SPACE BEACON A Special issue in commemoration of Professor RMVasagam

1939-2025

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Editorial

Professor R M Vasagam: Architect of Vision, Beacon of Ingenuity



India's scientific landscape mourns the loss of legendary Padma Shri Professor R. M. Vasagam, who passed on 14 February 2025. This guiding light's intellectual brilliance permanently elevated our nation's trajectory in space science and technology. His departure marks the end of an extraordinary chapter in India's scientific narrative, while his philosophy continues to inspire our shared vision of innovation. Professor Vasagam's imprint is evident in groundbreaking milestones, notably his leadership of the APPLE satellite programme decisively establishing India's capabilities in space communication while shaping countries competencies with remarkable foresight. This pioneering mission ushered in a new era of satellite-based telecommunications across the subcontinent. His guidance of the 75 Students' Satellites Mission revealed his deep investment in nurturing future scientific talent, while his tenures as Vice-Chancellor at two prestigious universities enabled him to transform engineering education to the greater heights.

At the core of his work ethics stood the powerful dictum: 'Announcements are not achievements'. This guideline prioritized genuine progress over empty pronouncements. Vasagam always advocated for measurable impact, ensuring technology remained anchored to addressing humanity's greater needs. He demonstrated exceptional pedagogical virtuosity. Transforming complex concepts into digestible frameworks that simultaneously challenged and illuminated. More remarkably, he converted apparent limitation into powerful catalyst for discovery and innovation. Professor Vasagam's enduring contribution is not a static monument but a dynamic intellectual movement. Like celestial light that travels after its source has dimmed, his wisdom continues to illuminate India's technological excellence—proof of scientific endeavor's transformative potential when guided by visionary leadership.

— Indian Technology Congress Association

From Earth to Eternity

The Life Scroll of Professor R M Vasagam

	22 June 1939 Born
1963 BE (Hons) from PSG College	
	1965 Master's from IIT Madras in Electrical Engineering
1977-1983 Project Director of APPLE Mission	Joined Indian Space Research Organisation (ISRO)
Ó	1982 Padma Shri Award
1994-1996 Director at Directorate of	
Advanced Technology and Planning, ISRO HQ & Opted for Retirment	1996-1999 Vice-Chancellor, Anna University,
1999-2001 Chairman, Tamil Nadu Institute of	Chennal
Information Technology, GoT	2003-2010 Vice-Chancellor, Dr MGR Educational and Research Institute, Chennai
2010-2013 Chairman, National Design and	
Research Forum, Bangalore	2011-2025 Chancellor, Dr MGR Educational and
2014 - 2016	Research Institute, Chennal
Chairman, Karnataka State Centre IEI 🛛	
A PAGAM	2015-2017 Chancellor, Karpagam University, Coimabatore
2021-2025 Chief Mentor,	
/> Students' Satellites Mission	14 February 2025
	Left for his heavenly abode

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A Poignant Tribute

India's Scientific Fraternity Reveres Professor R M Vasagam

As India observed its National Science Day on 28 February 2025, a date dedicated to celebrating scientific discovery and its potential to shape the nation's future, the ITCA organised a solemn yet deeply inspiring virtual tribute. This significant gathering commemorated the life and monumental contributions of Prof Vasagam, a true architect of India's technological prowess, who had passed away just two weeks prior, on 14 February. The timing of this homage held profound resonance. The day's national theme – '**Empowering Indian Youth for Global Leadership in Science & Innovation for Viksit Bharat'** – seemed almost custom-written to encapsulate Prof Vasagam's lifelong mission. His unwavering dedication was not merely to scientific advancement itself, but crucially, to cultivating the scientific temperament, and innovative spirit within India's youth, viewing them as the essential architects of a developed, and self-reliant nation.

The three-hour commemoration event became a remarkable confluence, drawing an extraordinary assembly of luminaries from the highest echelons of India's space, defense, and engineering sphere. It was a testament to the breadth and depth of Professor Vasagam's impact that such a distinguished group converged to share their respects and reflections.

Keynote tributes, rich with personal anecdotes and professional admiration, were delivered by individuals whose own careers represent significant milestones in India's progressive journey. Among the many voices honoring Prof Vasagam were Padma Shri Dr Mylswamy Annadurai, the celebrated former Director of the ISRO Satellite Centre, renowned for his leadership in lunar and Mars missions; Padma Bhushan Dr BN Suresh, Chancellor of the prestigious Indian Institute of Space Science and Technology (IIST) and a stalwart of launch vehicle technology; Padma Bhushan Dr A Sivathanu Pillai the visionary former CEO & MD of BrahMos Aerospace, instrumental in India's missile expedition capabilities; Padma Shri Dr YS Rajan an Honorary Distinguished Professor and Scientist at ISRO, known for his strategic thinking and policy influence; Lt Gen VJ Sundaram PVSM, former Director DRDL, Hyd a key figure in India's



integrated guided missile development program; and Padma Shri Dr B Dattaguru, former Professor & Head of the Aerospace Department at the esteemed Indian Institute of Science (IISc), Bangalore.

The virtual hall extended far beyond these keynote speakers. Representatives from globally recognized institutions, numerous universities reflecting his academic influence, vital professional organizations like the IEEE, IEI, NDRF, IIPE, alongside prominent figures from industry and leaders of burgeoning space-tech –



startups, all joined the collective expression of reverence. This diverse participation underscored the highly multifaceted nature of Prof Vasagam's contributions, spanning pure research, applied technology, education, policy, and industrial collaboration. Orchestrating this exemplary commemoration from the ITCA leadership were Dr L V Muralikrishna Reddy, President, Dr K Gopalakrishnan, Secretary General and Dr Wooday P Krishna, Founder Fellow, who meticulously coordinated the event alongside dedicated ITCA fellows and staff.



Family members of R. M. Vasagam participated

attendees Personal. and many sharing decades-long associations, fondly reminisced about Prof Vasagam. His impactful career was vividly brought to life through their memories recounting his pioneering tenure as the project director of the APPLE program, a mission that confident marked India's entry into geostationary communication satellite technology.

They spoke of his transformative leadership within educational institutions, where he served as Vice-Chancellor, fostering environments of rigorous academic inquiry. His visionary establishment and tireless championing of the 75 Students' Satellites Mission (75SSM) in considering India's Azadi Ka Amrit Mahotsav was repeatedly highlighted as a unique educational paradigm, empowering students across India to design, build, and launch their own satellites. Underlying all these endeavours, as speakers reiterated, was his core, unwavering belief: **'Technology without application is merely an intellectual exercise'.**

He was a true leader who inspired both the present and future generations to take India forward in science and innovation. His legacy continues to ignite minds and guide countless young scientists toward a future shaped by knowledge, dedication, and national pride.

– Padma Shri Dr Mylswamy Annadurai

To further enrich the remembrance, ITCA presented a meticulously curated, moving video montage. This visual narrative charted Professor Vasagam's remarkable journey, tracing his evolution from his early formative work through to his final significant contributions, painting a picture of relentless dedication and evolving vision. Adding profound historical context with technical depth, Dr T K Sundaramurthy, himself a distinguished veteran of the APPLE mission team and a former PSLV1 Mission Director at ISRO, delivered a special 'Innovation Showcase.'



A moment frozen in time, capturing the essence of a powerful address, a legacy of knowledge

His address offered rare, invaluable insights into the complexities and challenges of the APPLE satellite programme, specifically illuminating Prof Vasagam's commendable, calm, and decisive leadership during critical phases of that landmark mission. A powerful, recurring theme echoed throughout the diverse tributes was his unparalleled, exceptional, almost innate, ability to bridge the gap between technological and tangible achievement. possibility He possessed a unique foresight in identifying promising innovations, coupled with the pragmatic drive to see them implemented, consistently prioritizing their potential for societal benefit and relevance to national needs.

Several speakers moved beyond professional accolades to offer personal anecdotes. revealing the character of the man behind the formidable accomplishments. Shri R Κ Rajangam, an outstanding scientist at the ISRO Satellite Centre and President of Planet Aerospace, shared a specific, telling memory illustrating Prof Vasagam's remarkable capacity for maintaining composure under extreme pressures. He recounted critical junctures during the demanding APPLE mission where Professor Vasagam's calm, unflappable demeanor served not just as a personal trait, but as a vital source of inspiration, instilling confidence and fostering resilience throughout the entire team when stakes were highest.

from IEEE, Dr Ramakrishna Kappagantu representing the global engineering community, shed light on Prof Vasagam's profound and lasting impact on professional societies. He emphasized not only Professor Vasagam's dedicated contributions to IEEE activities spanning nearly six decades but also his pivotal role in establishing the IEI-IEEE Award for Engineering Excellence. This prestigious recognition continues to celebrate outstanding contributions within the Indian engineering landscape embodying his commitment to fostering professional standards and acknowledging merit.

Echoing the sentiment of his influence on professional development, former colleagues offered heartfelt testimonials highlighting his transformative mentorship. One mentee eloquently captured this, stating, 'He didn't just impart engineering principles or technical knowledge; he instilled in us the fundamental mindset of innovators and effective problemsolvers, teaching us how to think, not just what to think.' This impact resonated beyond India's borders. Er Dušan Radosavljević from Serbia, representing the World CanSat and Rocketry Consortium (WCRC), underscored Professor Vasagam's global influence. significant particularly on student satellite initiatives worldwide. He highlighted how Vasagam's pioneering educational model, exemplified by the one-of-a-kind 75SSM, has served as both an inspiration and a practical blueprint for similar student-led space technology programs emerging across the nations.

Adding a deeply personal and poignant layer to the commemoration was the virtual presence of Professor Vasagam's immediate family. His wife and daughters joined the tribute, graciously offering intimate perspectives that illuminated the dedicated husband and father behind the monumental public achievements. In а particularly moving address, one of his daughters conveyed the family's profound gratitude for the outpouring of respect. 'As we gather to honor our beloved father,' she shared, 'our family is deeply moved by the immense outpouring of love and respect shown here today. His influence clearly reached far beyond our home, touching the lives of countless colleagues, students, and friends across the nation and the world.' She then recounted a poignant memory from just the previous year, vividly illustrating his enduring passion for practical application over abstract theory. Even when presented with a highly sophisticated, cutting-edge research project on generative speech-to-speech translation, his immediate, instinctive reaction was to connect it back to a real-world problem - a 1990s initiative aimed at -

I have many memories of working with the professor during my tenure as Vice Chair and Chair of the IEEE Bangalore section, and he actively helped me several times through his advice, contacts, and influence and also at the Institution of Engineers.

– Shri Hitesh Mehta, Fiberoptica, Mumbai

A humble but towering personality, highly knowledgeable and a beacon to many in space science.

– Dr K Brahma Raju, SRKR, Bhgimavaram

He was not only my mentor for two decades but also a guiding force behind ITCA, and his vast knowledge and unwavering support will be deeply missed.

- Dr S K Prasad, ITCA founder Fellow

For the past two decades, I had the privilege of knowing this visionary, whose kindness, wisdom, and unwavering strength touched the lives of so many.

– Dr R K Suresh, SECE, Coimbatore

His contributions to India's space progress were immense, and his work in various fields continues to inspire me, even though we never had a one-on-one interaction. –Dr Antony Louis Piriyakumar, CIT Bangalore

I had the honor of interacting with him during several Aerospace Conventions and Council meetings of IEI, where his insights left everyone spellbound.

– Dr A K Saxena, IEI, Ranchi

His legacy is a beacon for future scientists and technologists and also remains an enduring source of inspiration.

- Dr P Varuna Reddy, Formerly with BEML

I had the privilege of meeting him on multiple occasions, and I was always impressed by his ability to both see possibilities and anticipate challenges with his unique perspective.

- Er S A Sathyamurthy, ITCA Fellow

Moments of Tribute.....



A pole star of India's space journey, his quiet brilliance and humility profoundly impacted the field, a story that deserves to be remembered and shared. – Padma Shri Dr. Y S Rajan



He was a quiet force behind India's space innovations. His vision, encouragement, and relentless support shaped minds, continue to define our scientific legacy.

– Lt Gen (Dr) V J Sundaram



His exceptional friendship and knowledge uplifted everyone around him. – Padma Bhushan Dr. B N Suresh

A visionary who never ceased to inspire, he constantly learned, innovated, and contributed to the nation's progress. Padma Bhushan Dr A Sivathanu

Pilla



He always thought in terms of the nation first, had a deep sense of culture, and acted institutionally, which is why all his actions yielded such great results.

– Dr Nadoia Woodav P Krishna



Professor Vasagam's wisdom, guidance, and contributions were extraordinary. His impact will always be remembered, and his loss is deeply felt by all of us.

– Dr B V A Rao. Former Chairman NDRF



His contributions were not just to ISRO but also to students, universities, and academic programs, shaping future generations.

– Padma Shri Prof B Dattaguru



dimensions of work and deep respect across institutions. Every interaction with him left me more appreciative of his wisdom, poise, and character. We must strive to emulate his legacy.





He was a pillar of space technology and a guiding force for MSMEs, startups, and academia.

Former Director, GTRE and NDRF



Professor's genius and kindness will always inspire and be remembered.

– Shri GNV Prasad, Former Deputy Director, Satellite Centre, URSC, ISRO



A passionate scientist, a gentle soul, and an eternal source of knowledge—Prof Vasagam was a role model whose legacy will continue to guide and inspire generations to come.

– Dr R Venkatesan, Professor of



Vasagam's integrity and respect for engineers set a lasting example.

– Prof Lawrence Surendra, , Mentor, and Adviser, The Sustainability Platform Asia



He was incredibly supportive, always willing to share his vast knowledge and experiences making invaluable contributions to India's space journey.

- Dr Priyank Kumar, Professor Incharge, Dept of Space Engineering and Rocketry, BITS Mesra,



The vision and guidance will forever inspire future generations.

– Dr Sivasubramanian Nagaswam, Former Senior Scientist & Chief General Manager, ISRO



- Prof (Dr) Sandeep Sancheti,



Professor Vasagam was an inspiring force whose vision and wisdom uplifted all who worked with him.

- Shri O P Khanna. Chairman. Needy Heart Foundation, and Former Chairman, IIPE



His visionary leadership ensured that satellite technology was used for societal benefit, pioneering tele education in remote villages through the APPLE satellite.

- Shri Puneet Mishra, Head, SAC, T & DS, URSC, ISROVP (Education), Global IEEE Aerospace and Electronic Systems Society Chair,

helping merchants in India's bustling turmeric markets overcome language barriers for better trade. 'His immediate instinct,' she explained, 'was always to apply technology, no matter how advanced, to solve tangible, real-world challenges, ensuring genuine benefits for humanity. This was the absolute essence of his philosophy – scientific and technological advancements must always serve a greater and practical purpose.'

Before the extensive virtual tributes commenced, a solemn, in-person presence of remembrance took place at the ITCA premises. Dr Annadurai inaugurated these proceedings, offering floral tributes alongside key office bearers and staff of ITCA, creating a tangible connection to the virtual commemoration that followed. In his welcome address setting the tone for the day, Dr Reddy eloquently captured the enduring spirit of the man they honoured: Though Professor Vasagam Sir has departed from our midst, his vision endures-not as a static monument or a historical footnote, but as a dynamic, living movement. It continuously inspires current and future generations of innovators to actively build the future he so boldly dared to imagine.'

This poignant gathering served as a heartfelt prelude, establishing a tone of deep respect and acknowledging the lasting, active impact of Prof Vasagam's visionary leadership. The entire event, both onsite and virtual, meticulously coordinated by Shri Srinivas Durvasula, Shri K Shanmugam, and their dedicated colleagues at ITCA, stood as a heartfelt and comprehensive tribute to Professor Vasagam's remarkable and multifaceted contributions.

As the gathering drew towards its close, marked by a reflective moment of silence, participants contemplated his legacy confirming the sentiment that it exists not as a static memorial, but as a living, vital continuum that thrive to energize and inspire generations of innovators. In his concluding remarks, Dr Gopalakrishnan emphasized this point, suggesting that the most fitting tribute to Vasagam Sir would be the successful realization and culmination of the 75 Students' Satellites Mission, perfectly reflecting his visionary integration of education, innovation, and practical application.

His legacy endures distinctly in new initiatives launched, in evolving national policies reflecting his emphasis on self-reliance and applicationdriven research, and perhaps most importantly, in a strengthened national ethos that firmly places innovation, indigenous capability, and societal benefit at the very heart of India's aspirations for the future. As India confidently strides into a new era of accelerated innovation and global technological leadership - the era of Viksit Bharat – Prof R M Vasagam's life and work serve as an enduring blueprint for sustainable progress. His pioneering path vividly reminds us that true scientific achievement is measured not just by discovery, but by its power to solve real challenges, empower the youth, and ensure that innovation drives both human understanding and equitable national development. 💸



APPLE

The Satellite that Launched India's Space Dreams

In the annals of India's technological journey, few achievements rival; the APPLE (Ariane Passenger Payload Experiment) satellite in significance and impact. Launched on 19 June 1981, this pioneering spacecraft did more than establish India's presence in space—it transformed the nation from a space-aspiring country to a spacefaring one. At the helm of this historic mission stood Prof R M Vasagam, whose visionary leadership converted an ambitious dream into a technological reality that continues to influence India's space endeavors decades later.

Serving as Project Director from 1977 to 1983, Prof Vasagam reshaped traditional management approaches. Confronted with challenges such as limited funding, inadequate infrastructure, and global skepticism, he adeptly turned these obstacles into opportunities, fostering a culture of innovation and resilience within his team.

He navigated unexplored domains with masterful precision

Dr TK Sundaramurthy reflected on how Professor Vasagam cultivated an environment where ambitious goals become attainable. 'His first question to me wasn't about my qualifications,' he recalled, but whether I'd had my lunch. That simple question captured Professor's remarkable blend of sharp intellect and heartfelt compassion. This leadership philosophy transformed a team of young engineers into pioneering space scientists. Working through nights, repurposing existing facilities, and developing indigenous solutions, the APPLE team demonstrated that determination could overcome seemingly insurmountable obstacles.

Under Prof Vasagam's stewardship, the team not only built APPLE—India's first experimental geostationary satellite—but also laid the crucial groundwork for the nation's future space endeavors. His legacy endures not just in the milestones achieved but in the spirit of resilience and compassion he instilled in an entire generation of space scientists. To his team, Prof Vasagam was more than a mentor he was a guiding force who proved that empathy and excellence could, and indeed must, go hand in hand.



Game-Changing Key Spec's of the APPLE Mission



The APPLE satellite's significance lies in its sophisticated, integrated architectural design, a demonstration of engineering ingenuity featuring a triaxial attitude control system, deployable solar arrays, and a lightweight yet robust carbon fiber structure. This structural and mechanical elegance was complemented by advanced propulsion and thermal management systems, ensuring precise orbital placement and operational resilience. However, the mission's true intellectual merit resides in its pioneering use of a C-band transponder to facilitate groundbreaking communication experiments. By enabling advancements in telemedicine, teleconferencing, tele-education, and networking, alongside innovations in emergency communication, the APPLE mission surpassed mere technological demonstration, evolving into a nexus for applied knowledge with profound societal implications.



Special Features

APPLE introduced key innovations that made it both advanced and efficient. Its carbon-fiber antenna and high-efficiency solar arrays enhanced performance while keeping the design compact—proof of smart engineering under tight constraints.

It also led to the creation of an indigenous tribology lab to test vital components like momentum wheels and solar drives. By using space-proven, locally developed systems, the team kept the mission on time and within budget, setting a strong foundation for future Indian space programs.



With scientists inspecting APPLE before ARIANE LO3 launch

APPLE Thermal Model Undergoing Solar Simulation Test



Testing and Validation

Extensive testing was conducted on APPLE, including, thermo-vacuum tests in both India and France to simulate the harsh conditions of space. Structural, vibration, and thermal tests to validate the spacecraft's resilience under launch and operational conditions. The momentum wheel design was validated for the first time in India, overcoming significant challenges that laid the foundation for subsequent Indian space missions. These evaluations ensured APPLE's readiness, marking a key step in India's path to space self-reliance.



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Technical Breakthroughs That Defined an Era

APPLE represented multiple technological firsts for India's space program:

- First three-axis stabilized geosynchronous experimental communication satellite.
- Pioneer in integrated bipropellant propulsion systems for orbit control.
- First successful deployment of large, dual solar arrays in space by India.
- Indigenous development of critical thermal control systems for the harsh space environment.

The 673 kg satellite, meticulously positioned at 102° East longitude, became a vital testbed for various indigenous technologies, including onboard power systems, communication transponders, and precise attitude control mechanisms. These innovations established the essential technological foundation for India's subsequent operational satellite communications infrastructure. Perhaps most emblematic of the mission's spirit was the iconic image of the APPLE satellite qualification model being transported on a humble bullock cart for antenna testing—a powerful symbol of Indian jugaad (innovative, frugal problem-solving) that vividly demonstrated how necessity often breeds ingenious solutions.

From Experimental Satellite to Enduring Impact

APPLE's successful deployment and flawless operation validated India's spacecraft design and operational capabilities on a global stage. It firmly established ISRO's credibility in the complex field of communication satellite technology and opened pathways for future international collaboration on equitable terms. 'What began as an experimental mission became the very cornerstone of India's national satellite communication program,' noted Prof Vasagam in one of his later reflections.

APPLE irrefutably proved that clear vision and unwavering determination could drive technological self-reliance, paving the way for the vital INSAT (Indian National Satellite System) and GSAT (Geosynchronous Satellite) series that subsequently revolutionized communication, broadcasting, and meteorology across India. The comprehensive knowledge ecosystem developed during the APPLE project—spanning testing protocols, component qualification standards, and mission management techniquescontinues to influence and enhance current nations space programs, driving reliability and fostering innovation.

Ariane LO3 rocket lifts off with Apple payload





A Living Inheritance

As India continues its ascent as a major space power, launching multiple satellites annually and offering competitive commercial space services worldwide, the pioneering work of the APPLE mission and Prof Vasagam's leadership remains incredibly significant. The mission's success unequivocally proved that with strong, empathetic leadership, meticulous planning, and steadfast commitment, India could achieve remarkable strides in high-technology fields like space exploration and achieve genuine selfreliance. According to various testimonies, APPLE represented far more than just a satellite launch; it was a powerful validation to India's burgeoning space capabilities. In essence, it was about launching national kickstarting ambitions, careers, and fulfilling long-held dreams.

From that historic bullock cart navigating uneven terrain to today's sophisticated launch vehicles soaring towards orbit, APPLE's journey symbolizes India's remarkable technological transformation—an enduring demonstration to Professor Vasagam's visionary foresight and the potent power of believing in indigenous capabilities.

This legacy of Vasagam continues to inspire successive generations of scientists, engineers, and dreamers. Institutions like ISRO stand tall today, built not solely on technological evolution, but crucially on the foundational values instilled during the APPLE era innovation against all odds, frugal engineering excellence, and an unshakeable spirit of self-belief. Young minds entering India's vibrant space sector look back at APPLE not merely as a historical milestone, but as a transformative movement that fundamentally redefined what was possible for a developing nation aiming for the planets. This legacy lives on, subtly shaping every new mission as an implicit tribute to those pioneers who once dared to dream beyond the skies. 💸



Today, as we dedicate the APPLE satellite to the nation, I feel immense pride in India's achievement. APPLE symbolizes our growing technological self reliance, thanks to the dedication of our scientists and engineers. This satellite will enhance communication, bridge distances, and open new avenues for education and research. It marks a major step in India's space program and our commitment to progress. Congratulations to all involved in this remarkable accomplishment.

— Smt. Indira Gandhi, Prime Minister of India, 1981

Echoes of Enduring Legacy

We remember the extraordinary life and profound legacy of Professor R M Vasagam, a true luminary whose contributions indelibly marked India's scientific, technological, and educational context. His unwavering dedication to space exploration, innovation, and the empowerment of young minds continues to ignite inspiration across generations. Though his physical presence is deeply missed, his visionary spirit endures—within the countless minds he nurtured, the groundbreaking missions he pioneered, and the transformative path he forged for India's future. His guiding principle, that technology must ultimately serve humanity, remains a powerful beacon for all striving to build a better world.



In the days following his passing, tributes emerged from across the nation and globe, capturing the profound impact of his life's work. This compilation gathers voices of admiration and reflections, serving to amplify the resonance of his legacy and showcase the breadth of his influence and the depth of respect he commanded. Let us honor his memory not merely with words, but through continued action—carrying forward his unwavering commitment to excellence, purposeful innovation, and mentorship. Professor Vasagam's legacy is not confined to remembrance; it is a living inspiration, urging us to reach new frontiers while holding fast to the values he cherished.

75 Students' Satellites Mission

A Vision Beyond the Stars

Professor Vasagam's most enduring bequest, the 75 Students' Satellites Mission continous to inspire younger generation. He profoundly reengineered the space education paradigm by forging an unprecedented threefold collaboration between academia, industry, and government. His visionary approach surpassed conventional pedagogical models, challenging students to actively construct functional satellites rather than passively absorbing theoretical knowledge. This distinctive ecosystem enabled experienced mentors to nurture nascent innovators, ensuring a vital intergenerational transfer of expertise while concurrently tackling tangible and real-world challenges. The Mission epitomizes his lifelong conviction that 'technology without application is merely an exercise,' and stands as a powerful continuation of his unwavering commitment to India's technological self-reliance through the strategic empowerment of its youth.



In 2021, while most octogenarians might a well-deserved retirement, contemplate Professor Vasagam, a name synonymous with India's space ambitions, embarked on what would become his most visionary and enduring initiative: the 75 Students' Satellites Mission (75SSM). Conceived as а powerful commemoration of India's 75th year of independence (Azadi Ka Amrit Mahotsav), this groundbreaking program transcended mere symbolic gesture. It embodied his lifelong philosophy that true educational excellence must be intricately linked with practical application.

'Students shouldn't just learn about satellitesthey should build them,' became the resounding call that united an unprecedented collaboration of academic institutions, expanding industries, supportive governmental bodies and domain experts, all galvanized by the octogenarian's infectious zeal and unwavering belief in the potential of nation's emerging talent. Professor Vasagam, whose intellectual prowess had already left an indelible mark on India's educational and technological landscape through innovative strides in space technology, aeronautics, and countless multidisciplinary domains, envisioned the 75SSM as more than just a series of satellite developments.

It was designed to be a crucible, forging the next generation of space engineers and innovators through hands-on experience that mirrored the complexities, challenges, and triumphs of experimental space missions. He understood profoundly that true mastery wasn't confined to theoretical understanding; it demanded the tangible act of creation—the iterative process of design, construction, testing, and problemsolving that defines the engineering discipline at its core. The scale of the 75SSM was unprecedented, involving a constellation of institutions spanning the entire geographical expense of the country.



Component testing of the subsystem boards

The 75SSM was not merely about assembling was hardware; holistic educational it а experience meticulously crafted to mirror the entire lifecycle of a CubeSat mission. Students, under the expert guidance of seasoned mentors from both R&D labs and industry, were immersed in every facet of satellite development. This encompassed the initial conceptualization and detailed design phases, the intricate processes of fabrication, component integration, rigorous environmental and functional testing, ultimately, and the exhilarating prospect of launch and subsequent orbital operation. This comprehensive approach ensured that participants gained a profound understanding of the multidisciplinary nature of satellite technology. It fostered not just specific technical skills but also crucial abilities in project management, collaborative teamwork, systems thinking, and critical problem-solving, the qualities essential for perfecting in the demanding global space sector.

Don't just study satellites—build them, launch them, own the sky! – 75SSM Mantra

This national collaboration, carefully devised by Prof Vasagam and his dedicated team, fostered a vibrant spirit of healthy competition alongside synergistic learning. Students from diverse backgrounds and possessing varied skill sets converged, united by a common, ambitious goal: to contribute directly to India's burgeoning space capabilities through their own ingenuity and diligent hard work.





The program rapidly evolved into a dynamic ecosystem where knowledge flowed freely between participating institutions, best practices were shared openly, and the collective creative energy of hundreds of young minds was focused on a singular satellite-building objective.

Prof Vasagam lasting vision remains influential, with the 75 student-created satellites paving the way for thousands more learners

Industry affiliates played an indispensable role in the 75SSM's success, providing not just crucial resource support but also invaluable technical expertise and mentorship opportunities. This provided students with direct exposure invaluable insights into the practical demands and operational realities of the sector, significantly enhancing their employability and preparing them to seamlessly transition into impactful professional roles upon graduation.



The 75SSM has generated a wide-reaching impact, extending far beyond its initial ambitious aim of launching 75 student-centric satellites. The program has demonstrably ignited a passion

for space exploration along with other STEM fields among a new generation and aspiring talents. Inspired countless others to pursue careers in a sector holding immense potential for national growth and establishing countries global leadership. It has also actively fostered a culture of innovation and entrepreneurship within participating institutions, encouraging students to think beyond traditional curricula and engage proactive hands-on projects and addressing functional industrial solutions.

Moreover, the 75SSM serves as a powerful demonstration of India's rapidly growing capabilities in the small satellite domain –a evergrowing sector with significant commercial and strategic implications. The skills, expertise, and infrastructure developed through-



this program directly contribute to nation's technological self-reliance (Atmanirbhar Bharat), reducing dependence on foreign technologies and fostering the growth of a vibrant, indigenous domestic space industry. Prof Vasagam, even in his advanced years, remained a tireless advocate for this vision, his palpable enthusiasm and unwavering belief serving as a constant source of motivation and inspiration for everyone involved.

Prof Vasagam fervently believed education must ignite hands-on innovation. The 75SSM mission proved students learn best by building—not just studying. He effectively transformed classrooms into workshops, abstract theory into functional satellites, and youthful dreams into orbit-ready reality. For him, true progress meant equipping young minds to solve real problems not merely – memorize answers—thereby turning India's next generation into active architects of the space age. He saw textbooks as initial blueprints, students as capable engineers, and classrooms as potential launchpads. His enduring vision? 'Where learning wasn't confined to pages but soared skyward, where every lesson possessed thrust, every idea carried payload, and every graduate became a mission controller of their own future'.

The 75SSM was just the ignition; the resulting fire of inspiration will propel generations forward. His legacy lives on vibrantly in every student who dares to build, launch and lead in this mission. His education vision proved definitively that with the right spark and learning transforms everyone associated.





75SSM CubeSat design Manufacturing and Testing



The Indelible Mark

The Education Visionary

The foundation of Professor R M Vasagam's legacy extends profoundly into academia. For more than a space scientist, he was a transformative educator who fundamentally reconfigured the engineering education's very architecture. Serving as Vice-Chancellor at Anna University and later Dr M G R University, his leadership was instrumental in modernizing technical curricula, meticulously aligning them with the evolving demands of technological advancements and pressing societal demands. By seamlessly connecting academia and industry, he ensured students gained practical and bonafide knowledge that extended far beyond traditional educational texts or scholarly volumes.

Prof Vasagam's revolutionary impact transformed engineering education from rocket science to satellite designs to fundamental academic reforms following his pioneering leadership at ISRO. As Vice-Chancellor, he dismantled traditional academic silos, forging pedagogical innovative approaches that constructively merged theoretical rigor with hands-on practical exposure. "Theory without application is like a satellite without a mission," became his definitive educational philosophy-a mantra that would only reshape technical curricula. This principle catalyzed sweeping educational reforms throughout institutions under his guidance, establishing a distinctive approach characterized by unwavering focus on real functional complexities.

He functioned as the intellectual propulsion system for modern engineering education, masterfully launching young minds beyond confined textbook culture into the practical orbit of applied ingenuity.

Drawing on his cross-domain repertoire from complex space systems, Prof Vasagam advocated educational programs for meticulously designed to translate abstract classroom concepts into tangible industrial solutions. This ensured learners not only acquired solid theoretical foundations, but also actively applied this knowledge to complex challenges encountered in professional contexts.



Dr A P J Abdul Kalam and Prof Vasagam share a moment of mutual respect at AU Jubliee celebrations

At Anna University, Professor Vasagam transformed engineering education by establishing a research-centered approach that prioritized practical experience and crossdisciplinary framework. His innovative programs in space technology, aeronautics, and computational sciences became instrumental in developing India's emerging aerospace talent pool. His educational vision continued at Dr. MGR University, where he reimagined curricula to incorporate real-world applications, creating graduates better prepared for industry's evolving demands. By bridging theoretical concepts with practical implementation, he ensured students developed not just technical knowledge but the adaptable problem-solving skills essential in a rapidly changing technological landscape.

Numerous universities and research institutions across India benefited from his steadfast mentorship and guidance. His insightful advice, impactful keynote speeches, and thoughtful convocation addresses continue to inspire, often rooted in principles of simplicity, rigor, and timeless values. The institutions connected with him have not only advanced their diverse expertise, but have also experienced a holistic transformation through his leadership, fostering cutting-edge curricula and elevating academic standards across the engineering fields. Prof Vasagam's educational legacy lives on vibrantly through the student's, countless engineers and problem-solvers who embody his philosophy of effectively bridging theory with practice. His forward-thinking approach has undeniably made a lasting impact on engineering, motivating current and future generations to think critically, innovate boldly, and apply their skills to make a measurable, positive difference in broad spectrum of education. His visionary approach lives on through generations of engineers forged in the crucible of his purpose-driven and application-oriented methodology.



Professor Vasagam architected a convergence between theoretical abstract and pragmatic implementation which led in establishing immersive laboratories, industry oriented curricula that transcend learning boundaries. This paradigmatic transformation manifests in engineers whose elegant solutions reconfigure the technology-society relationship—a reflection of his enduring intellectual influence.

Shaping Global Standards

As a transformative visionary in global engineering advancement, Prof Vasagam strategically elevated professional standards while cultivating innovation ecosystem that extended national boundaries. His leadership within prominent professional organizations, influential technical committees, and national research initiatives demonstrates a profound commitment to progress that resonated well beyond India's borders. His active, decades-long involvement in prestigious engineering bodies, including the Institution of Engineers India (IEI), the Indian Institution of Production Engineers (IIPE), and the Institute of Electrical and Electronics Engineers (IEEE), was central to this endeavour. As a Fellow of the century-old, pioneering IEI, Professor Vasagam systematically architected educational frameworks, guided countless engineering careers, and influentially advised reforms in technological policies. His impact at IEEE was particularly profound, masterfully aligning Indian engineering policies with international standards, indelibly marking his remarkable and enduring influence on the global engineering stage.

Driven by a profound commitment to progress, Prof Vasagam actively influenced these premier engineering organizations through strategic policy development and the introduction of ground breaking initiatives including policies, research and development. His remarkable over five decades association with the IEEE, beginning in 1970, culminated notably in the COestablishment of the prestigious programmes and award for Engineering Excellence, a testament to his collaborative spirit and dedication to recognizing outstanding achievement.

Within IEI, Professor Vasagam spearheaded transformative changes over a significant twelve-year period, fundamentally contributing to the landscape of engineering education, examination frameworks. research benchmarks, and accreditation practices across engineering disciplines fifteen including aerospace division. His influential rolesincluding Chairman of the IEI Karnataka State Centre and Chair of the National Aerospace Engineering Division Board—clearly reflect his unwavering dedication to the Institution's growth and professionalization efforts.



Inauguration of 31st Mechanical Engineering Convention, Sept 2015 at Bangalore



At the Seshadripuram Educational Trust, Bangalore

Under Prof Vasagam's visionary stewardship, the National Design and Research Forum (NDRF), an autonomous R&D arm of the IEI, flourished, and emerging as a dynamic catalyst for nurturing indigenous technological innovation. His ability to cultivate impactful cross-disciplinary collaborations was key to driving successes across diverse fields fostered under NDRF's umbrella, one of them was National Program of Micro Air Vehicles.

As Chairman of the Indian Institution of Production Engineers (IIPE), he strategically worked to elevate India's global manufacturingpresence and competitiveness. He effectively bridged the gap between industrial practice's and academic learning, translating complex manufacturing expertise into accessible educational frameworks thereby and strengthening professions position and reputation on the global scale. Professor Vasagam's steadfast commitment to these pivotal organizations forged an enduring legacy of excellence, collaboration, and relentless progress across the national and international engineering landscape. 💸



Nith Prof U R Rao, former Chairman and IEI Office Bearers



The ITCA's 75SSM Team at ISRO Head Quarters



The Encyclopedic Intellect...

Master of Many Domains

Far more than a distinguished space scientist or engineering educator, Professor R M Vasagam was revered for his intellectual brilliance, possessing with a knowledge base of astonishing breadth and profound depth. Those who associated closely with him recall moments where he could effortlessly retrieve detailed technical information from decades past, intricately connect disparate scientific principles, and illuminate complex engineering problems through the lens of historical context. This incredible intellectual capacity, combined with his exceptional memory and cognitive retention, earned him a singular reputation among contemporaries. To those who knew him well, Prof Vasagam manifested not merely as well-educated, but as a living encyclopedia—a mind seemingly attuned to the vast universe of science, engineering and beyond. This exploration reveals his multifaceted intelligence, far-reaching scientific influence, steadfast dedication and transformative innovation.

Professor Vasagam's intellect an overwhelming spanned spectrum of leaving colleagues, disciplines, engineers, students and even common man in perpetual admiration. His knowledge was never confined to a narrow specialization; it encompassed the interconnected complexities of space systems. From the systemic intricacies of satellite design and the subtle configurations complexities of orbital mechanics to the powerful forces governing spacecraft propulsion, he demonstrated and holistic authority over a broad spectrum of engineering disciplines. An electrical engineer by training, he navigated circuits, systems, and embedded electronics with virtuoso precision.

His proficiency in control systems, aerodynamics, and material science's reached an unparalleled level, akin to complete mastery. These disciplines are crucial for both launch vehicles and satellites. his understanding was exceptionally and commandable. His remarkable ease in absorbing and synthesizing knowledge was clearly evident. Yet, his expertise refused these bounds, embracing systems engineering principles, best practice's, unique educational methodologies, and cultivating а comprehensive understanding of global engineering standards.



Receiving the Padma Shri from President of India, Neelam Sanjiva Reddy at a formal ceremony 1982

A historic gathering, where knowledge converge in collective learning



With Prof U R Rao, former ISAC Director, at NASA's Wallops Flight Facility

He perceived the inherent interconnectedness of knowledge, weaving seemingly disparate threads into a rich, and multidimensional proficiency. What truly distinguished Vasagam was not merely this extraordinary intellectual breadth, but his remarkable ability to recall and connect concepts. He could effortlessly trace the evolution of satellite communication from Sputnik-era fundamentals to cutting-edge nanosatellite innovations, narrating the complex heritage with meticulous chronological detail that made things simple and accessible.

When discussing the routinely challenging fields on world of aerospace materials, he would illuminate their properties and applications with a crystalline clarity, transforming complexity into comprehension and revealing the underlying elegance of scientific principles. He bridged complex ideas with clarity, inspiring curiosity across every field he touched. As ISRO's satellite program grew from tentative beginnings to global prominence, Prof R M Vasagam served as its walking knowledge bank.

His remarkable cognitive capacity manifested far beyond mere intellectual display. As an educator, it enabled lectures of unparalleled depth and accuracy, delivered with a passion curiosity students that ignited in and adherents. As a mentor, it facilitated guidance grounded in precisely recalled precedents and fundamental principles, empowering the future generation to think critically and innovate fearlessly. As an authoritative leader, it informed decision-making illuminated bv historical insight and profound technical precision, ensuring choices were not merely expedient but deeply considered.



With Japanese delegates and Dr U R Rao, a gathering of global minds bridging nations through space science and technological exchange



Prof Vasagam's humble presence



With Dr A P J Abdul Kalam stands united in vision, symbolizing the launch of a nation's space dreams

Beyond his remarkable analytical acuity, what truly set Prof Vasagam apart was his deeply humanistic.down-to-earth approach to disseminating his profound wisdom. Despite his towering intellect and the universal respect, he commanded. he possessed an extraordinary ability to break down complex ideas into digestible concepts, patiently guiding those around him towards understanding. He never condescended but rather lifted others with clarity and encouragement, fostering a collaborative and intellectually stimulating environment. His passion for knowledge was infectious, and his genuine desire to share it made him not only a brilliant scholar but also an esteemed educator and acclaimed mentor. He understood that true progress lay not in hoarding knowledge, but in its effective, and empowering dissemination.

His attributes manifest as an exceptionally uncommon and limitless array, constituting a boundless repository of extraordinary rarity

The foundational principles driving his vision a commitment to intellectual rigor, a belief in the holistical web of knowledge, and a deep education passion for and mentorship continue to illuminate our collective pursuit of scientific advancement, particularly within the ever-evolving space ever evolving New-Space. endures His legacy not only in the contributions he made to science and technology but also in the minds he inspired to reach for the stars, grounded by a profound understanding of the earth beneath our feet.

His wisdom, like the principles he championed, resonates onward, guiding future generations as they navigate the complexities of the cosmos. To speak of Prof Vasagam is to speak of a visionary whose intellect not only absorbed knowledge but redefined its very structure. While others might operate within conventional disciplinary boundaries, he constantly pushed beyond them. Rather than thinking in direct paths, his mind keenly worked in elaborate loops and connected clusters, resembling the sky like arrangements, he valued highly. His intellect was encyclopedic not only in scope but in structure—organizing, cross-referencing, and expanding upon ideas with the precision of a master scholar and the boundless creativity of a cosmic dreamer.

Prof Vasagam's legacy is one of purposeful construction, not mere accumulation. He did not simply know more—heenvisioned more. He conceived of engineering not as a collection of disparate parts but as an intricate orchestra of systems, each component harmonized to achieve mission goals of stunning complexity. satellite launched, Everv everv mission planned, and every institution he touched bore the indelible imprint of this integrative visiona systems thinker ahead of his time, who saw space exploration not merely as a technological challenge, but as a philosophical, educational, and societal endeavor.

What elevated Prof Vasagam from an expert to an architect of dreams was his unique ability to interlace the technical with the visionary. He could speak of spacecraft trajectories with the same clarity and cadence poets reserve for destiny. To him, a launch vehicle was not just a mechanism—it was a narrative, a symphony of intention, precision, and purpose. Each equation he considered, each design he reviewed, carried the unmistakable tone of someone who believed science itself was a form of storytelling—a way to narrate humanity's determined ascent into the space.

As we look to the future of aerospace, education, and scientific discovery, Professor Vasagam's spirit continues to guide our aspirations. His vision lives on—revolving, like the satellites he helped design, around the relentless pursuit of knowledge and the elevation of the human spirit. In honoring him, we remember not just a brilliant mind, but a true architect of space dreams.

A Glimpse into the past

A Photo Gallery





Captain Rakesh Sharma and a mission leader share a historic moment



1



A focused young Vasagam, gazing ahead as a rising space pioneer





Honoring excellence, a beautiful display of respect and admiration









At the inaugural of the Robotic AI-ML Lab at Seshadripuram Public School, Bangalore





With Dr K Radhakrishnan (former ISRO Chairman), Dr A S Kiran Kumar (ISRO Chairman at that time) at Professor Satish Dhawan Commemoration lecture in September 2015, at the IEI



With Padma Shri Dr Mylswamy Annadurai, Padma Shri Dr V Prakash *(Former Director, CFTRI)*, Dr K Ramachandra





With Dr V Narayanan, current ISRO Chairman



Indian Technology Congress 2017

Industry 4.0 Engineering the Interface with Real World

10th & 11th Aur 017 NIMHANS C tion Centre Bengaluru

Vith Padma Shri Dr S Ayyappan,"Chancellor CAU Manipur) at the Indian Technology Congress in 2017







Innovating India's tech for 22 years, we pioneered the '75 Students' Satellites Mission' and made a global impact in space tech, precision agriculture, and Industry 4.0.

<u>Complied by</u> Moses Denny Veliath

Shanmugham K

Srinivas Durvasula

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