Dr. V. VENKATESWARA RAO
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Department of Aerospace Engineering
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EDUCATION

Degree	University	Year	Subject & Specialization
B.E.	AUCE, Visakhapatnam, AP	1979-83	Mechanical
MTech	REC, Warangal, AP	1983-85	ICE & GT
MBA	IGNOU, New Delhi	1995-98	Finance & HR
Ph. D	JNTUCE, Hyderabad, AP	2005-11	Mechanical (Metal Joining)

EXPERIENCE

S. No.	Organization/ Employer	Period of Service		Grade/ Post
		From	To	
1.	ISRO, SHAR, Sriharikota	22-06-198	31-12-1991	Sci/Engr SC
2.	ISRO, SHAR,Sriharikota	01-01-199	31-01-1997	Sci/Engr SD
3.	DRDL, Hyderabad	01-02-199	30-06-2001	Scientist D
4.	ASL, Hyderabad	01-07-200	30-06-2005	Scientist E
5.	ASL, Hyderabad	01-07-200	30-06-2010	Scientist F
6.	ASL, Hyderabad	01-07-201	06-10-2015	Scientist G
7.	ASL, Hyderabad	07-10-201	27-04-2016	Scientist H
8.	CAS, Hyderabad	28-04-201	31-12-2018	OS & Director
9.	ASL, Hyderabad	12-12-201	30-06-2019	OS & Program Director (AGNI)
10.	ARDE, Pune	01-07-201	30-06-2022	OS & Director

ACHIEVEMENTS

- 35 years of dedicated service at two of India's leading organizations, ISRO and DRDO
- During 10 years of service at ISRO, was involved in the following
  - Integration of solid rocket motors and other subsystems for ASLV and PSLV
  - Static testing of solid rocket motors, stage 1 and 3 of PSLV
  - Environmental testing of airframe sections, electronic packages of PSLV

- Functional and checkout testing of stage 2 and 4 of PSLV liquid engines
- Launch vehicle integration of ASLV and PSLV at launch pad

- During 25 years of service at DRDO in various positions was involved in the following
  - Environmental testing of flight structures and electronic packages
  - Integration of solid rocket motors and other subsystems
  - Static testing of solid rocket motors
  - Integration of solid rocket motors and other subsystems for all tactical missiles
  - Static testing of solid rocket motors for all tactical missiles at SPRITE
  - System integration and checkout testing
  - Gas dynamic testing of cannister launched missile systems at SPRITE
  - High altitude testing of upper stages
  - Missile ejection testing
  - Post flight analysis and implementing corrective actions
  - Conducting flight readiness reviews
  - Planning and execution of strategic missile integration and storage facilities
  - Equipping the training aids and conducting training
  - Design, realization and testing of composite rocket motor casing, canisters and gas generators
  - Configuration design and realization of rail and road mobile launchers for missile systems
  - Establishing and operationalization of world's biggest Hypersonic Wind Tunnel facility at CAS
  - Life cycle management
  - Design and testing of 16t electro-hydraulic activation system and 3t electro-mechanical activation system
  - Conducting PSQR user trial, EMI/EMC test, DGQA test and maintainability evaluation trials of Advanced Towed Artillery Gun System (ATAGS)
  - Delivering two regiments of Pinaka MBRL system to Indian Army
  - Planning and conducting developmental trials of Pinaka Enhanced and Guided Pinaka
  - Conducting PSQR User trials of Pinaka Enhanced
  - Design and development of 122 extended range rocket and conducting developmental trials
  - Configuration design, realization and testing of corner shot weapon system compatible for 9mm Glock pistol and UBGL with CAPF, MHA, Special forces
  - Configuration design, realization and testing of Joint Venture Protective Carbine (JVPC), 5.56x30mm weapon and ammunition with Indian Army
  - Configuration design, realization and developmental trials of 9mm Machine pistol, Light machine gun (7.62x51mm), Closed quarter battle (5.56x45mm) and new family of weapons (6.8x43mm)
  - Development tests and production of MBT Arjun, T-72/90 tanks, primary and secondary ammunition (FSAPDS, HESH)
  - Configuration design of new generation main battle tank (NGMBT) to get higher depth of penetration (DOP) in the order of 650-800mm
  - Design and developmental testing of Anti-tank guided missile fired from MBT Arjun tank
  - Production and delivery of Anti-Personal and Anti-Tank land munitions to Indian Army
  - Design and validation of 10 MJ Electromagnetic Rail Gun with 1kg projectile
  - Detailed design of 100 MJ Electromagnetic Rail Gun systems with 18kg projectile for 150 kms
  - Configuration design of 155mm Bourrelet artillery ammunition and 40mm grenade
  - Design, development and production of Blast, Impact, Pre-fragmented, RDPS and Submunition high explosive (HE) filled warheads for tactical missile systems

- Configuration design and production of Fuse technology for warheads and safe arm mechanism for missiles
- Production of Air power cartridges and canopy severance systems for fighter aircraft
- Design, development and production of Air munitions for Indian Airforce
- Development of Advanced Piezo materials and specialized Transducer Elements for Futuristic Armament and Under water applications
- Configuration design and development of extended range Anti-submarine rocket for Indian Navy

FACILITIES ESTABLISHED

1. Layout configuration, planning and establishment of 300 t solid rocket motor processing facility at SFC, Jagadalpur, DRDO. It consists of:
    a. Hardware preparation facility for autoclave, sand blasting, raco material processing facility, Ball mills & Qualification testing laboratory.
    b. Solid rocket motor casting facility, premixing, bowl cleaning automation
    c. Solid rocket motor curing facility
    d. Vertical trimming & Horizontal machining facilities
    e. 15mer nondestructive test facilities
    f. 300t solid rocket motor static test facility; Remote & local data acquisition center

2. Configuration planning & establishing state of art Strategic missiles integration, testing & storage center at CAS, Hyderabad. The facility includes:
    a. Preparation of 8 types of missiles simultaneously
    b. Check out & health checking/monitoring
    c. Cable harness preparation & related data acquisition center
    d. Liquid fuel reaction control system test facilities.
    e. Hydraulic actuator test facilities and rigs

3. Hypersonic Wind Tunnel (HWT) test facility established at CAS Hyderabad. The facility includes:
    a. High vacuum storage gas facility
    b. 12.5 Mach test chamber
    c. Heating chamber
    d. After cooler

4. Barrel manufacturing facility
    a. Cold swaging of rifle barrel
    b. Deep hole drilling machine

TECHNOLOGY TRANSFER

1. Solid rocket motor insulation, preparation and layup to private Industries
2. Solid rocket motor processing, casting, curing, NDT & static testing to private industries
3. 600 t capacity ammonium perchlorate(AP), 100t Hydroxy Terminated Poly Butadine (HTPB) manufacturing plants established at private industries.
4. Manufacturing of Pinaka MK I, Pinaka MK II & Pinaka enhanced solid rocket motors to public sectors and private industries
5. Manufacture of Anti-Tank Guided Missiles (Tank fired) to industry.
6. Manufacturing & testing of 155/52 Advanced Towing Artillery Gun Systems (ATAGS- ATAL) to private industries under DCPP route
7. Manufacturing of
    a. Corner shot weapon systems compatible for 9 MM Glock pistol/UBGL
    b. Joint Venture Protective Carbine (JVPC) 5.50X30MM infantry weapon systems
8. Production of primary and secondary tank ammunition, i.e., FSAPDS & HESH through private and public partnership (PPP)
9. Manufacturing and production of Anti personal and Anti-tank land munitions like Nipun, Parth, Ulka, Vibhav, Vishal, Prachand and Adrushey successfully
10. Manufacturing and Production of Tandem, Blast, Prefab, Fragmented, RDPS warheads for missiles for Nag, Helina, QRSAM, Astra, Akash, AD I & II, LRSAM, NGRAM, Pinaka, Prithvi and also for aircraft release bombs like 125 PF, 250 PF, 500 GP, 450 PF, LRGB, Rudra M I, II and III through industry
11. Production of power cartridges and canopy severance systems used for all fighter aircrafts available in India (includes imported fighter aircrafts) to the industry
12. Manufacturing and production of Artillery ammunition and Infantry ammunition

AWARDS AND RECOGNITIONS

1. Best Performance team award from Chairman, ISRO, 1996
2. DRDO Award for path breaking research/outstanding technology Development, 2007
3. Best Ph.D. award from IWS (Indian Welding Society), 2011
4. DRDO Technology Leadership Award, 2019
5. Dr Biren Roy Trust Award by Aeronautical Society of India,2022
6. Distinguished Alumnus Award for Professional Excellence by NIT, Warangal 2022

AFFILIATION TO PROFESSIONAL SOCIETIES

1. Fellow of Aeronautical Society of India (AeSI)
2. Fellow of Institution of Engineers, Hyderabad
3. Life Member, High Energy Materials Society of India (HEMSI)
4. Life Member, Indian Welding Society (IWS)
5. Life Member, Indian Society of Non-destructive Testing (ISNT)
6. Life Member, Astronautical Society of India (ASI)

PUBLICATIONS IN JOURNALS

1. *"Numerical study of the flow & thrust performance for angular twin inlet pintle nozzle",* International Journal of Mechanical Engineering (ISSN: 0974-5823) Vol. 7 No, 2022
2. *"Geometrical Burnback analysis and optimization of 3d propellant grains",* Journal of East China University of Science and Technology (Scopus & UGC Group- II) (ISSN: 1006-3080), 2022
3. *"Performance evaluation of the power cartridge in the closed vessels for waterjet application"*, Intl Journal of Energetic Materials Vol.7, Issue 01, 2021
4. *"Numerical study of penetration in concrete targets by eroding Projectiles of different materials",* Defense Science Journal, Vol.71 No.5, 2021
5. *"Shock wave behavior of polymeric materials for detonation wave shapers",* Defense Science Journal, Vol.71 No.6, 2021
6. *"Design and Validation of 3-D Solid propellant grain for large rocket motors",* Acta Scientific Pharmacology 2.10 (2021): 30-35 Volume 2 Issue, 2021
7. *"Aerodynamic studies of plenum chamber diffuser-ejector system for altitude simulation",* Journal of Aerospace Sciences and Technologies, 2015
8. *"Evaluation of thermal performance of phenol- formaldehyde resins by pyrolysis gas chromatography and thermos gravimetry",* Journal of Applied Pyrolysis, 2015
9. *"Gas Chromatography: A new method of noncontact NDE for Cure Monitoring of Carbon-Phenolic Composites for Determination of the Gelation Region for Pressure Application",* Russian Journal of Nondestructive Testing Vol 51, No 6, 2015
10. *"Dynamic Analysis of solid propellant grain for launch load",* MIT International Journal of Mechanical Engineering, Vol.4, No.2, 2014
11. *"Thermal and fiber compatibility studies of T-300 carbon fiber reinforced polyamide composites",* American Journal of Chemistry and Materials. Science, Vol.5, No.1, 2014

12. *"Determination of the pressure application criterion for improvement of solid resin content during autoclave curing of carbon phenolic composites by on-line gas chromatography",* International Journal of Polymer Materials, 2014
13. *"Dissimilar metal friction welding of maraging steel (MDN 250) to low alloy steel (AISI 4340)",* Journal of Material Processing Technology, 2012
14. *"Microstructure and mechanical properties of similar and dissimilar electron beam welds of age hardened maraging steel and quenched and tempered high strength low alloy steel",* Journal of Engineering Manufacture, Proceedings of the institution of Mechanical Engineers, Part B, UK, 2012
15. *"Microstructure, hardness and residual stress distribution of dissimilar metal electron beam welds - Maraging steel and high strength low alloy steel",* Journal of Material Science and Technology, Vol.26, No.12, 2010
16. *"Influence of Post weld heat treatments on microstructure and mechanical properties of gas tungsten, arc maraging steel weldments",* Journal of Material Science and Technology, Vol.26, No.12, 2010
17. *"Influence of post weld heat treatments on microstructure and mechanical properties of maraging steel electron beam weldments",* Journal of Steel Grips, 8, Germany, 2010
18. *"The effect of post weld heat treatments on the microstructure and mechanical properties of maraging steel laser weldments",* Proceedings of Institution of Mechanical Engineers, Journal of Materials design and Applications, Part L, Vol 223, 2009

PUBLICATIONS IN CONFERENCES

1. *"Testing a precision initiation coupler by detonation induced cavity collapse method", International Symposium on Ballistics, Reno, USA,* International Ballistics Society, May 2022
2. *"Burnback analysis of 3-d propellant grain for large solid rocket motors", International Conference on Research Contributions in Mechanical Engineering (ICRCME – ISBN: 978-1-5136-9400-9), February 2022*
3. *"Thermodynamic aspects of solid propellant gas generator for aircraft applications",* National Conference & Exhibition on Aerospace & Defence Related Mechanisms (ARMS 21), December 2021
4. *"Simulation and analysis of mechanical timer for five-minute arming delay for fuze mechanism of land-based munitions",* National Conference & Exhibition on Aerospace & Defence Related Mechanisms (ARMS 21), December 2021
5. *"Design and geometric optimization of solid propellant grain for large motors",* 31st international symposium on ballistics, India, November 2019

6. *"Design of a pulsed solid propellant divert and attitude control system (DACS)",* 30th international symposium on ballistics, long beach, US, September 2017
7. *"Failure analysis of maraging steel weld in service",* 1st International and 18th ISME Conference (ISME 18), February 2017
8. *"Life prediction studies on carbon epoxy composite structures",* 5th Intl Conference on PLMSS, December 2015
9. *"Structure properties evaluation in LASER beam welds of 15CDV6 alloy steel",* Intl Conference on Material Processing and Characterization, Hyderabad, May 2015
10. *"HSS tool wear mechanism in machining of HTPB based composite propellant grain",* AIMTDR 2014, December 2014
11. *"Microstructure, Hardness and Residual stress distribution of dissimilar metal LASER beam welds: Maraging steel and high strength low alloy Steel",* Intl Welding Symposium (IWS2K14), October 2014
12. *"Dissimilar metal gas tungsten arc welds of maraging steel and high strength low alloy steel microstructure and mechanical properties",* National Welding Seminar, Visakhapatnam, November 2013
13. *"Microstructure and mechanical properties of similar and dissimilar electron beam welds of age hardened maraging steel and quenched and tempered high strength low alloy steel.",* International Welding Symposium (IWS2K12), October 2012
14. *"Effect of post weld aging and homogenization microstructure and mechanical properties of electron beam maraging steel weldments.",* International Welding Symposium (IWS2K12), October 2012
15. *"Influence of post weld heat treatment on microstructure and mechanical properties of electron beam maraging steel weldments",* National Welding Seminar, Kolkata, December 2011
16. *"Influence of pre-weld heat treatment on microstructure, hardness and residual stresses in similar and dissimilar metal gas tungsten arc weldments of maraging steel and high strength alloy steel",* National Welding Meet, Pondicherry, August 2010

PHD SCHOLARS GUIDED

1. *"Effect of post weld heat treatment on the mechanical and metallurgical properties of the weld joints made by laser beam",* by MVL Ramesh, JNTU Hyderabad, 2016
2. *"Prediction and reduction of non-cavitating noise levels in marine propellant",* by V Rama Krishna, NIT Warangal, 2018
3. *"Agglomeration in metallized solid rocket propellants", by Tejasvi K, NIT Warangal, 2019*
4. *"Design and analysis of special purpose cutter for machining solid propellant grain" by Kishore Kumar Katikani, NIT Warangal, 2019*

5. *"Study of mechanical and performance parameters of composite propellant rocket motors" by P Sunitha, NIT Warangal, 2022 (under progress)*

RESEARCH PROJECTS

1. *"Machine Vision Based Adaptive Quality Assurance System for Aerospace Vehicle Assembly Unit, Dr. Sandip S Deshmukh, BITS Pilani Hyderabad*
2. *"Feasibility Study for Design, Manufacturing and Testing of CRDi Fuel Injection System, Dr. M. Ganesan, MGR Education, Chennai*
3. *"Use of Thermal Autofrettage for Defence Application, Dr. Seikh Mustafa Kamal, Tezpur university*
4. *"High Speed Fragment Launch By Rotary Mechanism, Prof. Rahul G. Makade, MIT Pune*
5. *"Numerical Analysis on Effect of fragment shape on damage of targets in ballistic application, Dr. A Kumaraswamy, DIAT Pune*
6. *"Development of hard chrome replacement Ni based alloy coating for gun barrel application using pulse current electro deposition, Dr. Nitin Wasekar, ARCI Hyderabad*
7. *"Laser Assisted Machining of Ceramics Ceramic Composites and Process Optimization, Dr. Subhas Bose, NIT Warangal*
8. *"Dynamic Characterization of Aluminum and Tungsten alloy, Prof. Syed Khaderi, IIT Hyderabad*
9. *"Design and Development of Battery-Super Capacitor- Solar Cell Hybrid Energy System for Quadcoptor and Fabrication of a Test Bench, Dr. K Selvajyothi, IIITDM, Kancheepuram*
10. *"Characterization of Grid Fin in subsonic regime, Dr. A Misra , DIAT Pune*
11. *"Development of a classifier based on deep/machine learning algorithms for land-based munitions, Prof. M Uttarakumari, RVCE Bengaluru*
12. *"Development of Laser Surface Modified Triboelectric Nanogenerator for Harvesting Energy from Shoe Sole, Dr. I A Palani, IIT Indore*
13. *"Design, Simulation, Fabrication, Packaging and Characterization of MEMS based Sound Source, Dr.Habibuddin Shaik, NMIT, Bengaluru*
14. *"Design and Development of Doppler Radar system for in-bore projectile velocity measurement, Dr. Debalina Ghosh, IIT Bhubaneswar*
15. *"Development of a low power video compression and enhancement module using TI's DaVinci Board along with its FPGA Realization, Dr. Manish Okade, NIT Rourkela*
16. *"Development of lithium based nano glass ceramics for armor applications, Dr.A.V.Deshpande, VNIT, Nagpur*
17. *"Development of Light Weight Functionally Graded Metal Ceramic Composite Armour Materials for Defence Applications, Prof. T P D Rajan, CSIR-NIIST, Thiruvananthapuram*
18. *"Development of PZT Ceramic foams, Dr. K Prabhakaran, IIST, Trivandrum*
19. *"Fabrication of nano-oxide dispersed Tungsten alloys by mechanical alloying for armament application, Prof. Anshuman Patra, NIT, Rourkela*
20. *"Development of hybrid supercapacitors with graphene and pseudo capacitance-based electrodes, Dr. Seema, C-MET, Thrissur*

21. *“Optimizing the Ballistic Performance of AA7075 Thick Plate Friction Stir Welds, Prof. Koteshwar Rao, SSN College of Engineering, Chennai*
22. *“Microwave sintering of particulate reinforced tungsten heavy alloy composites for defence applications, Dr. A. Raja Annamalai VIT, Vellore*
23. *“Study of Ti doped glass for lasers in armament applications, Dr Sonam Raheja, Apeejay Stya University, Gurugram*
24. *“To develop cost effective primary lithium battery for defence applications, Dr.Nirmalya Ballav, IISER, Pune*
25. *“Non-Local approach to Modeling Damage in Quasi Brittle Material under Blast and Ballistic Loads, Dr. A. Rajagopal, IIT Hyderabad*
26. *“Development & characterization of 2x2 twill woven carbon-kevlar hybrid composites with their modelling and analysis, Prof. Mali, MNIT, Jaipur*
27. *Machinability assessment and material characterization of tungsten heavy alloy used in defense applications as KE penetrators, Dr. Amrita Priyadarshani, BITS, Pilani Hyderabad*
28. *Development of functionally graded armor composites materials, Prof. Vikas Jindal IIT(BHU) Varanasi*
29. *Development and characterization of carbon fiber reinforced cermet brake pad containing nano encapsulated lubricant for achieving better tribological and braking performance, Dr. Senthil Kumaran, VIT, Vellore*
30. *Investigation Studies on Structrual and Mechanical Propertes of Electroplated NiW Nano Crystalline Thin Layers on Substrate for Erosion Resistant Application, Dr. K. R. Araganayagam, Kumaraguru College of Technology, Coimbatore*
31. *Study of Fatigue Crack Growth of Al 6061 - T6 Welds Obtained by Gas Metal Arc Welding Technique, Dr.Aruna Kumara P C, MS Ramaiah Institute of Technology, Bengaluru*
32. *Development of oxide dispersion strengthened tungsten heavy alloys: Study their structure-property relation, Dr. S Kumaran, NIT, Tiruchirappalli*
33. *Development of process and establishment of parameters for producing parts by permanent joining (welding) of Metal Additively Manufactured Aluminium alloy and conventionally manufactured parts/components of Aluminium alloy for current and futuristic applications in armament engineering, Prof. Vijay Hiwarkar, DIAT, Pune*
34. *Enhancing the Performance and Productivity of Gas Metal Arc Welded, Rolled Homogenized Armour Steel Joints by Rotary Arc (Spin Arc) Welding Technique, Dr.S. Malarvizhi, Annamalai University*
35. *Investigation on dynamic deformation behaviour of tungsten heavy alloys (WHAs) for defense applications, Dr. Nitin Kotkunde, BITS Pilani, Hyderabad*
36. *Computational multi-scale modelling as a virtual experimental setup for prediction of elastic and inelastic response of unidirectional fibre reinforced polymer composites, Dr. Shubhankar Roy Chowdhury, IIT Roorkee*
37. *Fatigue studies on influence of hybridization and patch lay-up configuration of post-impact response on repaired composites for defence Applications, A. Arockiarajan, IIT Madras*
38. *Investigation on weldability of 8 and 20 mm thick high nitrogen steel with strength of about 800 - 1200 MPa, Dr.Sandip Ghosh Chowdhary, NML Jamshedpur*

39. *Fatigue design of welded joints in military bridges experiments & simulations, Dr. Indra Vir Singh, IIT Roorkee*
40. *Development of light weight cost effective microwave radomes based on 3-D multi material printing technology, Dr. Saptarshi Ghosh, IIT Indore*
41. *Development of metallic micro-lattice structures with superior strain energy absorption characteristics for underbody protection in armoured fighting vehicles (AFVs), Dr. C. Chandrasekhar Sastry, IIITDM Kurnool*
42. *Futuristic W Alloys and composites, Prof. Bhaskar Majumdar, Sc- G, DIAT, Pune*
43. *Cold Spray deposition of driving band for ERFB projectile, Prof Bakshi, IIT Madras*