean, and Distinguished Professor
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2-110/7, '*Visak*', Mithilapuri,
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Visakhapatnam 530041,
A.P., INDIA

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Education

1984 – 1989	PhD *Wave Hydrodynamics*	Dalhousie University Halifax, Canada
1981 – 1983	M.S. *Ocean Engineering*	IIT, Madras Chennai, India
1978 – 1980	M.Sc. Marine Sciences (Physical Oceanography) *(University First Ranker)*	Andhra University, Visakhapatnam, India.

Work

December 2010 – to date — GVP College of Engineering[1], and GVP-SIRC[2], Visakhapatnam, India

[1] Accredited *A* Grade, NAAC/UGC; [2] SIRO recognized, Min. of Science & Technology

Director (R&D, IC&SR) — R&D on Design & Development of Cutting-Edge Systems/Technologies with Aerospace / Oceanic Applications in Defence and Civilian Sectors.

Distinguished Professor — Teaching and Training UG /PG / Research Scholars / Faculty Members.

November 2008 – December 2010 — VIT University, Vellore, India

Member, Board of Management — Instrumental in getting accreditation of A Grade, NAAC/UGC and ABET, USA

Director (R&D)
Dean, Academic Research — Steered overall R&D activities. Responsible for increasing the R&D output and patent productivity at VIT University. Streamlined the research and development policies and practices of VIT University. Facilitated award of 54 PhD and 25 M.S. by Research degrees.

Senior Professor — Trained and Taught UG/PG /Research Scholars / Faculty Members.

December 1989 – November 2008 — Naval Physical & Oceanographic Laboratory (NPOL), DRDO, Kochi, India

Additional Director — Institute Management and Human Resource Management.

Program(s) Director — Research, Design and Development of Non-Acoustic Technologies.

Head, COOP
(***Centre for Oceanics & Optronics)*** — Conceived and created the state of art facility – *Centre for Oceanics and Optronics (COOP)* – to facilitate innovative and path-breaking R&D.

Senior Scientist — Significant contributions to ocean science, engineering, and technology through the development of new algorithms, novel monitoring techniques, and innovative design and development of highly sensitive optoelectronic systems for studying the dynamics of stratified fluids and for use in naval surveillance activities. Design and Development of novel techniques and technologies to monitor ocean dynamics and was responsible for utilizing state-of-art satellite technology for surveillance activities - by developing satellite image processing algorithms that can comprehensively extract spatial feature information from any of the available satellite sensors covering regions of interest.

September 1984 – August 1989 — Dalhousie University, Halifax, Canada

Research and Teaching Assistant — R&D and Teaching Activities on Coastal and Ocean Processes.

June 1983 – September 1984 — Indian Institute of Technology, Madras, Chennai, India

Senior Project Officer — R &D and Consultancy Activities in Ocean / Coastal / Port and Harbor Engineering.

Professional Experience and Activities

2010 – To date

Director/Dean/Senior Professor
Distinguished Professor — **GVP-SIRC and GVP College of Engineering, Visakhapatnam, India**

Design & Development of Cutting-Edge Systems/Technologies with Aerospace / Oceanic Applications in Defence and Civilian Sectors.

Executive Director — **CASTLE, Visakhapatnam** – *A Non-Profit Scientific Society and Think Tank*

Editor — **ICTACT Journal on Image and Video Processing, India**

2014 – To date — **CATS Group of Companies, India**

Founder Director / Chairman — CATS – **C**ASTLE **A**dvanced **T**echnologies & **S**ystems, Group, India
Firms dealing with high-end Photonic and Smart Technologies.

2015 – 2017 — **University of Georgia, Athens, Georgia, USA**

Visiting Professor — College of Engineering, University of Georgia, Athens, Georgia, USA

2013 – 2015

Regional Director — **NMF – National Maritime Foundation, New Delhi, India**
NMF, Visakhapatnam Chapter
Indian Navy's A Think Tank for Advancing India's Maritime Interests.

Technical Adviser — **Mech Well Industries, Nasik, India**

2010 – 2017

Director — **Srujana Dukeship Consulting** – An Innovation Incubation Company
Technical Adviser — **Mrs. AVN College, Visakhapatnam**, India
Technical Adviser — **Hindustan University, Chennai,** India
Technical Adviser — **The Sun School, Vizianagaram**, India

Visiting Professor — **U of H – Central University of Hyderabad**, Hyderabad, India

2008 – 2010 — **VIT University, Vellore, India**

Board of Management
Director (R&D)
Dean, Academic Research

Steered R&D activities and was responsible for increasing R&D productivity. at VIT University. Instrumental in streamlining research policies/practices of VIT University. Facilitated award of 54 PhDs & 25 M.S by Research degrees.

1989 - 2008 — **Naval Physical & Oceanographic Laboratory (NPOL), DRDO**, Kochi, India

Program Director — R&D and Design and Development of Non-Acoustic Technologies.
Additional Director — Laboratory Management and Chief of HRD.
Senior Scientist — R&D on Naval Surveillance.
Head of COOP — Conceived, Designed, and Created State-of-art *Centre for Oceanics & Optronics*.

1984 - 1989 — **Dalhousie University, Halifax, Canada**

Research/ Teaching Assistant — R&D and Teaching Activities on Coastal and Ocean Processes.

1981 - 1984 — **Indian Institute of Technology, Madras,** Chennai, India

Researcher/Senior Project Officer — R &D and Consultancy Activities in Ocean / Coastal / Port and Harbor Engineering.

Organizations, Roles, and Professional Experience

S. No	Organization	Role	Year	No. of Years
1	CATS Smart Pvt. Ltd, Nashik, India	Founder Director	2016 – to date	7
2	University of Georgia, Athens, USA	*Visiting Professor, Teaching / Research*	2015 – 2017	2
3	CATS ECO Systems Pvt. Ltd, Nashik, India	Founder Director	2015 – to date	8
4	CATS Pvt. Ltd, Nashik, India	Founder Director	2015 – to date	8
5	CATS Global, Visakhapatnam, India	Founder Director	2014 – to date	9
6	Mech Well Industries, Nashik, India	*Technical Advisor*	2013 – 2015	2
7	National Maritime Foundation (NMF), New Delhi, India	*Regional Director*	2013 – 2015	2
8	Hindustan University, Chennai, India	*Technical Advisor*	2011 – 2013	2
9	Sun School, Vizianagaram, India	*Technical Advisor*	2013 – 2017	4
10	Mrs. AVN College, Visakhapatnam, India	*Technical Advisor*	2013 – 2017	4
11	University of Hyderabad, Hyderabad, India	*Visiting Professor, Teaching / Research*	2011 – 2017	6
12	GVP Institutes, Visakhapatnam	*Director (R&D), Dean, Senior Professor*	2010 – to date	13
13	Center for Advancement of Science, Technology and Engineering, (CASTLE) Visakhapatnam, India	*Founder and Executive Director*	2010 – to date	13
14	VIT University, Vellore, India	*Director (R&D) / Dean / Senior Professor*	2008 – 2010	2
15	Indian Space Research Organization, Dept. of Space, India	*Research Scientist and Program Director*	2006 – 2008	2
16	Engineering Design Bureau of Ocean Engineering, (EDBOE), Moscow, Russia	*Visiting Scientist*	2005	<1
17	DRDO, NPOL, Kochi, India	*Chairman, HRD*	2004 – 2007	3
18	DRDO Officers Mess & Institute (DROMI), Kochi, India	*President*	2001 – 2004	3
19	Korean Ocean Research and Development Institute (KORDI), Seoul, Korea	*Visiting Research Scientist*	1998	<1
20	CUSAT, Cochin University of Science & Technology, Kochi, India	*Visiting Professor, Teaching & Research*	1990 – 96	7
21	DRDO, Naval Physical & Oceanographic Laboratory, Kochi, India	*Senior Research Scientist and Program Director*	1989 – 2008	19
22	Ministry of Defence, Ministry of Earth Sciences, Ministry of Science & Technology, India	*Chief Scientist, Scientific Missions on Ships, Submarines, Helicopters, and Air Crafts*	1989 – 2008	19
23	Dalhousie University, Halifax, Canada	*Research / Teaching*	1984 – 1989	5
24	National Institute of Oceanography, Goa, India	*Visiting Scientist*	1983	1
25	IIT Madras, India	*Senior Project officer, Research*	1981 – 1984	3
26	Andhra University, Visakhapatnam, India	*Research*	1980 – 1981	<1

Also, actively involved in technical consultancy to many Governmental / Private Organizations, and Industry for last 40+ years.

Research Interests

Aerospace/Ocean Engineering, Oceanography, Port & Harbor Engineering, Earth Sciences, Coastal Processes, Ocean Dynamics, Lasers and optoelectronics, Image Processing, Satellite Technology, Defense Technology, Systems and Devices, Biomedical Technologies, Structural Health Monitoring, Environmental Engineering, Machine Learning.

Theses

- **PhD** *The reflection of waves on natural beaches*, **Dalhousie University, Halifax, Canada** (1989).
- **MS (Ocean Engineering)** - *Studies on wave-induced longshore sediment transport on beaches and related phenomena*, **IIT Madras, India** (1983).

Research Projects Completed / Levels of Participation

Involving a total financial outlay of more than INR 0.5 billion*, funded by the Governments of India, Canada, USA, and the industry*.

S. No	Name of Project (Year)	Role	Sponsor
25	*PROJECT AQMS (2019 – 2021)*	Principal Investigator	DST, Govt. of India
24	*PROJECT SHM (2017 – 2020)*	Principal Investigator	AICTE, Govt. of India
23	*PROJECT CATS (2015 – 2017)*	Principal Investigator	CATS, Nashik
22	*PROJECT BEACH (2015)*	Principal Investigator	VPT, Govt. of India
21	*PROJECT SSID (2014)*	Principal Investigator	SSID Pvt. Ltd.
20	*PROJECT SKY RIDE (2014)*	Principal Investigator	Sky Ride Tours & Travels
19	*PROJECT FORTIS (2014)*	Principal Investigator	Fortis Hospitals Pvt. Ltd.
18	*PROJECT CWET (2014 – 2015)*	Principal Investigator	MNRE, Govt. of India
17	*PROJECT ADA (2012 – 2014)*	Principal Investigator	MOD, Govt. of India
16	*PROJECT NRB (2012 – 2014)*	Principal Investigator	DRDO, Govt. of India
15	*PROJECT INMAS (2012 – 2014)*	Principal Investigator	DRDO, Govt. of India
14	*PROJECTS NSTL (2011– 2013)*	Principal Investigator	DRDO, Govt. of India
13	*PROJECT ISTM (2007 – 2008)*	Program Director	DOS, Govt. of India
12	*PROJECT 212* (2003 – 2008)*	Program Director	DRDO, Govt. of India
11	*PROJECT 205* (1998 – 2002)*	Project Director	DRDO, Govt. of India
10	*MUDBANKS (1994 – 1997)*	Principal Investigator	DST, Govt. of India
9	*NADS* (1994 – 1997)*	Project Director	DRDO, Govt. of India
8	*DYWAKE* (1990 – 1993)*	Project Director	DRDO, Govt. of India
7	*INWAVE* (1990 – 1993)*	Project Director	DRDO, Govt. of India
6	*COMAP (1989 – 1994)*	Team Leader	DRDO, Govt. of India
5	*BLUEWATER (1988 – 1989)*	Team Leader	Canada, Government
4	*QUEENSLAND (1987 – 1988)*	Team Leader	Canada, Government
3	C^2S^2 *(1984 – 1986)*	Member	Canada, Government
2	NSTS *(1984)*	Member	U.S.A., Government
1	*WRS / OTEC (1983 – 1984)*	Senior Project Officer	DOD, Govt. of India

* Classified Secret -Defence Projects

International R&D Experience

Worked with leading Scientists/ Engineers/Technologists in North America and U.K. for 7 years, and visited and collaborated with many researchers and scientists from premier R&D institutes in USA, Canada, UK, USA, France, Germany, Russia, Spain, Singapore, Sweden, Switzerland, Malaysia, Taiwan, China, Thailand, Korea, Australia and Netherlands.

Research Experience

Worked on a wide spectrum of research domains covering many interdisciplinary subjects at several institutes in India and institutes around the world.

Date	Institution	Subject
2021 – to date	GVP-SIRC and Gayatri Vidya Parishad College of Engineering, Visakhapatnam, India	Distinguished Professor, and Director. Responsible for Teaching, Research and Development, and Consultancy Projects of GVP. Institutes.
2010 – 2021	GVP-SIRC and Gayatri Vidya Parishad College of Engineering, Visakhapatnam, India	Senior Professor, Dean and Director. Responsible for Teaching, Research and Development, and Consultancy Projects of GVP Institutes.
2015 – 2017	University of Georgia, Athens, Georgia, USA	Visiting Research Professor at University of Georgia, Athens, Georgia, USA. Worked on Bio-photonics
2011 – 2017	Centre for Earth and Space Sciences, University of Hyderabad, India	Visiting Professor - Teaching and R&D on Ocean Dynamics, Simulation and Modeling
2008 – 2010	VIT University, Vellore, India	Senior Professor, Dean and Director of Research. Responsible for all PhD /MS / M Phil / Integrated PhD programs (1100 Faculty & 900 Research Students) and all R&D activities of university
1989 – 2008	Naval Physical & Oceanographic Laboratory, Defence R & D, India	Research on Surface and Internal Wave dynamics, Coastal processes, Tsunami dynamics, non-conventional techniques for Defence and ocean applications. Novel laboratory & field experiments using state-of-art optoelectronic and remote sensing satellite technologies
1984 – 1989	Dalhousie University, Canada	Research on near shore wave dynamics (theoretical modeling, field and laboratory experiments, in-situ data acquisition, data analyses employing various signal processing techniques, scientific interpretation, and publication of results in refereed journals)
1984 – 1989	Member of Inter-Institutional Group comprising Dalhousie University, University of Toronto, Memorial University of New Foundland, NERC, (Canada); University of Plymouth, University of East Anglia, (UK); University of Florida, Scripps Institution of Oceanography, University of Oregon, Naval Post Graduate School, USA Army Corps of Engineers Research Centre.	Field programs – Near shore data acquisition with electro-magnetic current meters, pressure transducers, optical backscattering sensors and acoustic suspended sediment profiler, remote sensing satellite sensors and CCD cameras on many North American (USA, Canada) & UK beaches
1984 – 1989	Dalhousie University, Canada	Teaching / Research Assistant – for graduate & undergraduate courses in oceanography, including lecturing, preparation of assignments, and evaluation papers & reports
1983 – 1984	Ocean Engineering Centre, Indian Institute of Technology, India	Wave Energy, OTEC (Ocean Thermal Energy Conversion) and Coastal Engineering Consultancy Projects
1981 – 1983	National Institute of Oceanography, & IIT, Madras	Oceanographic Cruises in Bay of Bengal, Indian Ocean & Arabian sea
1981 – 1983	Ocean Engineering Centre, Indian Institute of Technology, India	Research on near shore wave dynamics and sediment transport
1980 – 1981	Andhra University, India	Research on Coastal Processes and Waves

Research Supervision / Guidance

Fields of Research**:** Aerospace and Ocean Engineering, Oceanography, Optoelectronics, Photonics, Image Processing, Signal Processing, Satellite Image Processing, Wave Dynamics, Fluid Dynamics, Mechanical Engineering, Physics, Pattern Recognition, Computer Vision, Computer Software, Biomedical Technologies, Structural Health Monitoring, Environmental Engineering.

Supervised 86 Theses/Dissertations (**Ph.D. – 5**, **M Tech / ME / MSc/ MCA – 43, B Tech – 38**).

PhD

1. S. Sankar Ganesh, '*Air Quality Index Prediction using Machine Learning Techniques'***,** School of Electronics Engineering, VIT University, Vellore, 2019.

2. S. Naithani, '*Inversion technique to estimate geo-acoustic parameters of the seafloor sediments based on Matched Field Processing and Beamforming'*, Dept. of Geophysics, School of Marine Sciences, CUSAT, Cochin, 2015.

3. K. R. Prabhu, *'Design and Development of Electrical Capacitance Tomography System,* School of Electrical Engineering, VIT University, Vellore, 2013.

4. T. L. Rambabu, *'An inter-comparison of acoustic and optoelectronic techniques for monitoring stratified fluids'*, Department of Physics, Andhra University, Visakhapatnam, 2000.

5. P. Manoj Kumar, *'Near shore processes of Ambalapuzha coast, Kerala: Special reference to Mudbanks*, School of Marine Sciences, CUSAT, Cochin, 2000.

M. Tech.

1. K. Rahthinavel Raj, *'Inverse scattering transform technique for determination of suspended particle size and distribution function in a medium'*, International School of Photonics, CUSAT, Cochin, 1997.

2. T. K. Shahana, *'An improved edge detection algorithm for image processing'*, Department of Electronics, CUSAT, Cochin, 1999.

3. T. S. Asha, 'Laser beam position measurement using a four-quadrant detector system', International School of Photonics, CUSAT, Cochin, 1999.

4. C. Jayakrishnan, 'Developmental studies on LISS profiler – An instrument for monitoring in situ suspended sediment concentration', International School of Photonics, CUSAT, Cochin, 1999.

5. Babu Varghese, 'Laser beam deflection technique for the study of stratified fluids using lateral-effect position sensitive photo detectors', International School of Photonics, CUSAT, Cochin, 2000.

6. C. Sudhir, 'Characterization studies of position sensitive photo detectors and their application to refractive index measurements', International School of Photonics, CUSAT, Cochin 21, 2000.

7. Sajan Ambadiyil, 'Development of a novel fibre optic sensor for fluid monitoring', International School of Photonics, Cochin University of Science and Technology, Cochin 682 022, 2002.

8. Satish John, 'Multiplexed data acquisition system for remote measurements with multiple fiber sensors', International School of Photonics, Cochin University of Science and Tech. Cochin 682 022, 2002.

9. T. Mahesh Kumar, 'DSP based hardware for data acquisition from an optical sensor', Department of Electronics, Cochin University of Science and Technology, Cochin 682 022, April 2003.

10. V.R. Rajeev Kumar, 'Image Velocimetry: A technique for monitoring diffusion processes', International School of Photonics, Cochin University of Science and Technology, Cochin 682 022, April 2003.

11. Sumitha Mathew, 'Image enhancement using the principles of anisotropic diffusion', Department of Electronics, Cochin University of Science and Technology, Cochin 682 022, April 2003.

12. Ch. V. Sirisha, 'Signal Characterization and causality determination using different algorithms'. National Institute of Technology, Calicut, March 2004.

13. Preetha Sreekumar, 'System for transmission of laser sensor signals to distant location'. National Institute of Technology, Calicut, March 2004.

14. M. Prasad, 'Gaussian mixture models for image texture modeling and discrimination'. Amrita School of Engineering, Coimbatore, July 2007.

15. R. Vineeth, 'Algorithms for extraction of curvilinear features in very low SNR images'. Amrita School of Engineering, Coimbatore, July 2007.

16. Lekshmi Raj, 'Multichannel data acquisition and processing: A virtual instrumentation using UDP and DAQ tools', Sastra University, Thanjavur, April 2008.

17. Madhu S. Nair, 'Restoration and enhancement of color images using Fuzzy approach', University of Kerala, Thiruvananthapuram, July 2008.

18. Rekha Vibin, 'Gray level grouping: An automatic method for contrast enhancement', University of Kerala, Thiruvananthapuram, July 2008.

19. Hemachander, R. 'Operation of unmanned railway level crossing using GPS', VIT University, June 2010.

20. R. Hari Hara Varun, 'Testing of Structural Integrity of I- Section Using Experimental and Numerical Analysis', G.V.P College of Engineering (Autonomous), Visakhapatnam – 530048, March 2017.

21. Ashesh Adhikari, 'Experimental and Numerical Studies on Variations in Dynamic Parameters of Structural Sections with Varying Crack Characteristics'. G.V.P College of Engineering (Autonomous), Visakhapatnam – 530048, March 2017.

22. P. Kameswar Rao, 'Damage of Steel Structure Based On Vibrational Study by Experimental and Numerical Methods'. G.V.P College of Engineering (Autonomous), Visakhapatnam – 530048, March 2017.

23. Dinesh Choudhary, 'Damage Identification and Assessment in Cantilever Steel Section: Numerical and Experiment Investigation'. G.V.P College of Engineering (Autonomous), Visakhapatnam, March 2017.

24. L. Venkatesh, 'Design and Optimisation of Indoor Air Quality Monitoring System: Thermal Engineering Perspectives'. G.V.P College of Engineering (Autonomous), Visakhapatnam–530048, March 2017.

25. J.V.K.K.V Sarma, 'Design Considerations Related to Thermal Aspects in Indoor Air Quality System'. G.V.P College of Engineering (Autonomous), Visakhapatnam–530048, March 2017.

26. Gowtham V.K. Mangina, 'Automation of a variable frequency drive for wind tunnel applications'. G.V.P College of Engineering (Autonomous), Visakhapatnam–530048, October 2022.

M. Sc.

27. Prasithlal, R, 'Complex empirical orthogonal function analysis: Application to surface meteorological and oceanographic data', Department of Operations Research and Computer Applications, Cochin University of Science and Technology, 1991.

28. P.R. Biju, 'Application of Laser beam deflection technique for the study of stratified fluid media', International School of Photonics, CUSAT, Cochin, 1997.

29. H. Sreekala, 'Laser beam scattering by particle of arbitrary size: An experimental approach for particle sizing', Department of Physics, CUSAT, Cochin 21, 1999.

30. P. C. Ajith Kumar & Vishnu Vardhana Rao Yalamanchi, 'Simulation of near real-time data acquisition system and spatial feature extraction from SAR and optical images', Dept. of Electronics, CUSAT, Cochin 21, 2000.
31. T. S. Binilroy and Varsha Jose Joseph, 'Spatial feature extraction from images: improved algorithm and implementation', Department of Electronics, CUSAT, Cochin 21, 2000.

32. Sunitha Achamma George and S. Smitha, 'Quantification of mixing and diffusion process using laser beam deflection technique', School of Pure and Applied Physics, Mahatma Gandhi University, Kottayam 2001

33. R. Unmai, 'Spatial feature extraction from images: Application of wavelet and Radon Transforms', Department of Physics, Regional Engineering College, Trichy, 2000.

34. Neel Abraham, Jinto. K. Johnson, 'Software development for processing of satellite images from optical sensors', Faculty of Software Engineering, Annai Mathammal Sheela Engg College, Namakkal,, 2001.

35. Jinto. K. Johnson, 'Software development for processing of satellite images from microwave sensors', Faculty of Software Engineering, Annai Mathammal Sheela Engineering College, Namakkal, 2001.

36. Siji Chandrasekharan, M. Sunitha Thomas, Smitha Felix and M. Kavitha, 'Vibration monitoring using Michelson Interferometer', Department of Physics, St. Teresas College, Ernakulam, MG University, Kottayam 686 560, 2002.

37. Deepa Sivan, Sreelekha Badhran, 'Software development for signal processing and display of an optoelectronic system', Department of Computer Science, University of Calicut, Calicut, April 2003.

38. Neel Abraham, 'Software Development for Processing of Satellite Images from IRS Satellites', Faculty of Software Engineering, Annai Mathammal Sheela Engineering College, Namakkal, 2003.

39. Jinto. K. Johnson, 'Software Development for Processing of Satellite Images from Radarsat Satellites', Faculty of Software Engineering, Annai Mathammal Sheela Engg College, Namakkal, 2003.

M. C. A

40. Aswathy Karthikeyan, 'Bi-spectral analysis for detection of non-linearities in stochastic processes', Bharathidasan University, Tiruchirapalli, 1998.

41. Julie George, 'SpaFex: Package for feature extraction from images', Department of Computer Applications, VLB Janaki Ammal College of Engineering and Technology, Coimbatore 42, Bharathiar University, 2000.

42. Antony, Francis, 'SpaFex 2.0: Package for feature extraction from images', Kongu Engineering College, Perundurai, Erode, 2001.

43. Mr. Jayasankar, 'Design and development of multi-document interface for the existing dialog based software', VHNSN College, Virudhu Nagar, 2002.

B. Tech

1. Smitha U, Shakheela Marikar, 'Edge detection in image processing using Hough transform', Dept. of Electronics and Communication, College of Engineering, Trivandrum, 1996.

2. Ranjith J. et al., 'System for classification of ECG abnormalities using wavelet networks', Dept. of Electronics and Communication, Model Engineering College, Kochi, 1998.

3. Febin A. Gafoor, Jipson Paul, Praveen Paul, Sameer Baker, 'Development of a novel optical fibre sensor for monitoring of fluids', Dept. of Electronics & Communications, University College of Engineering, 2002.

4. Amit James, Bipin Thomas, Lavitha Elizabeth Peter, Lekshmi Nair, Sageeva Joseph, 'Multiscale image enhancement using robust anisotropic diffusion', Dept. of Electronics and Communications Engineering, MG University, 2003.

5. Ajit Kumar, S., Dileep Jose, Jerin Kuttathil, Joxin Stanly, 'Real Time Signal Analysis', Department of Information Technology, College of Engineering, Munnar, 2004.

6. Mansa Paniker, Nimmida, A, Sagini Joy, K., Sunitha, S., 'Design and Development of multi-channel signal analyser with LabVIEW', Department of Electronics & Communications, Government Engineering College, MG University, Idukki, 2007.

7. Nikhil Saraswath, Department of Mechanical Engineering, NIT Surathkal University, Surathkal, 2009.

8. Rohith, Department of Mechanical Engineering, RV College, Bangalore University, 2009.

9. N. S. V. Sravya et al., 'Design and Development of Systems for Eaves Dropping & Vibration Monitoring', Department of Mechanical Engineering, GVPCE, Visakhapatnam, 2012.

10. M. Tejaswi et al., 'I3 Assessment Tool', Department of Computer Science and Engineering, GVPCE, 2012.

11. A.J. Swamy et al., 'Design and Development of Optomechatronic Vibration Monitoring System', Department of Mechanical Engineering & Electronics & Communication Engineering, GVPCE, Visakhapatnam, 2013.

12. B. Bhargavi et al., '3D Modelling of Wind Tunnel and Design and Fabrication of a Holder for Thermal Mass Flow Sensor to be placed inside the Wind Tunnel', Department of Mechanical Engineering, GVPCE, Visakhapatnam, 2013.

13. S. Manikanta et al., 'Balancing of RC Plane and the Design of Enclosure Holding the Electronic Components', Department of Mechanical Engineering, GVPCE, Visakhapatnam 2013.

14. Ch. Pardha Saradhi et al., 'Calibration of Thermal Mass Flow Sensor', Department of Mechanical Engineering, GVPCE, Visakhapatnam 2013.

15. C. Naveen et al., 'Design and Development of Trans-Impedance Amplifier', Department of Electronics & Communication Engineering, GVPCE, Visakhapatnam, 2013.

16. S. Gayatri et al., 'Design of Regulated Power Supply System with a Digital Voltmeter', Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam, 2013.

17. K. Chakri et al., 'Design of Portable Opto-mechanical System for Vibration Monitoring of Machinery', Department of Mechanical Engineering, GVPCE, Visakhapatnam, 2013.

18. Ch.S.S.D. Kowshik et al., 'Design and Development of an Instrument Supporting Platform for Deployment in near-shore Ocean', Department of Mechanical Engineering, GVPCE, Visakhapatnam, 2013.

19. Satya Charan Tej et al., 'Design and Development of Wind Tunnel Facility', Department of Mechanical Engineering, GVPCE, Visakhapatnam, 2013.

20. Ravi Kiran Akella et al., 'Design and Development of an Opto-mechanical System for Wind Profiling System', Department of Mechanical Engineering, GVPCE, Visakhapatnam, 2013.

21. K. Jaswanth Ramakrishna Reddy et al., 'Design and Development Vibration Monitoring System', Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam, 2013.

22. Sri Vidya Neeharika Akella et al., 'Environmental Sensors', Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam, 2013.

23. Manikanta Voonna et al., 'Graphical User Interface using Beagle Bone Black', Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam, 2013.

24. N Chaitanya Kumar et al., 'Design and Development of a Novel Photonic System for Real Time Monitoring of Wind', Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam, 2013.

25. Aparna Tatavarti et al., 'Signal separation using Independent Component Analysis', Department of Electronics and Communication Engineering, GVPCEW, Visakhapatnam, 2013.

26. Naveen Challapalli et al., 'Determination of LASER beam position using PSD', Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam, 2015.

27. S. Gayatri et al., 'Motorized control of LASER beam using PSD for wind analyses, Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam, 2015.

28. Ravindra Jallepalli et al., 'Design of PSM amplifier', Department of Electronics and Communication Engineering, GVPCEW, Visakhapatnam, 2015.

29. B. Bhargavi et al., 'Design and fabrication of indoor environmental monitoring system', Department of Mechanical Engineering, GVPCE, Visakhapatnam, 2015.

30. K. Umamaheswara Rao et al., 'Design and fabrication of outdoor environmental monitoring system', Department of Mechanical Engineering, GVPCE, Visakhapatnam, 2015.

31. Aman Hyder et al., 'Design and Analysis of a Cabinet for an Indoor Air Quality System'. Department of Mechanical Engineering, GVPCE, Visakhapatnam 2017.

32. K. Vidya Sagar et al., 'Photonic System for Range Finding and Arduino based remote Data Acquisition using GSM Module'. Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam 2017.

33. R. Koushik et al., Electromagnetic Interference and Compatibility'. Department of Electrical and Electronics Engineering, GVPCE, Visakhapatnam 2018.

34. D. Sai Karthik Kumar et al., 'Design and analysis of Indoor Air Quality Monitoring System', Department of Mechanical Engineering, GVPCE, Visakhapatnam 2018.

35. Sowmya S. et al., Detection of Particles in Water Bottles Moving on a Conveyor Belt'. Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam 2019.

36. Saketha Somavedam, 'Application of Random Forest Classifier Algorithm for Classification of Photonic Sensor Data, Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam 2019.

37. Naveen Venu. B et. al., "Studies on extraction of range and profile information using laser based system", Department of Electronics and Communication Engineering, GVPCE, Visakhapatnam 2020.

38. Madhurima et al., "Development of Python Code for Data Acquisition, Signal Conditioning and Display for interfacing with AUM System and the remote user's server", Dept. of Computer Science and Engineering, GVPCE, Visakhapatnam 2021.

Publications, Monographs, Book Chapters, Patents, Systems Developed

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186. T. Santhanakrishnan and **Tatavarti V.S.N. Rao** (2008). 'New method and apparatus for simultaneous generation and detection of the optical diffraction pattern for vibration monitoring'- **International Patent** filed in **African Countries** – **PCT No. 1469/IN2008/000444**.

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189. K. Ganesan and **Tatavarti V.S.N. Rao** (2010). 'Wireless communication system for automatic operation of routing gates at cross road junctions and for providing advanced alerts of disasters'– IPO **No.3597/CHE/2010** Patent, Chennai – November 2010.

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Systems and Technologies Indigenously Designed & Developed

Systems and Technologies Developed / Ready for Commercialization – 12

191	***AUM*** **ॐ** **A**ir **U**nique – quality **M**onitoring	System for Environmental monitoring
192	***PRANEEDHI*** **प्रणिधि** **P**hotonic **R**econnoitering of **A**coustic **N**oise for **E**ffective **E**aves **D**ropping and **H**ighlighting **I**ntelligence	System for Eaves - dropping
193	***SAMIRA*** **समिरा** **S**eeing **A**ir in **M**otion: **I**nstrumentation for **R**emote sensing **A**pplications	System for Wind Profiling
194	***SARATHI*** **सारथि** **S**earch **A**nd **R**escue **A**pparatus for **T**argeting **H**olistic **I**nformation	System for search and Rescue in Disaster Management
195	***SAVDHAN*** **सावधान** **S**can, **A**nalyze, **V**alidate, **D**iscriminate, **H**ighlight, **A**ssess and **N**eutralize	System for Maritime Surveillance
196	***Dr. T*** **धन्वन्तरि (डॉ. टी)** ***D****hanvantari's* **T**echnology	System for Exhaled Breath Analysis
197	***taraNI*** **तरणि** **T**echnology for **A**ir data **R**eckoning for **A**erial **N**avigational **I**nformation	System for Air-data monitoring onboard Aircrafts.
198	***VAYU*** **वायु** **V**ariable **A**ir **Y**ielding **U**nit	Fully Instrumented Wind Tunnel Facility
199	***VEDA*** **वेदा** **V**ibrational **E**ffects – **D**etection **A**nalysis	System for Vehicle and Intrusion Monitoring
200	***VIDUR*** **विदुर** **V**ibration **I**ntelligence **D**ata **U**nravelling **R**emotely	System for Vibration and Condition Monitoring
201	***AJNA*** **आज्ञा** **A**erosol **J**udicating **N**avigational **A**pparatus	System for Microbial Surveillance in Air
202	***SWAASA*** **श्वासा** **S**ystem for **W**ellness **A**ssessment and **A**nalysis of **S**ampled **A**ir	System for Lung Functionality Assessment

Technical Accomplishments

Mathematical Modeling / Simulations

- Surface wave dynamics – Gravity waves, infragravity waves, far infragravity waves, edge waves, longshore currents, cross-shore currents in the nearshore and resulting sediment transport, frequency dependent reflections, decomposition of incoming waves and outgoing waves.
- Sub-surface wave dynamics – Motions in stratified fluids, the forced dynamics in stratified fluids, wakes and waves in stratified fluids.

Novel Laboratory Experiments

- Conceived, designed and conducted laboratory experiments using novel optoelectronic techniques and sensors for detection, discrimination and parameterization of natural and manmade (forced) hydrodynamic signatures.
- Testing and calibration of instruments.

Sea Trials / Field Experiments

- Conceived, designed and conducted 50+ sea trials during different environmental conditions at various geographical locations involving the use of traditional sensors, non-conventional sensors in ocean moorings and on board ships, submarines & aircrafts; and satellite based optical and microwave sensors.
- Conceived, planned & participated in many innovative scientific missions as *Chief Scientist* on board naval platforms (*ships, submarines, long-range aircrafts and helicopters)* and INS Sagardhwani.

Remote Sensing Satellite Observations / Sea Truth – For Operational Requirements

- Conceived, designed and conducted satellite-sea trials in conjunction with Department of Space, DRDO and NAVY - more than 150 satellite scenes collected, analyzed and interpreted.
- Remote sensing by optical and microwave satellite sensors from – IRS 1C, IRS 1D, IRS P4, IRS P6, ERS, RADARSAT, ENVISAT, TES, IKONOS, QUICKBIRD.
- Parameterization study of the wake imagery from sensors on board ocean surface platforms and satellites, in terms of ship speed, displacement, propeller characteristics etc. to enable classification of the ships.

Design and Development

- Novel technique for determining frequency dependent wave reflections, decomposition of waves.
- Underwater Submarine Simulator, Single Point Mooring, Gravity platform for inshore use.
- Optoelectronic Systems for detection, discrimination of hydrodynamic signatures.
- Optoelectronic Systems for detection of ships and submarines.
- Infrastructure for ongoing and futuristic R &D activities.
- *SpaFEx* – A state of art satellite image processing package, capable of detecting and discriminating targets.
- Optoelectronic System for Tsunami Monitoring.
- Photonics Systems for Air Data Monitoring Onboard Aircrafts.
- Photonic System for Wind Profiling.
- Photonic System for Vibration and Condition Monitoring.
- Photonic System for Environmental Monitoring.

Algorithm Development for Signal and Image Processing

- New algorithms for data processing and information extraction.
- Adopted innovative ways of interpretation of observations from conventional sensors and mapped the temporal and spatial evolutionary characteristics of sub surface generated wakes and waves in ocean.
- Digital signal and image processing of voluminous data obtained from laboratory and field trials.

Teaching (Graduate Level Courses)

Ocean Engineering, Oceanography, Fluid Dynamics, Geophysical Fluid Dynamics, Geo-Mathematics, Digital Signal Processing, Time Series/Spectral Analysis, Image Processing, Remote Sensing Applications, Research Methodology, Structural Health Monitoring.

- Visiting Professor, University of Georgia, Athens, Georgia, USA (March 2015 – July 2017).
- Visiting Professor, Central University of Hyderabad, India (2011 – 2017).
- Senior Professor, GVPCE, Visakhapatnam, India (2010 – to date).
- Senior Professor, VIT University, Vellore, India (2008 – 2010).
- Visiting Professor, Cochin University of Science & Technology, Kochi, India (1990 – 1996).
- Teaching / Research Assistant, Dalhousie University, Halifax, Canada (1984–1989).

Awards / Fellowships / Recognitions

- Fellow, Andhra Pradesh Akademi of Sciences (2017)
- Visiting Professor, University of Georgia, USA (March 2015 – July 2017).
- Technical Adviser, Mech Well Industries, Nashik (2013 – 2015).
- Regional Director, National Maritime Foundation, Visakhapatnam (2013 – 2015).
- Most Active Researcher Award, GVP College of Eng., Visakhapatnam (2015, 2014, 2013, 2012, 2011).
- Most Active Researcher Award, VIT University, India (2010, 2009).
- Listed in *Who's Who in the World* (2008-'09);
- Listed in *Who's Who in Science & Engineering*, (2007 – 2008).
- Laboratory Award for Novel Optoelectronic Technology Development, NPOL, India (2007)
- Silicon Medal, National Science Day, DRDO, India (2006).
- Fellow, Optical society of India (2004)
- National Science Day Award for Advances in Defence Technology, DRDO, India (1997).
- Berkner Fellow, American Geophysical Union, USA (1990 – 1994).
- Dalhousie Senior Fellow, Canada (1988 – 1989).
- International Center for Ocean Development (ICOD) Fellow, Canada (1985 – 1987).
- Dalhousie Fellow, Canada (1985 – 1987).
- Prof. Ronald F. Hayes International Scholar (1984 – 1985).
- Dalhousie Fellow, Canada (1984 – 1985).
- Institute Fellow, IIT Madras, India (1981 – 1983).
- CSIR Scholar, India (1980 – 1981).
- Andhra University First Ranker / Gold Medalist (1980).

Team Building / Technical Leadership

Feb. 2013 – Feb. 2015	Regional Director, National Maritime Foundation (NMF)
Dec. 2010 – to date	Director (Consultancy & Research), GVP-SIRC & GVPCE
Oct. 2010 – to date	Executive Director, CASTLE

Responsible for multi institutional R&D, Consultancy and Patents involving Professors/Scientists/Stakeholders

Nov. 2008 – Dec. 2010	Director (Research & Development), VIT University

Responsible for all University R&D, Consultancy and Patents involving 1100 Faculty and 900+ scholars.

1989 – Nov. 2008	Team Leader / Program Head / Project Director

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Institution Building / Organizational Management / Leadership

- Governing Body, Bhagavathula Charitable Trust, Visakhapatnam, 2020 -2022.
- Director, CASTLE Advanced Technologies and Systems–CATS Group of Companies, Dec.2014 – to date.
- *Regional Director, National Maritime Foundation, Visakhapatnam, Feb. 2013 – Feb. 2015.*
- *Director, GVP-SIRC and GVP College of Engineering, Visakhapatnam, Dec 2010 – to date.*
- *Founder and Executive Director, CASTLE, Visakhapatnam, Oct. 2010 – to date.*
- *Member, Board of Management & Academic Council – VIT University from 2008 to Dec. 2010.*
- *Director (R&D) – VIT University from 2008 to Dec. 2010.*
- *Program Director, National Projects of Space, Defence and Earth Sciences Ministries, 2005 – 2008.*
- *Chief, HRD (700+ people) & Active Member of Laboratory Management, NPOL, Kochi, 2004 – 2007.*
- *President, DROMI – Defence Research Officers Mess and Institute, Kochi, 2001 – 2004.*
- *Founder and Head, Centre for Oceanics and Optronics, a State-of-Art R&D facility, NPOL, 2000 – 2008.*

Program Director, Non-Acoustic Surveillance Technologies Program, DRDO, Ministry of Defence, 1990 – 2008.

Science, Engineering, and Technology – Contributions

Prof. Rao Tatavarti possesses an outstanding academic and research career built on the firm foundation of education and training in Sciences and Engineering at some of the best institutes in the world. Tatavarti had his preliminary education from Andhra University, majoring in Physics in his undergraduate program and Physical Oceanography, Marine Sciences in his Master's program. Later he joined IIT Madras and secured a Master's in Ocean Engineering before moving to Canada to work on his Ph.D. After completing his doctoral research in Canada, Dr. Tatavarti joined the Defence Research and Development Organisation India, on invitation, where he had the opportunity to work on path-breaking but highly classified work related to Naval Surveillance. After a long stint at the Naval Physical & Oceanographic Laboratory in Kochi as a Senior Scientist and Program Director, Dr. Tatavarti opted for voluntary retirement when he was the Director Grade Scientist to move to academia as the Director (Research & Development) and a Senior Professor at VIT University, Vellore - a premier university in the country. From Vellore, Prof. Tatavarti moved to Visakhapatnam, where he initially served as Director of Gayatri Vidya Parishad institutions, Dean (Research and Consultancy), and Senior Professor at GVP College of Engineering; and is now a Distinguished Professor and Director.

Tatavarti had his first Masters's in Marine Sciences with Physical Oceanography as a specialization from Andhra University, where he secured the university's first rank. During his second Masters's in Ocean Engineering at the Indian Institute of Technology, Madras, Tatavarti worked on the problem of the nearshore sediment transport along the coast of Madras and its many implications to the nearshore shoreline dynamics, successfully identifying the alongshore and cross-shore components of sediment in motion during the various seasons of the year and for the first time, quantifying the effects of near-shore structures on the dynamics of shorelines (Tatavarti and Sundar, 1984 in the *Proc. Pacific Congress on Marine Technology;* Tatavarti, Sundar and Raju, 1985 in the *Proc. Intl. Conf. on Dock and Harbor Engineering;* Tatavarti, Sundar and Raju, 1987 in the *J. Institution of Engineers, India*). After completing his Masters's in Ocean Engineering, Tatavarti contributed to the prestigious national programs on renewable wave and tidal energy from the ocean as a Senior Project Officer at IIT Madras, wherein he was responsible for identifying and quantifying the energy potentials along the Indian coastline (Tatavarti and Sundar, 1982 in the *J. Energy*), which formed the guiding design criteria for extraction of renewable energy along the Indian coasts.

After securing two concurrent international scholarships and an invitation to work with two world-renowned senior professors, Anthony Bowen, and David Huntley, at Dalhousie University, Canada, Tatavarti moved to Dalhousie University for his doctoral work. As part of his doctoral work, Dr. Tatavarti's research in the area of wave hydrodynamics resulted in the development of analytical models and algorithms for quantifying the frequency-dependent wave reflections on natural beaches (and in laboratory wave flumes), which enabled the decomposition of waves into incoming and outgoing waves on a natural (or a laboratory) beach. This work provided insights into near-shore hydrodynamics of waves and the *first field evidence for the existence of long wave generation by time-varying breaker zone locations* (the breaking point) *in the surf zone*. The work directly applied to designing and constructing jetties and breakwaters in Coastal, Port, and Harbor Engineering (Tatavarti and Huntley, 1987 in the *Proc. Canadian Coastal Conference*; Tatavarti *et al.*, 1988, in the *Proc. ASCE Coastal Engineering Conference*; Tatavarti, 1989 in *Ph.D. Thesis,* Dalhousie University, Canada; Huntley, Simmons and Tatavarti, 1999 in *Jl. Port, Coastal, and Harbor Engineering*). While working on the various signal processing techniques on enormous data sets, Dr. Tatavarti demonstrated that the Eigen-value problem is a form of minimum least squared approximation and that the Complex Empirical Orthogonal Function Analyses are a better tool to extract additional insights from data (Tatavarti and Andrade, 1992 in *Jl. Ocean Engineering*). Dr. Tatavarti has also participated in many ocean exploration programs associated with the oil and natural gas industry in and outside India and has expert knowledge in exploration and exploitation techniques and technologies.

During his tenure with the Defence Research & Development Organisation (DRDO), Dr. Tatavarti pioneered non-acoustic naval surveillance technologies. He conceived, built, and headed the *Centre for Oceanics and Optronics* at Kochi's Naval Physical & Oceanographic Laboratory. He was also the Program Director of many major Defence and civilian programs, which had great significance to the Navy and the country's disaster management programs. Dr. Tatavarti has significantly contributed to ocean science, engineering, and technology through new algorithms, novel monitoring techniques, and innovative design and development of highly sensitive optoelectronic systems for studying the dynamics of stratified fluids. The optoelectronic systems developed by Dr. Tatavarti helped make significant inroads into understanding the free and forced motions in stratified fluids. They opened new pathways in ocean and aerospace surveillance technologies and systems for Defence and civilian applications.

Dr. Tatavarti's research on novel techniques for monitoring stratified fluid dynamics demonstrated that advances in optoelectronic technology could suitably be adopted for fluid dynamic studies. His monitoring techniques achieved higher sensitivity, thus demonstrating the efficacy of optoelectronics as a remote sensing tool for monitoring stratified fluid motions. The work thus established new pathways with far-reaching implications for both Defence and civilian applications (Tatavarti *et al.,* 1995 in *Current Science*; Tatavarti *et al.,* 2002 in *Proc. ICONS Conference*; NPOL-RR-08/2003 in *Research Report*). After successfully demonstrating the techniques under laboratory conditions, Dr. Tatavarti developed engineered optoelectronic systems for monitoring stratified fluids with very high sensitivity (Tatavarti*,* 2009 in *Proc. IEEE Conference on Sensors)*. During field trials in various oceans, Dr. Tatavarti further deployed the indigenously developed optoelectronic systems to demonstrate the feasibility of identifying natural and anthropogenic hydrodynamic signatures and fast-moving solitons in both upstream and downstream directions of moving bodies. The indigenous systems have multiple applications and have helped Tatavarti and the team file for national and international patents. As the Program Director and Chief Scientist, Dr. Tatavarti had efficiently designed and effectively deployed several naval and civilian platforms (ships, submarines, helicopters, and aircraft) during the 50+ missions he steered successfully.

Addressing the problem of detecting and discriminating spatial features, patterns, and objects from space-borne satellite images, Dr. Tatavarti developed a suite of image processing algorithms utilizing concepts from physics, hydrodynamics, pattern recognition, computer vision, and motion mechanics. Dr. Tatavarti and his team successfully tested the innovatively developed suite of algorithms for its utility in identifying spatial features and objects (ships and submarines) and their manifestations on the ocean surface. This work had significant implications for the Navy and therefore was documented in the form of classified research reports (NPOL-RR-10/2003, NPOL-RR-12/2003; NPOL-RR-47/2007) and publications (Tatavarti and Sivakumar, 2002 in Proc. *ICONS Conference*; Tatavarti, 2003 in Proc. *UDT Conference*). He was also instrumental in developing a decision-based algorithm for the efficient removal of salt and pepper noise from images (Nair, Revathy, and Tatavarti, 2008 in *Proc. IEEE CISP Conference*) and fuzzy-logic based automatic contrast enhancement method for images from satellites (Nair, Lakshmanan, Wilscy and Tatavarti, 2009 in *Signal Video and Image Processing Journal*) and an efficient noise detection algorithm for impulse noise removal in images (Nasimudeen, Nair and Tatavarti, 2010 in *Signal Video and Image Processing Journal*).

Simultaneously, in the R&D on the civilian domain, Dr. Tatavarti has contributed significantly to understanding the unique and complex fluid-mud (mud bank) phenomenon off the Kerala coast, utilizing indigenous sensors and conducting innovative field experiments. This work gave the first field evidence for the existence of strong edge waves, infragravity waves, far infragravity waves, wave reflections, alongshore and cross-shore currents and their interactions with the monsoonal dynamics, thus explaining the formation and sustenance of mud banks (Tatavarti *et al.,* 1996 in *Current Science*; Kumar, Narayana, and Tatavarti, 1998 in *Jl. Geol. Soc. India*; Tatavarti *et al.,* 1999 in *Current Science*; Narayana, Kumar and Tatavarti, 2001 in *Coastal and Estuarine Fine Sediment Processes*, Elsevier Publication; Tatavarti and Narayana, 2006 in *Jl. Coastal Research*).

Based on field studies immediately after the December 2004 tsunami, Dr. Tatavarti showed that the sediment deposits on the coast could serve as markers of paleo-tsunamis (Narayana, Tatavarti, Shinu, and Subeer, 2007 in *Marine Geology*). In 2008, working with the Department of Space, and the Ministry of Earth Sciences, Dr. Tatavarti developed an optoelectronic system for monitoring tsunamis in the ocean with very high sensitivity (3 to 4 orders of magnitude higher sensitivity than the conventional pressure transducers presently used).

From November 2008 to December 2010, Dr. Tatavarti worked as the Director of Research and a Senior Professor at VIT University, leading the R&D activities of the university, having 1100 faculty and 900 research students in his capacity as Director (R&D), and Member of the Board of Management and the Academic Council at VIT University. As Director of Research at one of the top Indian universities, Dr. Tatavarti developed algorithms for pragmatically quantifying the quality of research output from a university to enthuse and encourage the university researchers to excel further in their research endeavors (Tatavarti *et al*., 2010 in *Current Science*). VIT has conferred the Most Active Researcher Award on Prof. Tatavarti (2009, 2010).

Exploring the fertile domain of biomedical technologies, Prof. Tatavarti's image processing research - *for developing an automated diagnosis of diabetic retinopathy and glaucoma using Fundus and OCT images* – resulted in a benchmark publication garnering a large number of citations by the biomedical and

biotechnological research fraternity (Arulmozhivarman, Das, Murthy and Tatavarti**,** 2012 in *J. Lipids in Health and Disease*).

Prof. Tatavarti's advanced work on non-acoustic technologies for the detection of surface and sub-surface platforms in the ocean, published by a high-powered committee of the Ministry of Defence, Government of India, attracted the attention of 1500+ academic and defense scientists/engineers/technologists/researchers from across 100 countries (*https://independent.academia.edu/RaoTatavarti/Analytics/activity/overview*; Toppaladoddi, Dixit, Tatavarti and Govindarajan, 2011 in *Physics of Fluids*; Tatavarti et al., 2013 in *IDST Journal*), including those in the highest echelons of Government of India.

Since December 2010, Dr. Tatavarti is working as the Director (Research & Consultancy) at Gayatri Engineering College, an autonomous institute affiliated currently to Jawaharlal Nehru Technological University, Kakinada, where he established state of the *art photonic research laboratory* and *an indigenous subsonic wind tunnel facility*. In 2010, Prof. Tatavarti also founded a non-profit think tank, *CASTLE*, which endeavors to inculcate the spirit of R&D amongst all and bring together researchers and various stakeholders to address societal problems.

Dr. Tatavarti's research interests are varied, and he has guided PhDs (5), Master's (43), and Bachelor's (38) students in various fields of Science and Engineering. In addition, he taught graduate-level courses in *oceanography/ocean engineering/signal and image processing/ fluid dynamics/optoelectronics/research methodology* for graduate students at IIT Madras, Cochin University of Science and Technology, VIT University, University of Hyderabad, GVP College of Engineering, Indian Maritime University, India; Dalhousie University, Canada and the University of Georgia, USA. As part of his professional career, Dr. Tatavarti headed projects from various governmental agencies with a total financial outlay of more than Rs.500 million and offered technical consultancy and advice to multiple industries and organizations. In recognition of Dr. Tatavarti's contributions, DRDO has conferred on him an *Award for Advances in Naval Technology (1997)*, a *Silicon Medal (2006)*, and *DRDO Laboratory Scientist of the Year Award (2007)*.

Employing novel pedagogical principles (Saripalle, Kumar, and Tatavarti, 2014 in *Journal of Innovation and Technology Management*), Prof. Tatavarti mentored, taught, and guided hundreds of science and engineering students of different disciplines at various institutes worldwide and successfully facilitated them in securing challenging, well-paid jobs in the industry, and or embark on research activities at other internationally reputed institutes. (Ref: http://*www.gvpsirc.in*). Prof. Tatavarti's penchant for taking up work on complex and challenging scientific problems, coupled with his out-of-the-box thinking, reaped rich dividends in the form of the development of novel photonic technologies to solve pernicious problems related to fast-moving fighter aircraft *(for the Ministry of Defence, Government of India);* and for accurate and cost-effective resource assessment for setting up wind power plants (*for Ministry of New and Renewable Energy, Government of India*). The path-breaking technologies received appreciation and accolades from the Government of India (*http://www.cats-global.com/testimonial.htm*).

Addressing the problem of sea erosion at Visakhapatnam on the invitation of the Chief Minister of Andhra Pradesh in 2015, Dr. Tatavarti steered an inter-institutional team of researchers and students and conducted the *first and perhaps the only known field investigations and detailed scientific study of the nearshore zone (especially the surf zone) of Visakhapatnam* - with various state of the art instrumentation coupled with theoretical modeling and simulation studies. Based on the innovative studies and the engineering solution recommended to the Government, Prof. Tatavarti demonstrated how complex problems can be solved, even under challenging conditions and constraints, with local talent and resources (*Research Reports by Rao Tatavarti, 2015; on 'Wave, Current and Sediment Measurements in the Nearshore Zone for Suggesting Measures for Mitigation of Vizag Beach Erosion,' IENG/SE-V/AE-I, 12 Reports, pp.1300). https://www.thehindu.com/news/cities/Visakhapatnam/a-rewarding-experience/article6944195.ece; https://www.linkedin.com/pulse/saga-sea-erosion-visakhapatnam-prof-dr-rao-tatavarti).*

Pursuing the beliefs that - *the interplay of science with necessity ushers in new technology*; and that *the interaction of science and technology is what helps bring about an understanding of the world, connecting with the world, thereby contributing to the transformation of the world*, Prof. Tatavarti assiduously coupled the relevant sciences with engineering, to design and develop indigenous photonic technologies and systems, to overcome many of the prevalent challenges using innovative principles. After undergoing rigorous testing and evaluations *as per standard international practices in the laboratory and the field*, Tatavarti demonstrated that the indigenously developed systems are not only more advantageous than any of the commercially available conventional systems in vogue, but also were more economical with superior

sensitivities and accuracy. In brief, using innovative principles encompassing interdisciplinary fields of research, Prof Tatavarti had indigenously developed novel and highly sensitive photonic systems (*patents pending*) - *AUM, PRANEEDHI, SAMIRA, SARATHI, SAVDHAN, TARANI, VAYU, VIDUR, VEDA* - for a wide range of Defence and civilian applications, which are now ready for commercialization.

Two of the indigenous photonic systems - VEDA and VIDUR, having applications in real-time remote vibration and condition monitoring, in addition to structural health monitoring; have attracted the attention of the Ministry of Railways and the Ministry of Road Transport and Highways, Government of India due to their potential applications to both the Ministries of Government of India.

Consequently, technology demonstrations and field evaluation trials for VEDA and VIDUR systems were successfully carried out in December 2016 - for the *Ministry of Railways* on the KK Line (Kothavalasa-Kirandul Line under the Waltair Division of East Coast Railway of the Ministry of Railways which passes through three southern states through complex terrains coupled with problems of track removal/obstruction by insurgents), and in February 2017 - for the Ministry of Road Transport and Highways on the NHAI Road Bridge on NH16 (*a bridge identified to be under distress by MORTH, GOI*), Visakhapatnam.

The technology demonstration for Ministry of Railways conducted in the presence of Divisional Railway Manager, Waltair Division, East Coast Railway and the details were presented to the Cabinet Minister of Indian Railways and at the International Technical Seminar 2017 of the Institution of Permanent Way Engineers (India) in January 2017. Against the background of the complexities in real-time monitoring of permanent ways, bridges, and structures, the novel, innovative photonic systems (*patents pending)* - designed and developed by Prof. Tatavarti - were demonstrated to be capable of monitoring real-time vibrations and can be deployed on the train, as well as on track; for real-time effective monitoring.

Prof. Tatavarti completed the technology demonstrations of VEDA and VIDUR in February 2017 at Visakhapatnam, on a live road bridge in the presence of the Director General and Special Secretary of MORTH (Ministry of Road Transport and Highways), Govt. of India. The systems are compact, portable, and can be easily deployed at any location for real-time vibration and condition monitoring in a non-intrusive fashion, even in inaccessible areas, and can remotely track vibrations and conditions of structures simultaneously in the time and frequency domains. Technologies for integrating various spatially separated systems using fundamental Internet of Things communication concepts are also in place for quick deployment. *(http://www.thehindu.com/news/cities/Visakhapatnam/now-get-updated-on-health-ofstructures/article17328904. ece).*

In 2017, Prof. Tatavarti started a high-end Technology Start-Up Company, CATS Global, which endeavored to push indigenous technologies and systems worldwide (Ref: *http://www.cats-global.com*). Judging the importance and potential of CATS technologies, the multinational consortium of AIRBUS had selected CATS Global from among 140+ start-up firms across seven countries to accelerate the commercialization process (*https://www.airbus-bizlab.com/news/airbus-bizlab-bengaluru-starts-third-season-with-six-finalist-start-ups/view)*.

Questioning the conventional wisdom of air pollution monitoring at a single location which involves measurements by a suite of sensors having different technologies from different manufacturers - integrated and housed in a rather bulky shipping container, which not only poses significant challenges in data acquisition and assimilation but also involves significantly high costs to arrive at digestible information for researchers, policymakers as well as the common public; Tatavarti (2018) designed and developed a compact photonic system capable of remote real-time monitoring of various air pollutants in situ - either at a particular location or across a spatial domain of interest. The photonic system was designed and developed using COTS (commercially off the shelf) technologies, making it significantly cheaper for broader deployment, in sync with the WHO's roadmap and solving the accompanying problems and challenges associated with the monitoring of air pollution at a single location with the disparate sensors of varying sensitivities, accuracies, and temporal responses.

The uniqueness and novelty of the novel photonic system, AUM, lies in its ability to innovatively apply the concepts of laser backscattering, artificial intelligence, and machine (deep) learning to identify, classify and quantify various air pollutants simultaneously from a single laser backscattering measurement. The photonic system was extensively evaluated in the laboratory and the field and was found to be good, yielding air quality estimates at very high sampling frequencies with high sensitivity and accuracy. This was duly recognized by the Minister of Science & Technology and Health, Government of India and the Department of Science & Technology of the Government of India.

(https://www.google.com/url?sa=t&source=web&rct=j&url=https://mobile.twitter.com/drharshvardhan/status/1293748811647442944&ved=2ahUKEwjNiZvZhZzrAhUJbn0KHTJ_CMQ4ChAWMAB6BAgIEAE&usg=AOvVaw0QmFmiEtrz1N44No4iFIHX;
https://www.google.com/url?sa=t&source=web&rct=j&url=https://dst.gov.in/indigenous-air-unique-quality-monitoring-aum-photonic-system-developed-real-time-remote-monitoring&ved=2ahUKEwiBwPSMiZ_rAhV3_XMBHROrCMwQFjABegQIAhAB&usg=AOvVaw23H8DU9u1lnelned3xOfG).

The premier Industry body of Indian Industry, the *India Electronics and Semiconductor Association* (*IESA*), honored CATS Global with the Most *Promising Aviation & Defence Start-up of the Year Award* (2019)- after adjudging it to have demonstrated its innovation, technical and marketing excellence, customer acceptance /market success /a true leadership offering by a start-up in Aviation and Defence (*https://www.youtube.com/watch?v=GEIIC346O4E*).

On a request from Hindustan Aeronautics Limited (HAL), an Indian state-owned aerospace and defense company in 2020, Prof Tatavarti demonstrated the technology of the photonic system VIDUR, for detection and localization of damage on one of two identical specimens provided by HAL, which were specially fabricated to represent complex aircraft structural assembly - with the damage camouflaged under the layers of one of the specimens. The successful technology demonstration laid the foundation for collaboration with HAL in the aircraft maintenance and repair domain.

Prof. Tatavarti's technological developments have attracted the interests and attention of the international scientific and engineering fraternity, which resulted in his collaborations and MoUs with *Ecole Polytechnique Federale de Lausanne* (EPFL), a research institute and university in Lausanne, Switzerland, and M/S SenseFly, SA (Parrot Group), Switzerland. The Indian Defence PSU HAL, Nashik, and the Air Force Station BRD11 (Base Repair Depot 11) Ojhar, Nashik, have requested Dr. Tatavarti to share his indigenous technology for the Structural Health Integrity Assessment of the Indian Fighter aircraft.

In recognition of his multifaceted achievements, *Aviation Update*, India's premier aviation monthly magazine, featured Prof Tatavarti on its cover page with a caption titled '*Up, Close and Personal with the savant Prof Dr. Rao Tatavarti' (https://www.magzter.com/IN/AVIATION-UPDATE/Aviation-Update/Business/410116; https://www.magzter.com/article/Flying-Aviation/Aviation-Update/INTERVIEW*; *Aviation Update*, Feb. 2020, Vol 6, Issue 5, *http://www.avaiationmagazine.in*).

Prof. Tatavarti's brief yet eloquent articulation on the need for indigenous Defence technologies for India (Tatavarti, 2015 in *Organizer* and *Panchajanya*) resulted in him becoming a consultant and technical adviser to the then *Raksha Mantri*. Having varied research interests, Dr. Tatavarti has 200+ Scientific and Technical contributions to his credit (*169 Research Publications in Peer Reviewed Journals / Conference Proceedings / Classified Research Reports, 2 Monographs, 4 Book Chapters, 12 Indigenous Systems, and 8 Patents - Indian Patent No.1469/DEL/2007, US Patent No. US2010/0321698/A1, European Patent No. EP 2160577 (A2), International Patent filed in African Countries – PCT No. 1469/IN2008/000444, Indian Patent – IPO No. 1819/DEL/2008, Indian Patent No.2567/CHE/2010, Indian Patent No.3597/CHE/2010, US Provisional Patent No. 62/863,013/2019*). In 2017, Prof. Tatavarti was elected Fellow of the Andhra Pradesh Akademi of Sciences for his multifaceted pioneering and path-breaking works across many disciplines of Science and Engineering.

Prof. Rao Tatavarti is currently having an *h-index* of 19 and an *i10 index* of 24, with more than 1000+ *citations* (Ref: *https://scholar.google.co.in/citations?user=soE7Q9MAAAAJ&hl=en*)*;* is an active researcher and a keynote speaker at many reputed institutes and scientific and technical gatherings worldwide, in addition to being a reviewer and editor of peer-reviewed journals.

Prof. Tatavarti travels worldwide and actively collaborates in multi-disciplinary research and academic activities with his peers at many internationally reputed institutes.

Academic / Research / Administrative / Leadership - Contributions

Dr. Tatavarti's practical contributions to the administration/leadership/management of organizations are linked to his firm belief that for an organization to soar above average, appropriate structures and systems are needed to attract the best and deploy them in complementary roles. Dr. Tatavarti believes that for any organization / institute to achieve excellence, the leadership/management needs to leverage the complementarity of members, who should be empowered to play to their strengths, thereby realizing synergy and creating value.

Prof. Rao Tatavarti has successfully donned the role of an Institution Builder / Administrator/ Leader / Director since 1989 at various governmental and private organizations - by efficiently building teams, motivating people to excel even under challenging conditions, and effectively facilitating the completion of tasks in time within the stipulated time frames and budgets.

Dr. Rao Tatavarti not only served in his primary role as a Senior Scientist at the Naval Physical and Oceanographic Laboratory of the Defence Research and Development Organisation from December 1989 to November 2008 but also concurrently served in many senior administrative and management roles of the management of laboratory with a strength of 700+ people. In July 1999, Dr. Tatavarti was promoted to Scientist E in DRDO, equivalent to the rank of a University Professor. Since 1999 to date Dr. Tatavarti was continuously shouldering leadership / administrative / management responsibilities at various laboratories, institutes, and nationally important R&D projects of the Ministries of Defence and Space and was instrumental in conceptualizing and creating national facilities, in addition to training and mentoring hundreds of students, faculty, researchers, scientists, and other personnel.

Dr. Tatavarti was responsible for conceptualizing and completing several National Defence Programs on Non-Acoustic Technology development for the Nation and also for creating state of the art Centre for Optronics and Oceanics Research facility at NPOL during his stint with the Defence Research and Development Organization, Ministry of Defence.

During his stint at DRDO, Dr. Tatavarti was also responsible for conceiving and building various facilities at NPOL's DROMI (Defence Research Officers Mess and Institute) and subsequently transformed the organization into an efficient and profitable service facility - to serve Defence officers and their families.

Dr. Tatavarti, during his stint as the Chief of HRD at NPOL, DRDO, was responsible for conceptualizing and implementing a roadmap for the human resources development involving 700+ scientists, technical and administrative staff to the satisfaction of both the management as well as the team.

From November 2008 to December 2010, Dr. Tatavarti served as a Senior Professor, Dean (Academic Research), and Director (R&D) at VIT University in Vellore, where he supervised and led a faculty strength of 1100 people and a research scholar strength of 900 people. Prof. Tatavarti successfully channeled the disparate goals and aspirations of 1100 faculty and 900 researchers of VIT University into quantifiable R&D outputs - by effectively designing and implementing a process agreeable to all stakeholders, which ensured the University to leapfrog itself into higher echelons regarding R&D, Publications, and Patent outputs.

From December 2010 to 2021, Prof. Tatavarti served as a Senior Professor, Dean, and Director at the Gayatri Vidya Parishad Institutes (GVP Engineering Colleges) and concurrently at GVP-SIRC, which is recognized as a Scientific and Industrial Research Organisation by DSIR, Ministry of Science and Technology, Govt. of India. He is now the Distinguished Professor and Director of GVP Institutes.

Proving the point that people - *irrespective of their backgrounds and conditions*, can be effectively transformed into an efficient workforce, *even under challenging and exacting conditions* - Prof Tatavarti was successful in creating a state of art Photonics Research Laboratory and a sub-sonic wind tunnel facility at GVP-SIRC, Visakhapatnam, and had effectively conceptualized, mentored and guided many faculty and graduate/ undergraduate students from various backgrounds and a multitude of institutions, to work on and complete nationally significant projects - thus not only providing a major push to the nation's efforts on indigenization of various cutting edge technologies, but also developing and training the future workforce for India (see, *http://www.gvpsirc.in/feedback.html*).

In 2013, Prof. Rao Tatavarti was invited to head the Andhra Pradesh Chapter of the *National Maritime Foundation* (a Think Tank of the Indian Navy) as its Regional Director (2013-2015), wherein he contributed significantly towards the advancement of India's Maritime interests. Since 2016 Prof. Tatavarti has been the Founder, Director, and Chairman of the CASTLE Advanced Technologies and Systems (CATS) group of companies. Prof. Rao Tatavarti mentors and guides various students/researchers from multiple institutes all across India and has been successfully running an internship program for young students who earn while they learn during their stint at GVP-SIRC, Visakhapatnam and also helps Prof. Tatavarti in the development of various technologies and systems having applications for the *Ministries of Defence, New and Renewable Energy, Railways, Shipping Surface and Road Transport, and Environment*. From 2020 – to date, Prof. Tatavarti is also serving as a Member of the Governing Body of Bhagavathula Charitable Trust, Visakhapatnam.

Institutional Collaborations

Academics, Research and Development, Invited Talks

USA
1. University of Georgia
2. University of Florida
3. Scripps Institution of Oceanography
4. University of Oregon
5. Naval Post Graduate School
6. Army Corps of Engineers Research Centre

CANADA
7. University of Toronto, Canada
8. Memorial University of New Foundland
9. National Engineering Research Council
10. Dalhousie University
11. University of Waterloo
12. Technical University of Nova Scotia
13. Bedford Institute of Oceanography

UK
14. University of Plymouth
15. University of East Anglia
16. University of Wales

AUSTRALIA
17. Royal Melbourne Institute of Technology University

SINGAPORE
18. DSTO National Laboratories
19. Defence Science and Technology Agency

MALAYSIA
20. Malaysian Maritime Enforcement Agency
21. Malaysian Coast Guard

SOUTH KOREA
22. Korea Ocean Research and Development Institute

RUSSIA
23. Engineering Design Bureau of Ocean Engineering

INDIA
24. IIT Delhi
25. IIT Madras
26. IIT Kharagpur
27. IIT Bombay
28. University of Hyderabad
29. Andhra University
30. JNTU Kakinada
31. JNTU Hyderabad
32. VIT University
33. Hindustan University
34. GITAM University
35. AMET University
36. Indian Maritime University
37. Indian Institute of Science
38. University of Kerala
39. Cochin University of Science and Technology
40. JNCASR
41. IISER
42. IIST
43. ISRO
44. DRDO
45. NIWE, MNRE
46. NIOT
47. NIO
48. Ministry of Defence
49. Ministry of Railways
50. Ministry of Science and Technology

Research & Development Collaborations – Government Organisations

Ministry of Defence

- Defence Research & Development Organisation Headquarters (DRDO)
- Indian Navy
- Indian Coast Guard
- ADA, ADE, GTRE, LRDE, MTRDC Bangalore
- NPOL, Kochi; NSTL, Visakhapatnam; NMRL, Ambernath
- DEAL, IRDE, Dehradun; ITM, Mussorie; SASE, Manali
- DIPAC, LASTEC, SSPL, DTRL, New Delhi
- Institute of Nuclear Medicine & Allied Sciences (INMAS)

Department of Space

- Indian Space Research Organisation (ISRO) Headquarters (DRDO)
- ADRIN, NRSC, Hyderabad
- LPSC, ISTRAC, LEOS, Bangalore
- VSSC, ISST Thiruvananthapuram
- NARL, Tirupati
- SAC, PRL, Ahmedabad

Ministry of New and Renewable Energy

- National Institute of Wind Energy

Ministry of Electronics & Information Technology

- C-DAC, Pune

Ministry of Railways

- East Coast Railway, Visakhapatnam
- RDSO, Lucknow

Ministry of Science & Technology

- DSIR, New Delhi; Survey of India, Dehradun

Ministry of Earth Sciences

- NIOT, INCOIS, IMD

Ministry of Shipping and Surface Transport

- Visakhapatnam Port Trust, Visakhapatnam; V.O. Chidambaranar Port Trust, Thoothukudi

Ministry of Environment

- Central Pollution Control Board, New Delhi
- Karnataka State Pollution Control Board, Bengaluru.

PhD Theses Examiner

Examiner for Doctoral Theses from the following Institutes / Universities:

- IIT Madras, Chennai.
- IISC Bangalore.
- Andhra University, Visakhapatnam.
- Anna University, Chennai.
- Goa University, Panaji.
- Mangalore University, Mangalore.
- Cochin University of Science and Technology, Kochi.
- National Institute of Technology, Tiruchirappalli.
- University of Kerala, Thiruvananthapuram.
- Central University of Rajasthan, Jaipur.
- MG University, Kottayam.
- VIT University, Vellore.
- Defence Institute of Advanced Technology, Pune.

Membership of Professional Societies

- Fellow, Andhra Pradesh Akademi of Sciences (APAS)
- Life Member, Indian Defence Scientists and Technologists, IDST
- Founder and Executive Director, CASTLE.
- Fellow, Optical Society of India.
- Life Member, International Association of Engineers, Hong Kong.
- Life Member & Founder, General Secretary Ocean Society of India.
- Life Member, Instrument Society of India.
- Life Member, Photonics Society of India.
- Member, SPIE International Society of Optical Engineering, USA.
- Member, AGU American Geophysical Union, USA.
- Member, India Meteorological Society.

Other Activities

2020 – 2022	Member, Governing Body, Bhagavathula Charitable Trust, Visakhapatnam
2008 – 2023	Member, Editorial Board, ICTACT Journal on Image and Video Processing
1990 – 2023	Theses Evaluator for Masters, Ph.D. students at Institutes/ Universities
1990 – 2023	Invited talks/lectures at many institutes/organizations
1990 – 2008	Member, Selection committees & Research committees at CUSAT
1990 – 2008	Advisor for DST, DOS, NRB and DOD projects at CUSAT
1990 – 2008	Member, Departmental Academic Committees Andhra University, CUSAT
1975 – 1978	Prize Winner, Inter-University competitions, Debates, Essays and Sports

Societal Significance of Research and Development Activities

Taught, trained, and mentored thousands of students and faculty from across the country in various scientific and engineering domains and was instrumental in developing the following systems for various societal applications as well as in nation-building.

1. Development of Novel Photonic Technologies for Ministry of Defence, Govt. of India
2. Development of Novel Technologies for Futuristic Fighter aircraft for Ministry of Defence, Govt. of India
3. Development of Bio-Photonic Technologies for the Medical Industry
4. Development of Fully Automated Subsonic Wind Tunnel Facility for Educational Institutes / Industry
5. Development of Wind Profiling System for Ministry of New and Renewable Energy, Govt. of India
6. Development of Vibration and Condition Monitoring Systems for the Automobile and Aerospace Industry
7. Development of Intrusion Detection and Traffic Analysis Systems for Highways and Railways
8. Development of Portable Platforms Surf Zone Deployment for Coastal and Ocean Engineering Industry
9. Development of a Novel Environmental Monitoring System for Air Quality Monitoring for Industry
10. Development of Track Monitoring System for Ministry of Railways, Govt. of India
11. Development of Photonic System for Wellness Monitoring
12. Development of Photonic Systems for Pipeline Integrity Management, Oil and Gas Industry.