

## Thrust Areas of Research



### ARMREB

New high energy binders & polymers, Propellants with high burning rate, Hazard Assessment, Sensitivity & Safety, Mechanical properties of explosives & Propellant, Detonation in Gaseous Media Combustion studies, RF Sensors based on CW, FMCW, Pulsed systems, Fusing & Safety Arming Mechanism, Noise suppressors and flash eliminators Disposal of Aged Propellants & Explosives, Multifunction Next Gen Fire Protective suits, Safety regarding production, storage, transportation & handling of explosive materials

### NRB

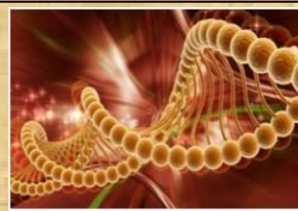
Sonar Domes for ship & Submarines, Ocean Acoustic Models & Algorithms, Smart composite materials & sensors, Self healing components for Marine application, Bio-mimicking Under Water Autonomous Vehicle, Under water Image processing techniques, Acoustic transducers & materials, Deep sea mooring, tether cables & winches etc, Ocean energy, battery for underwater application, Ocean Weather forecast & modeling, Hydrodynamics of wake & wave, Stealth Technology & materials, Target detection

### AR&DB

Hypersonic R&D, Combustion models for high speed flow, Low Reynolds No Aerodynamics for micro AVs, Aerospace Information Network Systems, Rapid Information flow systems, Low cost inertial satellite, Hybrid navigation systems analysis, modeling & hardware, MEMS sensors, Hyper spectral, Multi spectral, Active, Passive, Acoustic, Electro-optical, Radar etc., High Temperature Material for Aero Engine, Material & Manufacturing, Propulsion, Gas Turbine Engine Technology & Nozzles, Combustion and Gas dynamics, CFD, Compressors & Turbines. Composite & conformal structures

### LSRB

Life Support systems & Bio medical technologies for Air, land & sea applications, Military psychology, cognitive engineering, personnel selection, Human adaptation to extreme environments, ergonomics and human factors/ engineering for equipment development. Nutrition and specialized food and agriculture technologies, Bio-technology and high altitude agro animal technologies, Nuclear & Chemical detection, protection & decontamination and Bio-defense against human, animal and plant pathogens



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## Defense Research & Development Organization



**VISION:** Make India prosperous by establishing world class academic research base in the frontiers of science and technology to support the present and future needs of defense and security of the nation

**MISSION:** To encourage and fund basic and applied research in pertinent scientific disciplines relevant to DRDO by enabling and supporting emerging talent in academic institutions & to create and evolve a knowledge-base

## Research Boards

Naval Research Board (NRB)  
Established in 1996

Armament Research Board (ARMREB)  
Established in 1997

Life Science Research Board (LSRB)  
Established 1998

Aeronautics Research & Development Board (AR & DB)  
Established in 1971

**ARMREB Panels**  
High Energy Materials  
Armament Sensor and Electronics, Materials for Armament Applications, Combustion Detonics & Shockwaves, Armament Design Mechanism & Ballistics, Safety, Test & Evaluation  
LABS: ARDE, HEMRL, CEFEES, TBRL, PXE

**NRB Panels**  
Material  
Sonar Signal Behavior  
Hydrodynamics  
Marine Systems  
Ocean Environment  
Scientific Computing  
Hydro-Vibro-Acoustic  
LABS: NPOL, NSTL, NMRL, DMRL

**AR&DB Panels**  
Aerodynamics, Aerospace Resources, Materials & Manufacturing, Propulsion, Sigma, Structures, and Systems/Systems Engineering.  
LABS: ADE, GTRE, CABS, ADRDE, CEMILAC

**LSRB Panels**  
Life Support & Biomedical Devices, Soldier Health & Drug Development, Physiology of Extreme Environment & Behavioural Sciences, Bio-technology & Bio-remediation, Food Science, Hill Agriculture, Bio fuels & Bio-resources  
LABS: DIPAS, INMAS, DFRL, DEBEL, DRDE



Under Research Boards Grants are offered to Universities, Laboratories, Institutions and Research Organizations

Infrastructure/ Facilities development in academic institutions, Paper publications, Research talent & Patent development

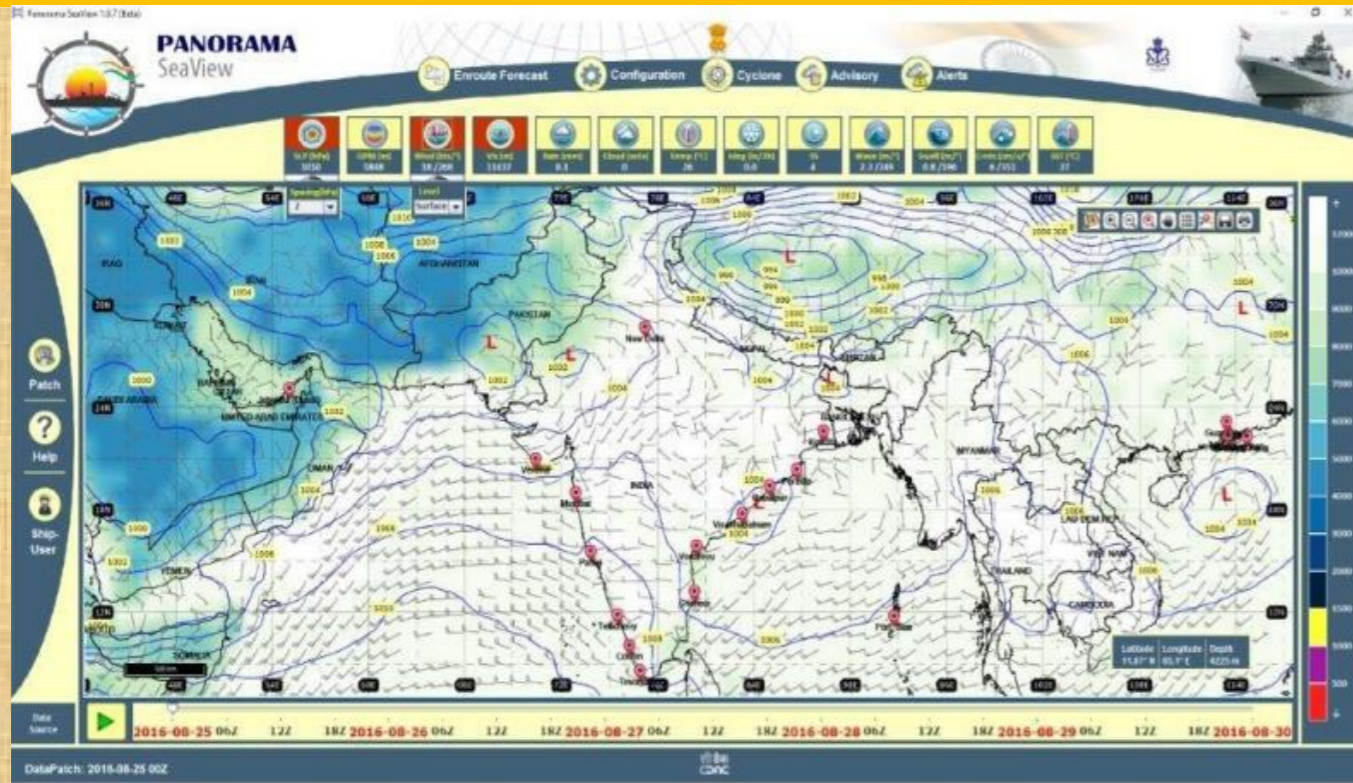
Director General (Technology Management), Room No 301, A Wing 3<sup>rd</sup> Floor, Rajaji Marg, New Delhi-110011  
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# Recent Achievements

“Development of Hardware and real time implementation of Path following and Cooperative Motion Control Algorithms for AUVs”, NIT Rourkela (NRB)



Marine Forecast Visualization System PANORAMA being installed at Indian Naval Meteorological Analysis Centre (INMAC), Kochi and Naval Operations Data Processing and Analysis Centre (NODPAC), Kochi by CDAC, Pune (NRB)



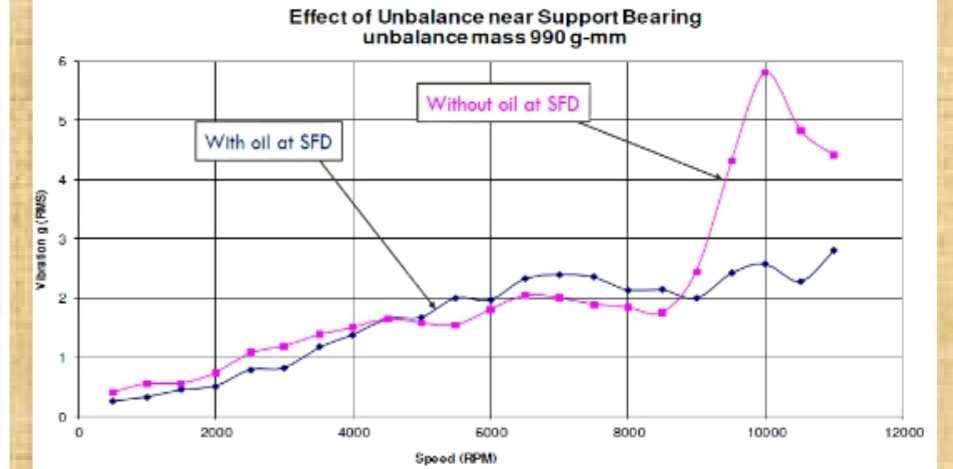
Transonic Stall Flutter: Unsteady Flow Over Turbo-machine Blades in Transonic Regime  
Institute: IISc, Bangalore (AR&DB)



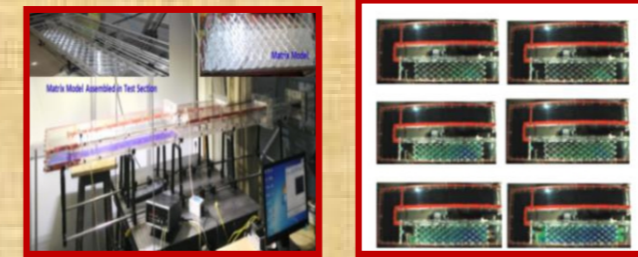
Test Facilities/ Infrastructure	Test facility established for conducting experiments on Transonic Staff Flutter
Application	Kaveri and its Class of Future Engine, GTRE

## Characterization of Squeeze Film Dampers of Large Engines (AR&DB)

Test Facilities/ Infrastructure	A State-of-the-Art facility has been established
User Labs	GTRE, CVRDE, HAL



Matrix Cooling, Institute: IIT Roorkee (AR&DB)

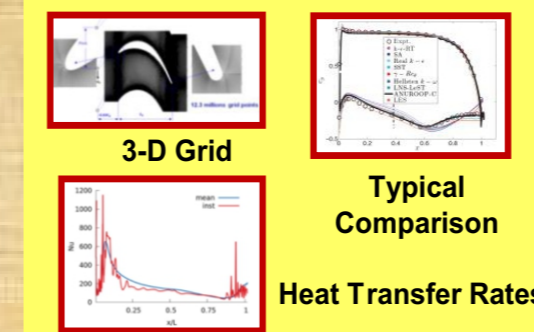


Blade Cooling Rig at IIT Roorkee      Typical Liquid Crystal Images



Development of Novel Raman Spectroscopic Techniques like SERS And SORS for Detection of Explosives by IISc, Bangalore (ARMREB)

DNS of Turbo-machinery Blading, Institute: JNCASR, B'lore. (AR&DB)



Development of 3 dimensional weaving technology for “T” stiffeners used in composite airframes, NAL B'lore (AR&DB)

User Labs	ADA/ ADE/ NAL Bangalore
No of Patents	3 Patents
Technology Developed	<ul style="list-style-type: none"> <li>•3D weaving machine for manufacturing 3D woven Performa designed &amp; developed</li> <li>•1st Compressible Advanced CFD Code for Turbo machines developed (GTRE)</li> </ul>

Development of micro needle based electrode for bio-potential measurement, Central Manufacturing Technology Institute, Bangalore (LSRB)

