

List of Completed STC Projects as of December, 2024

Sr No.	Research Title
1.	A 14GHz Phase Locked Loop and Millimetre-Wave Circuits in Standard 90nm CMOS Technology
2.	A flood warning system for entire India-optimal utilization for satellite based data and development of a computationally efficient flood inundation model
3.	A Kalman Filter-Based Multi-Constellation GNSS Integrity Monitor (KFM)
4.	A self-consistent predictive quantum transport simulator for quantum dot IR photo detectors
5.	A Study of Geomorphic characteristics and Structural elements in Select Seismically Active Regions of India; with the help of Remote Sensing Techniques
6.	A study of weather over Himalayan terrain using microwave data from AMSU-B
7.	Aerial Image understanding
8.	Analysis and design of wide band compact rectangular patch antenna embedded on cylindrical pin structure (PIC)
9.	Application Aware Image Quality Evaluation
10.	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
11.	Application of RS and GIS techniques to evaluate effects of landuse – landcover on ravination along Pravara Basin, Maharashtra
12.	Assessing Impacts of Global and Local Changes on River Basin Scale Hydrology
13.	Assessment and Implementation of Complex Image Co-registration and Phase Unwrapping Algorithms for Interferometric SAR Processing
14.	Biodiversity assessment of tropical midges using geo-biological parameters and remote sensing techniques
15.	Biomechanical Aspects of Plant and Root Growth in Microgravity Environments
16.	Calibration of Polarimetric SAR systems and Software Development
17.	Characterization and Modeling of Radiation hardened CMOS transistors for space applications
18.	Comprehensive Simulation Engine for Type-II Superlattice based Barrier Infrared Photodetectors
19.	Conformal, Transparent and Lightweight Microwave Absorbers for Ground and Space Applications-Phase-2
20.	Data driven modeling of morphology and formation of impact craters in Basalt: A case study of Lonar
21.	Deep learning for Automated Feature Discovery in Hyperspectral Images (LDH)
22.	Design and Analysis of a Light Weight Cryptographic System on FPGAs
23.	Design and Development of a Thermal Gradient Diffusion Chamber for measurement of Ice Nuclei in the Atmosphere
24.	Design and Development of an Advanced Carbon Fiber 3D Printable Printer
25.	Design and Development of Application tool for Differential InSAR Technique to Determine Ground Surface Movement (ITG)
26.	Design and Development of Five Axis Magnetic field Assisted fluid jet polishing for nano-surface generation

27.	Design and Development of GaN Based Compact DC-DC Converter
28.	Design and Development of Substrate Integrated Waveguide (SIW) based Bandpass Filters
29.	Design and Efficient Implementation of Advanced Encryption and Decryption Techniques for Use in Spacecraft Communications (EEC)
30.	Design and Implementation of a 250 MSPS, 8-bit ADC in sub-micron technology for Space Applications (BTA)
31.	Design and Implementation of Fault Attack Resilient Encryption for Secure Communication (FRS)
32.	Design and implementation of scalable parameterized stream cipher well-suited for both software and hardware
33.	Design and simulation of satellite-borne high resolution interferometric measurement of monsoon rain rate (SHIMMER)
34.	Design feasibility of PLL synthesizer for ku band
35.	Design of an 8-bit Analog to Digital and Digital To Analog data converters
36.	Design of an Integrated Code for Authentication and Error Correction
37.	Design of Dual/Tri-Band Circularly-Polarized Antennas with Reduced Ground Plane Size
38.	Design of Fault-Tolerant VLSI Systems for Applications in Satellite Communication (DFV)
39.	Design of polymer nanocomposites based wideband microwave absorbers for stealth and electromagnetic shielding applications
40.	Design of radiation hardened data converters
41.	Design, fabrication and testing of a compact and robust Monochromator
42.	Design, implementation and performance evaluation of algorithms for compression of Hyper-spectral data products (PSD)
43.	Design, Simulation and Development of MM-Wave Six Port Receiver
44.	Detectability of Critical Delamination in Composite Space Components: Vibration based Approach
45.	Development and Evaluation of Multiscale CNT/polymer composites
46.	Development of a 3-D Riesz Scanner Scanner
47.	Development of a Gas sensor to detect leakage of Helium gas from inflatable space structure
48.	Development of a Laser Assisted Scribing Technique to Generate Gridded Strips of a Parabolic Antenna
49.	Development of a NIR laser based platform for emulating single event effects on integrated circuits due to radiation strikes
50.	Development of cloud climatology and preparation of a cloud atlas based on the analysis of microwave images from AMSU on board NOAA satellites using Artificial Neural networks (ANN) technique
51.	Development of Earth Simulator For Time Domain GPR Applications (EDG)
52.	Development of far-infrared transmitting Te based chalcogenide glasses for space applications
53.	Development of forest health monitoring model based on Hyperion data for Geo-Environmental Impact management in the Iron Ore mining belts of Saranda Forest, Jharkhand
54.	Development of image quality improvement algorithms for satellite imagery/ radiometric data
55.	Development of Integrated Heat Pipe Based Passive Thermal Management Platforms with Stress Free Mountings

56.	Development of Low Cost Colloidal HgCdTe Quantum Dot photodetectors and their utility in the Monolithic Infrared Focal Plane Arrays
57.	Development of mixed refrigerant cascade refrigerators operating with non-flammable refrigerants for cooling space simulation chambers
58.	Development of Nano-polishing technology for metal mirror
59.	Development of Ohmic and Schottky Contacts on GaN HEMT
60.	Development of piezoelectric ZnO films as high-frequency resonators(HTM)
61.	Development of Pre qual engineering model of "SEAPS" (300 KHz to 30 MHz) RF Front-End Electronics and Data Acquisition System for low frequency space science studies
62.	Development of Reconfigurable Flat-Panel Metasurface Antenna
63.	DHM Based Precision Assembly Simulation of MMIC Packages
64.	Edge-Aware Interpolation for Terrestrial 3-D Maps
65.	Effect of altered gravity on gene expression of Human Blood Mononuclear Cells and bone cell with special reference Immunity and differentiation
66.	Effect of lensing phenomenon on doped fiber for high power lasers
67.	Effect of Terrain Relief and vegetation cover on interferometric SAR derived digital elevation models
68.	Effects of simulated microgravity on expression profile of micro RNA in human cardiomyocytes
69.	Electromagnetically Coupled Dual Polarized High Isolation Broadband Planar Antenna Array for Satellite Communication
70.	Energy efficient & wide-range 15Mb/s-1.5Gb/s SERDES
71.	Enhancement of Transport Layer performance for Inter Planetary Network
72.	Enhancing rural development through improved communication: case study western India
73.	Error resilient Scheme for Satellite TV system
74.	Establishment of Quantum Communication Link for Space Application (EQS)
75.	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
76.	Estimation of vulnerable soil-carbon and hotspots of carbon-efflux across different land-use in India
77.	Experimental Study of Flame Spread Under Convection In Micro-Gravity
78.	Exploiting strong thermoelectric effect in 2D transition metal dichalcogenides for IR sensing applications
79.	Exploration of vertical soil moisture profile by assimilating the surface soil moisture data retrieved from remotely sensed SAR data (VIR)
80.	Fabricating of Porous Copper with Carbon Nanotube Reinforcement for Loop Heat Pipe Application
81.	Fabrication of narrow bandwidth low loss microstrip filter
82.	Fabrication of Sensitive Hand-Held Magnetometer and its use for surveying near Pune geomagnetic rock systems
83.	Fast Sign-of-Laplacian-based Image Matching
84.	Feasibility of Design and Development of L & S Band Dual Polarized Shared/Common Aperture Microstrip Antenna (ALC)
85.	Feasibility Study of Microwave Imaging for Material Resource Exploitation in Planetary Missions

86.	Feasibility study of Photonic bandgap structures for Space applications
87.	Feasibility study of smoke characterization of flaming and smouldering materials in micro-gravity
88.	Forecasting applications of the microwave data from AMSU on board NOAA Satellite
89.	Forward Error Control (FEC) Schemes for High Data Rate Optical Communications
90.	FPGA-based design and development of H-264 codec
91.	Free Space Optical communication with Acousto-Optic-Modulator based Transmitter
92.	Geochemical and isotopic study of Jarosite and its implications for aqueous alteration in planetary surface environments
93.	Gigahertz and Terahertz antenna on photonic crystal substrate
94.	GPU based Multi-Temporal Implementation of Image Change Detection Algorithms and their Verification (TIT)
95.	Growth and aging of tissues under microgravity environment
96.	Growth and Characterization of AlGaIn/GaN Heterostructure by Plasma Assisted Molecular Beam Epitaxy (PA-MBE) Technique for High Mobility Electron Transistor
97.	Handset normalization and reduction of noise and distortion for voice authentication
98.	Hands-free Gesture Control for 3D Data Visualization by Immersive Image Navigation (Phase-II_STC0038)
99.	Hands-free Gesture Control for Immersive Image Navigation
100.	HEMT modeling for broad temperature and frequency ranges
101.	High Gain agile antennas and feed arrays for multibeam antennas.
102.	High Precision Satellite Image Denoising in Hardware
103.	High Resolution Image Restoration and Enhancement using GPU
104.	High throughput surface characterization using coherent optical imaging
105.	Highly sensitive IR detection using photo-gating by electrically defined quantum dot
106.	Hyperspectral Data Processing using Deep Learning Neural network and Graph cut method for mineral identification and Mapping (TIM)
107.	Identification of mesoscale eddies in the Bay of Bengal using Lagrangian Coherent Structures
108.	Impact Melt Cover on Central Peaks of Lunar Impact Craters: Evaluating its Implications for Deriving Sub-surface Mineralogy using data from Chandrayaan-1 & other recent lunar missions
109.	Implementation of the designed HRPT receiver for collecting atmospheric data
110.	Implementing a Scalable Video Transcoder based on Motion Compensated Temporal Filtering (SVM)
111.	Indigenous Authenticated Encryption for Satellite Communication (IAE)
112.	Integrated approach to teaching Programming and Mathematics : Development of Study Material with accompanying software.
113.	Integration of spectral and spatial information for hyperspectral image classification
114.	Investigation of vegetation changes in the arid TransHimalayan ecosystem of northern India the arid Trans-Himalayan ecosystem of northern India the arid Trans-Himalayan ecosystem of northern India Himalayan ecosystem of northern India
115.	Ka Band Propagation Experiments over Indian Tropical Region for Improvement of Ka Band Satellite Communication (KPE)
116.	Microwave Active Remote Sensing of Buried Objects
117.	Microwave Metamaterial Absorber

118.	Microwave Remote Sensing and SAR Tutor with Virtual Laboratory
119.	Mobile communication using genetic algorithms
120.	Model Based Error Concealment (SVD)
121.	Model based tomographic subsurface soil characterization
122.	Modelling and Mapping of Supraglacial Debris Cover Thickness using UAS and Satellite Remote Sensing Data in selected Glaciers of Western Himalayas
123.	Modelling and System Identification of Inflated Torus membrane using Frequency Response Transmissibility
124.	Modelling and validation of evapotranspiration from India Space borne thermal sensors
125.	Modelling of Evapotranspiration from Remote Sensing
126.	Modelling of Water Quality Parameters for Coastal and Inland Water Bodies using Data from Multispectral and Hyperspectral Imaging Systems
127.	Molecular Size and Mass Sensitive Ultrasensitive Thermal Spectrometer Applications
128.	Multiple Access array antenna system at S band using digital beam forming techniques
129.	New synthesis route to prepare infrared transmitting bulk chalcogenide glasses and glass-ceramics glasses and glass-ceramics bulk chalcogenide glasses and glass-ceramics
130.	Novel Strategies for Source-Node Localization in Mobile Ad-Hoc Sensor Networks
131.	Numerical investigations on surface gravity waves and internal tides
132.	On chip Ku/K band quadrature oscillator and PLL
133.	Ontology enabled disaster management web service using data integration
134.	Optical characterization of wetlands from Earth Observations
135.	Paleo-geographic reconstruction: Development of a new GIS based methodology
136.	Parallel Electro-Magnetic Solver for Microwave, Infrared, and Optical applications (MIO-PEMS)
137.	PDK Development and modeling support for ISRO's GaN HEMT Technology
138.	Petrographic, Geochemical, Isotopic and Remote Sensing study of the Dhala impact crater, India
139.	Phase-II Expanded Proposal on Design of Active Flexible and Re-configurable Parabolic Antenna using SMA based Smart Actuators
140.	Physico-chemical conditions of formation of bole beds within Deccan basalt for Martian analogue
141.	Polarimetric Analysis of SAR Images for Segmentation, Classification and Recognition of Objects (ARI)
142.	Polarimetric synthetic Aperture radar (SAR) data analysis for Earth Observation (EO) applications
143.	Powder Metallurgical (P/M) Processing of Diamond-based High Thermal Conductivity Alloys with Transition Metal Additives
144.	Pre project-Energy Efficient Routing
145.	Preparation of Barium Magnesium Tantalate (BMT) and Barium Zinc Tantalate (BZT) with and without dopants for microwave dielectric application
146.	Probabilistic Estimation of Soil Moisture from RISAT1 Data along with Uncertainty Quantification (PMA)
147.	Protocol Development for Interplanetary Delay Tolerant Network (ITN)
148.	QPSK Demodulator based on Wideband Acquisition Technique
149.	Quality Assessment of Pansharpened Images

150.	Radiation Tolerant All Digital Wide-Tuning Range Fractional-N Phase-Locked Loop (PLL)
151.	Reconstruction of Late Quaternary Fluvio-sedimentary response of Kaveri and Palar Rivers: Based on chronostratigraphy, digital geomorphometry and remote sensing analysis
152.	Reduction of false acceptance/rejection for non cooperative speakers in Automatic Speaker Recognition System (FAN)
153.	Relation between pathogenic bio - aerosol and biotic stress of crop - A case study for yellow rust fungus of wheat
154.	Remote Sensing application in Coastal Geomorphology, changes in morphology in parts of West coast of Maharashtra, India
155.	Research and development of MoS ₂ Quantum Dots based non-contact temperature sensor for applications in Indian Space Research programs
156.	Retrieving of Temperature and Salinity of the Ocean from Satellite Surface Observation (RBU)
157.	RTE-optical-tomography based mixed-phase cloud parameter retrieval
158.	RTE-tomography based cloud monitoring
159.	Satellite Image Denoising in Hardware
160.	Satellite image restoration in multiplicative noise conditions
161.	Satellite Image Super-Resolution Using Deep Neural Networks
162.	Satellite stereo triplet image matching for digital elevation model generation
163.	Secure Key Management in Wireless AD HOC Networks (MWA)
164.	Shape Memory Alloys actuated Mechanically Active Reconfigurable light weight PEEK material based parabolic reflector for active control on RF patterns for High frequency Micro / Nano Spacecraft Applications
165.	Shoreline Change Analysis along Andaman and Nicobar Islands: Implication for Coral Conservation (AAC)
166.	Simulating urban growth using GIS & RS - a case study of Pune city, India
167.	Source of Black carbon in of particulate fraction in Himalayan Snow using stable isotope analyses
168.	Space-Time Trellis Coding (STTC)/Turbo coding based robust satellite image processing and communication
169.	SPIRIT: A Post-Processing System for NavIC Signals for High-Precision Applications
170.	Stabilization of a 3D Platform for Space Applications Against Rolling and Pitching Excitations
171.	Stabilization of zirconia for electronic applications, in tetragonal and cubic structure using various dopants.
172.	Studies on Biodiversity of poly-extremophilic bacteria for their probable use as test organisms in space research
173.	Studies on fade mitigation control for microwave satellite signal propagation
174.	Studies on New Modulation Techniques for Satellite Navigation (NSN)
175.	Studies on Retro-Directive Array for Space Applications (RAA)
176.	Studies on the construction and performance evaluation of multiplexed binary offset carrier spreading modulation for improved satellite radio navigation signal and system design
177.	Study of CDMA codes for satellite navigation
178.	Study of free space laser communication using semiconductor laser diode at 1 MBPS duplex with the target distance of 500/1000 meters
179.	Study of interferometric data and its applications for subsidence monitoring

180.	Study of the apparent convective cloud and cloud systems motion during the southwest monsoon season using the Meteosat-5 half-hourly infrared images
181.	Study of the direct radiative forcing of atmospheric aerosols over different environments
182.	Study on different aspects of secured quantum communication (DSQ)
183.	Suitability of Free Space Optical Communication link for On Board Data Handling (OBDH) in Satellite (OCH)
184.	Super resolution of Hyperspectral Remote Sensing Images
185.	Test Simulator for satellite based AIS
186.	Total Variation and Compressive Sensing for L1 Regularization Based Image and Video Restoration
187.	Ultrasensitive Thermal Spectrometer with Molecular Size and Mass Sensitivity
188.	Underlay Cognitive Radio based Satellite-Terrestrial Non-Cooperative/Cooperative Communication for Efficient Resource Utilization: Protocol Design and Performance Analysis
189.	Vibration Control of Cryo-coolers for Satellite Applications
190.	Where is the grass green? Quantifying historical declines and mapping existing grasslands in India
191.	Wide-band Frequency Selective Surfaces(FSS) for quasi optical network