WESAT - Development of a Payload for the Comparison of Solar Radiation and UV Index Measurements

WESAT Mission

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WESAT - Women Engineered Satellite Payload

LBS Institute of Technology for Women (LBSITW), Poojappura, Thiruvananthapuram, Kerala, India

WESAT developed by LBSITW, is a groundbreaking project, initiated by the Space Club of our institute. **WESAT is India's First Satellite Payload developed by a Women only Institute led by an all-women team and is also the First Student Satellite Payload from the Govt. Of Kerala**. The purpose of WESAT is to measure UV radiations in space and on earth's surface and their influence on the warm temperatures and climate change phenomena in Kerala. This pioneering effort, entirely managed by a team of women, is a testament to gender equality and innovation. Overcoming challenges including the pandemic, the project collaborated with VSSC, ISRO, IN-SPACe, Dept. of Space culminating in ISRO's approval of the launch in the PSLV C-58 mission. WESAT holds the promise of yielding invaluable insights into atmospheric warming and health risks, specifically focusing on Kerala.

The WESAT project was born out of a collective passion for space exploration and the allure of a women-only space endeavor. The team was captivated by the potential of contributing to space research and understanding the impact of UV radiation. The mission's goal aligned perfectly with the desire to make a positive difference in society and set a unique milestone in the field of aerospace engineering.

The Mission

This satellite is mainly aimed at measuring the ultraviolet radiation in space and on the earth's surface and understanding the impact on recent phenomena such as heat waves and climate changes occurring in Kerala. This is the first kind of study in this regard considering our state. Further studies will help government agencies to invoke quick actions and formulate policies to reduce hazardous impacts on the environment. As of now, WESAT stands as the primary source of data for both UV and solar intensity, providing valuable insights into these crucial parameters.

Government Partnership

MoU signed with VSSC, ISRO, IN-SPACe, Dept. of Space and Govt. of India for launching WESAT in the PSLV C-58 mission which is India's 60th PSLV mission. WESAT's collaboration with esteemed organizations like the Indian Space Research Organisation (ISRO) and IN-SPACe is a testament to the mission's legitimacy. The team sent a proposal to ISRO, which was approved after several discussions. This collaboration ensures the successful execution of their mission. The project received 10 lakhs funding from the central government through Department of Science & Technology (DST) Nidhi Prayas scheme and 14.4 lakhs from the State Government via Kerala Startup Mission (KSUM).

Pioneering Achievement

Our institute is proud to be the first institute in Kerala and the only women institute in India to accomplish this milestone. Our project has garnered extensive media coverage in a multitude of prestigious newspapers (The Hindu, The Indian Express, Times of India, Malayala Manorama, etc.) and telecasted on prominent TV as well as YouTube channels (NDTV, Doordarshan, Asianet, Manorama, ETV Bharat, etc.).

All-women space club's project to be part of ISRO's PSLV mission

PARVANA K B

THE Space Club of Lal Bahadur Shastri Institute of Technology for Women (LBSITW) in Thiruvananthapuram created history on Monday when they handed over a satellite to Vikram Sarabhai Space Centre.

WESAT, is India's first satellite payload to be built by an all-women team and the first such project from Kerala. It is also the first satellite developed by an institute to be launched by ISRO in the upcoming PSLV mission.

WESAT's purpose is to measure UV rays in space and on Earth's surface and their influence on the warm temperatures and climate change phenomena in Kerala. This isn't an information that is readily available in the state. With a monitoring station, the college hopes to provide real-time updates on the WESAT website, which can be accessed by anyone.

"The idea for the WESAT project originated with the 2017 batch of students part of the Space Club. We didn't have much idea then. However, subsequent batches conducted extensive studies. Then, during the pandemic months, when we finally had time to invest in the project, we created a comprehensive project proposal and submitted it to ISRO. We received a call from them a month later and our work was on," says Lizy Abraham, the principal investigator of WESAT.

Project coordinator Lizy Abraham and members of the Space Club | VINCENT PULICKAL

The work that began in 2019 took nearly four years to complete. "We had many ups and downs, but we succeeded through our hard work and determination," shares a delighted Devika D, the student coordinator of the project.

Gopika P S, one of the first students of the space club, says, "WESAT is not just a project, but an emotion. I always dreamt of learning astrophysics and working with NASA or ISRO. During my high school days, I even sent an email to NASA asking them for a job," Gopika recalls.

"Choosing electronics and communications for my BTech was influenced by noted ISRO scientist G Madhavan Nair, who too graduated in the same subject. The initiation of the Space Club during that time aligned perfectly with my life goals," she adds.

Another alumna, Kousalya R, who actively participated in the Space Club, expressed her joy about WESAT's success. "I'm thrilled! It was after much struggle that we identified a sensor for sun intesity. But sadly, we had to graduate before the project was complete. Our juniors showed so much enthusiasm. A big salute to them and Lizy ma'am," says Kousalya.

The satellite is slated to be launched on the PSLV C58 mission of ISRO, which will see payloads from across the country also launched. WESAT will be the sole representation from Kerala for the mission.

Tuesday, January 2, 2024
THIRUVANANTHAPURAM

Thiruvananth

A thrilling New Year launch for the engineering students of LBS

WESAT developed by the institute was launched by ISRO's PSLV C-58 on Monday. The 1.4-kg nanosatellite is country's first satellite to be fully designed by women, meant to study ultraviolet radiation and its impact

Tiki Rajwi
THIRUVANANTHAPURAM

The new year opened on a thrilling note for the Lal Bahadur Shastri Institute of Technology for Women (LBSITW) here with a nanosatellite developed by its students launched aboard an Indian Space Research Organisation (ISRO) mission on Monday morning.

The announcement of the mission's success from the Satish Dhawan Space Centre, Sriharikota, was received with cheer at the LBS Institute's seminar hall where the launch was shown live on a big screen.

WESAT, short for 'Women Engineered Satellite,' was launched aboard the Polar Satellite Launch Vehicle (PSLV)-C58/XPoSat mission as one of the 10 secondary payloads. The 60th mission of the PSLV had as its main payload the XPoSAT, a dedicated scientific satellite from ISRO.

The 1.4-kg WESAT is billed as the first Indian satellite to be fully designed and developed by women. The satellite is meant to study ultraviolet radiation and its impact, according to the institute's space club, which was responsible for its development with technical assistance from ISRO.

Lizy Abraham, Assistant Professor and Principal Investigator of the satellite project, and several members of the space club were in Sriharikota for the launch. The rest of the team watched it live at the institute with other students and teachers.

"It was really exciting. Five years of hard work has paid off. We have also received the initial data from WESAT," Prof. Abraham told *The Hindu* from Sriharikota after the launch.

150 women

"It's a big moment for us. The project was conceived in 2018 and ISRO had cleared it in 2019. Many of them have graduated, and we have 42 members in the club at present. In all, 150 women have worked on WESAT," Sheril Mariam Jose, one of three coordinators of the project who had watched the mission live at the institute here, said.

Speaking at Sriharikota after the mission, PSLV-C58 mission director Jayakumar M. said the WESAT project "showcases women empowerment in the field of science and technology."

Monitoring station

As part of the project, the institute had constructed a ground monitoring station, which had become operational last year.

For launching WESAT aboard an ISRO mission as a co-passenger satellite, the institute had also signed an agreement with the Indian National Space Promotion and Authorisation Centre (IN-SPACe), the single-window agency which handles space sector activities of private entities.

J Jayamohan, Principal, LBS Institute, praised the students and the faculty members for the hard work they had put in. "The institute started work on the satellite project in 2019, but the COVID-19 pandemic delayed it. Otherwise, it could have been launched earlier," Dr. Jayamohan said.

Funding issue

Funds were a major issue, he recalls. The project cost ₹10 lakh. Of this, the Department of Science and Technology (DST), Government of India, contributed ₹10 lakh, while the Kerala government pitched in

Proud moment: Some members of the WESAT team pose with a replica of the nanosatellite that was launched aboard an Indian Space Research Organisation mission on Monday.

LBS women's satellite in next PSLV mission

Gouri S Dev | TNN

Thiruvananthapuram: A fully-fledged payload developed by students of LBS Institute of Technology for Women has cleared all quality tests prescribed by ISRO and it will be launched in the next PSLV mission. VSSC director S Unnikrishnan Nair unveiled the WESAT project director M Jayakumar unveiled the WESAT payload here on Monday.

VSSC director S Unnikrishnan Nair unveils the WESAT

A new monitoring station has been installed on top of

SCRIPTING 'HER'STORY

All-woman team's small satellite enters orbit

SOVI VIDYADHARAN @TPuram

IT WAS a proud moment for students and faculty of Lal Bahadur Shastri Institute of Technology for Women (LBSITW) when a small satellite developed by them was successfully placed in orbit as part of the PSLV C58 mission that was launched by ISRO on Monday.

The Women Engineered SATellite' (WESAT), designed fully under the supervision of women, would measure the ultraviolet (UV) index of the sun and also study UV radiation effects on earth, particularly over Kerala.

Being the only self-powered payload in the PSLV C-58 mission, WESAT was capable of capturing data even before reaching its orbit located at an altitude of 350 km from the earth's surface.

"It was indeed a proud moment for us as our payload was the first to transmit data from the moment the heat shield got separated, at around three minutes after lift-off," Principal Investigator of the WESAT project Dr Lizy Abraham told *TNIE* from Sriharikotta where a 40-member team from LBSITW witnessed the launch.

The data from WESAT was received by ISRO Telemetry, Tracking and Command Network (ISTRAC), Bengaluru. Around 23 minutes after lift-off, the satellite was placed on orbit, said Lizy who also is also the coordinator of LBSITW's Space Club that has around 150 student members who developed the satellite.

"The students were overjoyed when the ISRO chairman and the PSLV mission director referred to our small satellite as a symbol of women empowerment," she said. It was a crowning moment for the student team whose hard work over the past five years made WESAT possible.

The satellite is equipped with UV sensors and solar intensity sensors, providing valuable data for climate change studies and health risk assessments.

Higher Education Minister R Bindu hailed the WESAT launch as a milestone in the country's space exploration history.

Bindu had presented ₹31 lakh as funding grant, sanctioned under the Central government scheme NIDHI PRAYAS and corporate social responsibility funds, for the development of WESAT.

Students and faculty members of Lal Bahadur Shastri Institute of Technology for Women with ISRO chairman S Somanath after the launch of WESAT on Monday

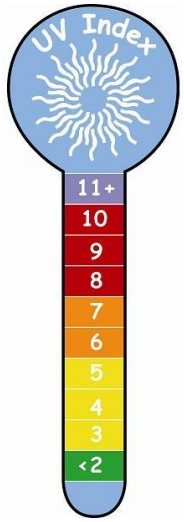
"The students were overjoyed when the ISRO chairman and the PSLV mission director referred to our small satellite as a symbol of women empowerment"
Dr Lizy Abraham, principal investigator, WESAT project

The Challenges Faced and Overcome

In the beginning, the team found it hard to convince and attain the trust of the people around that it was actually possible and the study was novel. One of the significant challenges the team faced, likewise, was securing adequate funding for the payload's development. In the beginning the institution gave an initial amount and the rest of the essentials were covered by the team coordinators. It took untiring efforts of months which was made fruitful by the sponsoring of Central Government and Kerala State Government. To overcome this challenge, they had to emphasize the scientific significance of their mission to garner the necessary financial support. The team remained flexible, adapting to evolving resource requirements. Another main issue was the passing out of project teams as 3 batches of B.Tech students involved in this mission has been graduated during the period. This caused a delay as another round of members had to be selected and trained to work for the mission and they were able to carry out the mission without significant gaps.

The Role of Ground Stations

The ground monitoring station is a vital component of WESAT's operations. It collects the data on UV intensity, Sun Intensity, temperature as well as humidity in the earth's atmosphere which is currently not available in public domains, especially the details on Kerala. This data can be accessed by the public through the dedicated website wesat.in designed by space club members which provides the accurate data of sun intensity, uv intensity, uv index, temperature and humidity in Thiruvananthapuram city. The monitoring station and the dedicated website are constructed by the students under the supervision of faculty coordinators.



Importance of Measuring UV Radiation

Measuring UV radiation both in Earth's atmosphere and space is crucial for multiple reasons. UV data contributes to the study of climate change, aids in the protection of human health, and is invaluable for exploring celestial objects. The insights gained from UV measurements provide a wealth of information for researchers and decision-makers.

Understanding Heatwaves and Climate Change in Kerala

The data collected by WESAT's payload will help understand the correlation between UV radiation intensity and solar intensity in both space and Earth's atmosphere. This information will provide insights into atmospheric warming and its implications, including potential health hazards due to increased UV exposure.

Measuring UV Radiation and Solar Intensity

WESAT collects data through a specially designed payload in Space above 350Km in circular orbit of 9.6degree inclination from the earth's surface and a monitoring station on Earth. The payload is equipped with UV sensors and solar intensity sensors, allowing for the comparison of UV radiation measurements in space with those on the Earth's surface.

Curious to know the design of our WESAT Payload?

The payload features a distinctive shape and is equipped to measure both UV intensity and sun intensity, enabling the calculation of the UV index. These values will be continuously transmitted via telemetry during the orbital journey.

WESAT Payload

Conclusion

WESAT, the Women Engineered SATellite, represents a milestone in space technology and gender equality. This ambitious project, led by an all-female team of engineers, has demonstrated the remarkable capabilities of women in aerospace engineering. Beyond the technical achievements, WESAT's commitment to education and empowerment serves as a source of inspiration for women and girls around the world. Through dedication, collaboration, and innovation, WESAT is shedding light on the impact of UV radiation and changing the narrative in space exploration.

Acknowledgements

We would like to extend our sincere gratitude to all those involved in providing technical support for WESAT and contributing to the successful completion of this mission. Special thanks to the teams at ISRO (Indian Space Research Organisation), VSSC (Vikram Sarabhai Space Centre), GSR Industries, and the dedicated staff at SHAR (Satish Dhawan Space Centre) for their invaluable expertise, guidance, and collaboration throughout the development process. Your unwavering support has been instrumental in advancing our mission and achieving our goals. We are immensely grateful to Department of Science and Technology (DST), Govt. of India and Kerala Startup Mission, Govt. of Kerala for their generous financial support towards the development of WESAT.

WESAT Principal Investigator Dr.Lizy Abraham with student coordinators Ms.Devika D K & Ms.Surya Jayakumar at SHAR witnessing the launch from Mission Control Centre (MCC)

Team WESAT & Staff members of LBSITW at SDSC SHAR after the launch

WESAT
Women Engineered SATellite

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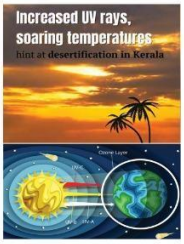
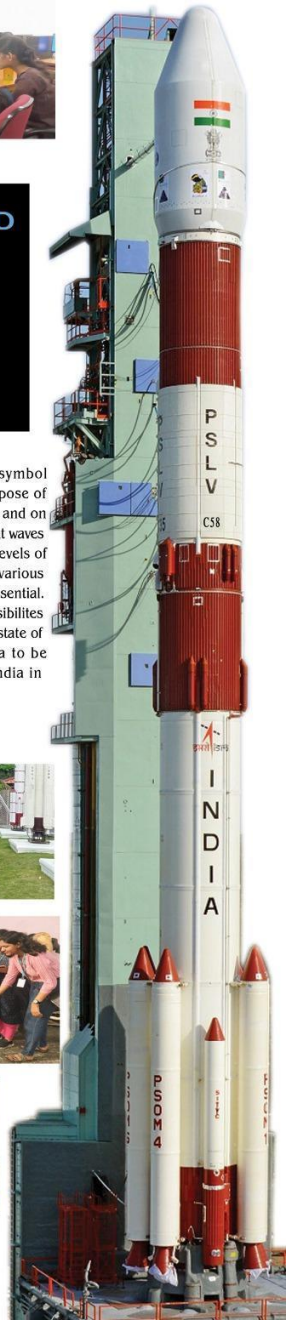
WESAT (Women Engineered Satellite) Student Satellite Program

- ***India's first satellite payload by a women only institute led by an all women team.***
- ***First satellite payload from the Govt. of Kerala.***

Backed by four years of dedicated work and collaboration with esteemed organizations such as ISRO, VSSC, IN-SPACe, Dept. of Space, and Govt. of India, WESAT addresses global challenges such as atmospheric warming and related health hazards.This pioneering effort, entirely managed by a team of women, is a testament to gender equality and innovation. WESAT's success could gain .



International recognition as a symbol of women empowerment. The purpose of WESAT is to measure UV rays in space and on earth's surface and their influence on heat waves and climate changes in kerala . High levels of UV rays in our state can contribute to various health issues, making WESAT's study essential. WESAT will also help to realize the possibilites of climatic changes with respect to the state of Kerala which is an important area to be addressed by the Govt of Kerala, India in view of the recent Floods.



Instagram : space_club.lbsitw

Linkedin : WESAT(Women Engineered Satellite) Student Satellite Program

Twitter : s_wesat

Website : https://wesat.in/

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