G20 भारत 2023 INDIA

आज़ादी का अमृत महोत्सव

PROVIDING SPACE FOR BETTER TOMORROW...

IN-SPACe

Indian National Space Promotion and Authorization Centre

Department of Space, Government of India

“IN-SPACe will give opportunities to the best scientific minds working in Government or private sector”

Hon’ble Prime Minister **Shri Narendra Modi**

PROVIDING SPACE FOR BETTER TOMORROW...

MESSAGE

Shri Somanath S.
Secretary, Department of Space (DOS) &
Chairman, ISRO

Over six decades, India has demonstrated its might in Space programme having built an impressive infrastructure and technical capabilities resulting in national development and garnering international recognition. The programme has been well-contributed by its national space agency, the Indian Space Research Organisation, ISRO, and ably supported by the Indian industry.

Reckoning the strengths of Indian private players and start-ups, and the role they can play in the global Space sector, the Department of Space, Government of India initiated opening up the sector for wider participation. The release of Space Policy 2023 aims to harness and boost these initiatives.

The results are emerging. Several promising Non-Governmental Entities (NGEs) and start-ups have developed the capabilities and aim to enhance them. To survey the sector, and to promote complementing efforts, a Coffee Table Book is bought out by IN-SPACe. The book showcases the promising capabilities and ambitious plans of selected NGEs and start-ups.

Assuring capabilities and daring plans of resilient NGEs and start-ups exemplify the aspirations of the vibrant and thriving Indian Space Sector and signal exciting days. The quest for innovation by brilliant minds adds value to space activities. The synergy between the stakeholders fosters technological advancements and a myriad of opportunities.

I wish the NGEs and Space Start-ups – listed here and waiting to be listed – all the very best. Surely, IN-SPACe, the Department of Space and the Government of India will ensure the unveiling of their full potential for the growth of the global space sector and the development of the Nation.

Somanath S.

FOREWORD

Dr. Pawan Kumar Goenka
Chairman, IN-SPACe

It gives me great pleasure to introduce this Coffee table book representing emerging capabilities of Indian private space companies, in conjunction with the fourth Space Economy Leaders Meet (SELM).

Globally these are very exciting times for the space industry, and post the liberalization of the Indian Space Sector, through the Space reforms initiated by Government of India, there has been significant momentum in the Indian private space ecosystem as well. It is very encouraging to see the rapid increase in the number of space startups, which have gone up by 3X in 2 years and are over 190 in 2023. Investment in the space sector is rising. Recently, startups like Skyroot Aerospace, Pixxel and Agnikul Cosmos have been successful in securing significant venture capital funding. In CY 2022 the total investment crossed USD 110 Mn in a year which is highest ever for Space start-ups in India till date.

Similarly, companies traditionally serving ISRO as suppliers are also upping the game and moving up the value chain with investments as well as increased participation in technology and infrastructure development. Space activity across segments is gaining momentum in the country. While Upstream activities are getting higher attention, the midstream, and downstream space activities are also expanding at a rapid pace.

This book serves as a testament to the transformative power of collaboration, innovation, and entrepreneurship in the Indian space sector. The private space industry in India is emerging as a thriving ecosystem of large companies, and budding startups, each with its unique expertise pushing the boundaries of possibilities. Within the pages of this book, you will discover that the private sector has started building cutting-edge technologies for satellite and launch vehicle manufacturing to provide advanced communication and Earth observation capabilities.

I hope this endeavor of documenting the present capabilities and future plans of our private companies, in the form of a coffee table book will be useful and contribute to the wider industry interface. This is a living document as we will constantly add to the list of companies featured in this book.

Happy Reading!

Dr. Pawan Kumar Goenka

CONTENTS

Promoter

Enabler

Authorizer

Supervisor

IN-SPACe being the Promoter and Enabler is working towards creating a vibrant environment for NGEs and start-ups. Greater private sector participation in the entire value chain of the space economy is the need of the hour.

In recent times we have seen a tremendous increase of excitement in start-ups. The number of space start-ups have gone up, from just 1 in 2014 to more than 190+ in 2023. We are working towards making a conducive ecosystem wherein the investors are inclined towards investing in start-ups. The investment in Indian Space Sector has increased from $6 Mn in 2019 to over $110 Mn in 2022.

This coffee table book with the theme of “providing space for better tomorrow…” is an endeavour to act a bridge between all the significant stakeholders viz. Department of Space (DoS), ISRO and NGEs/Start-ups. We are hopeful that publication will help in connecting the dots for technological and commercial collaboration for like-minded organization working in the space ecosystem.

Agboost Tech Consultancy

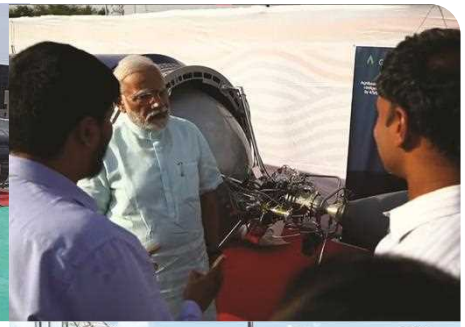
Present capabilities

- Offering geospatial technology and Predictive data Analytic services to the agriculture and utility industries.
- AI-powered Agriculture Health Monitoring and Climate Resilience Solution.
- Land Cover Digitization Powered by AI (HD Vector Map).
- Agricultural Drone and IoT Services (Precision Ag Tech).
- Design and build automation solutions for the agriculture and utilities industries.

Future plans

- A new innovation in the integration of IoT devices and satellite images-by intervention of AI/DL agriculture solutions etc, such as soil moisture depth analysis of up to 120cm.
- Internet of Things (IoT) leasing services for commercial enterprises and carbon trading.
- A real-time AL/ML-based method for monitoring subsurface water.
- Introduction of a Space Application into a Digital Twin.
- Design & Development of Agriculture Satellites in collaboration with ISRO.
- Satellite based Assets Tracking System.

Agnikul Cosmos Pvt. Ltd.



Present capabilities

- Ability to design and manufacture single piece 3D printed rocket engines.
- Only company in India to successfully test semi cryo 3D printed engines at VSSC.
- First private company to establish launchpad in SDSC SHAR.
- Inhouse facility that allows end to end manufacturing of two rocket engines per week.
- Inhouse capabilities to develop launch vehicle flight software end to end.
- Inhouse facilities to test semi cryo engines upto 40 kN thrust.

Future plans

- Launch contract to launch within 2 weeks time frame.
- Launch ability to launch from multiple launchpads in the country.
- 30 - 300 kg at same price per kg.

Alpha Design Technologies Pvt. Ltd.

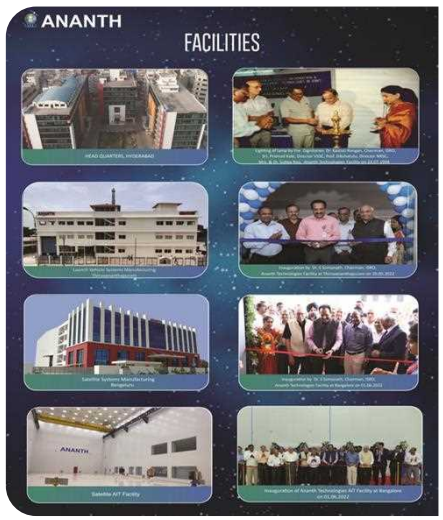
Present capabilities

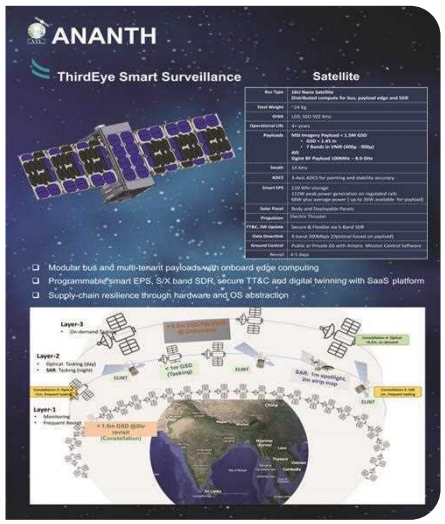
- Possess ISRO trained and skilled 60 member team for conducting Assembly Integration Testing of Small /Medium/Large Satellites.
- Established supplier of ISRO for PSLV/GSLV – Launcher Subsystems over past 10 years, through ADTL subsidiaries.
- Over 10 years experience in establishing Satellite Earth Stations catering to TT&C, Multimedia Communications & large number of VSATS.
- Established state of the art manufacturing / production centers in Bangalore, Hyderabad and Trivandrum to meet the requirements of Land, Ship, Space and Air borne Systems.
- Developed successfully High dynamics 2-Axis Aircraft tracking systems for high speed communications, for DRDO & HAL.

Future plans

- Building Small and Medium Satellites through Industry collaboration & ISRO.
- Establishing Satellite and Sub system Manufacturing facility.
- To address opportunities for Contract manufacture of Satellite sub-systems and Ground Exploitation Systems for Small and Medium satellites through JV & TOT from foreign collaborator.

Ananth Technologies Pvt. Ltd.





Present capabilities

- Satellite Systems
- Launch Vehicle Systems
- Space Applications
- Satellite AIT Activities
- Small Satellites

Future plans

- Small Satellites Constellation for Mapping
- GEO Satellites for Communication
- AIT for Launch Vehicles

Astra Microwave Products Ltd.

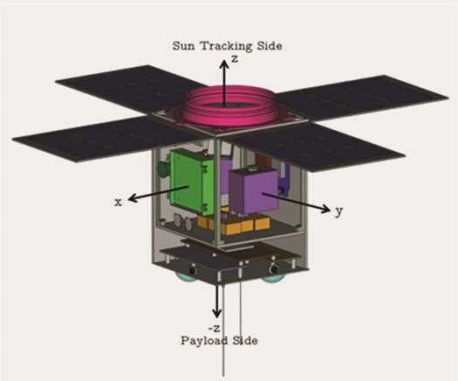
Present capabilities

- Design & Development of RF Payloads like SSPAs, Receivers, TR Modules, Switch Matrices, Integration Blocks, LNAs, DA's, Up- downconverters, etc.
- Design & Development Navic Rx, CORS Receiver, Timing Receivers etc.
- Manufacturing of Transponders for various frequency bands, Transmitters, Antennae.
- Design & Development of Sub systems for Space based ELINT, etc.

Future plans

- Design & Development of Space based SAR.
- Satellite Integration & Testing.
- Design & Development of Space based ELINT system.

Astrome Technologies Pvt. Ltd.



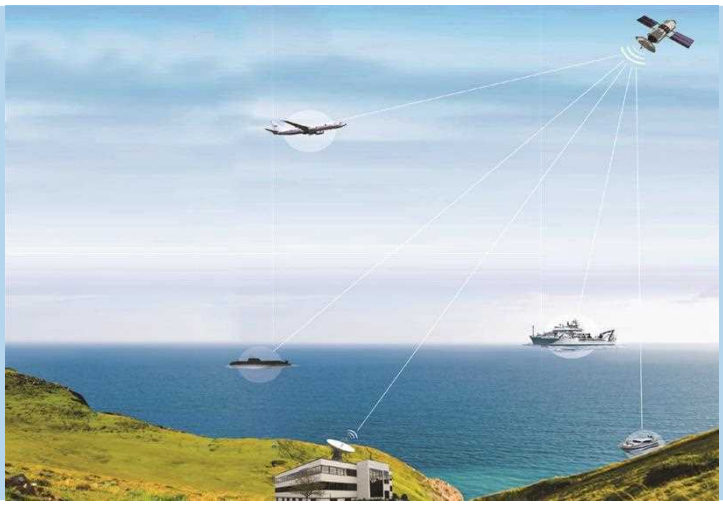
Present capabilities

- Mobility Satellite Terminal for Ku-Band, C-Band, Ka-Band and W-Band frequencies.
- User and Gateway Terminals for Low Earth Orbit (LEO) and Medium Earth Orbit (MEO) Satellite Constellations.
- Very High Throughput Inter-Satellite Data Links in V-Band.

Future plans

- Signal Intelligence (SIGINT) airborne and space-borne solutions.
- Electronic Intelligence (ELINT) airborne and space-borne solutions.

Avantel Ltd.



MSS Transceiver with DBF-Shipborne

MSS Transceiver with DBF-Airborne

MSS Transceiver with DBF-Submarine

UHF Satcom System - Shipborne

UHF Satcom System - Airborne

UHF Satcom System - Submarine

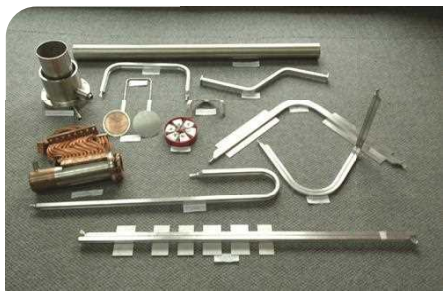
Present capabilities

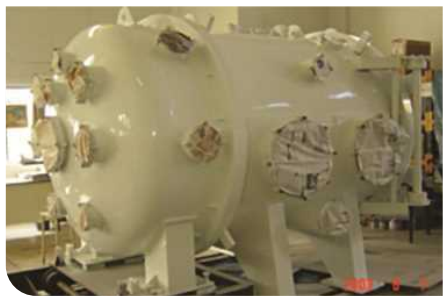
- Design & Development of SATCOM (MSS & UHF) Earth Stations & User Terminals.
- Software Defined Radios in UHF and S band.
- Embedded Systems & Digital Signal Processing.
- Network Management & Application Software.

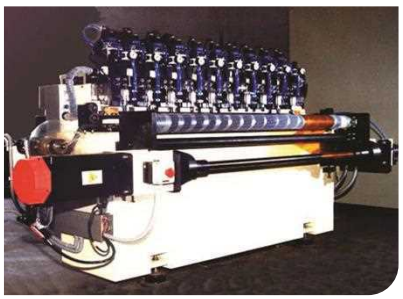
Future plans

- Design & Development of Ku Band Ground Segment.
- Software Defined Radios in L band and Ku band.
- Manufacture & Integration of Small Satellites.
- GSAAS Services.

Avasarala Technologies Ltd.





Present capabilities

- Heat Pipe for Thermal Management
- Solar Array Deployment Mechanism
- Wave Guides
- Bonded Film Lubrication
- Critical Equipments for Space

Future plans

- Structures
- Other Mechanisms
- Critical Systems and Sub assemblies

Azista Bst Aerospace Pvt. Ltd.

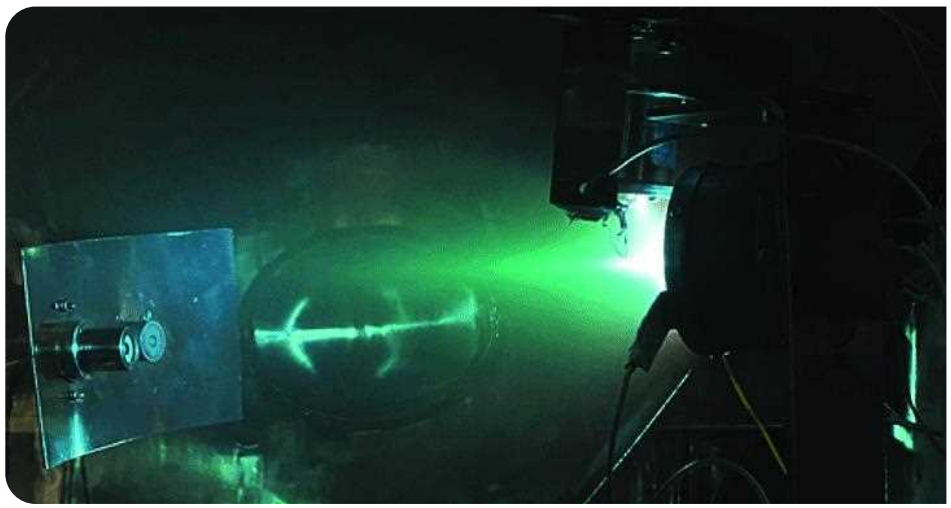
Present capabilities

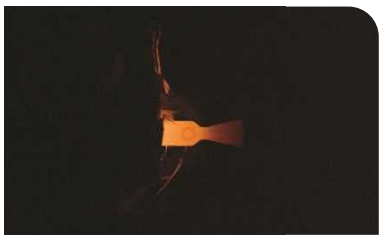
- **AFR**: Wide Swath Satellite (4.6m GSD & 60km swath)
- **Small Satellite Bus**: LEOS 50 for 40 kg to 100kg class satellites
- **Nanosatellites buses**: Azista – X Series from 1U to 27U
- **Satellites and Sub-systems**: Mass Manufacturing
- Data Processing and Data Analytics as a service

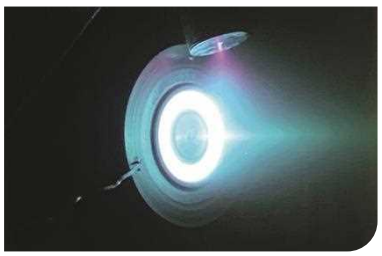
Future plans

- **Azista Vista**: Wide Swath Maritime Satellites
  - 5m GSD, 150 km Swath &
  - 5m GSD, 600 km Swath
- **Azista Fine View**: Submeter Electro – Optical Satellite (0.67m GSD, 10km Swath)
- **Azista Ultra View**: C – Band Synthetic Aperture Radar (SAR)

Bellatrix Aerospace







Present capabilities

- Advanced Electric Propulsion
- High-Performance Alternative Green Propulsion
- State-of-the-Art in-house production and test facilities
- Short lead times

Future plans

- Establishment of world's largest spacecraft & propulsion manufacturing facility
- Full-range of technologies for in-space mobility
- Revolutionary business model for space of Satellite-as-a-Service (SaaS)
- Last-mile In-space Connectivity

ROLE OF IN-SPACe

IN-SPACe, established as a single-window agency for all space sector activities of Non-Government Entities (NGEs), plays an important role in boosting the private space sector economy in India.

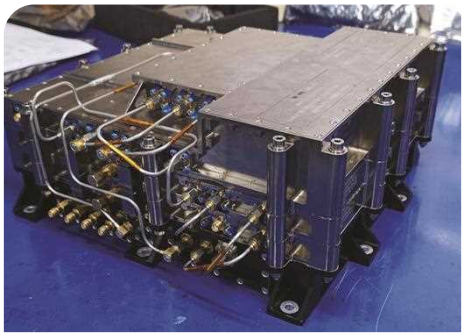
संवर्धक
PROMOTER

समर्थक
ENABLER

प्राधिकृतक
AUTHORIZER

पर्यवेक्षक
SUPERVISOR

Centum Electronics Ltd.



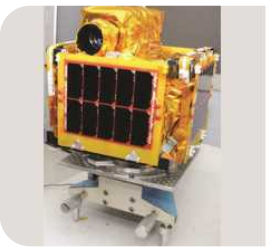
Present capabilities

- Space object tracking radar
- Payload
  - Electronic warfare
  - Sar
  - Hyperspectral
- Bus management unit
- Satellite avionics systems
- Launch vehicle avionics systems

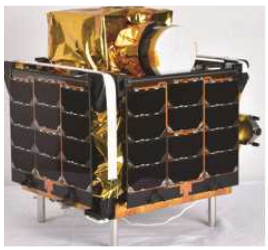
Future plans

- Payload Integration
- Ais, Isl & Tsm
- Assembly, Integration & Testing(Ait)
- Small Satellites
- Atomic Clock

Data Patterns (India) Ltd.



NIUSAT (2017)



Micro Satellite (2022)

THAPAR Satellite
Ground Station

THAPARSAT
IR Camera Payload

Present capabilities

- Micro Satellites
- Payloads Subsystems
  - Gyros
  - Magnetometers
  - Torquers
  - Sun Sensors
  - Reaction wheels
  - TMTC
  - Payload transmitters
  - On board computers
  - Ground stations
  - Software defined radio transceivers

ISRO Packages Manufacturing

DC DC converter

ICU Package

Modern Satellite Components

On Board Computers

Ground Station for Micro Satellite

Payload Transmitters

UHF Transceiver

Future Plans

- Electro Optical Imaging
- Synthetic Aperture Radar Imaging
- RF Spectrum Monitoring
- Custom Payloads
- High Capacity Ground Stations
- 1Gbps downlink capability

Made in India with Pride

Dhruva Space

Present capabilities

- Building satellite platforms and subsystems.
- Launch facilitation and development of separation systems.
- Development and operation of satellite Earth Stations.
- Design and development of Space-grade Solar Arrays.

Future plans

- Enabling rapid constellation deployment across diverse Space missions.

Digantara Research and Technologies

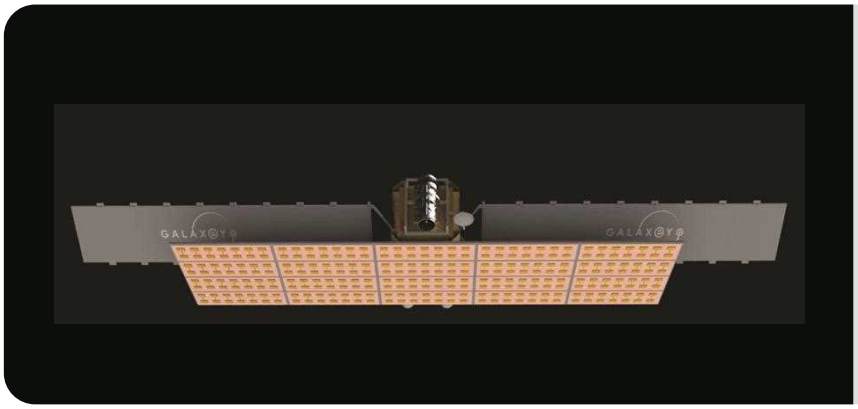
Present capabilities

- Ground and space based sensing capability.
- Sensor fusion for increased accuracy.
- Data agnostic processing engine.
- Common Operational Picture for Comprehensive Awareness.

Future plans

- Dedicated satellite constellation for space based sensing.
- Multi – modal data pool for increased data accuracy and latency.
- 50+ SSA based analytics across the value chain.

GalaxEye Space Solutions Pvt. Ltd.



GalaxEye is a Space Tech startup , spun out of IIT Madras , aiming to sharpen the future of Satellite imagery acquisition. We are building a constellation of indigenous microsatellites equipped with our novel "Drishti Sensor" which enables us to provide a data fusion with the same temporal, spatial and prospective matched optical and SAR dataset. We have also raised capital in our Seed round of funding.

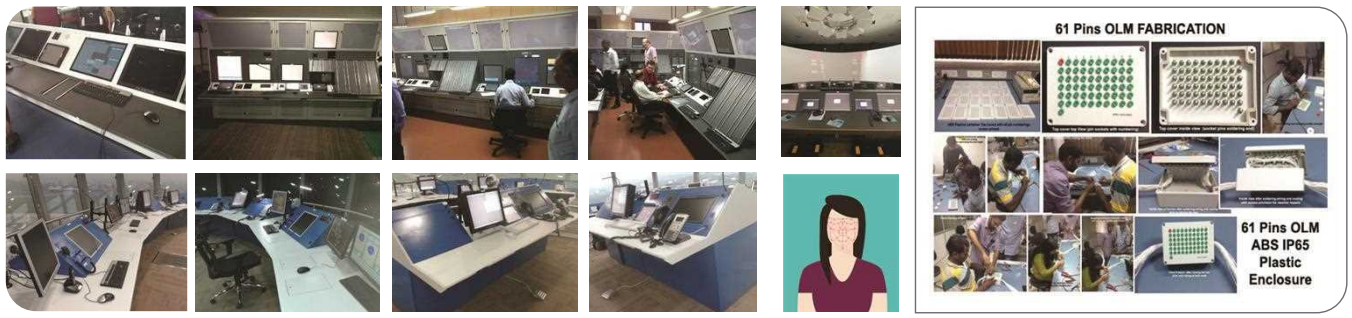
Present capabilities

- Expertise in data fusion of EO and SAR from aerial and satellite imagery.
- Drishti sensor for low altitude imaging.
- Inhouse SAR development capabilities.
- Inhouse Satellite bus development capabilities.

Future plans

- Very high resolution satellite imagery.
- Near real time capture to delivery of fused dataset.
- Edge computing on the satellite
- On demand tasking around the globe.

Grintex India Ltd.



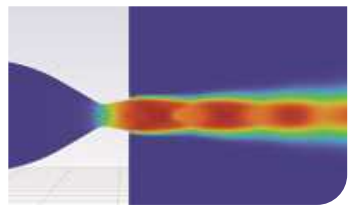
Present capabilities

- System Integration & Engineering services for Defence, Aerospace and Space Industry.
- Air Traffic Control and Airport Safety Systems.
- Ship Design, Construction Supervision & Integration Services.
- Satellite Communications, Design and Implementation.
- Surveillance & Security Systems.
- Software Development & Maintenance.
- Artificial Intelligence (AI – NLP and Computer Vision, Audio and Acoustics analysis),Web based Technologies.AR/VR, Mobile Apps.

Future plans

- Support Make in India initiatives for Govt. of India in existing domain areas.
- LEO Nano Satellite constellations for Aviation, Meteorology and Marine applications and support services /data products.
- AR/VR/MR and METAVERSE Applications in Ground Segment-Space Technology areas to support ISRO Programmes.
- Cutting edge Technologies to MBRSC, Dubai in Aviation, Marine, and Space Sectors. setting up satellite manufacturing and services in the UAE as an eligible UAE defense offsets with maximum multiplier benefits.
- Technical work contract Human resource services for ISRO, DEFENCE & AEROSPACE Organisations.

InspeCity



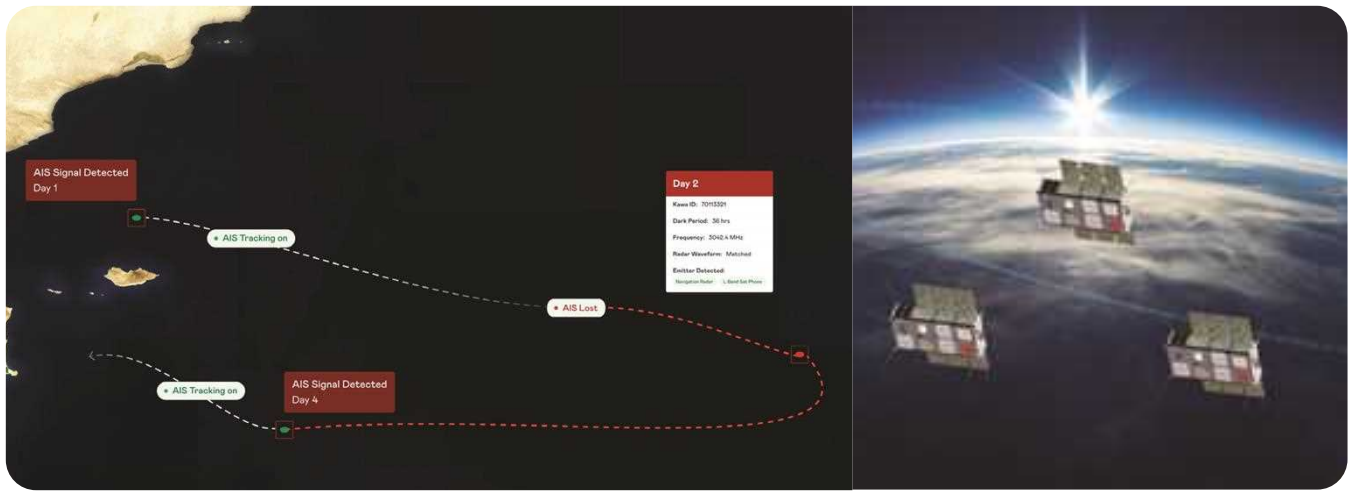
Present capabilities

- Cubesat propulsion systems
- Microsat propulsion systems
- Rendezvous and proximity operation systems
- Thrust stands

Future plans

- Satellite (individual and constellation) deployment
- End-of-life deorbit
- Refuelable propulsion systems
- Mission extension

Kawa Space



Present capabilities

Maritime Domain Awareness Toolkit

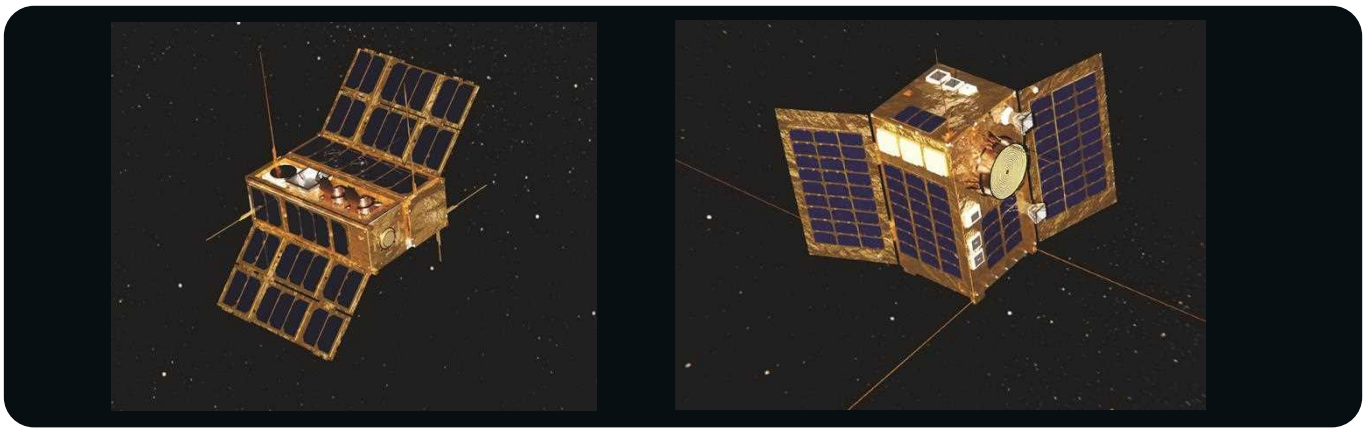
- Powerful software platform to combine AIS, SAR & RF geo-Intelligence.
- Monitoring S & X Navigations radars to track any vessel activity.
- Dark Vessel identification using data fusion and AI.
- Deployment-ready solutions for IUU fishing, Decarbonizing Maritime Transport, and Global maritime logistics monitoring.
- End user query processing within milliseconds.

Future plans

Complete ISR stack powered by Kawa's 18 Satellite RF Constellation

- Frequency mapping from 30 MHz to 18 GHz
- Near-real-time visit to any location
- Area Domain Awareness Toolkit
  - SIGINT, ELINT and MDA as a Service
  - Age of Data as low as 30 min
  - Millions of square kilometres covered in each scene/capture
  - Emitter location accuracy of <100m

Kepler Aerospace



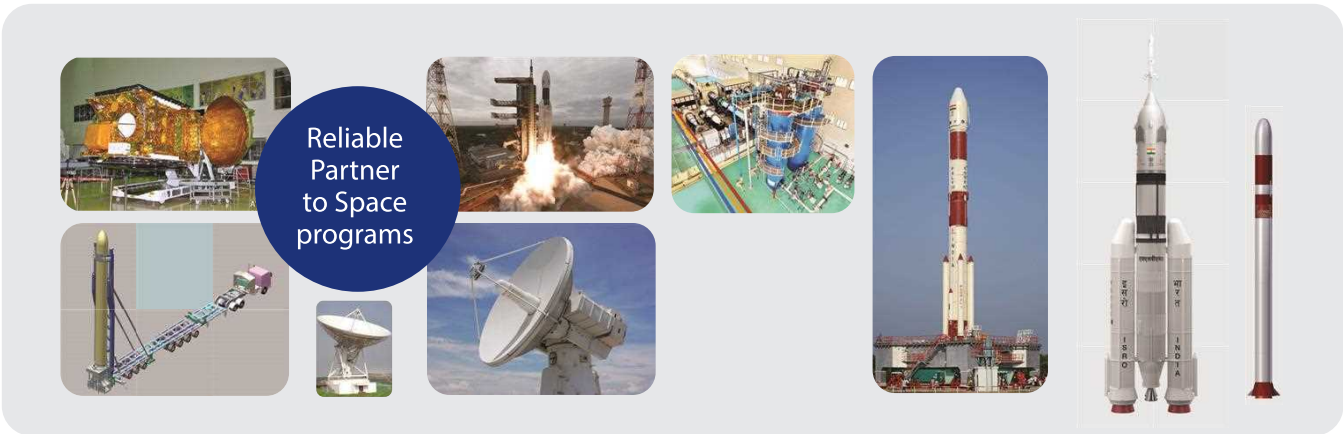
Present capabilities

- Satcom equipment capable of TX up to C band and RX up to X band, to be used in remote ground stations for turnkey operations.
- Offering ground station as a service through the Kepler United Satellite Command Centre Backend infrastructure.
- Developed Long Range UHF TTC, UHF Beacon for spacecraft, Multi band SDR based TX/RX, Micro Space grade GNSS for small satellites.
- Satellite subsystems such as communications systems, ADCS, GNSS receivers and satellite systems engineering.

Future plans

- Formation flying Spectrum Monitoring ELINT satellite constellations monitoring 90 MHz – 3 GHz and Data Link through S/X band.
- EO satellites and satellite constellations for persistent Intelligence, Surveillance and Reconnaissance.
- Ultra ruggedized GNSS solutions for satellite, drone and hi-rel applications.
- Encrypted high reliability high data rate transceivers and data links
- Intelligence, Surveillance.
- Intelligence as a service
- Reconnaissance data-as-a service.

Larsen & Toubro



Present capabilities

- System Integration for Launch Vehicle
- LV Subsystems (PSLV,GSLV,GSLVMK3, SSLV)
- Satellites Subsystems (SADM, RADM, Solar Substrates, Bus structure, ADCS)
- SATCOMM infrastructure (Gateways for GSAT)
- Antenna & Radars
- R&D Test facilities (Wind tunnels/High altitude Engine test)
- Space grade Additive Manufacturing
- Composite structures for Space crafts & LV

Future plans

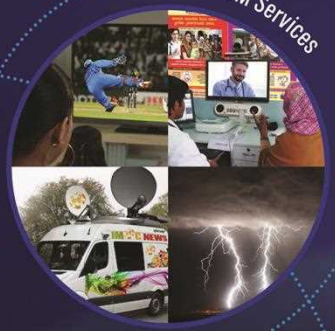
- End to End Launch Solutions
- System integration of LV's
- System Integration of Satellites
- Mobile Launch Solutions

Self Reliant Space Ecosystem

Satellite Based Services

Launch Services To Global Customers

SATCOM Services



Satellite Manufacturing, Assembling & Testing

Remote Sensing Services

Technology Transfer & Technical Consultancy

Satellite Building & Ground Segment

Space Technologies
Towards a New Paradigm

Manastu Space Technologies

Present capabilities

Developing Green Propulsion system for satellites. Including:

- High Performance fuel – A new hydrogen peroxide-based fuel with additives to enhance performance.
- Reliable and efficient engine – A new combustion chamber for the fuel.
- Ultra-high temperature catalyst - This catalyst faces 1400 degree Celsius, making it the world's most cutting-edge catalyst.

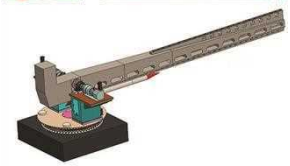
Future plans

- In-Space Refuelling
- Life Extension Services
- De-Orbiting Services

MISSAR Systems

Capabilities





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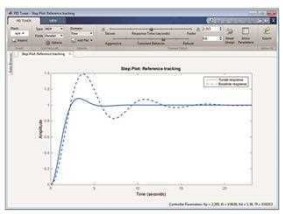


Electronics

- Embedded Design
- RF Design and Analysis
- DSP and FPGA Based Processing

Robotics

- Stationary Robots, Mobile Robots
- Mechanical System Analysis
- Antenna and Radar Pedestals

Instrumentation

- Control System Design
- Stability Analysis
- Servo Loop Tuning
- Bandwidth Calculation and Compensator Design

Verticals


Space


Oil and Gas


Aerospace and Defence


Robotics


Consumer and Industrial Electronics


Railways

Portfolio

Developed 50+ Industrial Products for various Industries for Indigenisation.

Executed 10+ Product/Project for ISRO like Satellite Gateway Unit; Servo Control System for X-Band PSR, X-Band DWR and C-Band DWR; Vehicle Tracking using NavIC; High Precision Water Level Measurement etc.

Developed 15+ Products and Prototypes for PSUs and Government Organisations like Indian Army, ONGC and Indian Railways like Vehicle Tracking Unit, SRP Remote Monitoring System, Universal Input USB Charger etc.

Future Plans

Development of Indigenous Servo Control and Motion Control Components as well as Hardware

Navigation and Positioning Systems for Military Use

Gyro Stabilised and Reaction Wheel Systems

MTAR Technologies Ltd.

Catering to Propulsion Systems since 1980s

Satellite Valves

Ball Screws

Stage 1: Electro-pneumatic Modules

Stage 2: Upper Stage Cryogenic Engine Sub Systems Cryogenic Upper Stage (Injector Head, LH2 Turbo Pump Assembly, LOX Turbo Pump Assembly and Gas Generator)

Stage 1: Vikas Engine

Present capabilities

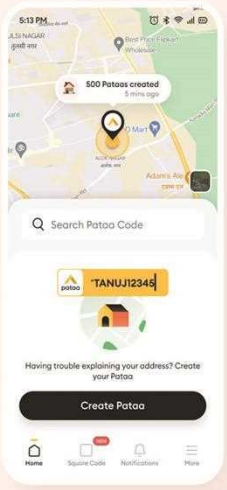
- MTAR has been catering to Indian Space program for more than three decades.
- The company is equipped with advanced machining, assembly (2*10,000 class clean rooms) and state-of-the-art quality control facilities
- MTAR supplies the following products to ISRO
  - Vikas Engine
  - Upper Stage Cryogenic Engine Sub Systems
  - Electro-pneumatic modules
  - Satellite Valves
  - Semi Cryogenic Engine Combustion Chamber
  - Grid Fin for Gaganyaan project

Future plans

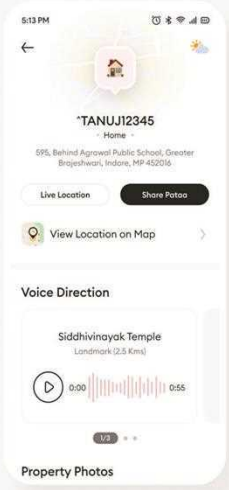
With a vision to graduate into system design and development, MTAR has initiated the development of a Two Stage to Low Earth Orbit Small Satellite Launch Vehicle powered by Semi Cryogenic Propulsion with 1000 kN thrust booster engine in the first stage and 100 kN thrust cruising engine in the second stage for a payload capacity of 500 kg with the support of ISRO through IN-SPACe

Pataa Navigations Pvt. Ltd.

^Pataa - Your uique digital address code

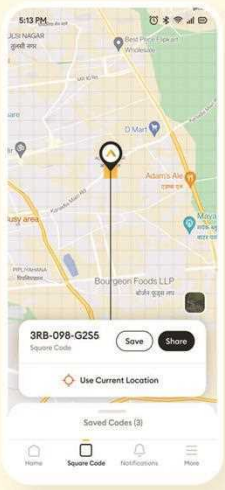


Share ^Pataa for online orders and with visitors



No more explaining calls on address

Share your current location instantly



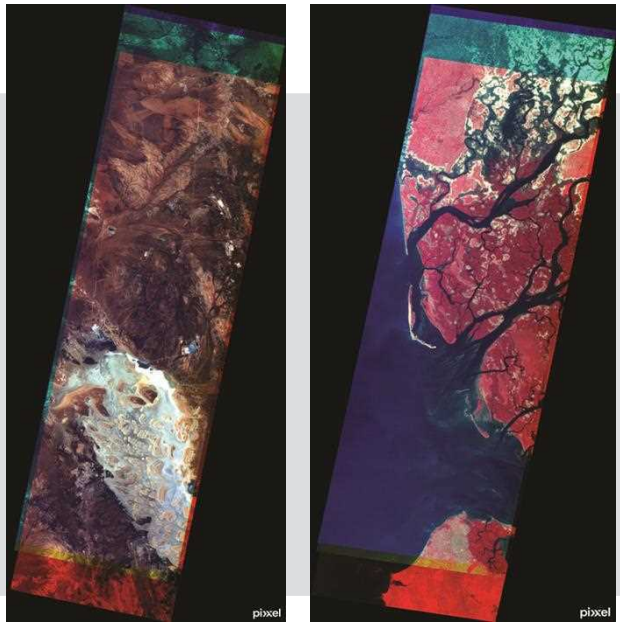
Present capabilities

- Digital Addressing
- Geo tagging
- Solutions for Logistics & Delivery companies
- Drone Delivery Solutions (API)

Future plans

- Augmented Reality on Maps
- Location intelligent solution by predictive proximity

Pixxel



Present capabilities

- Pixxel is a space data company, building the world's first constellation of hyperspectral earth imaging satellites and the analytical tools to mine insights from that data. The constellation is designed to provide global coverage every 24 hours, with the aim of detecting, monitoring and predicting global phenomena.
- First Indian company ever to launch a commercial private EO satellite.
- Raised $35M to date from Lightspeed, Accenture, Radical, In-Q-Tel, Blume and others.
- 3 fully functional demo satellites in orbit with sample imagery being beamed down regularly.

Future plans

Key Products:

- Hyperspectral Satellite Imagery: Building the world's highest resolution hyperspectral satellite constellation at 5m spatial resolution, 250+bands of information at a 24-hour refresh rate. This provides 50x more information than existing satellites in orbit.
- Geospatial Analytics Platform: For rapidly deployable use cases: A sandbox environment for developers to build automated workflows to generate relevant insights.

SatSure Analytics India Pvt. Ltd.

SATSURE

Present capabilities

- Monitoring one million+ sq. km every week
- **SatSure Sage:** It is an agricultural loan lifecycle risk management product suite through which we have enabled more than 2 million farmer loans.
- **SatSure Sparta:** An application and API-ready remote sensing data products platform for AgTech and Climate-Tech. Through this platform, we have classified 18+ crops and have monitored 300+ districts in India alone.
- **SatSure Skies:** A high-resolution satellite imagery change detection product suite for Infrastructure, Power Utilities, Renewable Energy, Oil and Gas and Aviation.
- **Four patents** were filed, and **two patents** were received for remote-sensing data products.
- **SatSure Cygnus:** An all-weather vegetation monitoring data product that reconstructs optical satellite data from Synthetic Aperture Radar (SAR) data.
- A farm scoring patent was received, which uses satellite imagery and AI to create land scores for crop loan underwriting.

Decision Intelligence from Space

Future plans

- **KaleidEO:** A subsidiary of SatSure, where we plan to launch a fleet of four high-resolution, optical, multispectral satellites.
- An innovative AI-on-the-Edge processing capability will drive the satellites.
- Expanding business opportunities across North America, Latin America, Africa, and Asia Pacific.

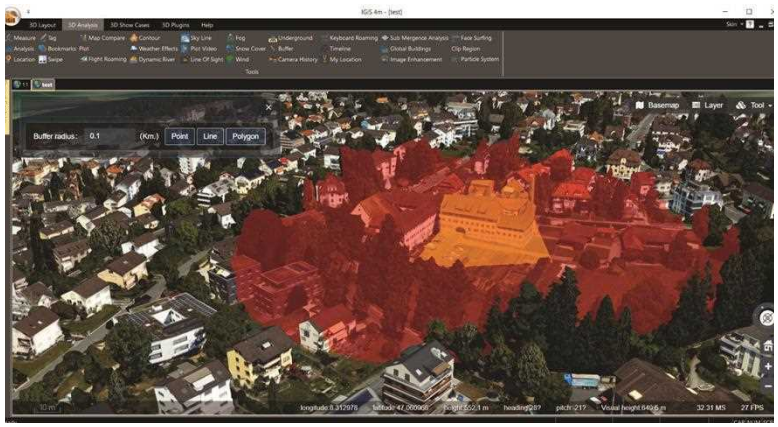
Scanpoint Geomatics Ltd.

IGiS Technology Development Partners

SGL SCANPOINT GEOMATICS LIMITED | इसरो isro

Present capabilities

- IGiS – An Integrated Geospatial software platform for
  - GIS, Image Processing and Photogrammetry
  - Advanced geo-analytics using AI/ML
  - Seamless experience - Web, Mobile, Desktop
  - Global scale 3D Data support
  - Compliant to OGC and other global standards
- IGiS based frameworks for industry verticals like Urban & Smart Cities, Agriculture & forest, Land Records, Disaster Management, Utilities, Geology & Mining, Water Resources, Spatial Data Infrastructure etc.
- End to end Geomatics Solution Provider.



IGiS GIS & IP Desktop

IGiS GIS & IP Enterprise Suite

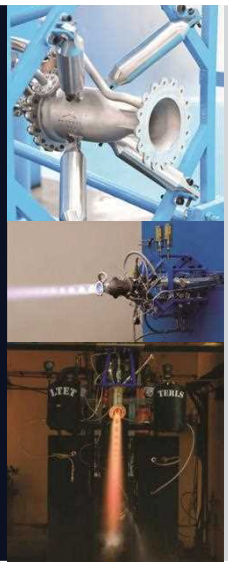
IGiS Photogrammetry Suite

IGiS 3D Pruthvi

Future plans

- IGiS Based Cloud native solutions like
  - Geospatial Platform As A Service
  - Geospatial Framework As A Service
  - Mobile GIS As A Service
- Geo-enabled Agri-tech Platform

Skyroot Aerospace



SKYROOT
AEROSPACE

1st private company to launch a rocket to space in south asia on 18th Nov. 2022

Present capabilities

- Flight proven Avionics, Solid Propulsion, Structures, Thermal, Aerodynamics, Trajectory, Navigation and Control systems
- Proven Sub-Orbital Space Launch Capability
- All Composite Launch Vehicles
- 3D-Printed Cryogenic and Earth Storable Engines
- AI & ML based Indigenous Software Development

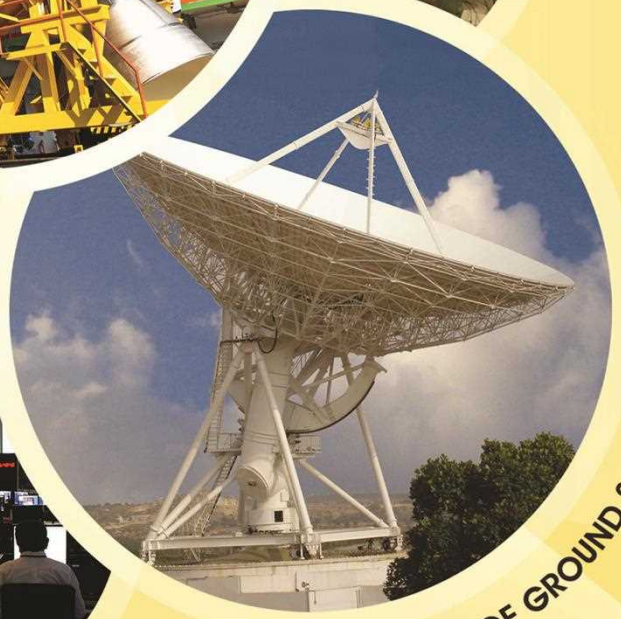
Future plans

- Regular Orbital Launches
- Assembly to Launch in 72 hours
- Modular Upgradation of Launch Vehicles
- Establishment of World-class Integrated Manufacturing, Testing, and Qualification
- Facility Interplanetary Missions

NewSpace India Limited (NSIL)

LAUNCH VEHICLE BUILDING

OWNING & OPERATING SATELLITES

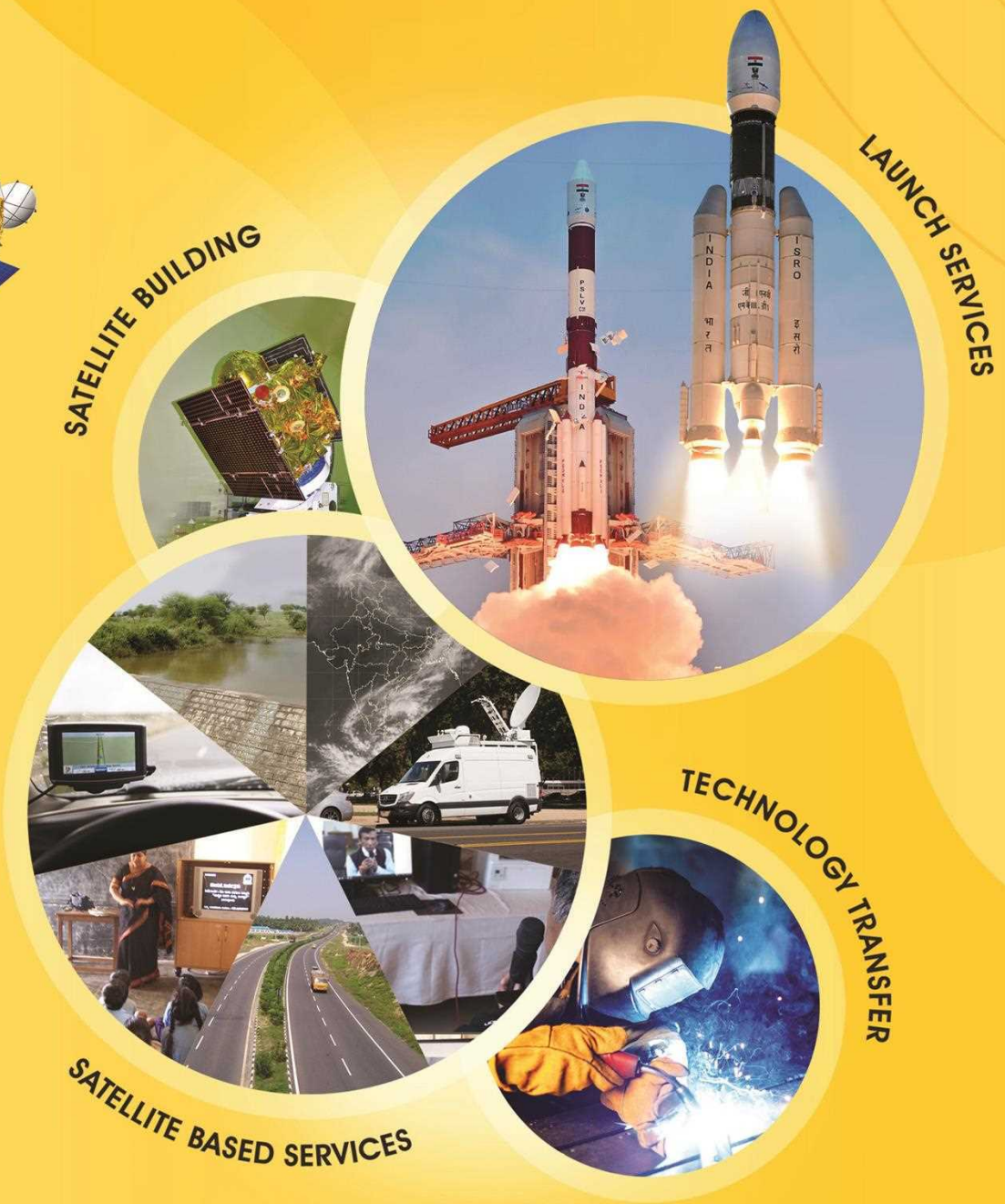


ESTABLISHMENT OF GROUND SEGMENT

MISSION SUPPORT SERVICES

NSIL
एनसिल

A Central Public Sector Enterprise (CPSE)
under Department of Space



Space Kidz India

Present capabilities

- Nanosatellite Bus Manufaturing
- Hosted Payload Platform
- Ground Station Tracking
- Complete Nano Satellite Subsystems

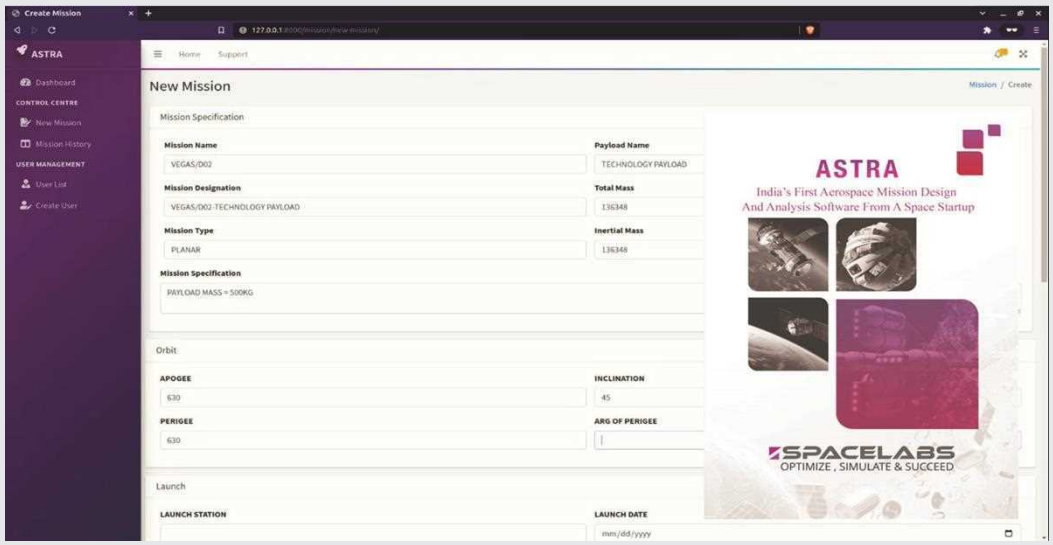
Future plans

- Microsatellite Buses
- Higher Orbit Capabilities with on-board propulsion
- Mission to Lunar Orbit
- Space Rikshaw

SPACELABS

SPACELABS
OPTIMIZE , SIMULATE & SUCCEED

'THESPACELABS' is the first and the only startup in India, to provide products and services in the area of aerospace mission design and simulation.



Present capabilities

We have software products to cater the need of the Aerospace industry

- ASTRA - AeroSpace TRAjectory optimizer
- SARAS6 – Simulator for AeRospace ApplicationS - 6 DOF
- SARAS6-RT- Simulator for AeRospace ApplicationS -6 DOF Real-Time

Future plans

ERP based data management and Big data analytics for the aerospace industry.

Tata Advanced Systems Ltd.

Present capabilities

- Assembly, Integration and Testing of various satellites for ISRO
- Satellite components such as metallic/composite parts for Satellites and Launchers
- Ground Stations such as Mobile Telemetry System for LCA and Modern Air Defence Command & Control System

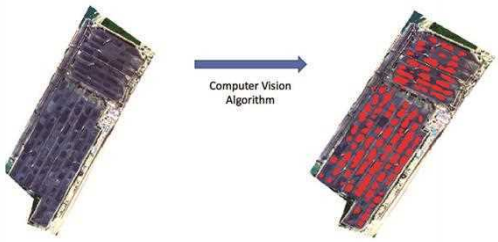
Future plans

- Providing End to End satellite based solutions to India and its friendly countries

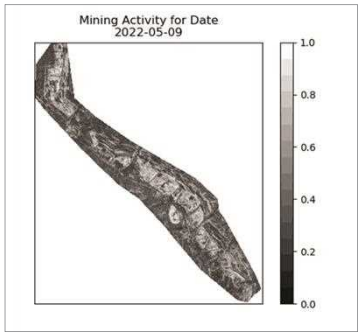
Tathya

Current set of Products

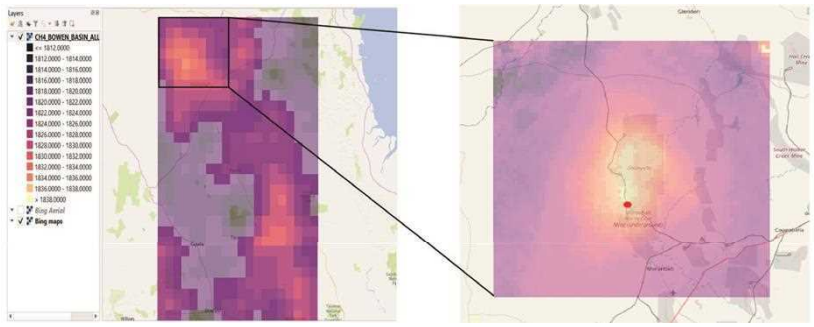
Monitoring Production from heat emitting sources i.e. Steel, Copper smelter



Monitoring Open Yard stockpiles i.e. Coal, Ironore



Monitoring mining production open pit mines



Future plans

- Flood Monitoring
- Deforestation
- CO2, Sox, Nox emission monitoring
- Commodity price forecasting
- Supply chain risk management

Transcend Satellite Technology LLP

12U Cube Satellite Design with deployable solar panels

Present capabilities

- Payload Development
  1.1) Communication Payloads based on SDR and IoT
  1.2) Quantum Encryption Payload for satellite communication
  1.3) Earth Observation Payload Design for flood monitoring
- End to End Satellite Design (1U to 27U; 100-200 Kg Satellites)
- Student Satellites (1U to 3U)
- Student CubeSat Kit for training and workshops

Future plans

- Constellations of Earth observationSatellites for for military, defence and social purposes
- Design satellites for Earth health monitoring
- Satellite to demonstration secure quantum communication.

Walchandnagar Industries Ltd.

Present capabilities

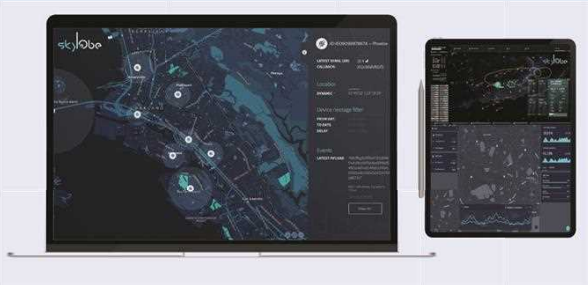
- State of the art manufacturing facilities & Skilled team coupled with 5 decades of expertise in manufacturing Solid Metallic Rocket Motor Cases (RMC) ,Nozzles & subsystems for Launch Vehicles
- Leading edge Testing labs, ND examination & Data Acquisition- Tool Room
- Exclusive Proof pressure Testing facilities for RMC segments for PSLV, GSLV MKII/III, SSLV & Human rated LV.
- Developed subsystems for Crew Escape system for Gaganyaan

Future plans (FY 23-24)

- Composite Rocket Motor casing & Nozzle hardwares
- Huge capital expenditures for increased production rate.

Xovian Aerospace Pvt. Ltd.

RADIO BASED GEOINT & SIGINT INFRASTRUCTURE



Present capabilities

- RF Based Nano Satellite
- RF Monitoring Payload 100MHz to 18 GHz
- Satellite bus & Subsystems

Future plans

- Satellite Constellation
- GEOINT & SIGINT Decision Intelligence Platform
- Full scale Spectrum Monitoring

YADS Technologies Pvt. Ltd.

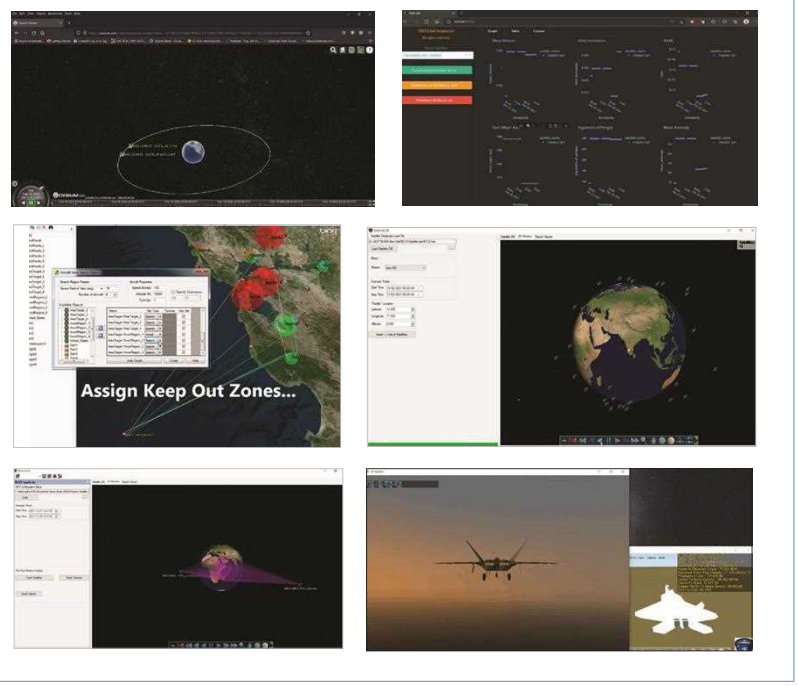
YADS Technologies has a vision of equipping India with a complete indigenous solution in the space sector by establishing an integrated ground station to carry out SSA operations and support space industries with essential data for their space operations.

YADS' Market

- Aircraft & UAVs Mission Planning
- Satellite Communications Analysis
- TT&C
- C4ISR
- GIS Solutions
- Artificial Identification System (AIS)
- Space Situational Awareness (SSA)

Current YADS Products

- Space situational Awareness - TT&C, Manoeuvring and collision alerts
- Aircraft Mission Planner - Escape Routing, Coverage analysis, Sensor field of view analysis
- Automatic identification System
- X-Plane live streaming with RF Communications.5. Drone integration for real-time communication analysis.



A view of Design Lab established at IN-SPACe

PROVIDING SPACE FOR BETTER TOMORROW...

“There should be no space between the common man and the space technology”

Hon’ble Prime Minister **Shri Narendra Modi**

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