

**Projects under Space Technology Cells
(From 2008 onwards)**

IISc Bangalore

Sl. No.	Title of the Project
1.	Development of a surface EMG device for analysis of human muscle dynamics
2.	Prediction of stream flow at river basin scale under climate change scenarios
3.	Studies on Cowl/ramp interactions at hypersonic mach numbers
4.	Shock tube studies on pyrolysis, combustion and ignition delay of fuels
5.	Effect of temperature on atomization in Gas centered coaxial injection systems
6.	Experimental investigation of shape memory effect in noble metallic nanowires
7.	Measurement of convective surface heat transfer rates for a missile shaped body with forward facing cavity flying at hypersonic Mach number
8.	Flood assessment using satellite images
9.	Experiment study of low pressure plasma characteristics for propulsion applications
10.	Plastic crystal composite electrolytes for rechargeable lithium batteries
11.	Root zone soil moisture retrieval by assimilation of near surface measurements
12.	Nano size ZnO synthesis by microwave heating techniques for optoelectronic and gas sensing applications
13.	Measuring displacement and strain field using digital image correlation
14.	Prediction of properties of single walled and multi walled carbon nanotubes and nanocomposites
15.	EM analysis of integration and packaging issues with RF MEMS switches
16.	Application of stable isotope technique in rain water sample to understand tropical convective system

Sl. No.	Title of the Project
17.	Development of a fluid structure interaction strategy for incompressible fluids
18.	Prediction of micro vibrations in a space craft
19.	Design, development, fabrication and characterization of MEMS based flow sensor
20.	Catalytic performance of iridium supported on carbon nanotubes in hydrazine fuel decomposition for space applications
21.	Nonlinear optimal guidance and control of reusable launch vehicle in descent phase
22.	Hyper spectral image processing for agriculture data
23.	Methodology for assessing and quantifying stability of humans while standing and during gait on stable and unstable platforms
24.	Studies on thin film coatings for multi junction solar cells
25.	Establishment of shock tube facility for the study of thermal protection system materials for re-entry applications
26.	Mapping of shear/suture zones in southern India with remote sensing and geological applications.
27.	Development of Plasma Accelerators for Space Propulsion
28.	Development of MEMS based static pressure sensors for hypersonic shock tunnels
29.	Pulsation characteristics of sprays discharging from gas-centered coaxial atomizers
30.	Development and characterization of catalyst for Hydroxyl Ammonium Nitrate (HAN) monopropellant
31.	Wireless Structural Health Monitoring of Impact Damage and Vibration in Spacecraft Structures
32.	Multi-temporal Time Series Analysis of Satellite Image
33.	Study of Jet Impingement Aeroacoustics Using Acoustic Holography
34.	Microfabrication and packaging of high-resolution accelerometers
35.	Large deformation analysis of fiber-reinforced elastomers
36.	Development of efficient high-resolution multi-domain combined compact schemes for simulation of fluid flows

Sl. No.	Title of the Project
37.	Studies on the development of sol gel based protective coatings on thermal control surfaces of spacecrafts
38.	Inverter Output Filter for AC motor Devices
39.	Low Voltage actuated digital microfluid chips using nanostructured SiO ₂ films
40.	Thermo-acoustic pulse tube refrigerators operating down to 100K
41.	Using satellite telemetry to track a migratory marine turtle
42.	Assimilation of remote sensing data for modeling the land surface fluxes at watershed scale using a distributed hydrological model
43.	Novel and Parallelized Computational Schemes for Wrinkled Membranes and Unfurling Inflatable Structure
44.	Generation of modulated microwave signals using integrated optical techniques
45.	Hydrated mineral evolution on earth and other planetary objects: An insitu crystallographic approach combined with spectroscopic studies
46.	Organic Materials for Solar Cells
47.	Ab Initio Analytical Study of the Effect of Strain on Silicon Nanoelectronics
48.	Boron based highly luminous and low voltage Display Materials
49.	Understanding the effect of an elevated stressor hormone associated with space mission on neural function using live neuronal cultures
50.	Probabilistic seismic hazard evaluation of Karnataka state considering local site effects and revisit of source characterization based on remote sensing data
51.	Numerical Simulations of vapor Growth in the Evaporator of a capillary pumped loop
52.	Multifunctional Carbon Nanotubes (CNTS) material for optical mirror Applications in space
53.	Experimental analysis of Bubble Dynamics and Temperature Field in a Dual Compensation Chamber Loop Heat Pipe
54.	A Compact Atomic Force Microscope for operation in space
55.	Pyrolysis & ignition delay studies on fuels of interest to ISRO

Sl. No.	Title of the Project
56.	Online Trajectory optimization for optimal and Robust Guidance of Launch vehicles
57.	Performance evaluation of pulse tube cryocooler through dynamic pressure-mass flow measurements
58.	Model-Independent prognostics method for automated contingency management of spacecraft subsystems
59.	Design and building of a batch reactor for screening catalytic decomposition of various monopropellants
60.	Infrared transparent chalcogenide glasses: Materials to see beyond visible
61.	Palladium functionalized one-dimensional (1D) carbon nanotubes and silicon nanowires for hydrogen gas sensing
62.	Measurements of deformation fields through image analysis for complex constitutive materials
63.	Studies on tuning of the Kalman filter statistics and the gains
64.	Development, fabrication and characterization of low cost MEMS based digitally compensated pressure sensor
65.	Validation of discrete, linear state-space systems
66.	Feasibility study fabrication/design plan for energy scavenging using polymer piezoelectric on a stretchable membrane
67.	Probabilistic behaviour of modal properties of an airframe
68.	Effect of cryotreatment on the mechanical properties of metals
69.	Experimental investigation of high enthalpy test gas with inorganic nanomaterials in a shock tube
70.	Enhancing surface plasmon resonance sensitivity using metamaterials
71.	Thermoelectric characterisation of PbTe-SB & PbSe-Sb multilayer thin films
72.	Where is the grass green? Quantifying historical declines and mapping existing grasslands in India
73.	Optical investigation of nano-structured 3D plasmonic crystals
74.	A Setup for the study of resistance fluctuations in magnetic tunnel junctions
75.	Defluoridation of drinking water using activated alumina as an adsorbent
76.	Effect of geometrical and flow parameters on drop size distributions for sprays from gas-centered swirl coaxial atomizers

Sl. No.	Title of the Project
77.	Acceleration responses at different body segments and selected body orientations to spacecraft takeoff and impact landing
78.	Physics of machining advanced composites
79.	Nanoscale chemoresistive gas sensor
80.	High Temperature Superconductor Based Liquid Level Probe For LOX System
81.	DHM Based Precision Assembly Simulation of MMIC Packages
82.	Dynamics of sharks and migratory cycle in west coast of India
83.	The Advection-Condensation Model and Water Vapour in the Atmosphere
84.	Paleo-geographic reconstruction: Development of a new GIS based methodology
85.	Utilizing ionic liquid electrolytes to synthesize polymer electrolytes for lithium-ion Batteries
86.	Robust and efficient signal processing techniques for multicomponent FM signal parameter estimation
87.	Source of Black carbon of particulate fraction in Himalayan Snow using stable isotope analyses
88.	Organic and Metal-Organic Hybrid Assemblies For Sensing
89.	Understanding Aeroacoustic Scattering of Supersonic Shrouded Jets
90.	Classical and quantum low density parity check codes, construction and performance bounds
91.	Amorphous silicon carbide thin films by pulsed DC magnetron sputtering for micro electro mechanical systems applications
92.	Seismic vulnerability assessment using high resolution remote sensing data for disaster management.
93.	Synthesis and electro-optical studies of core/shell semiconductor nanocrystals for energy applications
94.	Urban revolution urbanisation pattern and environmental sustainability analysis of major cities
95.	Estimation of soil hydraulic properties in a catchment using agro hydrological models and microwave remote sensing
96.	Major, trace element and chromium isotopic study of the lunar impact crater India

Sl. No.	Title of the Project
97.	Processing of novel metallic thermal interface materials using liquid phase sintering followed by accumulative roll bonding
98.	Self healing circuits implementing open fault repair in circuits using micro-particle automations
99.	Development of a versatile optofluidic microscope for initiating Indian space research programs in biomedicine and telepathology
100.	Development and characterization of composite coatings based on nanoporous aluminium alloy surfaces
101.	Study of tribological properties of polytetrafluoro-ethylene at cryogenic temperatures
102.	Novel techniques to map and monitor forest degradation in the Nilgiri Biosphere Reserve
103.	Investigation of spatial and temporal dynamics of vegetation in semi arid ecosystems
104.	Development, realization and characterization of nanoparticle based radiation detectors for space applications
105.	Laboratory Low Temperature Astrochemistry
106.	Studies of integration of GPS and INS for varying coupling architectures using stochastic filters
107.	Preparation of carbon nitrides for space applications
108.	A Novel liquid droplet based bistable MEMS switch
109.	Sensor integrated wireless mote for compressed sensing and health monitoring
110.	Modeling primary atomization of liquid jets using the level set method
111.	Understanding the fine scale duration characteristics of tropical rainfall
112.	Development and performance evaluation of PCM coupled heat pipe
113.	Unified correlations for bubble dynamics and bubble visualization within the evaporator of loop heat pipe and performance studies of LHP
114.	Hybrid Isolator for Reaction/Momentum Wheel
115.	Combustion studies of composite propellants containing nano burn rate catalysts
116.	Development of Eco-friendly High-performance Piezoceramic actuator materials

Sl. No.	Title of the Project
117.	Development of Low cost colloidal HgCdTe Quantum Dot photodetectors and their utility in the monolithic infrared focal plane arrays
118.	Synthesis, growth and studies of magnetocaloric materials
119.	A setup for the study of thermal properties of nanoscale devices of ultrathin layered materials
120.	Numerical simulations of vapor growth in the evaporator of a capillary pumped loop
121.	Generation of BPSK/QPSK modulated microwave signals using optical techniques
122.	Movement strategies for commensalism: coexistence of meso-carnivores in human-dominated landscapes
123.	Investigating the origin of the Indian Ocean Geoid low
124.	Development of whole-Earth models for understanding core-mantle interaction
125.	Investigation of vegetation changes in the arid Trans-Himalayan ecosystem of northern India
126.	Towards Ultrafast Investigation of Laser Initiated Decomposition Mechanisms, Kinetics and Dynamics of Metalized Energetic Materials
127.	Local and global extinction of shear stablized turbulent premixed and partially premixed flames in high speed flows
128.	Theoretical and computational study of frictional effects in viscoelastic and generalized elastic contacts
129.	3-D Die Level Packaging for hybrid systems
130.	Developing wafer scale plasmonic devices to improve near and mid-IR detection in harsh environments
131.	High resolution image restoration and enhancement using GPU
132.	Conjugated Polymer Nanocomposites for Organic Solar Cells
133.	Development of optimization based image processing software system for Indian forest resource assessment using Radar Satellite (RISAT) images
134.	Effect of impurities and alloying on the growth of intermetallics, Kirkendall pores and diffusion mechanisam in Cu-Sn system to flip-chip bonding
135.	Engineering length and rigidity of M13 filamentous bacteriophages.

Sl. No.	Title of the Project
136.	Electrical and optical studies of vertically stacked hetero-structures made of atomically thick two-dimensional materials.
137.	A platform for supporting capture, structure and reuse of design knowledge applied to the domain of spacecraft mechanisms.
138.	Generic re-entry configuration with double aero-spikes at the nose.
139.	Geochemical and isotopic study of Jarosite and its implications for aqueous alteration in planetary surface environments.
140.	Micromechanical analysis for damage modeling of unidirectional composite laminae.
141.	Modeling of evapotranspiration from remote sensing
142.	Quantification of cure residual stresses in polymer composites
143.	Fine-scale structure of outgoing longwave radiation with an emphasis on the northward propagating Boreal Summer ISO
144.	Contact induced deformation of anodized aluminium alloy surfaces
145.	Development of high emissivity coating for thermal protection systems and study of their interaction with shock heated test gases
146.	Development of magnetorheological (MR) fluid for application of PSLV/GSLV
147.	New synthesis route to prepare infrared transmitting bulk chalcogenide glasses and glass-ceramics
148.	Development of new high temperature, high strength and high heat flux copper based materials for space application

IIT Bombay

Sl. No.	Title of the Project
1.	Analysis of Hyperspectral Remote Sensing Images and Application to Agriculture
2.	Development of Novel magnetic Nanocomposite films for a Magneto-Optical Sensor- Phase –I
3.	Identification of Chaos in slosh and sliding remote control of slosh using 2 DOF slosh rig
4.	Generation of 3D Microscopic Hydro-phobic Geometries on Metallic Surfaces using Excimer (UV) Lasers
5.	Assessment of Turbulence Models in Hypersonic Reacting Three-Dimensional Flow Around Re-entry Flight Vehicles
6.	Investigation of Rarefied Gas Flow Through Closed Ducts as Applied to Outer Space Vehicles and Micro channels
7.	Development of Kerosene based nano-fluid for enhancement of internal flow convective heat transfer
8.	Transonic buffeting of expendable and reusable launch vehicles
9.	Fast Sign-of-Laplacian-based Image Matching
10.	Compact Ku-Band On Chip VCO for satellite Communication
11.	IITB Student Satellite project (ISSP)
12.	Hybrid Control and Fault Detection during Re-entry of reusable Launch Vehicles
13.	Singularity Avoidance Algorithms in Variable Speed CMGs
14.	Development of High Resolution Schemes for Flow Computations on Space Vehicle Configurations using Unstructured Grids
15.	Study of shock-turbulent boundary layer interaction in high-speed air intake - Phase II
16.	Estimation of viscous drag on a scramjet engine in a shock tunnel through wall-heating rate measurements
17.	Decentralized Control of Multi-satellite Formation Flying
18.	Rapid Development and Manufacturing of Machined Aerospace Components

Sl. No.	Title of the Project
19.	Assessing Impacts of Global and Local Changes on River Basin Scale Hydrology
20.	Estimation of Sea Surface Nitrate-nitrogen from SST and chlorophyll-a- in using OCM and Thermal Sensors : an investigation of new production around Mumbai coast
21.	Near Real-Time Detection and Assessment of Disbonds in Honeycomb Composite Sandwich Structures using Ultrasonic Guided Waves
22.	Development of a Direct Simulation Monte Carlo Code for High Speed High Knudsen Number Flows
23.	Development of Magnetic Nanocomposite Films and A Prototype Magneto-Optical Sensor
24.	On chip Ku/K band quadrature oscillator and PLL
25.	Microwave Remote Sensing and SAR Tutor with Virtual Laboratory
26.	A 14GHz Phase Locked Loop and Millimetre-Wave Circuits in Standard 90nm CMOS Technology
27.	Investigation of novel multi-functional materials from the full Haussler family
28.	Development of a six-component accelerometer balance for use in shock tunnels
29.	Application of imaging spectroscopy and thermal remote sensing techniques in delineating palaeo-channel related calcretes; an investigation in parts of Rajasthan and Gujarat for carnotite exploration”
30.	Effect of Terrain Relief and Vegetation Cover on Interferometric SAR Derived Digital Elevation Models
31.	Controllability Issues in Satellites
32.	Ignition delay studies of fuels using a shock tube
33.	Synthesis and Combustion of Methylcubane
34.	Design and fabrication of 3D Micro-textured Hydrophobic Geometries on Metallic Surfaces – part II
35.	Numerical and experimental investigation in slosh phenomenon under microgravity
36.	Electromagnetically coupled dual polarized high isolation broadband planar antenna array for satellite communication
37.	High strain rate deformation of aerospace Al alloys experimental studies and development of constitutive relationships

SI. No.	Title of the Project
38.	Development of SIFT based stereo triplet matching techniques for images from TMC on Chandrayan-1 for generating denser point cloud for 3D surface generation
39.	Materials for thermoelectric power generation in space
40.	High Gain Agile Antennas and Feed Arrays for Multibeam Antennas
41.	Signal processing for Performance Improvement of Multi-object Tracking Radar
42.	Calibration of Polarimetric SAR systems and Software Development
43.	Spacecraft Orientation Maneuvers Under Control and State Constraints
44.	Micro structural origin of Residual Stresses in AA7075
45.	Design and Development of Low Cost Green Anechoic Chamber

IIT Kanpur

Sl. No.	Title of the Project
1.	Identification and control of combustion instability in bluff body stabilized diffusion flames
2.	Study of spray combustion in a swirl stabilized dump combustor
3.	Measurement of 3-D unsteady velocity field of impinging transient supersonic jets using time resolved PIV to identify noise producing large structures and developing a strategy to control those using micro-jets and water injection
4.	Development of DR based 3D CT system
5.	Development of high strength ultrafine in-situ composites for aerospace applications
6.	Corrosion protection of Mg-Li alloys
7.	Fabrication of micro channel (<500 Microns) on aerospace materials
8.	Development of Zirconium di-boride and hafnium di-boride based Ultra High temperature composites (UHTC) for Applications in space vehicles
9.	Measurement of 3-D unsteady velocity field of impinging transient supersonic jets using Time Resolved PIV to identify noise producing large structures and developing a strategy to control those using micro-jets and water injection
10.	Development of Ultrafine High Strength in situ composite for aerospace Applications
11.	Carbon-Carbon Composites for Structural Applications using Carbon Nanotube Coated Carbon Fiber and Synthetic Resin (Phenol-Formaldehyde)
12.	Characterization and Corrosion Protection of Mg-Li Alloys
13.	Development of High Speed Schlieren System to Visualize the Shock Structure During Start-Up of GSLV MK-III
14.	Toughened Ceramics:ZrO ₂ Stabilized With Nano Ceramics
15.	Development of Carbon Nanotube Coated Backing Structure/Bipolar Plate (Exfoliated Carbon Nanostructured Reinforced Phenolic Nanocomposites) for the PEM Fuel Cells: Performance Evaluation
16.	Starting flow characteristics of S200 solid motor in ground test conditions: near and far field acoustics and near field

Sl. No.	Title of the Project
	velocity measurements
17.	Developing biomedical technologies to counter the deleterious effects of microgravity on the rod and cone photo-receptor network of the retina
18.	Doped oxides as anodes for hydrogen generation via water electrolysis
19.	Satellite Formation Keeping Control
20.	Study of High Entropy Alloys for Enhanced Ductility: Preparation and Consolidation
21.	Total Variation and Compressive Sensing for L1 Regularization Based Image and Video Restoration
22.	Model based tomographic subsurface soil characterization
23.	CNT Reinforced Composites for Structural Applications
24.	Excimer laser micromachining for miniaturized hybrid microwave integrated circuits (MHMIC)
25.	Modeling of a electro-dynamic shaker for predicting its mechanical response due to electrical input variables
26.	Development of Brazing Alloys and Techniques for Ti-based Alloys
27.	High Rate Severe Plastic Deformation (HRSPD) by machining as a route to obtain micro structurally Engineered Nanograined Titanium
28.	Role of Particle Size of Ytria Stabilized Zirconia On the Wear Resistance of the PLASMA Sprayed Aluminum Oxide Coatings
29.	Numerical Characterization of strut-ramp injector for supersonic combustion using Large Eddy Simulation (LES)
30.	Development of a Multi-scale, Multi-physics Particle-based Flow Solver for Flow-field Prediction in Transitional Flow Regime
31.	Free Space Optical Communication with Acousto-Optic-Modulator based Transmitter
32.	Satellite stereo triplet image matching for digital elevation model generation
33.	Plasma Exposure Damage of Ultra High Temperature Ceramics
34.	Effect of Heat Treatment on the Mechanical Properties of Thermo mechanically Processed Russian grade 12X21H5T

SI. No.	Title of the Project
	Duplex-Steel
35.	Phase-II Expanded Proposal on Design of Active Flexible and Re-configurable Parabolic Antenna using SMA based Smart Actuators
36.	Experimental Studies on Kerosene Gel-propellant Spray loaded with nano-Aluminum Particle
37.	Si/Ge nanowire anodes and non-native nanostructured cathodes for advanced Li ion batteries
38.	Highly Stable Nanoparticles-Nafion Nanocomposite via Click Chemistry for Fuel Cell Applications.
39.	Microwave Metamaterial Absorbers
40.	Powder Metallurgical Processing Of Diamond-Based High Composites With Transition Metal Additives
41.	Novel strategies for source node localization in mobile AD-HOC sensor networks
42.	Powder Metallurgical Processing of Cu-Sn and Tungsten Heavy Alloys and their Composites
43.	Kinetics of Microstructure Evolution in Brazing Joints of 0.07C-16Cr-6Ni Steel and Silver Obtained with a Ag-Cu-Sn Filler Metal
44.	Development of Brazing Filler Alloys for Dissimilar Metal (Ti based Alloys with Steels) Brazing (ISRO Applications)
45.	Effect of crystallographic texture and microstructure on mechanical properties of light weight aluminum-lithium alloys
46.	Feasibility study on "Development of High Temperature and Ultra High Temperature Composites for TPS Applications"
47.	Ultrasensitive Thermal Spectrometer with Molecular Size and Mass Sensitivity
48.	Application of Meta-material Mushroom Structure for Realization of Planar Single / Triple Pass – band Filter for Significant Size Reduction
49.	HEMT modeling for broad temperature and frequency ranges
50.	Microwave Active Remote Sensing of Buried Objects
51.	Surface texturing to enhance adhesion interface between dissimilar materials using (ECMM)
52.	Physical Metallurgy of Mg-Li Alloys and Coatings

Sl. No.	Title of the Project
53.	Fabricating a flexible, portable, light weight charge storage device using Nano iron pyrite.
54.	Feasibility study of Photonic bandgap structures for space applications.

IIT Kharagpur

Sl. No.	Title of the Project
1.	Feasibility study of experimentation platforms in satellites
2.	Linking KCSTC to SAC, ISRO through EDUSAT
3.	Maritime location based service
4.	Ka band propagation experiments over Indian tropical region for improvement of Ka band satellite communication
5.	Studies on the construction and performance evaluation of multiplexed binary offset carrier spreading modulation for improved satellite radio navigation signal and system design
6.	Studies on fade mitigation control for microwave satellite signal propagation
7.	Handset normalization and reduction of noise and distortion for voice authentication
8.	Design and Development of Hydrostatic Journal Bearings for Cryogenic Rocket Engine Turbopump
9.	FPGA-based design and development of H-264 codec
10.	Development of Advanced Polymeric Materials for Improved Electrical /ESD properties Using Nano Additives for Space Application
11.	Feasibility Study of Microwave Imaging for Material Resource Exploitation in Planetary Missions
12.	Development of RF MEMS Capacitive Shunt Switch in Application as Phase Shifters for Satellite Communication Systems
13.	Study of CDMA codes for satellite navigation
14.	Analysis and Development of Conceptual Design Methodologies for Air Collection and Enrichment System of Air Breathing Propulsion- Phase II
15.	Development of a MEMS based Array for bio-medical diagnostics
16.	Nano-fluid Based Coolant and Combustion Fuel System
17.	Design of radiation hardened data converters

Sl. No.	Title of the Project
18.	Silicon Carbide as high temperature MEMS and MOSFET devices
19.	Error resilient Scheme for Satellite TV system
20.	Design, Simulation and Development of MM-Wave Six Port Receiver
21.	Design of Planar Compact High performance RF/Microwave Filters for Satellite Applications
22.	Design of an Integrated Code for Authentication and Error Correction
23.	Test Simulator for satellite based AIS
24.	Multiple Access array antenna system at S band using digital beam forming techniques
25.	Enhancement of Transport Layer performance for Inter Planetary Network
26.	Study on Improvement of adhesion of EPDM based nanocomposites in Solid Rocket Motor Thermal Insulation applications
27.	Interplanetary Satellite Orbit Determination using Ground based observations
28.	Synthesis of satellite footprint patterns from planar array antennas by combination of Particle Swarm Optimization and Fast Fourier transform
29.	Analysis of Different Conducting and Dielectric Structures as EMI Sensors
30.	Design & Development of High-Speed Miniaturized RF MEMS Switched Capacitor
31.	Reliability modeling, Analysis and Prediction of 21 NA (Absolute) Pressure Transducers
32.	Use of hyperspectral remote sensing imagery for mineral identification and mineral potential mapping
33.	Testing and Characterization of In-house developed MEMS capacitive accelerometer
34.	Design and Analysis of a Light Weight Cryptographic System on FPGAs
35.	Thermal - aware Task Scheduling for signal- Processor and Multi- Processor Embedded Systems
36.	Pre project-Energy Efficient Routing
37.	Analysis and Design of Wideband Compact Rectangular Patch Antenna Embedded on Cylindrical pin Structure

Sl. No.	Title of the Project
38.	Theoretical and Experiment Analysis of Evaporation in the Grooves of a Micro Heat Pipe
39.	Design and Development of Application tool for InSAR to Determine Ground Surface Movement
40.	Studies on Retro-Directive Array for Space Applications
41.	Model Based Error Concealments
42.	Studies on new modulation techniques for satellite navigation
43.	Design and implementation of scalable parameterized stream cipher well suited for both software and hardware
44.	GPU based multi-temporal implementation of image change detection algorithms and their verification
45.	Probabilistic estimation of soil moisture from RISAT1 data along with uncertainty quantification
46.	Design of fault tolerant VLSI systems for applications in satellite communication
47.	Secure key management in wireless AD HOC networks
48.	Development of compositionally modulated thermal barrier coating by hybrid technologies
49.	Development of shape memory polymer nanocomposites (SMPN) for space deployable material
50.	Hands free gesture control for immersive image navigation
51.	Study on different aspects of secured quantum communication
52.	Suitability of free space optical communication link for on board data handling (OBDH) in satellite
53.	Design and fabrication of closed loop MEMS Capacitive Accelerometer
54.	Real time detection of face/core debond initiation and interfacial delamination propagation morphology in sandwich composite panels using fiber optic bragg grating sensors
55.	Feasibility of Design and Development of L & S Band Dual Polarized shared/common Aperture Microstrip Antenna
56.	Microgravity Slosh Analysis
57.	Development of constitutive equations for CNT epoxy nanocomposites

IIT Madras

Sl. No.	Title of the Project
1.	Enhancement of atomization in effervescent atomizers using ultrasonics
2.	Numerical predictions of evaporation rate constants of kerosene droplets at elevated pressure and temperatures in high pressure semi-cryogenic rockets
3.	Study of composite laminates under biaxial stress field
4.	Measurement of elemental species for space exploration applications by using laser-induced breakdown spectroscopy technique
5.	Numerical computation studies on air breathing propulsion system
6.	Stress-state dependent ductile fracture model
7.	Processing of preceramic polymers in the quaternary Si-B-C-N system for ultra-high temperature applications beyond 2000°C
8.	Technology development of proportional solenoid valve for space applications
9.	Experimental studies on high speed air intakes
10.	Development of mixed refrigerant cascade refrigerators operating with non-flammable refrigerants for cooling space simulation chambers
11.	Friction stir spot welding of aluminum alloy 2014
12.	Experimental studies on non-linear effects of piezoelectric materials
13.	Detection of non-linearities in atmospheric weather data and statistical forecasting using multivariate techniques
14.	Buckling control of cylindrical/conical shells for aerospace applications using PZT actuators
15.	Estimation of anisotropic conductivity of plates using the inverse heat transfer method
16.	Detection and classification of algal blooms in Indian coastal waters using Ocean Colour Monitor (OCM) Data
17.	CFD prediction of vortex formation and suppression during the draining of liquid from toroidal tanks

Sl. No.	Title of the Project
18.	Phased array inspection of friction stir welded (FSW) components
19.	Near nozzle spray structure in semi-cryogenic sprays
20.	Large eddy simulation of multiple round jets
21.	Characterization of metallic materials for biaxial loading
22.	Non-precious metal catalyst for oxygen reduction reaction in Polymer Electrolyte Membrane Fuel Cells (PEMFC) with improved durability and activity
23.	Modeling, Analysis, Design and Implementation of 2KW Battery Discharge Regulator
24.	Synthesis and multi-scale property evaluation of multi-walled carbon nanotube reinforced aluminium composites having improved dispersion
25.	Computation of strain and curvature from digital image correlation data
26.	Development of an experimental facility for the estimation of anisotropic conductivity of plates using the inverse heat transfer method
27.	Rare-earth silicate environmental barrier coatings for SiC based high temperature materials
28.	Numerical simulation of suppression of residual flames and cooling of solid rocket motors using water injection
29.	Development of Bi-metallic joining technique and realization of Bi-metallic adaptors for launch vehicles
30.	Experimental studies on high speed air intakes with Moving Cowls
31.	Development of Electro spray Based MEMS Microthruster
32.	The high energy Particle detector Project
33.	Synthesis and Thermo-mechanical processing effects on the Microstructure and Mechanical properties of Ti-Al-Ni-Cr-Co-Fe based multi component/High entropy alloys
34.	Development of atmospheric correction algorithm for Ocean Color Monitor (OCM2) Sensor for optically Complex Oceanic Waters
35.	Development of a laser assisted scribing technique to generate gridded strips of a parabolic antenna

Sl. No.	Title of the Project
36.	Wide-band Frequency Selective Surfaces(FSS) for quasi optical network
37.	Processing and characterization of advanced metallic thermal protection materials for reusable launch vehicle applications
38.	Hybrid rockets for sounding rocket applications using hydrogen peroxide as oxidizer
39.	Numerical Modelling of Arcjet
40.	Optimization of hot workability and control of microstructure in Ni – base superalloys used in rocket engine applications
41.	Contact stress parameter evaluation using digital photoelasticity

**Savitribai Phule Pune University
(Formerly University of Pune)**

Sl. No.	Title of the Project
1.	Gas Sensing applications of Metallophthalocyanines
2.	Synthesis of undoped and Cd, Al, In, B doped nanostructures of ZnO by intermittent chemical spray pyrolysis for optoelectronic and gas sensing applications
3.	Application of GIS-RS in Mapping and Conservation of Threatened Medicinal Plant Species from Northern Western Ghats of India
4.	Studies on preparation and photo catalytic applications of Nanocrystalline TiO ₂ and its nanocomposites
5.	Development and characterization of thin film solid electrolyte cells as voltage source, temperature, pressure and gas sensor
6.	Visual & Photographic observations of meteor showers
7.	Design, Development and Realization of Gasifier Cookstoves
8.	Developing an environmental magnetic model for assessment of the anthropogenic particulate loading in the urban environments: A case study from the Pune Metropolitan regions Maharashtra.
9.	Application of remotely sensed data for the evaluation of impervious surface growth and its effect on surface runoff in two rapidly urbanizing watersheds of Western Maharashtra, India.
10.	Modelling spatial patterns in fresh water reservoirs with special reference to plankton, molluscs and fishes using Physico-Chemical characteristics of water and remote sensing techniques (Panshet and Varasgaon reservoirs, district Pune)
11.	Deposition of layered transition metal chalcogenides thin films by SILAR method for their tribological applications.
12.	Synthesis and Applications of composites of TiO ₂ with Carbon Nanotubes and Metal Chalcogenides
13.	Chemical Deposition of CuInSe ₂ , CdS and ZnO thin films for Solar Cell Applications.
14.	Use of Geographical Information System to study tuberculosis epidemiology and the factors affecting case detection in a rural population in Pune district, Maharashtra

Sl. No.	Title of the Project
15.	A comparative study of telecommunication technology: Its impact and relevance on Urban, Rural and Tribal community of Maharashtra.
16.	Study of Biodiversity of some invertebrate of Sawanga (Vithoba) Lake Region, Dist Amravati, Maharashtra.
17.	Impact of low and high radiation doses on the nutritional quality, functional properties and shelf life of various foods.
18.	Study of the direct radiative forcing of atmospheric aerosols over different environments.
19.	Study of Si quantum dots for solar cell applications
20.	Studies on structural, optical and electrical properties of transparent conducting thin film (TCO).
21.	Novel electrochemical approach to prepare CuInGaSe ₂ based solar cells using non-aqueous bath.
22.	Design and development of an odor tracking system.
23.	Study of interferometric data and its applications for subsidence monitoring.
24.	Identification of critical areas of conservation concern using RS-GIS technique from northern Western Ghats of India.
25.	Development of high performance Polycarbonate/Graphite nanocomposites with low percolation for EMI shielding application.
26.	Synthesis and characterization of Copper Chromite for propellant.
27.	Preparation of Barium Magnesium Tantalate (BMT) and Barium Zinc Tantalate (BZT) with and without dopants for microwave dielectric application.
28.	Biodegradation of Ammonium Perchlorate by phytoremediation approaches.
29.	Enhancing rural development through improved communication: case study western India
30.	Measurement of plasma temperature and identification of species during re-entry of Space Shuttle, using plasma emission spectroscopy
31.	Splitting of carbon dioxide into oxygen and carbon moiety using biomimetics of biological catalysts involved in photosynthesis
32.	Preparation of CO ₃ O ₄ films by using electrochemical and spray pyrolysis deposition methods for gas sensing applications

Sl. No.	Title of the Project
33.	Development of transition metal oxide nanoparticle films for solar radiation protection and solar cells.
34.	Real time human detection using covariance matrix as human descriptor
35.	Sensor-less XY planar flexural scanning mechanism for precision application
36.	Metallic surface plasmon phenomenon as a biosensor for the identification of biomolecules
37.	Hazardous Nitrous Oxide gas leakage detection and monitoring system using wireless sensor network
38.	Impact of Flood Hazards on settlement of Pune Region
39.	Digital elevation model (DEM) fusion
40.	Development of conducting polyaniline-ZnO nano particle composite paint coating for corrosion protection
41.	Naphthoquinone containing metal polypyridyl complexes for solar cells: Computational and experimental Study
42.	Halophilic bacterial diversity of marine ecosystems from west coast of India
43.	Development of microwave excess noise generator heads using gas discharge of reactive & non-reactive gases
44.	Development of graphite fiber reinforced aluminium (7075) in the rolled sheet form
45.	Studies on nano porous metal oxides via anodization and their applications in super capacitors
46.	Multifunctional conducting polymer transition metal composite nanostructures based sensor device for detection of NO ₂ , H ₂ S and NH ₃
47.	Feasibility study on indigenous development of electrochemical based gas sensors and transmitter
48.	Development of F.C. observatory - an autonomous robotic telescope
49.	Study of Precipitation characteristics using disdrometer and satellite datasets over Pune
50.	Optimization of low voltage DC micro-grid with intelligent solar PV utilization for a computer laboratory
51.	Processing of natural biopolymers –wild and domestic silk varieties of northern Western Ghats: Fabrication of biopolymer film based technological substrate for advanced optical structures
52.	Interaction of plasma with Thermal Protecting System (TPS) material during re-entry of space vehicles

Sl. No.	Title of the Project
53.	Stabilization of Zirconia in tetragonal and cubic structure using various dopants for electronic applications
54.	Remote sensing applications in coastal geomorphology, changes in morphology in parts of west coast of Maharashtra, India
55.	Occurrence and distribution of fluoride in groundwater of terekhol river basin, Sindhudurg district, Maharashtra: A remote sensing and GIS based study
56.	Development of Aerogel based high performance TPS for Launch Vehicles
57.	Space Radiation from the Optically Transparent Planer Microstrip Antenna Integrated with the Solar Panels of Small Satellites
58.	Design feasibility of PLL frequency synthesizer for Ku band