# Graduate student leads control of pioneering NASA solar sail satellite



Prajit Saravanan, a graduate student at Santa Clara University, has taken on the rare and significant role of controlling a satellite in space at the age of 21. Initially planning to pursue a Master’s degree at New York University, Saravanan’s ambitions shifted after he discovered the Robotics Systems Lab (RSL) and its unique professional opportunities at Santa Clara.

Since April 2024, Saravanan has led a group of students tracking the NASA Advanced Composite Solar Sail System (NASA ACS3), a pioneering spacecraft designed to test solar sail technology. This technology harnesses the natural energy of the sun, rather than traditional rocket fuel, to propel the satellite through space. The solar sail, which is roughly half the size of a tennis court, unfolds from a compact satellite after launch, allowing the satellite to move through space by reflecting photons from the sun. Saravanan described it as similar to a sailboat powered by wind, saying, “The solar sail reflects photons from the sun that, in turn, push it forward. Because there is no friction in space, the sail can move freely and continuously.”

The mission aims to study how far the solar sail can travel and how it can be used to adjust altitude in space, with the potential for application in future NASA missions. “We deployed the sail and now we want to see how far we can go from here,” Saravanan said. “When this happens, we’ll be able to show that it can be used for more NASA missions in the future. It would be the cherry on top.”

The Robotics Systems Lab has been involved in NASA-related projects for nearly twenty years, securing close to $1.5 million in funding and collaborating closely with NASA’s Ames Research Center, located just 15 minutes from Santa Clara’s campus. Recently, they were awarded a $177,200 grant to continue operations for the NASA ACS3 mission, and NASA has extended its contract with the university for a further year.

Saravanan and his team operate out of a building known as “The Garage,” a former auto shop transformed into a high-tech control centre. They utilise 10-foot antenna dishes situated atop Guadalupe Hall on the university campus to communicate directly with the satellite. As the solar sail orbits Earth, it passes over Santa Clara University up to four times a day. During these passes, students remotely control the antennas to send commands or gather data via radio waves, which are then shared with NASA scientists for further analysis.

Saravanan’s daily responsibilities include monitoring the satellite’s health, scripting commands, downloading images, and tracking its trajectory. Despite the automation of many tasks, students remain on site during each satellite pass as a precautionary measure. “It’s stressful, but it’s a fun kind of stressful. Anything can go wrong, but anything can be fixed,” Saravanan explained. “I have to come up with a solution in the moment. For me, it’s fun when there is a challenge involved.”

His dedication and expertise have earned him a summer internship with NASA, followed by a full-time position as a systems engineer overseeing the solar sail mission — a role he secured before graduating. Saravanan credited much of his success to the mentorship and support of faculty members Chris Kitts and Michael Neumann at the Robotics Systems Lab. “The professors really believe in you. They put trust into their students,” he said. “Even when you make a mistake, they don’t get mad. They let you learn on your own. The professors want to see you grow.”

The Santa Clara University publication is reporting this story, highlighting the university's ongoing partnership with NASA and its contributions to cutting-edge space exploration technology.

Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

1. <https://www.nasa.gov/mission/acs3/> - This NASA page provides detailed information about the Advanced Composite Solar Sail System (ACS3), including its mission objectives and technological innovations, corroborating the article's mention of the satellite's design and purpose.
2. <https://www.nasa.gov/smallspacecraft/what-is-acs3/> - This resource explains how solar sails use sunlight for propulsion, aligning with the article's description of the satellite's propulsion method.
3. <https://www.nasa.gov/event/nasas-advanced-composite-solar-sail-system/> - This event page confirms the launch date of the ACS3 mission, supporting the article's timeline of events.
4. <https://www.nasa.gov/general/nasa-next-generation-solar-sail-boom-technology-ready-for-launch/> - This article discusses the development of new solar sail technologies, providing context for the ACS3 mission's technological advancements mentioned in the article.
5. <https://www.nasa.gov/blogs/smallsatellites/2024/04/23/solar-sail-cubesat-has-deployed-from-rocket/> - This blog post details the deployment of the ACS3 CubeSat from the rocket, corroborating the article's account of the satellite's launch and deployment.
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