Students Get Serious: Aerospace Space Technology Lab Becomes a Rocket Dream Factory

Campus focus

The “TKU-II” sounding rocket, successfully launched in November 2025, reached a maximum altitude of over 7 kilometers, setting a new record for Tamkang University’s scientific rocket launches. This achievement also makes TKU the only private university in Taiwan to have reached this milestone. During an on-campus interview with external media on December 17, Professor Kuan Ouyang, launch commander of TKU-II and faculty member of the Department of Aerospace Engineering, emphasized that rocket development is a highly integrated systems engineering endeavor that relies on multidisciplinary collaboration. The successful launch of TKU-II represents the combined technical guidance of multiple faculty members and the hands-on efforts of students from the Space Technology Lab (STL). Through the students’ performance, public attention has been drawn to Taiwan’s space development, prompting many to realize that “college students can really build rockets.”

STL currently consists of 32 members and is a laboratory composed entirely of undergraduate students. Over the past two years, with funding from the Taiwan Space Agency (TASA) under its three-year Small Scientific Sounding Rocket Development Program, the team has successfully launched four small scientific sounding rockets, to which STL members made critical contributions. In recent years, as TASA has actively recruited talent, several graduates from the lab have gone on to join the organization. Established in 2017, the laboratory grew in tandem with real-world space missions, as the Department of Aerospace Engineering became the third academic unit in Taiwan capable of designing and manufacturing university-grade rockets. From solid propellants, engines, and nozzles to rocket structures, avionics systems, and dynamic analysis, nearly all components are designed and built in-house by students, making STL an actual rocket dream factory. This level of independent development distinguishes them

from high school teams participating in the Taiwan Cup Rocket Competition, where safety and expertise considerations typically require the use of standardized engines, fuel, and components provided by organizers, with students focusing primarily on assembly.

According to Jui-Chuan Tang, student chief of the STL, while many high school students participate in the Taiwan Cup, the defining strength of university teams lies in independent research and development. High school teams, constrained by safety regulations and technical limitations, generally assemble pre-approved components, whereas STL students engage in the whole engineering process from design to validation.

Members of the lab do not all come from the aerospace department, but they share a common trait: a dream of space. Although rocket research offers neither academic credit nor financial compensation, students devote themselves out of passion for the space industry, while gaining invaluable practical experience through collaboration with TASA projects. Tang himself joined the lab as a freshman, assisting senior students during the development of the first rocket, TKU-I. “Looking back, I didn’t do much myself, but the moment it launched was still incredibly powerful,” he recalled. During the second rocket, Jessie, he took charge of propellant production as senior members transitioned into advisory roles. For the third rocket, he served as systems group leader, coordinating operations among teams. By the fourth mission, TKU-II, he assumed even greater responsibility: “I not only had to manage internal coordination but also present review reports to TASA. I learned that building rockets requires not just engineering skills, but also communication and organizational abilities.”

Through these launch missions, the lab has not only validated students’ system integration capabilities but also significantly enhanced the department’s visibility and momentum in talent cultivation. The fourth mission was particularly motivating, as the team redesigned nearly the entire rocket (excluding the propellant) and successfully verified avionics signal transmission at the theoretical altitude of 7 kilometers.

“Rocket launches actually have a high failure rate,” Tang noted,

recalling the third mission, Polaris, when avionics issues caused extreme pressure during a 5:00 a.m. launch preparation. “That experience taught us how to solve problems under intense pressure. By staying true to facts and trusting data, we learned from failure.”


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