

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

IISc

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
17	Development of a fluid structure interaction strategy for incompressible fluids
18	Prediction of micro vibrations in a space craft

Sl. No.	Title of the Project
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 MEMS based static pressure sensors for hypersonic shock tunnels
28	Pulsation characteristics of sprays discharging from gas-centered coaxial atomizers
29	Development and characterization of catalyst for Hydroxyl Ammonium Nitrate (HAN) monopropellant
30	Wireless Structural Health Monitoring of Impact Damage and Vibration in Spacecraft Structures
31	Multi-temporal Time Series Analysis of Satellite Image
32	Study of Jet Impingement Aeroacoustics Using Acoustic Holography
33	Microfabrication and packaging of high-resolution accelerometers
34	Large deformation analysis of fiber-reinforced elastomers
35	Development of efficient high-resolution multi-domain combined compact schemes for simulation of fluid flows
36	Studies on the development of sol gel based protective coatings on thermal control surfaces of spacecrafts
37	Inverter Output Filter for AC motor Devices
38	Low Voltage actuated digital microfluid chips using nanostructured SiO ₂ films
39	Thermo-acoustic pulse tube refrigerators operating down to 100K

Sl. No.	Title of the Project
40	Using satellite telemetry to track a migratory marine turtle
41	Assimilation of remote sensing data for modeling the land surface fluxes at watershed scale using a distributed hydrological model
42	Novel and Parallelized Computational Schemes for Wrinkled Membranes and Unfurling Inflatable Structure
43	Generation of modulated microwave signals using integrated optical techniques
44	Hydrated mineral evolution on earth and other planetary objects: An insitu crystallographic approach combined with spectroscopic studies
45	Organic Materials for Solar Cells
46	Ab Initio Analytical Study of the Effect of Strain on Silicon Nanoelectronics
47	Boron based highly luminous and low voltage Display Materials
48	Understanding the effect of an elevated stressor hormone associated with space mission on neural function using live neuronal cultures
49	Probabilistic seismic hazard evaluation of Karnataka state considering local site effects and revisit of source characterization based on remote sensing data
50	Numerical Simulations of vapor Growth in the Evaporator of a capillary pumped loop
51	Multifunctional Carbon Nanotubes (CNTS) material for optical mirror Applications in space
52	Experimental analysis of Bubble Dynamics and Temperature Field in a Dual Compensation Chamber Loop Heat Pipe
53	A Compact Atomic Force Microscope for operation in space
54	Pyrolysis & ignition delay studies on fuels of interest to ISRO
55	Online Trajectory optimization for optimal and Robust Guidance of Launch vehicles
56	Performance evaluation of pulse tube cryocooler through dynamic pressure-mass flow measurements
57	Model-Independent prognostics method for automated contingency management of spacecraft subsystems
58	Design and building of a batch reactor for screening catalytic decomposition of various monopropellants
59	Infrared transparent chalcogenide glasses:Materials to see beyond visible

Sl. No.	Title of the Project
60	Palladium functionalized one-dimensional (1D) carbon nanotubes and silicon nanowires for hydrogen gas sensing
61	Measurements of deformation fields through image analysis for complex constitutive materials
62	Studies on tuning of the Kalman filter statistics and the gains
63	Development, fabrication and characterization of low cost MEMS based digitally compensated pressure sensor
64	Validation of discrete, linear state-space systems
65	Feasibility study fabrication/design plan for energy scavenging using polymer piezoelectric on a stretchable membrane
66	Probabilistic behaviour of modal properties of an airframe
67	Effect of cryotreatment on the mechanical properties of metals
68	Experimental investigation of high enthalpy test gas with inorganic nanomaterials in a shock tube
69	Enhancing surface plasmon resonance sensitivity using metamaterials
70	Thermoelectric characterisation of PbTe-SB & PbSe-Sb multilayer thin films
71	Where is the grass green? Quantifying historical declines and mapping existing grasslands in India
72	Optical investigation of nano-structured 3D plasmonic crystals
73	A Setup for the study of resistance fluctuations in magnetic tunnel junctions
74	Defluoridation of drinking water using activated alumina as an adsorbent
75	Effect of geometrical and flow parameters on drop size distributions for sprays from gas-centered swirl coaxial atomizers
76	Acceleration responses at different body segments and selected body orientations to spacecraft takeoff and impact landing
77	Physics of machining advanced composites
78	Nanoscale chemoresistive gas sensor
79	High Temperature Superconductor Based Liquid Level Probe For LOX System

Sl. No.	Title of the Project
80	DHM Based Precision Assembly Simulation of MMIC Packages
81	Dynamics of sharks and migratory cycle in west coast of India
82	The Advection-Condensation Model and Water Vapour in the Atmosphere
83	Paleo-geographic reconstruction: Development of a new GIS based methodology
84	Utilizing ionic liquid electrolytes to synthesize polymer electrolytes for lithium-ion Batteries
85	Robust and efficient signal processing techniques for multicomponent FM signal parameter estimation
86	Source of Black carbon of particulate fraction in Himalayan Snow using stable isotope analyses
87	Organic and Metal-Organic Hybrid Assemblies For Sensing
88	Understanding Aeroacoustic Scattering of Supersonic Shrouded Jets
89	Classical and quantum low density parity check codes, construction and performance bounds
90	Amorphous silicon carbide thin films by pulsed DC magnetron sputtering for micro electro mechanical systems applications
91	Seismic vulnerability assessment using high resolution remote sensing data for disaster management.
92	Synthesis and electro-optical studies of core/shell semiconductor nanocrystals for energy applications
93	Urban revolution urbanisation pattern and environmental sustainability analysis of major cities
94	Estimation of soil hydraulic properties in a catchment using agro hydrological models and microwave remote sensing
95	Major, trace element and chromium isotopic study of the lunar impact crater India
96	Processing of novel metallic thermal interface materials using liquid phase sintering followed by accumulative roll bonding
97	Self heating circuits implementing open fault repair in circuits using micro-particle automations
98	Development of a versatile optofluidic microscope for initiating Indian space research programs in biomedicine and telepathology
99	Development and characterization of composite coatings based on nanoporous aluminium alloy surfaces

Sl. No.	Title of the Project
100	Study of tribological properties of polytetrafluoro-ethylene at cryogenic temperatures
101	Novel techniques to map and monitor forest degradation in the nilgiri biosphere reserve
102	Investigation of spatial and temporal dynamics of vegetation in semi arid ecosystems
103	Development, realization and characterization of nanoparticle based radiation detectors for space applications
104	Laboratory Low Temperature Astrochemistry
105	Studies of integration of GPS and INS for varying coupling architectures using stochastic filters
106	Preparation of carbon nitrides for space applications
107	A Novel liquid droplet based bistable MEMS switch
108	Sensor integrated wireless mote for compressed sensing and health monitoring
109	Modeling primary atomization of liquid jets using the level set method
110	Understanding the fine scale duration characteristics of tropical rainfall
111	Development and performance evaluation of PCM coupled heat pipe
112	Unified correlations for bubble dynamics and bubble visualization within the evaporator of loop heat pipe and performance studies of LHP
113	Hybrid Isolator for Reaction/Momentum Wheel
114	Combustion studies of composite propellants containing nano burn rate catalysts
115	Development of Eco-friendly High-performance Piezoceramic actuator materials
116	Development of Low cost colloidal HgCdTe Quantum Dot photodetectors and their utility in the monolithic infrared focal plane arrays
117	Synthesis, growth and studies of magnetocaloric materials
118	A setup for the study of thermal properties of nanoscale devices of ultrathin layered materials
119	Numerical simulations of vapor growth in the evaporator of a capillary pumped loop
120	Generation of BPSK/QPSK modulated microwave signals using optical techniques

Sl. No.	Title of the Project
121	Movement strategies for commensalism: coexistence of meso-carnivores in human-dominated landscapes
122	Investigating the origin of the Indian Ocean Geoid low
123	Development of whole-Earth models for understanding core-mantle interaction
124	Investigation of vegetation changes in the arid Trans-Himalayan ecosystem of northern India
125	Towards Ultrafast Investigation of Laser Initiated Decomposition Mechanisms, Kinetics and Dynamics of Metalized Energetic Materials
126	Local and global extinction of shear stablized turbulent premixed and partially premixed flames in high speed flows
127	Theoretical and computational study of frictional effects in viscoelastic and generalized elastic contacts
128	3-D Die Level Packaging for hybrid systems
129	Developing wafer scale plasmonic devices to improve near and mid-IR detection in harsh environments
130	High resolution image restoration and enhancement using GPU
131	Conjugated Polymer Nanocomposites for Organic Solar Cells
132	Engineering length and rigidity of M13 filamentous bacteriophages.
133	Electrical and optical studies of vertically stacked hetero-structures made of atomically thick two-dimensional materials.
134	A platform for supporting capture, structure and reuse of design knowledge applied to the domain of spacecraft mechanisms.
135	Generic re-entry configuration with double aero-spikes at the nose.
136	Geochemical and isotopic study of Jarosite and its implications for aqueous alteration in planetary surface environments.
137	Sustainable synthesis of Li-Fe-P-O quaternary cathodes for Li-ion batteries with tailored morphololy (SuperLion)
138	Micromechanical analysis for damage modeling of unidirectional composite laminae.
139	Performance evaluation of MEMS based space qualified pressure transducers under extreme environment for inter-planetary mission.

Sl. No.	Title of the Project
140	Modeling of evapotranspiration from remote sensing
141	Quantification of cure residual stresses in polymer composites
142	Fine-scale structure of outgoing longwave radiation with an emphasis on the northward propagating Boreal Summer ISO
143	Contact induced deformation of anodized aluminium alloy surfaces
144	Development of high emissivity coating for thermal protection systems and study of their interaction with shock heated test gases
145	Development of magnetorheological (MR) fluid for application of PSLV/GSLV
146	New synthesis route to prepare infrared transmitting bulk chalcogenide glasses and glass-ceramics
147	Development of new high temperature, high strength and high heat flux copper based materials for space application
148	Integrated guidance and control of a lunar module for optimal soft-landing
149	Solution processability of transition metal dichalcogenides and related applications
150	Development of a 3-D Riesz Scanner
151	Development of Low Power Consuming Synthesis Strategy for High-performance Ecofriendly Piezoceramic Sensor/Actuator
152	Physics of compact objects and underlying Supernovae
153	Synthesis of Nanoparticles Decorated Carbon Nanotubes for Thermal Control Coating Applications
154	Fabrication of novel dielectric and ferroelectric ceramic polymer composite fabrics for space applications
155	Sn-whiskering: Mechanism and Suppression
156	Inferring ecological feedbacks from spatial patterns and remote sensing data
157	Novel polymer sheathed ammonia borane based hydrogen storage systems
158	Design and development of environmentally benign strategies for selective decomposition of hydrazine and its derivatives to hydrogen gas and/or safer products
159	a-SiC/cSi heterojunction photo detectors with low noise for space applications

Sl. No.	Title of the Project
160	Investigation of thermoelectric and mechanical properties of La ₃ Te ₄ system
161	Exploiting strong thermoelectric effect in 2D transition metal dichalcogenides for IR sensing applications
162	Mechanical Design and Microfabrication of Electro-thermally Actuated Compliant Bistable RF MEMS Switches
163	Sensor nodes with integrated electronics on flexible substrates for wireless sensor networks
164	An optical system for characterization of multiaxis dynamics of MEMS devices
165	Aeroacoustic sound sources in Mach 1.3 merging twin jets
166	Evaporation from Novel Porous Wick Structures including leaf like ones

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

Sl. No.	Title of the Project
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
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

Sl. No.	Title of the Project
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
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	Novel route towards fabrication of Borides-carbon Nanotube (CNT) Bulk Composites with Higher Volume Fraction of Uniformly Distributed/dispersed CNTs
43	Development of Invisible Watermarks For Vector GIS Data Layers
44	Heat flux prediction in shock - boundary layer interaction and multi-jet interaction with reversed flow
45	Evaluation and mapping of flooding along Paradip coast due to storms and tides using Numerical modelling and Geo-Spatial Techniques
46	Calibration of Polarimetric SAR systems and Software Development
47	Transfer Learning Driven Rapid Change Detection for Disaster Management
48	A Comprehensive Mapping of Flood Risk in Changing Climate : An Application to Jagatsinghpur District, Orissa
49	Spacecraft Orientation Maneuvers Under Control and State Constraints
50	Micro structural origin of Residual Stresses in AA7075

Sl. No.	Title of the Project
51	Micromechanics of textile composites
52	Numerical Simulation of Arc Plasma in Arc-Heated Wind Tunnel
53	Investigation of the effect of surface roughness on the heat transfer rates of a typical reentry capsule.
54	Novel Absorber Materials for Multi-junction Solar PV Application using Non-toxic and Earth Abundant Element
55	A self-consistent predictive quantum transport simulator for quantum dot IR photo detectors
56	Fractional NPLL and ADC for IRNSS User Receiver
57	Design and Development of Low Cost Green Anechoic Chamber
58	Development of Mild and Efficiency Nitration Reactions: Synthesis of High Energy Materials Relevant to Rocket Propellants
59	Development of Ohmic Contact and Schottky Contact on Gallium Nitride (GaN) HEMT
60	Visible-NIR Electromagnetic Wave Concentration using Metallic Aperture for Photodetectors
61	Optimization of Hot Workability and Control of Microstructure in Cu-Cr-Ti-Zr Alloy: An approach through Thermo-Mechanical Simulation
62	Development of a 3D transient, non-isothermal, multiphase model of a PEM Fuel Cell
63	Simulation, design and development of a solid state hydrogen storage system

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

Sl. No.	Title of the Project
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	Development of DR based 3D CT System
12	Study of Spray Combustion in a Swirl Stabilized Dump Combustor
13	Identification and Control of Combustion Instability in Bluff Body Stabilized Diffusion Flames
14	Carbon-Carbon Composites for Structural Applications using Carbon Nanotube Coated Carbon Fiber and Synthetic Resin (Phenol-Formaldehyde)
15	Characterization and Corrosion Protection of Mg-Li Alloys
16	Development of High Speed Schlieren System to Visualize the Shock Structure During Start-Up of GSLV MK-III
17	Toughened Ceramics:ZrO ₂ Stabilized With Nano Ceramics
18	Fabrication of Micro Channel (< 500 Microns) on Aerospace Application
19	Development of Carbon Nanotube Coated Backing Structure/Bipolar Plate (Exfoliated Carbon Nanostructured Reinforced Phenolic Nanocomposites) for the PEM Fuel Cells: Performance Evaluation
20	Starting flow characteristics of S200 solid motor in ground test conditions: near and far field acoustics and near field velocity measurements
21	Developing biomedical technologies to counter the deleterious effects of microgravity on the rod and cone photo-receptor network of the retina
22	Doped oxides as anodes for hydrogen generation via water electrolysis
23	Satellite Formation Keeping Control

Sl. No.	Title of the Project
24	Study of High Entropy Alloys for Enhanced Ductility: Preparation and Consolidation
25	Total Variation and Compressive Sensing for L1 Regularization Based Image and Video Restoration
26	Model based tomographic subsurface soil characterization
27	CNT Reinforced Composites for Structural Applications
28	Excimer laser micromachining for miniaturized hybrid microwave integrated circuits (MHMIC)
29	Modeling of a electro-dynamic shaker for predicting its mechanical response due to electrical input variables
30	Development of Brazing Alloys and Techniques for Ti-based Alloys
31	High Rate Severe Plastic Deformation (HRSPD) by machining as a route to obtain micro structurally Engineered Nanograined Titanium
32	Role of Particle Size of Ytria Stabilized Zirconia On the Wear Resistance of the PLASMA Sprayed Aluminum Oxide Coatings
33	Numerical Characterization of strut-ramp injector for supersonic combustion using Large Eddy Simulation (LES)
34	Development of a Multi-scale, Multi-physics Particle-based Flow Solver for Flow-field Prediction in Transitional Flow Regime
35	Free Space Optical Communication with Acousto-Optic-Modulator based Transmitter
36	Satellite stereo triplet image matching for digital elevation model generation
37	Plasma Exposure Damage of Ultra High Temperature Ceramics
38	Effect of Heat Treatment on the Mechanical Properties of Thermo mechanically Processed Russian grade 12X21H5T Duplex-Steel
39	Phase-II Expanded Proposal on Design of Active Flexible and Re-configurable Parabolic Antenna using SMA based Smart Actuators
40	Experimental Studies on Kerosene Gel-propellant Spray loaded with nano-Aluminum Particle
41	Si/Ge nanowire anodes and non-native nanostructured cathodes for advanced Li ion batteries
42	Highly Stable Nanoparticles-Nafion Nanocomposite via Click Chemistry for Fuel Cell Applications.
43	Microwave Metamaterial Absorbers

Sl. No.	Title of the Project
44	Powder Metallurgical Processing Of Diamond-Based High Composites With Transition Metal Additives
45	Novel strategies for source node localization in mobile AD-HOC sensor networks
46	Accelerated computational algorithms for accurate simulations of acoustic and electromagnetic scattering from open surfaces
47	Powder Metallurgical Processing of Cu-Sn and Tungsten Heavy Alloys and their Composites
48	Kinetics of Microstructure Evolution in Brazing Joints of 0.07C-16Cr-6Ni Steel and Silver Obtained with a Ag-Cu-Sn Filler Metal
49	Development of Brazing Filler Alloys for Dissimilar Metal (Ti based Alloys with Steels) Brazing (ISRO Applications)
50	Effect of crystallographic texture and microstructure on mechanical properties of light weight aluminum-lithium alloys
51	Design of a Smart Inflated Torus and Antenna Membrane
52	Feasibility study on "Development of High Temperature and Ultra High Temperature Composites for TPS Applications"
53	Comprehensive Two & Three Dimensional Modeling of Water Permeation across Proton Exchange Membrane in Fuel Cell integrated with Electro- Osmotic Pump.
54	Ultrasensitive Thermal Spectrometer with Molecular Size and Mass Sensitivity
55	Stress Concentration Factors (SCFs) in Curved Plates for Space Applications
56	Application of Meta-material Mushroom Structure for Realization of Planar Single / Triple Pass – band Filter for Significant Size Reduction
57	HEMT modeling for broad temperature and frequency ranges
58	Microwave Active Remote Sensing of Buried Objects
59	Development of Novel Plasmonic Devices for Next Generation Chip-scale Technology based on Nanophotonics
60	Surface texturing to enhance adhesion interface between dissimilar materials using (ECMM)
61	Development of integrated heat pipe based passive thermal Management platforms with vibration isolation capability
62	Vibration Control of Cryo-coolers for Satellite Applications

Sl. No.	Title of the Project
63	Physical Metallurgy of Mg-Li Alloys and Coatings
64	Growth and aging of tissues under microgravity environment
65	Laser Assisted Fabrication of Functionally and Microstructurally Graded Thermal Protection Systems (TPSs) for Reusable Launch Vehicles (RLVs).
66	Numerical investigations on surface gravity waves and internal tides
67	Three dimensional transient analysis of side load for current and future booster nozzles during start-up and shut down.
68	Design & Development of Supercapacitor using heavily Nitrogen Doped Graphene
69	High throughput surface characterization using coherent optical imaging
70	Surface grooving of Cu/Ni based alloys using Jet Electrolytic dissolution for enhancement of heat transfer rate.
71	Fabricating of Porous Copper with Carbon Nanotube Reinforcement for Loop Heat Pipe Application.
72	Mechanical Behaviour and Processing Maps of Suction Cast High Entropy Alloys.
73	Fabricating a flexible, portable, light weight charge storage device using Nano iron pyrite.
74	RTE-tomography based cloud and ocean monitoring.
75	Feasibility study of Photonic bandgap structures for space applications.
76	Design and Development of GaN Based Compact DC-DC Converter.
77	Application-Aware Image Quality Evaluation.
78	Characterization and Modeling of Radiation hardened CMOS transistors for space applications.
79	Surface texturing to enhance adhesion interface between dissimilar materials using ECMM (Electrochemical Micromachining)
80	Effect of heat treatment on mechanical properties of thermo-mechanically processed Russian grade 12X21H5T duplex-steel.

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
18	Silicon Carbide as high temperature MEMS and MOSFET devices
19	Error resilient Scheme for Satellite TV system

Sl. No.	Title of the Project
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
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

Sl. No.	Title of the Project
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	Design and efficient implementation of advanced encryption and decryption techniques for use in spacecraft communications
46	Reduction of false acceptance/rejection for non cooperative speakers in automatic speaker recognition system
47	Implementing a scalable video transcoder based on motion compensated temporal filtering
48	Probabilistic estimation of soil moisture from RISAT1 data along with uncertainty quantification
49	Design of fault tolerant VLSI systems for applications in satellite communication
50	Secure key management in wireless AD DOC networks
51	Development of compositionally modulated thermal barrier coating by hybrid technologies
52	Development of shape memory polymer nanocomposites (SMPN) for space deployable material
53	Thermo hydraulic simulation of LOX booster turbo pump for semi cryogenic rocket engine
54	Protocol development for interplanetary delay tolerant network
55	Development of Earth Simulator for time domain GPR Applications
56	Hands free gesture control for immersive image navigation
57	Retrieving temperature and salinity profiles in the Bay of Bengal using satellite observations
58	Study on different aspects of secured quantum communication
59	Suitability of free space optical communication link for on board data handling(OBDH) in satellite
60	Design and development of perforated plate heat exchangers for cooling of gaseous helium by using liquid hydrogen
61	Design and fabrication of closed loop MEMS Capacitive Accelerometer

Sl. No.	Title of the Project
62	Droplet-based cooling of Electronic hot spots
63	Development of Substrate Integrated Waveguide (SIW) based Passive Devices for Satellite Transponder.
64	Experimental evaluation of forming limit diagram and forming behavior for differently heat treated Inconel -718 material
65	Real time detection of face/core debond initiation and interfacial delamination propagation morphology in sandwich composite panels using fiber optic bragg grating sensors
66	Damage assessment of composite structures using swarm based optimization technique from changes of vibrational response
67	Theoretical and Experimental Studies on Cooling of Liquid Nitrogen by Helium Injection
68	Modeling and Simulation of Shrinkage and Warpage of Autoclave Molded composite components
69	Feasibility of Design and Development of L & S Band Dual Polarized shared/common Aperture Microstrip Antenna
70	Microencapsulation of Phase Change Material Using Fluidic Method
71	Design, Implementation and performance evaluation of Algorithms for compression of Hyper-spectral data products
72	Design and Implementation a 250 MSPS, 8 BIT ADC in Sub-Micron Technology for Space Application
73	Microgravity Slosh Analysis
74	Development of constitutive equations for CNT epoxy nanocomposites
75	Geodynamic Modeling and Tectonic Reconstruction of a Fossil Subduction Zone in the Context of Nagaland Ophiolite Complex – Field vis a vis Remote Sensing convergence
76	Deep Learning for Automated Discovery in Hyper spectral images
77	Reliability Assessment of L40 Stage Assembly and Integration Process
78	Advanced High Strength Conjugated Polymer based Conductive Fibers as a Smart Textile Materials for Space Applications
79	Assessment and implementation of complex image co-registration and phase unwrapping and Wavelet Based Phase Noise Reduction for interferometric SAR processing
80	Design of Dual/Tri-Band Circularly-Polarized Antennas with Reduced Ground Plane Size

Sl. No.	Title of the Project
81	Design and Development of Closed-Loop MEMS Capacitive Accelerometer
82	Exploring the MEMS based Flexible Pressure Sensors for Electronic Skin Applications
83	Exploration of vertical soil moisture profile by assimilating the surface soil moisture data retrieved from remotely sensed SAR data
84	Indigenous Authenticated Encryption for Satellite Communication

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

Sl. No.	Title of the Project
	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
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 Electrospray Based MEMS Microthruster
32	The high energy Particle detector Project

Sl. No.	Title of the 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 Electrospray based MEMS Microthruster
35	The High Energy Particle Detector Project
36	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
37	Development of atmospheric correction algorithm for Ocean Color Monitor(OCM2)Sensor for optically Complex Oceanic Waters
38	Development of a laser assisted scribing technique to generate gridded strips of a parabolic antenna
39	Wide-band Frequency Selective Surfaces(FSS) for quasi optical network
40	Processing and characterization of advanced metallic thermal protection materials for reusable launch vehicle applications
41	Spatial disaggregation and inverse modeling of quality field level irrigation water distribution and efficiency across a command area using an integrated thermal remote sensing and crop growth modelling approach
42	Design, Fabrication and testing of programmable high voltage power supply for space applications
43	Flow characterization studies and performance analysis of an annular aerospike nozzle
44	Hybrid rockets for sounding rocket applications using hydrogen peroxide as oxidizer
45	Development of the multiscale modelling framework for the fracture studies of textile composites
46	Numerical Modelling of Arcjet
47	Mixed mode translaminar fracture of fibre reinforced composites – Experiments and Simulations
48	Simulation of mixing layer in stratified medium
49	Identification of mesoscale eddies in the Bay of Bengal using Lagrangian Coherent Structures
50	Optimization of hot workability and control of microstructure in Ni – base superalloys used in rocket engine applications
51	Contact stress parameter evaluation using digital photoelasticity
52	16 bit 5MS/S analog to digital converter

Sl. No.	Title of the Project
53	Effect of Thermo-mechanical processing on the microstructure, texture and anisotropy evolution in various Ti alloy being used in various launch vehicle programmes of ISRO
54	Experimental Investigation of Ageing Related issues in composite solid propellants
55	Condition Monitoring of Aerospace Structural Materials adopting Multi-Fusion Sensor System
56	CFD Studies on Jet Deflector Duct of Future Launch Pad for Advanced Launch Vehicles of ISRO

**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	Studies on preparation and photo catalytic applications of Nanocrystalline TiO ₂ and its nanocomposites
4	Development and characterization of thin film solid electrolyte cells as voltage source, temperature, pressure and gas sensor
5	Visual & Photographic observations of meteor showers
6	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 .
7	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.
8	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)
9	Deposition of layered transition metal chalcogenides thin films by SILAR method for their tribological applications.

Sl. No.	Title of the Project
10	Synthesis and Applications of composites of TiO_2 with Carbon Nanotubes and Metal Chalcogenides
11	Chemical Deposition of CuInSe_2 , CdS and ZnO thin films for Solar Cell Applications.
12	Use of Geographical Information System to study tuberculosis epidemiology and the factors affecting case detection in a rural population in Pune district, Maharashtra
13	A comparative study of telecommunication technology: Its impact and relevance on Urban, Rural and Tribal community of Maharashtra.
14	Study of Biodiversity of some invertebrate of Sawanga (Vithoba) Lake Region, Dist Amravati, Maharashtra.
15	Impact of low and high radiation doses on the nutritional quality, functional properties and shelf life of various foods.
16	Study of the direct radiative forcing of atmospheric aerosols over different environments.
17	Study of Si quantum dots for solar cell applications
18	Studies on structural, optical and electrical properties of transparent conducting thin film (TCO).
19	Novel electrochemical approach to prepare CuInGaSe_2 based solar cells using non-aqueous bath.
20	Design and development of an odor tracking system.
21	Study of interferometric data and its applications for subsidence monitoring.
22	Identification of critical areas of conservation concern using RS-GIS technique from northern Western Ghats of India.
23	Development of high performance Polycarbonate/Graphite nanocomposites with low percolation for EMI shielding application.
24	Synthesis and characterization of Copper Chromite for propellant.
25	Preparation of Barium Magnesium Tantalate (BMT) and Barium Zinc Tantalate (BZT) with and without dopants for microwave dielectric application.
26	Biodegradation of Ammonium Perchlorate by phytoremediation approaches.
27	Enhancing rural development through improved communication: case study western India.
28	Measurement of plasma temperature and identification of species during re-entry of Space Shuttle, using plasma emission spectroscopy.

Sl. No.	Title of the Project
29	Splitting of carbon dioxide into oxygen and carbon moiety using biomimetics of biological catalysts involved in photosynthesis
30	Preparation of CO_3O_4 films by using electrochemical and spray pyrolysis deposition methods for gas sensing applications
31	Development of transition metal oxide nanoparticle films for solar radiation protection and solar cells.
32	Real time human detection using covariance matrix as human descriptor
33	Sensor-less XY planar flexural scanning mechanism for precision application
34	Metallic surface plasmon phenomenon as a biosensor for the identification of biomolecules
35	Hazardous Nitrous Oxide gas leakage detection and monitoring system using wireless sensor network
36	Impact of Flood Hazards on settlement of Pune Region
37	Digital elevation model (DEM) fusion
38	Development of conducting polyaniline-ZnO nano particle composite paint coating for corrosion protection
39	Naphthoquinone containing metal polypyridyl complexes for solar cells: Computational and experimental Study
40	Halophilic bacterial diversity of marine ecosystems from west coast of India
41	Development of microwave excess noise generator heads using gas discharge of reactive & non-reactive gases
42	Development of graphite fiber reinforced aluminium (7075) in the rolled sheet form
43	Studies on nano porous metal oxides via anodization and their applications in super capacitors
44	Multifunctional conducting polymer transition metal composite nanostructures based sensor device for detection of NO_2 , H_2S and NH_3
45	Feasibility study on indigenous development of electrochemical based gas sensors and transmitter
46	Development of F.C. observatory - an autonomous robotic telescope
47	Study of Precipitation characteristics using disdrometer and satellite datasets over Pune

Sl. No.	Title of the Project
48	Optimization of low voltage DC micro-grid with intelligent solar PV utilization for a computer laboratory
49	Processing of natural biopolymers –wild and domestic silk varieties of northern Western Ghats: Fabrication of biopolymer film based technological substrate for advanced optical structures
50	Interaction of plasma with Thermal Protecting System (TPS) material during re-entry of space vehicles
51	Stabilization of Zirconia in tetragonal and cubic structure using various dopants for electronic applications
52	Remote sensing applications in coastal geomorphology , changes in morphology in parts of west coast of Maharashtra, India
53	Occurrence and distribution of fluoride in groundwater of terekhol river basin, Sindhudurg district, Maharashtra: A remote sensing and GIS based study
54	Development of Aerogel based high performance TPS for Launch Vehicles
55	Development of Prequal engineering model of “SEAPS”(300 KHz to 30 MHz) RF Front end electronics and data acquisition system for low frequency space science studies
56	Studies on biodiversity of poly-extremophilic bacteria for their probable use as test organisms in space research
57	Fabrication of magnetoelectric energy harvesters by utilizing piezoelectric-macro fiber composite(MFC) and magnetostrictive Nickel/Metglas/Magnetic oxide materials
58	Design, fabrication and testing of a compact and robust Monochromator
59	Space Radiation from the Optically Transparent Planer Microstrip Antenna Integrated with the Solar Panels of Small Satellites
60	New Title: Design feasibility of PLL frequency synthesizer for Ku band
61	Development of coating/manufacturing technology for friction stir coating/welding tool for welding of 3 mm thick stainless steel sheets
62	Development of Nuclear Batteries using Radioactive Sources
63	Access, Exposure and Impact of EDUSAT program: An Intervention Study of Stakeholders and Beneficiary
64	Drilling techniques/technology for drilling of miniature size holes of diameter less than 10 microns in super alloys for a depth of 1.0 mm
65	Valve-less linear compressor driven stirling cycle cryocooler for space applications
66	Converting energy derivable from low energy sources into electrical power for autonomous sensors applications

Sl. No.	Title of the Project
67	Development of high current density thermal-field (T-f) cathodes
68	Studies on glare reduction techniques for indoor illumination systems
69	Fabrication of a small satellite for monitoring radiations in different orbits of outer atmosphere where orbit manoeuvring will be controlled by solar sail
70	Development of Pre qual engineering model of "SEAPS" (300 KHz to 30 MHz) RF Front-End Electronic and Data Acquisition system for low frequency space science studies
71	Bioleaching to Electronic Wastes (E-wastes)