Engineer Your CubeSat
Frugal Way to Access LEO

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Chairman, UNISEC INDIA

Brief Bio...

- President – Indian Technology Congress Association
- Chairman - 75 Students' Satellites Mission
- Global Fellowships: FRSC, IEI, IEEE-Eta Kappa Nu, and IET(UK)
- Formerly President – The Institution of Engineers (India)
- Formerly Director – National Design and Research Forum

University Space Engineering Consortium

UNISEC GLOBAL

Space International, a nonprofit, non-governmental organization

Focus on global sensitization for space debris mitigation, and identify approaches

Expand global footprint in each nation to progress UNISEC charter

Evangelize the use of nanosatellites through Mission Idea Contest and build synergy with the International Space Station

UNISEC INDIA

India Chapter, established November 2018

Rapid expansion-48 Local/ Institutional Chapters

Launch of UNITYSat-28 Feb 2021

Incorporation of the Startup -
TMISAT, Israel and

TSC Technologies Pvt Ltd

Development Partner for ITCA's
75 Students' Satellites Mission

20 CanSat Competitions

OUTCOMES...

CanSat to CubeSat Hands-on Up Skilling
Launching of CanSats
Webinar /Seminar/Workshops
MoUs and Collaborations

Payload Competitions
Publications, Patents and IPRs
Satellites Built and Launched
Ground Stations Established

It’s an ‘Up and Coming’ growth sector

- **Space Transformation**
  Race 1 to Race 2
- **Growth Engine for Global Economy**
  VCs, Private equity, PPP, SPACs and coporate players
- **Potential Space Business**
  USD 1.1 Triliion
- **Mass and Mega Missions**
  Webb Observatory, Constellations, Planet Missions – Moon/Mars/Venus/ Sun, Astroid Programme, Space Tourism, etc.
- **Space Industrialization**
  Entrepreneurs and Startups

- **Increased Lunches**
  140+; SpaceX- Starlink, Uk’s OneWeb, Boeing
- **Nation’s Transformation**
  Spacefaring to Spacecrafting, Geo-Political and National Security Interests
- **Emerging Business Opportunites**
  Upstream and Downstream
- **Rapidly Emerging Technologies**
  AI, AR, Robotics, Blockchain, NFTs and more
- **Space Resources**
  Mining, Energy, new Scientific Discoveries, and Debris Mitigation

Driving forces

Influential Commercial Factors, Enhanced Effient Technologies, Human Imagination

Indian Space Sector – A Snapshot

Azadi Ka Amrit Mahotsav

To celebrate and commemorate 75 years of Independence

Dedicated to the people of India through its evolutionary journey fuelled by the spirit of AatmaNirbhar Bharat

The "75 Week" Agenda

ISRO - 75 images captured from Chandrayaan-1, Mars Orbiter Mission, AstroSat and Chandrayaan-2; Space on Wheels; 75 Major Activities of ISRO - Coffee Table Book

The Mahotsav's Ideology

Freedom Struggle

Ideas@75

Resolve@75

Actions@75

Achievements@75

We honor the Mahotsav through amazing Missions in NewSpace

India@75
The Tech Outlook

USD 5 trillion economy by 2024-25 and
a USD 10 trillion by 2030

Make-in-India, Atmanirbhar Bharath,
Azadi Ka Amrit Mahotsav

Start-up Culture
16 January - National Startup day

BharatNet project and Roadmap for
5G Ecosystem

National Mission on Quantum Technologies &
Applications (NM-QTA)

Establish leadership in satellite launches for other nations, and Contribution to Global Space Economy

Current decade
TECHADE

- Honourable PM of India

Innovation, Entrepreneurship and Startups

Changing Scenarios in NewSpace

Digitalization

New functionality and applications

Miniaturization

MEMS, Smart Sensors, PCBs, Data Processing and Solar Cells are all manifestation's

Industry 4.0

Constellations are examples of mass fabrication, 3D printing

Adaptability

Designs, Computing, Software and Apps

Availability

Commercial-off-the-shell **(COTS)** Space Components

Affordability

Reduced Development Lifecycle considers risk, cost and time to market

Space Technologies for SDG2030

Crop Productivity Optimization

Food security and safe distribution

End Malnutrition's

Geo-Referenced Baseline Inventory of Skill Facilities

Tele-Education to Overcome Geographic Limitations

Literacy Enrichment

Urban Planning and Infrastructure Monitoring

Expansion and Improvement of City Services

Deployment of sensor based smart waste management systems

Monitoring and Prevention and planning of infectious diseases and epidemiology

Regulating Air pollutants

Telemedicine and Telesurgeries

Climate early warning systems and mitigation plans

Reduce Global Co2 levels

Human and Institutional Capacity Building

Increase afforestation and reforestation

Biodiversity protection and Predicting conservation hotspots

Identifying human-animal conflict zones

Engineering Your CubeSats

- ITCA Initiative in 2018 ”Engineer Your Satellite (EYS)
- Capacity Building Programmes –

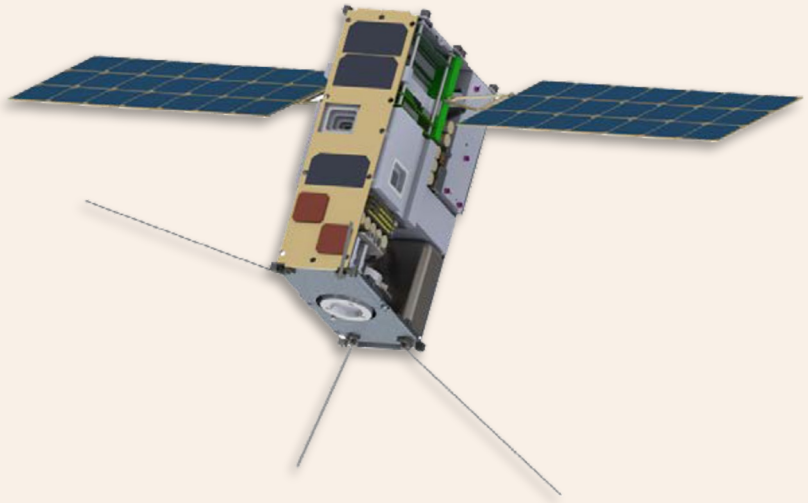
  Training, Upskilling, Certification and Visits
- 75 Students’ Satellites Mission
- Student Sat Eco-System in India
- UNISEC India Patronage

Frugal Way to Access LEO

- GEO to MEO to LEO
- Emerging Applications – Communications, EOs, Tourism
- Miniaturization, Digitalization, Reduced Life Cycles, Affordable Cost etc
- Small and Reusable Launch Vehicles
- Start-ups, Entrepreneurships, Investments
- Space Stations, Space Enabled Manufacturing
- Sustainable Eco-system for LEO Economy and Commercialization

The Engineering of SmallSats

- Six decades of competency and One Decade of extraordinary growth
- SmallSat revolution: CubeSats, NanoSats, PicoSats, FemtoSats, CanSats; weighing less than 600 kilograms
- Forty percent of all SmallSats launched in the past decade were launched in 2020 onwards
- **40+ Thousand satellites are to be built and launched by 2030**
- **Markets currently registering at a CAGR of 16.4%**
- Dominated by SpaceX, Starlink and OneWeb constellations
- Communications, remote sensing, and military intelligence, scientific data collection, monitoring natural and human-made disasters among others



In the foreseeable future, we will witness further transformations

75 Students' Satellites Mission

Scope

Launching
75 student-built
SmallSats to LEO

Objectives

Build and sharpen students' skills in design, development, manufacture, integration, testing, launch, and monitoring of small satellites

Methodology

Providing science-based education and experience-based learning with mentoring by ITCA's renowned SpaceTech teams. Strengthening skills in systems engineering and project management

Through this unique mission, students will be able to compile a portfolio of signature space projects that will highlight their competencies

Prime Minister's Vision...

The Mission's purpose is to encourage students to embrace

STEM education

in pursuit of long-term professions through

experiential hands-on learning.

It provides innovative, fascinating, and

constructive space projects

that foster problem-solving and critical thinking.

Ethos...

INDIAN TECHNOLOGY CONGRESS ASSOCIATION

ITCA is a platform that connects bright minds, entrepreneurs, and innovators to faster ideas, concepts and builds NewSpace solutions through the 75 Students' Satellites Mission.

UNISEC INDIA
University Space Engineering Consortium

UNISEC is a global organization focused on creating a world using space science and technology for the greater good. Emphasis is on creating a world where global university students can participate in practical space projects

In Synergy with...

INDIAN TECHNOLOGY CONGRESS ASSOCIATION

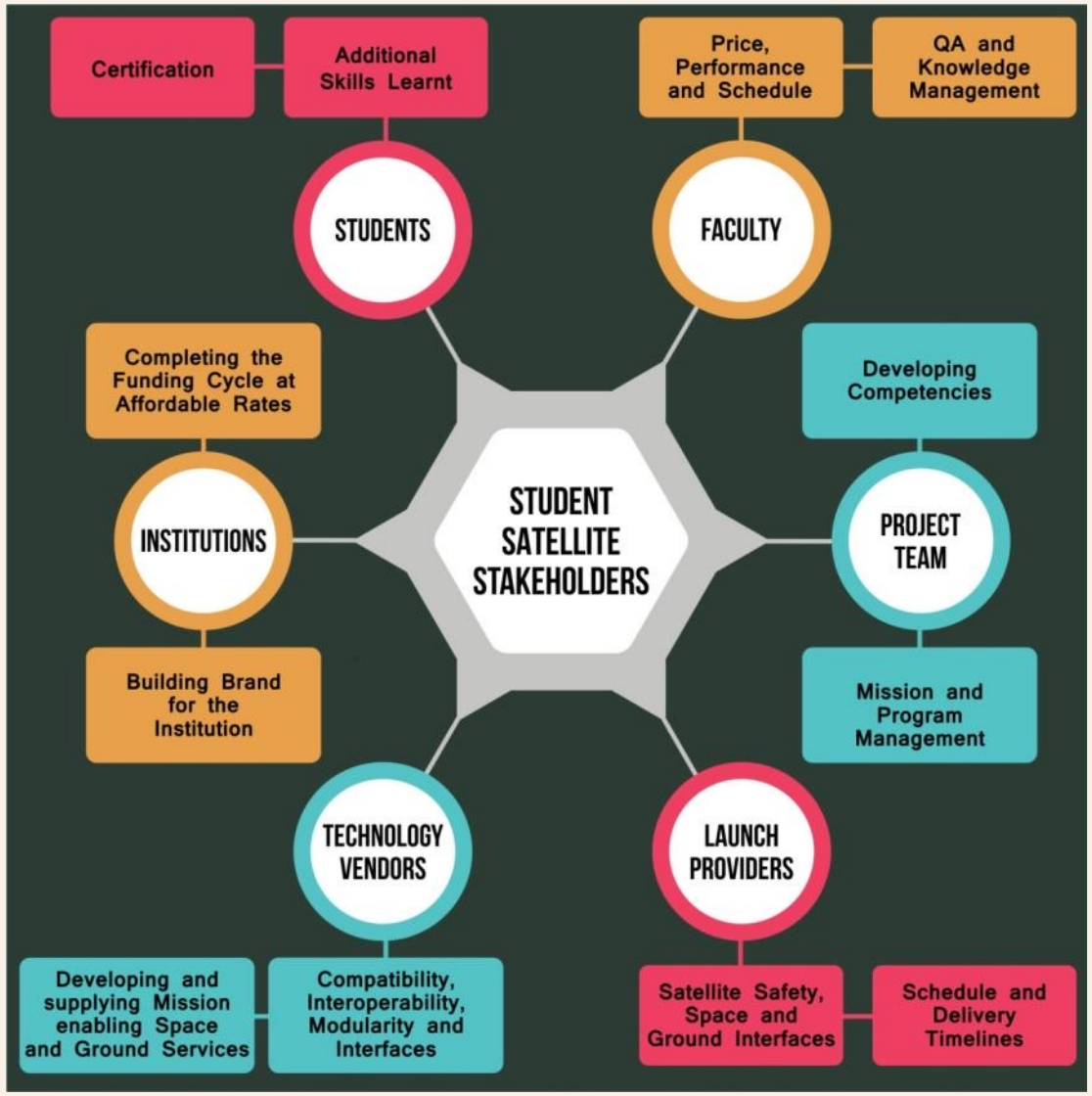
ISRO | NSIL | KSTePS | SYMBA-MAZ Business Consortium | BRICS | КРСП/CSPD | VALLES MARINERIS space innovation and beyond | PA Planet Aerospace | ATL ANANTH TECHNOLOGIES LTD | ALPHA DESIGN TECHNOLOGIES | NEW TECH SOLUTIONS | UNISEC INDIA University Space Engineering Consortium | DUCOM AEROSPACE | KARNATAKA HYBRID MICRO DEVICES LTD. | mp Micropack Limited macro quality in micro circuitry | PCB POWER MARKET | KEPLER AEROSPACE | DHRUVA SPACE

India | Israel | France | Russia | Canada | Spain | United Kingdom | United States

Japan | Italy | Serbia | Germany | Netherland | Portugal | Tunisia | Peru

Value Proposition

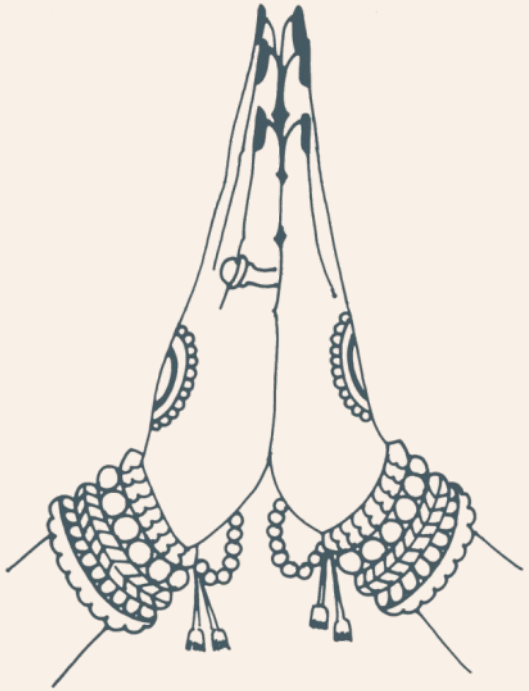
- Space and related technologies will be critical for the next two-three decades. Students will have significant opportunities for growth and success
- Multidisciplinary learning framework, transnational technology culture and entrepreneurial spirit are essential for success
- Faculty can enhance their competencies and progress research activities
- Universities / Institutions gain substantially through collaborative incubation with industry and R&D organizations' participating



The Space Endeavors, What Next?

- To Create future workforce through robust Student-centric content for NewSpace Challenges
- To Create campus ecosystem by stimulating students' entrepreneurial mindset to establish Startups and Industry
- Strengthen Space 4.0 assets and infrastructure for SmallSat development through partnerships
- To deepen the faculties interdisciplinary competencies to pursue research in SpaceTech

75 Satellites Mission to deliver value for institutions, faculty and students in the realm of NewSpace



Thank You...