



UNISEC-Global The 21st Virtual Meeting

May 16, 2022, 22:00-24:00
(Standard Japan time GMT +9)

21ST VIRTUAL UNISEC-GLOBAL MEETING

Moderator: **Ms. Bhavana Savanth**, 75 Satellites Project/TSC Technologies **May 21, 2022, Time: 22:00 - 24:00 (JST)**

OPENING REMARKS
Dr. L.V. Muralikrishna Reddy
 President, UNISEC India, President, Indian Technology Congress Association and 75 Students' Satellites Consortium, Mission 2022

KEYNOTE SPEAKERS

Padma Shri Dr. Mylswamy Annadurai
 Outstanding Scientist, Former Director, ISRO Satellite Centre, Project Director, Chandrayaan 1 & 2 and Programme Director, Mars Orbiter Mission (MoM)
Topic: Engineer Your CubeSat: 75 Students' Satellites Mission 2022 to Celebrate India's Freedom 75 Years

Er. Dušan Radosavljević
 Head, Committee for Space Programme Development (CSPD), Serbia, Founder World CanSat Rocketry Consortium (WCRC) and POC, UNISEC Serbia
Topic: Introduction to World CanSat/Rocketry Championship - WCRC

Er. Nikhil Riyaz
 Student Representative, UNISEC India, Founder CEO, TSC Technologies P Ltd and Core Technical Team, 75 Students' Satellites Mission 2022
Topic: Report on UNISEC India Chapter Activities and Noteworthy Events

ANNOUNCEMENT & CLOSING
Rei Kawashima, UNISEC-Global and those who have announcements

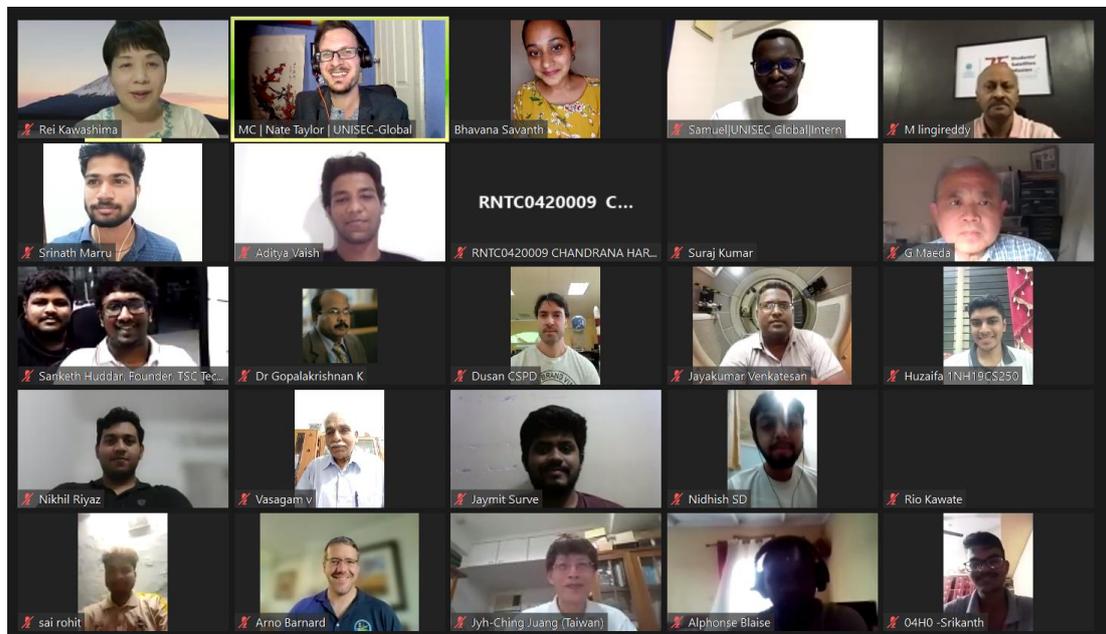
Dr. Jayakumar Venkatesan
 Director of Human Spaceflight Research, Analog Astronaut Training Center, Poland and Valtes Marinis International Private Limited (Aerospace Company), India
Topic: Space Exploration and Analog Astronaut Training Opportunities

Padma Shri Prof. R. M. Vasagam
 Eminent Scientist, ISRO, Project Director, India's First Geo-Stationary Communication Satellite "APPLE", Former Vice Chancellor, Anna University, Dr MGR University
Topic: Space Applications for Early Warning Systems, Disaster Mitigation and Management

Theme
Engineer your
CubeSat: Frugal
Way to Access
LEO

THANK YOU

<http://www.unisec-global.org/virtual-meeting.html>



The following report was prepared by UNISEC-Global Secretariat
 May 16, 2022.
 Japan

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1. Opening Remarks

Dr. LV Muralikrishna Reddy, The President of UNISEC-India

Dr. LV Muralikrishna Reddy is the president of UNISEC India, president of Indian technology congress association (ITCA) and 75 students' satellite consortium mission 2022. Under his leadership, the mission was well appreciated throughout the country with the Honorable Prime Minister specifically mentioning it in the recent UNGA address. He is a recipient of noted Global Awards including the coveted fellowship of the Royal society of Chemistry and IEEE-Eta Kappa Nu recognizing individual excellence in education and meritorious work in professional practice. Dr. Reddy was bestowed the honorary fellow, institution of engineers for his singular contribution for the growth of India's Engineering profession and efforts to forge bilateral ties.



Pictured: Dr. LV Muralikrishna giving the opening remarks for 21st UNISEC Global Virtual Meeting

Highlights:

- With the help of UNISEC GLOBAL, UNISEC INDIA has reached great heights for spreading the space activities in India from during the pandemic to now:
 - Established in November 2018 has rapid expansion to 48 Local/Institutional Chapters
 - Launch of UNITYSat on 28Feb 2021
 - Incorporation of startup- TMISAT, Israel and TSC Technologies Pvt. Ltd.
 - Development Partner for ITCA's 75 students' Satellites Mission
 - 20 CanSat Competitions
- Partner ecosystem for student satellite development activity has generated some outcomes:
 - CanSat to CubeSat hands-on
 - Launching of CanSats
 - Webinar/Seminars/ Workshops
 - MoUs and collaborations
 - Payload competitions
 - Publications, patents and IPRs
 - Satellites built and launched
 - Ground stations established
- To harness the 75 years of independence of India named under Azadi Ka Amrit Mahotsav, 75 students' Satellite Consortium Mission is commemorated and celebrated
- A snapshot of India's Technology Outlook:
 - Expected to have a USD 5 trillion economy by 2024-25
 - Lot of missions by Make-in-India, *Atmanirbhar Bharath* (translation: self-sustained India)
 - Declared 16th Jan as National Startup Day
 - Declared current decade as **TECHADE**

- BharatNet project and roadmap for 5G Ecosystem
- National Mission on Quantum Technologies and Applications (NM-QTA)
- Contribution to Global Space Economy
- Factors like digitization, miniaturization, Industry 4.0, adaptability, availability, affordability are changing scenarios in new space economy
- SDG 2030 is another focus of Indian Technology Congress along with UNISEC India
- **Engineering Your CubeSats**
 - ITCA Initiative in 2018 ‘‘Engineer Your Satellite (EYS)
 - Capacity Building Programs – Training, Up Skilling, Certification and Visits
 - 75 Students’ Satellite Missions
 - 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
 - Small and Reusable Launch Vehicles
 - Start-ups, Entrepreneurships, Investments
 - Space Station, Space Enabled Manufacturing
 - Sustainable Eco-System for LEO Economy and Commercialization
 - 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
 - Dominated by SpaceX, Starlink and OneWeb Constellations
- 75 Students’ Satellites Mission:
 - Scope: Launching 75 student-built SmallSats to LEO
 - Objectives: Make students to go through the entire process of satellite development/launch
 - Methodology: Provide science-based education and experience-based learning
- Purpose is to encourage students to embrace STEM education through hands-on learning
- Provides interesting space projects that foster problem-solving and critical thinking.
- ITCA and UNISEC India has synergy with many national space agencies, industries, state government
- Student Satellite Stakeholders:
 - Students, Faculty, Institutions, Technology Vendors, Launch providers , Project Team
- The Space Endeavors, What Next?
 - To create future workforce
 - To create entrepreneurial mindset
 - Strengthen SmallSat development through partnerships
 - To pursue research in SpaceTech
- 75 Satellites Mission to deliver value for institutions, faculty and students in the realm of NewSpace

2. Presentation on 75 Students’ Satellites Mission

Dr. Mylswamy Annadurai, Indian Space Research Organization

PadmaShree Dr. Mylswamy Annadurai is popularly known as Moon Man of India. He is an Indian scientist, governor, national design and research forum. He was with Indian Space Research Organization (ISRO) and service director satellite research center Bangalore. During his 30+ years of service at ISRO, he’s had some of the major contributions including two of the major missions namely Chandrayan-1 and Mangalyaan. He has been listed among 100 global thinkers of 2014. He is the mentor of TSC technologies, student startup and instrumental for the success launch of 3 nano-satellites; UNITYSat during 28th Feb along with ISRO space LVC51 Amazonia Mission.



Pictured: Dr. Mylswamy provides information on 75 Students' Satellites Mission ISRO and ICTA

Highlights:

- Prime Minister's Vision to commemorate the 75th year of its independence
 - India launching 75 such satellites into space
 - Indian students from schools and colleges
- Students will be able to compile a portfolio of signature space projects and highlight their career
- India started its initial Space program journey with the help of USSR-USA-France
- Started on launching satellites and in 2008 by Chandrayaan-1 making its presence around the moon
- **Indian Space Sector- A Snapshot**
 - DOS -ISRO, NSIL, IN-SPACE; ISA
 - Space Policy – SpaceCom and SpaceRS policies in some states
 - GSLV, PSLV and SSLV
 - New launch facility for SmallSats
 - Contribution to global space economy from 2% to higher levels
 - Gaganyaan – The first Human Spacecraft
 - The moon exploration program – Chandrayaan3; the data of Chandrayaan – 2 mission made available for academia to study and analyze
 - India's Thematic Space Alliances (Quad 1: India, USA, Australia and Japan and Quad-2: India, Israel, UAE and USA)
 - New National Space Ecosystem – Industry, Government and Academia
- The purpose of ITCA is to help in converting Indian- space into a Global Space Hub

Sl. No.	Name of Satellites	Launch Date	Launch Mass	Launch Vehicle	Name of University/ EEI
1.	UNITYSat (3 Sats: JITSat, GHRCEsat & SriShakthiSat)	Feb 28, 2021	1.4 kg	P SLV-C51 Amazonia Mission	JIT, GHRCE and SIET/ TSC Tech)
2.	NIUSAT	Jun 23, 2017	15 kg	PSLV-C38 / Cartosat-2 Series Satellite	Noorul Isalm University
3.	PRATHAM	Sep 26, 2016	10 kg	PSLV-C35 / SCATSAT-1	IIT-Bombay
4.	PISAT	Sep 26, 2016	5.25 kg	PSLV-C35 / SCATSAT-1	PES University & Others
5.	SATHYABAMASAT	Jun 22, 2016	1.5 kg	PSLV-C34 / CARTOSAT-2 Series Satellite	Sathyabama University
6.	SWAYAM	Jun 22, 2016	1kg	PSLV-C34 / CARTOSAT-2 Series Satellite	College of Engg, Pune
7.	SRMSat	Oct 12, 2011	10.9 kg	PSLV-C18/Megha-Tropiques	SRM University
8.	Jugnu	Oct 12, 2011	3 kg	PSLV-C18/Megha-Tropiques	IIT-Kanpur
9.	STUDSAT	Jul 12, 2010	41 kg	PSLV-C15/CARTOSAT-2B	7EEIs of KAR & AP
10.	ANUSAT	Apr 20, 2009	40 kg	PSLV-C12 / RISAT-2	Anna University

Pictured: Academic satellites launched from India since 2008

- From 2018, every year ISRO conducts a capacity building program UNNATI on nanosatellites
- ITCA connects all the sectors and makes good impact on Indian sub-continent
- The 75th year of Independence Mahotsav's Ideology:
 - Freedom Struggle, Ideas, Resolve, Take Actions, Achievement
- **75 Students' Satellites Mission enables end-to-end life cycle experience for students**
- Space Technologies for SDG2030
- Global Small Satellites in Orbit
 - Increased by 14 times over last decade
 - Around 40,000+ satellites to be built and launched by 2030
 - current market value is USD 325 Billion and is projected to reach USD 1371 by 2030, registering a CAGR of 16.4%
- The Prominence of LEO
 - The platform is good as Satellite broadband's importance will further increase
 - 63% of the rural population globally will be benefited from satellites
- Mission Pathfinder
 - The mission will be achieved by considering Why, Who, What, When, Where and How
 - Missions shall be achieved with low cost within limited time
 - It will generate education and skills along with future jobs
 - Will be done by schools, colleges and universities
 - Shall complete by year 2022, assistance from Indian Technology Congress Association
- ITCA brings the ecosystem to scale up from concept to constellation (end-to-end)
- ITCA is concentrating on 1U CubeSats
- Payload Proposed; LoRa Store and Forward, LoRa Inter-Satellite Communication, Study RF Beamforming, GNSS Reflectometry, Optical Radiometry, Amateur Radio Repeater
- Ground Station Configurations
 - Every institution will be equipped with a ground station
 - ITCA-CSPD-TSC Ground Station Setup v3.0 to be established at Host Campus
- ISRO will be the Project Monitoring Committee to mentor, review progress and oversee entire mission
- Mission Timeline currently at end of QM/FM Procurement.



Pictured: PadmaShree Dr. Mylswamy explaining the timeline of overall mission

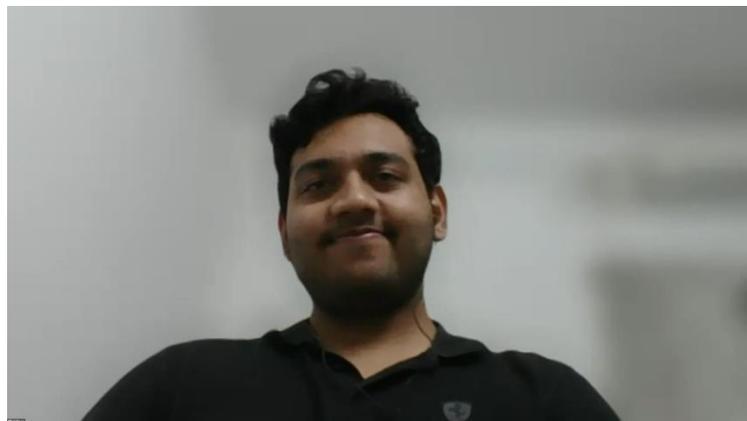
- Mission Deliverables to the involved institutions:
 - Space qualified satellite with qualification test reports
 - Primary and secondary payloads
 - Nano Satellite Centre and Ground control Station (GCS)- Antennas, Receiver, rotator
 - SatNOGS/TinyGS Ground Station Network
 - A mobile App for tracking of satellite by students
 - Satellite integration with launch vehicle PSLV/SSLV services at ISRO- Spaceport, Sriharikota

- Jigs/Fixtures for CubeSats
- Safety submission requirement for launch
- Interface control document.
- Frequency allocation: Orbit Spectrum Coordination and Acquisition
- Registration of Satellite with IN-SPACE
- Launch campaign and developer Integration
- Participation of institution's satellite team in world CanSat Rocketry Championship
- Training materials/ Mentor/Internship/ Startups
- **The project is a disruptive innovation that will make a bigger impact for new space solutions**
- Students will get access to course material through Learning Management System
- Opportunity for India to build collaborations with 90+ space faring nations
- Karnataka Government school students Satellite (KGS3Sat) named PUNEETHSat
- ITCA-TMISAT Students' Satellites Programs providing training to various institutions around India
- Collaborations:
 - Indo-Israel Space Tech Leadership Program
 - ITCA Satellite Development Alliances with Serbia
 - ITCA- UNISEC collaboration
 - ITCA's Satellite teaming partnerships are across the globe
 - ITCA team launched UNITYSat on 28.02.2021 during ISRO's PSLV C51 Amazonia Mission

3. Presentation on UNISEC India Chapter Activities 2021-2022

Nikhil Riyaz, UNISEC India

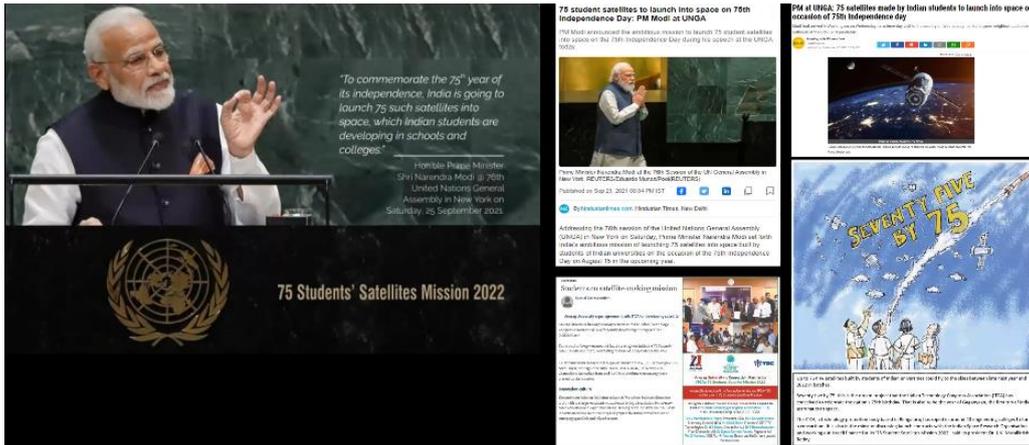
Nikhil Riyaz is a student representative of UNISEC India. He is also a founder and chief executive officer of TSC Technologies Pvt. Ltd. He is a co-team member and the technical lead for India's 75 Students' Satellite Mission 2022. He is an engineer by profession.



Pictured: Nikhil presenting on UNISEC India chapter report

Highlights:

- History of UNISEC India
 - Foundation and official announcement at 6th UNISEC-Global meet at Strasbourg, France
 - Announcement of World CanSat Rocketry Competition
 - Successfully built and launched the UNITYSAT, 0.30U satellites
 - Development of CanSat kits for educational institution
 - Development of cost-effective UHF and VHF ground station systems
 - Establishment of 30+ institutional chapters under UNISEC India
- Outreach
 - Reached 160+ Universities and Engineering Institution and conducted workshops
 - Signed MOUs with 60+ institutions toward the development of 75 Students' Satellite Mission
 - Conducted 7 payload competitions to identify suitable upcoming missions payloads



Pictured: Media coverage of 75 Students' Satellite Mission 2022

- **75 Students' Satellites Mission 2022**
 - Primary objective
 - To establish an ecosystem in India for University participation in space tech
 - Aligns very well with UNISEC Global objectives
 - Encourage participation of Universities students in space
 - Comparing India with other space fairing nations
 - Limited university student involvement in space ecosystem couple of years ago
 - This has started changing since 2020
 - Due to the formation of different organization
 - Indian Space Association (ISpA) and IN-Space
 - University participation and private participation in space sector
 - Objective is to launch 75 satellites to commemorate 75th year of Indian Independence
 - **Deadline for all of these satellites will be December of 2022**
- Media Coverage
 - 75 students' satellite mission and activities has been covered in media articles
 - ITCA, ATAC, UNISEC India have been involve in lot of these media articles
 - Honorable Prime Minister of India coated Satellite Mission in the UN general assembly
 - Media covered MOUs signing activities, CanSat designing activities
 - Lot of activities has been published that has happened across India as part of mission
- Collaboration with government schools
- Adequate training to at least 200 students within just 1 state Karnataka
- **Setting up Nano Satellite Center in each of these schools and universities with Ground Stations**
 - These stations can operate all the way from lower UHF to up above 6GHz of operations
 - Application developed by TAC called SatNav for satellite tracking and communication
 - Ground station is setup network over cloud and able to communicate straight from phone
- Formation of PMC (Program Monitoring Committee) for 75 Satellites' Mission
- 1U is the proposed platform for 75 Satellites Mission
- Industry Collaboration
 - 15-20 industries
 - Pulling more industries to this space ecosystem
 - Students are able to work with these industries
 - ISRO works with lot of these industries in satellite missions
 - These industries are qualified for development of satellites
 - Similar industries are also catering to the needs of university and education sector
- ITC 2022 – Satellites for Everyone and Space for Everyone organized by ITCA
- 15 CanSat workshops conducted across Universities and Engineering institutes
- Publications in magazines, books, guides and 48+ patents related to space tech all filed by studetns
- Nanosatellite Development Self-Paced Course offered by TSC teach how to build satellites

4. Presentation on Space Exploration and Analog Astronaut Training Opportunities

Dr. Jayakumar Venkatesan, Valles Marineris International Pvt. Ltd.

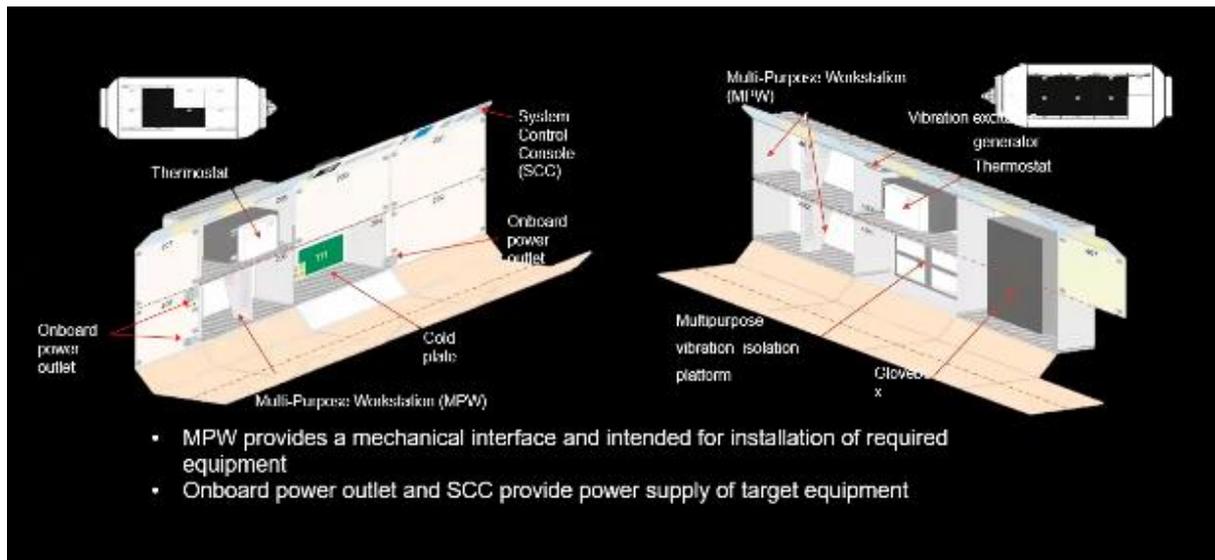
He is an Astro-preneur and a chief executive officer of Valles Marineris International Private Ltd India. He is the partner and chief technologist of Synergy Moon USA. He is also the director at Analog Astronaut Training Center. He has 14+ years of experience in aeromechanical systems for combat drone and spacecraft engineering. His expertise also lies in spacecraft engineering and additive manufacturing nanosatellite research. He is also the chief technological officer for KSF Space foundation USA. Dr. Venkatesan is a visionary board member to the upgrade technology contest organize by National Technology Initiative, Foundation Agency of Strategic Initiatives Russia and the deputy chairman for International Academy of Space Law Russia.



Pictured: Dr. Jayakumar presenting about space exploration and Analog Astronaut training opportunities

Highlights:

- Started journey with google lunar XPRIZE
- One of the cofounder and chief technology officer Synergy Moon
- Working on CubeSat platforms and manned spacecraft training simulators
- Activities that his organization is working on:
 - Space exploration rovers: Mars rovers developing for synergy moon USA
 - Astronaut Training: Analog Astronaut training center in Poland
 - Space Station Experiments
 - Russia, professional astronautic training supplier
 - Russia, main contractor for the GLAVKOSMOS
 - Development of the Soyuz spacecraft training simulators
 - Looking forward to work on other simulators
 - Stratospheric Missions
 - Study about stratosphere
 - Two variants:
 - Pressurized variant for living or microorganisms
 - Unpressurized exposed to the environment like radiation distantly
 - Demonstrated the space station experiments in 2018,
 - World first living tissue printed in the international space station
 - Partnership with 3D Bio-printing solution in Russia
 - Sending some corona virus protein samples to international space station
 - Using Soyuz MS 22
 - Space Missions
 - Continuing moon mission,
 - By 2025, trying to build micro lander on the Moon
- Working on consulting services for space and training programs



Pictured: Schematic of Russian multipurpose workstation

- Drive machine test
 - Monitor the eyes, bones and muscles strength, brain activity, ears, lungs, and liver functions
- Multipurpose workstations (MPWs) is up to 3-meter cube
- Planned experiments in MPWs:
 - Behavior of different solution and biological analogs
 - Physiological efforts, organoleptic properties, agriculture in space station
 - Body robot
 - Survival of micro materials
 - External changed of gas composition
 - Microorganisms resistance for spaceflight conditions
 - Nano sensor projects
 - Formicarium: Ant behaviors because of their highly organized nature
 - Protoplanet
 - Working on bio energy
- Lunar Surface Exploration where Russia, India, France, and Malaysia are working together
- Example projects in Moon:
 - Remotely constructing work
 - Buildings and small stations, payload stations
 - Operating program on 3D bio printer
 - Develop Worlds first organ development with 3D bio printing in Moon
 - Agriculture technology: making big size of a lunar plant factory
- Soyuz Spacecraft Training Simulator: stand alone on one
- New opportunities in bio fabrication, have different bio-printing
 - Planning to have six chambers to print 6 different critical organs
- Technically can get stem cell donors
- Research on how to prepare for medicine for humans in space flight
- Planning to make the statements of corona virus protein
 - Plan to send it during the autumn, Soyuz MS-22 spacecraft will perform the activity
 - People are worried about it but it is safe
- Making the constellations plans with 5G and 6G with the partners the NAVS,
 - Also supplied willing to work with the companies and industries
 - Whoever want to develop the mission
- Happy to support with the antennas and someday develop the payload programs

5. Presentation on Introduction to World CanSat/Rocketry Championship (WCRC)

Dusan Radosavljevic, Committee for Space Program Development

Dusan Radosavljevic is a structural and software engineer and founder head of Committee for Space Program Development (CSPD), Republic of Serbia. He is the co-founder of World CanSat and Rocketry Consortium and Championship which involves 75 plus countries. He is the mentor of TSC Technologies Pvt. Ltd. After completing CLTP-7 course, he launched education program related to space engineering for students of elementary, secondary and higher education in Serbia. Mr. Radosavljevic is a member of the National Strategy for development of education, human resources and technical technological capacities in the sphere of space engineering.



Pictured: Dusan introducing World CanSat Rocketry Championship (WCRC)

Highlights:

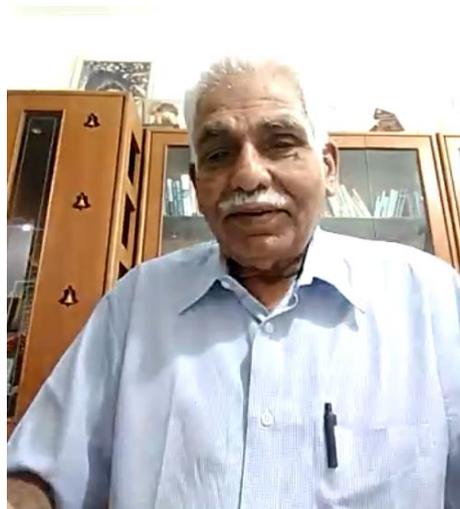
- Children from kindergartens and schools get acquainted with aviation and space program
- This event is exclusively held every weekend at Serbia Aerospace Centre
- There are about a hundred students attending this weekend
- Completed CLPT-7 and returned to Serbia
- Have a big responsibility and lot of work to do to establish Serbian Space Program
- Need to define all programs for capacity building human resources development in this area
- Serious work to change the awareness of citizens of my country; post conflict with Georgia
- After COVID period, this program is being implemented in full capacity
- CanSat Rocketry Program has become the part of education process at all levels of education in Serbia
- This year Serbia had National CanSat Rocketry Competition in April within WCRC
- In 2019, had International CanSat Rocketry Competition at an airport
- Teams from India, Bulgaria, Hungary and countries from former Yugoslavia participated
- Immediately after this India and Serbia decided to join the launch of Global initiative to establish World CanSat Rocketry Championship (WCRC)
- WCRC Consortium of seven countries has been established which manage the championship
- They have defined the rules of functioning of championship.
- WCRC functions like any other sport, for example: football, basketball, cricket
- There are three phases:
 - First phase: Holding of National Competitions
 - Second phase: Continental competition and qualifying nature to participate in third phase
 - Third phase: World Finals
- Essence of the championship is CanSat
- The rocketry part is just launching tool for satellite
- In many countries, rockets cannot be used so drones or helium balloons are used
- WCRC also encloses countries that already have CanSat/Rocketry programs and competitions
- Enable their team to continue to compete in International level in phases two and three of WCRC

- Does not interfere in the functioning at national level and does not interfere with existing rules
- Can join either as person of contact or organizer of National CanSat Rocketry Competition
- WCRS are currently present in over 60 countries
- In 2022, for the first time ever, WCRC World's Final will be held in Serbia in September
- I want make an official invitation to university students teams worldwide to register and participate i.
- Rules have been defined and official document has been published in our website:
<https://www.wcrc.world>
- Registration of teams is until **June 15, 2022**
- For all questions use contact information from the documents in the website

6. Presentation on Space Applications for Early Warning Systems, Disaster Mitigation and Management

Prof. R.M. Vasagam, Chancellor of Dr. MGR and Karpagam University

Padma Shri Prof. R.M. Vasagam is the first employee of ISRO. He has worked with Vikram Sarabhai and Prof. Satish Dhawan. He is the first project director of ISRO APPLE, India's first communication satellite and outstanding scientist of ISRO with 30+ years of experience. He has contributed to Indian Space program right from its inception from the Stone Age of ISRO to the Moon mission to the Mars mission and the Gaganyaan. Even today, at ISRO he is called a walking encyclopedia. He has served as the Chancellor of Dr. MGR and Karpagam University, Karunya University, Visvesvaraya Technological University and a Vice Chancellor of Anna University, Dr. MGR University. He has been the recipient for many honorary awards: Vikaram Sarabhai award, the Padma Shri, distinguished Alumni's Award from PSG College Technologies, distinguished Alumni's Award from IIT Madras, Systems Gold Medal, and Systems Society of India. He has served as visiting scientists at Institute of Space Astronautical Sciences at University of Tokyo, Centre for Space Research Lincoln Lab MIT, Boston and NASA Goddard Space Flight Center Maryland, USA, 1971.



Pictured: Padma Shri Prof. R.M presenting on 75 Students' Satellite Mission: 2022, UNISEC India

Highlights:

- 1957 marked the beginning of collaborative program in space
- In 1963, Equatorial Rocket Launching Station was made in Thumba
- Brazil, Ghana, Australia also have Equatorial Rocket launching station at around 10km altitude
- This station is one with ionosphere research which is still a puzzle
- Interaction held on 19 June 2021 with Padma Shri Prof R.M. Vasagam and APPLE Team

40 Years of APPLE: Interactions held on 19 June 2021 with Padma Shri Prof. R.M. Vasagam and APPLE Team!



Pictured: ISRO first launched rocket and APPLE Sat- Memory lane

- 21 November, 1963, ISRO rocket was transported using bicycle to Thumba Rocket Station
- Radio silence needed as radars are operating so at that time motor vehicles cannot be used
- Right side of image: model of first orbital launch and church where most of the work was done
- APPLE satellite was brought in bullock cart done to protect its highly magnetic sensitive instruments
- This is a state of art technologies mission from 1977 and launched in 1981
- Operated for 27 months to do tele-medicine, tele-computing, tele-teaching and tele-conference
- What was started in those days has blossomed into operation level



*Ariane personnel in front of APPLE satellite (with Square Solar Panels)
Courtesy: Ariane Space*

Pictured: Ariane-1 with three satellites including APPLE-Sat

- Bullock cart carried satellite to open field to test antenna pattern for VHF communication
- Few weeks before launch found problem with link budget with almost 10db loss
- Required closed indoor Anechoic chamber which was not available in country
- In Ariane, AppleSat was a passenger between top MeteorSat and bottom Italian Monitoring Satellite
- Ariane-1 was originally 1540 kg became 1640 kg at time of launch,
- Due to improved performance, propulsion and central mass.
- **Launch took place in June 19, 1981**
- Celebration of 30 years of launch of APPLE through online meeting
- Small satellite with small solar wings is going to be dominant thing in upcoming decades
- 1U to 12U missions have been successfully flown
- Missions democratizing space technology to all countries and group has come
- Globally more than 3000 satellites have been already launched

IoT Applications

- lightning data on global scale
- sea erosion mapping
- Tsunami warning
- earthquake monitoring with radon gas precursor events

Lightning Data Courtesy: NASA

NOAA Deployed Tsunami warning Buoys. Courtesy: NOAA

Figure 8: Shoreline change map along Indian coast (1990-2016)

7% Erosion in the last decade!

Pictured: IoT application on data monitoring and mapping of Natural Disasters

- Natural disasters can be monitored from space
- Natural Disaster Force, Indian Meteorological Department, Hospitals are supported by satellite data
- Epidemiology, spread of diseases that can be monitored very carefully through satellite data
- Useful for reporting, collecting and getting data in real time
- Drought is the biggest disaster and vegetation index devised by NASA scientists can be useful
- Water stress, plants photosynthesis character and everything can be done by vegetation index
- In India, there is central service from National Remote Sensing Centre publishing these data continuously
- Cyclone monitoring is done through geo-stationary orbit using radiometer
- During Orissa cyclone, because of the timeline of data, people's lives could be saved
- Post-disaster assessment is also made possible due to satellite data
- Other major natural disaster is forest fire that happens in countries like USA, Australia
- Satellite data can be used to detect the beginning of forest fire
- Aeronautics will come into picture for forest fire fighting
- Pictures are coming from geo-stationary satellite of forest fires
- Here small satellite constellation can come into full force
- IoT, basically devices spread all over the place for water quality or air quality
- Collected and consulted through small satellite mission
- Constellation of satellite that are monitoring all over the globe
- Collecting data and then taking it to cloud so that everyone can have access to shared data
- Ocean database are helping us to get the data which are placed across the country coasts
- Allowing to coast lane, data is going through satellite link to central location Hyderabad
- Data from the NASA from the lightning, hundred thousand lightening occurring everyday
- IoT in combination with small satellite globally can tract all these events
- Military early warning system, defense service have this system for tracking enemies or anything
- Can get instant alarm of fighter jets comes scrambling
- Disease is breaking out or catastrophe occurs like Bhopal tragedy
- The system is biggest requirement for dealing with above tragedies and catastrophes
- The system is unfulfilled dream so we have to pay respect to Dr. Dhawan by implementing it
- Small satellite constellation should help to make actual implementation of civilian early warning
- Focus on monitoring for defense purposes should shift to civilian early warning system.
- Helps UN and national agencies in times of disasters
- This is where UNISEC, other UN bodies and Indian Technology Congress can come together and work

7. Announcements and Closing

Rei Kawashima, UNISEC-Global



Pictured: Kawashima-san giving closing remarks

Highlights:

- Today we got highest record more than 600 registration and more than 200 actual participation
- Thank UNISEC India for successful meeting
- **Next Virtual Meeting**
 - Date: June 18, 2022 10:00 pm - 0:00 am (JST)
 - Theme: TBD
 - Confirmed speaker: TBD
 - Local Chapter presentation: TBD
 - Host: UNISEC- SAR

UNISEC-Global Social network accounts

 @uniseccglobal
<https://www.facebook.com/uniseccglobal/>

 @unisecc_global
https://www.instagram.com/unisecc_japan/

LinkedIn  <https://www.linkedin.com/groups/8982613/>

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8. Participant Statistics

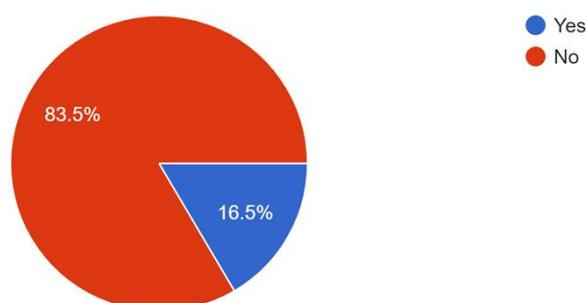
600 registered participants from 25 countries/regions participated in the 21st Virtual UNISEC-Global Meeting.

Country/Region	Number of registrants	Country/Region	Number of registrants
Australia	1	Myanmar	1
Bangladesh	2	Nepal	3
Bulgaria	2	Nigeria	1
Chile	1	Pakistan	4
Colombia	6	Philippines	8
Egypt	4	Saudi Arabia	2
India	540	Singapore	1
Indonesia	1	Taiwan	1
Japan	11	Turkey	2
Kazakhstan	1	United Kingdom	1
Kenya	2	United States	1
Malaysia	2	Zimbabwe	1
Rwanda	1		

9. Participant Questionnaire

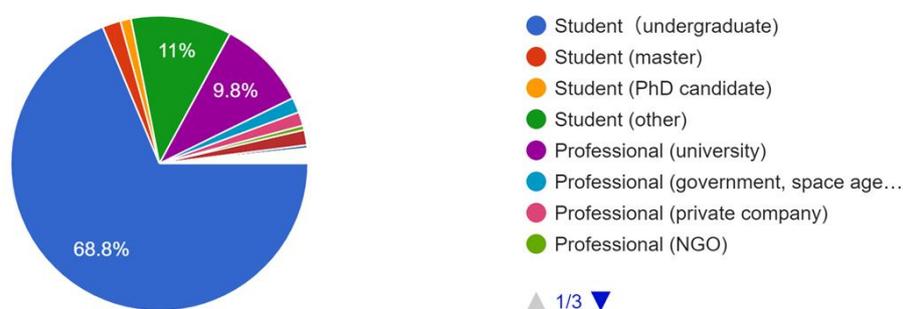
Have you participated in the UNISEC-Global Meeting previously?

593 responses



Student or professional?

602 responses



Thank you