

**Projects under Space Technology Cells**  
**(From 2008 onwards)**  
**IISc, Bangalore**

SI. 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

<b>Sl. No.</b>	<b>Title of the Project</b>
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 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 Aero acoustics Using Acoustic Holography
33	Micro fabrication 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

Sl. No.	Title of the Project
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 <sub>2</sub> films
39	Thermo-acoustic pulse tube refrigerators operating down to 100K
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 Nano Tubes (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

<b>Sl. No.</b>	<b>Title of the Project</b>
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
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 of 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 characterization 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

Sl. No.	Title of the Project
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 chemo resistive gas sensor
79	High Temperature Superconductor Based Liquid Level Probe For LOX System
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 Aero acoustic 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

<b>Sl. No.</b>	<b>Title of the Project</b>
91	Seismic vulnerability assessment using high resolution remote sensing data for disaster
92	Synthesis and electro-optical studies of core/shell semiconductor nanocrystals for energy applications
93	Urban revolution urbanization 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
100	Study of tribological properties of polyetrafluro-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	Studies of integration of GPS and INS for varying coupling architectures using stochastic filters
105	Preparation of carbon nitrides for space applications
106	A Novel liquid droplet based bistable MEMS switch
107	Sensor integrated wireless mote for compressed sensing and health monitoring
108	Modeling primary atomization of liquid jets using the level set method
109	Understanding the fine scale duration characteristics of tropical rainfall

<b>Sl. No.</b>	<b>Title of the Project</b>
110	Development and performance evaluation of PCM coupled heat pipe
111	Unified correlations for bubble dynamics and bubble visualization within the evaporator of loop heat pipe and performance studies of LHP
112	Combustion studies of composite propellants containing nano burn rate catalysts
113	Development of Eco-friendly High-performance Piezoceramic actuator materials
114	Development of Low cost colloidal HgCdTe Quantum Dot photo detectors and their utility in the monolithic infrared focal plane arrays
115	Synthesis, growth and studies of magneto caloric materials
116	A setup for the study of thermal properties of nanoscale devices of ultrathin layered materials
117	Numerical simulations of vapor growth in the evaporator of a capillary pumped loop
118	Generation of BPSK/QPSK modulated microwave signals using optical techniques
119	Movement strategies for commensalism: coexistence of meso-carnivores in human-dominated landscapes
120	Investigating the origin of the Indian Ocean Geoid low
121	Development of whole-Earth models for understanding core-mantle interaction
122	Investigation of vegetation changes in the arid Trans-Himalayan ecosystem of northern India
123	Towards Ultrafast Investigation of Laser Initiated Decomposition Mechanisms, Kinetics and Dynamics of Metalized Energetic Materials
124	Local and global extinction of shear stabilized turbulent premixed and partially premixed flames in high speed flows
125	Theoretical and computational study of frictional effects in viscoelastic and generalized elastic contacts

<b>Sl. No.</b>	<b>Title of the Project</b>
126	3-D Die Level Packaging for hybrid systems
127	Developing wafer scale plasmonic devices to improve near and mid-IR detection in harsh environments
128	High resolution image restoration and enhancement using GPU
129	Conjugated Polymer Nanocomposites for Organic Solar Cells

## **IIT Bombay**

<b>Sl. No.</b>	<b>Title of the Project</b>
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	Hybrid Control and Fault Detection during Re-entry of reusable Launch Vehicles
12	Singularity Avoidance Algorithms in Variable Speed CMGs



Sl. No.	Title of the Project
13	Development of High Resolution Schemes for Flow Computations on Space Vehicle Configurations using Unstructured Grids
14	Study of shock-turbulent boundary layer interaction in high-speed air intake - Phase II
15	Estimation of viscous drag on a scramjet engine in a shock tunnel through wall-heating rate measurements
16	Decentralized Control of Multi-satellite Formation Flying
17	Rapid Development and Manufacturing of Machined Aerospace Components
18	Assessing Impacts of Global and Local Changes on River Basin Scale Hydrology
19	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
20	Near Real-Time Detection and Assessment of Disbonds in Honeycomb Composite Sandwich Structures using Ultrasonic Guided Waves
21	Development of a Direct Simulation Monte Carlo Code for High Speed High Knudsen Number Flows
22	Development of Magnetic Nanocomposite Films and A Prototype Magneto-Optical Sensor
23	On chip Ku/K band quadrature oscillator and PLL
24	Microwave Remote Sensing and SAR Tutor with Virtual Laboratory
25	A 14GHz Phase Locked Loop and Millimetre-Wave Circuits in Standard 90nm CMOS Technology
26	Investigation of novel multi-functional materials from the full Haussler family
27	Development of a six-component accelerometer balance for use in shock tunnels
28	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”
29	Effect of Terrain Relief and Vegetation Cover on Interferometric SAR Derived Digital Elevation Models
30	Controllability Issues in Satellites

Sl. No.	Title of the Project
31	Ignition delay studies of fuels using a shock tube
32	Synthesis and Combustion of Methylcubane
33	Design and fabrication of 3D Micro-textured Hydrophobic Geometries on Metallic Surfaces – part II
34	Numerical and experimental investigation in slosh phenomenon under microgravity
35	Electromagnetically coupled dual polarized high isolation broadband planar antenna array for satellite communication
36	High strain rate deformation of aerospace Al alloys experimental studies and development of constitutive relationships
37	Development of SIFT based stereo triplet matching techniques for images from TMC on Chandrayan-1 for generating denser point cloud for 3D surface generation
38	Materials for thermoelectric power generation in space
39	High Gain Agile Antennas and Feed Arrays for Multibeam Antennas
40	Signal processing for Performance Improvement of Multi-object Tracking Radar
41	Novel route towards fabrication of Borides-Carbon Nanotube (CNT) Bulk Composites with Higher Volume Fraction of Uniformly Distributed/dispersed CNTs
42	Development of Invisible Watermarks For Vector GIS Data Layers
43	Heat flux prediction in shock - boundary layer interaction and multi-jet interaction with reversed flow
44	Evaluation and mapping of flooding along Paradip coast due to storms and tides using Numerical modelling and Geo-Spatial Techniques
45	Calibration of Polarimetric SAR systems and Software Development
46	Transfer Learning Driven Rapid Change Detection for Disaster Management
47	A Comprehensive Mapping of Flood Risk in Changing Climate : An Application to Jagatsinghpur District, Orissa

<b>Sl. No.</b>	<b>Title of the Project</b>
48	Spacecraft Orientation Maneuvers Under Control and State Constraints
49	Micro structural origin of Residual Stresses in AA7075

## IIT Kanpur

<b>Sl. No.</b>	<b>Title of the Project</b>
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	Development of DR based 3D CT System
12	Study of Spray Combustion in a Swirl Stabilized Dump Combustor

<b>Sl. No.</b>	<b>Title of the Project</b>
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 <sub>2</sub> 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
24	Development of Carbon Nanostructure Reinforced Bipolar Plates made of Phenolic Resin and Carbon Fiber for the PEM Fuel Cells: Performance Evaluation
25	Study of High Entropy Alloys for Enhanced Ductility: Preparation and Consolidation
26	Total Variation and Compressive Sensing for L1 Regularization Based Image and Video Restoration
27	Model based tomographic subsurface soil characterization
28	CNT Reinforced Composites for Structural Applications
29	Excimer laser micromachining for Miniaturized Hybrid Microwave Integrated Circuits (MHMIC)

<b>Sl. No.</b>	<b>Title of the Project</b>
30	Modeling of a electro-dynamic shaker for predicting its mechanical response due to electrical input variables
31	Development of Brazing Alloys and Techniques for Ti-based Alloys
32	High Rate Severe Plastic Deformation (HRSPD) by machining as a route to obtain micro structurally Engineered Nanograined Titanium
33	Role of Particle Size of Ytria Stabilized Zirconia On the Wear Resistance of the PLASMA Sprayed Aluminum Oxide Coatings
34	Numerical Characterization of strut-ramp injector for supersonic combustion using Large Eddy Simulation (LES)
35	Development of a Multi-scale, Multi-physics Particle-based Flow Solver for Flow-field Prediction in Transitional Flow Regime
36	Free Space Optical Communication with Acousto-Optic-Modulator based Transmitter
37	Satellite stereo triplet image matching for digital elevation model generation
38	Plasma Exposure Damage of Ultra High Temperature Ceramics
39	Effect of Heat Treatment on the Mechanical Properties of Thermo mechanically Processed Russian grade 12X21H5T Duplex-Steel
40	Design of Active Flexible and Re-configurable Parabolic Antenna using SMA based Smart Actuators
41	Experimental Studies on Kerosene Gel-propellant Spray loaded with nano-Aluminum Particle
42	Si/Ge nanowire anodes and non-native nanostructured cathodes for advanced Li ion batteries
43	Highly Stable Nanoparticles-Nafion Nanocomposite via Click Chemistry for Fuel Cell Applications.
44	Microwave Metamaterial Absorbers
45	Powder Metallurgical Processing of Diamond-Based High Composites with Transition Metal Additives
46	Novel strategies for source node localization in mobile AD-HOC sensor networks
47	Accelerated computational algorithms for accurate simulations of acoustic and electromagnetic scattering from

<b>Sl. No.</b>	<b>Title of the Project</b>
	open surfaces
48	Powder Metallurgical Processing of Cu-Sn and Tungsten Heavy Alloys and their Composites
49	Kinetics of Microstructure Evolution in Brazing Joints of 0.07C-16Cr-6Ni Steel and Silver Obtained with a Ag-Cu-Sn Filler Metal
50	Development of Brazing Filler Alloys for Dissimilar Metal (Ti based Alloys with Steels) Brazing (ISRO Applications)
51	Effect of crystallographic texture and microstructure on mechanical properties of light weight aluminum-lithium alloys
52	Design of a Smart Inflated Torus and Antenna Membrane
53	Feasibility study on "Development of High Temperature and Ultra High Temperature Composites for TPS Applications"

## IIT Kharagpur

<b>Sl. No</b>	<b>Title of the Project</b>
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

<b>Sl. No</b>	<b>Title of the Project</b>
8	Design and Development of Hydrostatic Journal Bearings for Cryogenic Rocket Engine Turbo pump
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
15	Development of a MEMS based Assay 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
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

Sl. No	Title of the Project
	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 hyper spectral 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
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



Sl. No	Title of the Project
	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 development of closed loop MEMS Capacitive Accelerometer
62	Droplet-based cooling of electronic hot spots
63	Experimental evaluation of forming limit diagram and forming behavior for differently heat treated Inconel -718 material

<b>Sl. No</b>	<b>Title of the Project</b>
64	Real time detection of face/core debond initiation and interfacial delamination propagation morphology in sandwich composite panels using fiber optic Bragg grating sensors
65	Damage assessment of composite structures using swarm based optimization technique from changes of vibrational response
66	Development of Substrate Integrated Waveguide (SIW) based Passive Devices for Satellite Transponder

## IIT Madras

<b>Sl. No.</b>	<b>Title of the Project</b>
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

<b>Sl. No.</b>	<b>Title of the Project</b>
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
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

<b>Sl. No.</b>	<b>Title of the Project</b>
30	Experimental studies on high speed air intakes with Moving Cowls
31	Development of Electro spray Based MEMS Micro thruster
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 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

## University of Pune

<b>Sl. No.</b>	<b>Title of the Project</b>
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 <sub>2</sub> and its nanocomposites

Sl. No.	Title of the Project
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.
10	Synthesis and Applications of composites of $\text{TiO}_2$ with Carbon Nanotubes and Metal Chalcogenides
11	Chemical Deposition of $\text{CuInSe}_2$ , $\text{CdS}$ and $\text{ZnO}$ 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. Amaravati, 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).

Sl. No.	Title of the Project
19	Novel electrochemical approach to prepare CuInGaSe <sub>2</sub> 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.
29	Splitting of carbon dioxide into oxygen and carbon moiety using biomimetics of biological catalysts involved in photosynthesis
30	Preparation of Co <sub>3</sub> O <sub>4</sub> 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

Sl. No.	Title of the Project
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 <sub>2</sub> , H <sub>2</sub> S and NH <sub>3</sub>
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
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

<b>Sl. No.</b>	<b>Title of the Project</b>
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