Record-Breaking Achievement! TKU-II Sounding Rocket Reaches Over 7 km, Validating the Stability of its Next-Generation Avionics System

Campus focus

On November 23 at 6:46 a.m., the Department of Aerospace Engineering at Tamkang University successfully launched its fourth small scientific sounding rocket, "TKU-II," from the National Science and Technology Council's Short-Term Scientific Sounding Rocket Launch Site in Xuhai, Pingtung. With 13 seconds of powered flight, the rocket reached a maximum altitude of over 7 km, setting a new record for the university. The mission followed all planned procedures and landed safely within the designated zone, marking another milestone in TKU's rocket development history.

The TKU-II mission team consisted of 30 student participants. The rocket was developed based on the design of the department's third rocket, "Polaris." It uses RNX solid propellant and features a single-stage carbon steel airframe, with a total mass of 52.3 kg, an overall length of 2.22 m, and a maximum diameter of 13.9 cm. The rocket produced an average thrust of 2,765 N, with a burn time of 13 seconds, reaching apogee 38 seconds after liftoff. Its total impulse was approximately 26,000 N· s. This mission primarily focused on testing avionics data transmission and verifying the stability and reliability of TKU's next-generation avionics system.

Professor Fu-Yuen Hsiao, who completed three rocket missions during his two-year term as Department Chair, explained that TKU utilizes RNX propellant, which differs from traditional solid fuel in that it has superior stability—ideal for academic research and hands-on engineering training. Multiple successful RNX-powered launches at TKU have validated the reliability of the university's self-developed engines. Accordingly, TKU's rocket engine has been selected as the standard model for the inaugural "Rocket Taiwan Cup" hosted by the Taiwan Space Agency (TASA) in 2025.

Tamkang University has previously successfully launched “TKU-I,” “Jessie,” and “Polaris,” each with unique technical objectives that have steadily advanced the team’s capabilities. Professor Yi-Jen Wang, Principal Investigator of the sounding rocket program, emphasized that each rocket mission reflects the growth and progress of the entire team. The TKU-II mission specifically evaluated the performance of the avionics communication and telemetry system. Prof. Hsiao added that future research will continue to focus on roll-control, multi-stage vehicle separation, and in-flight re-ignition—all of which rely on a stable and trustworthy avionics foundation, making this successful verification particularly crucial.

Launch Director Professor Kwan Ouyang highlighted that rocket development is a highly integrated systems engineering effort, requiring multidisciplinary collaboration. The successful launch of “TKU-II” represents the collective achievements of faculty technical guidance and hands-on work by students of the Space Technology Laboratory. Department Chair Chien-Chun Hung stated that the laboratory, established in 2017, is dedicated to solid rocket research and education, aiming to equip students with fundamental knowledge of rocket development and provide practical experience through participation in sounding rocket missions, thereby transforming theory into real-world applications.

In addition to acknowledging the research support from TASA, Chair Hung expressed gratitude for the university’s resource assistance and the enthusiastic sponsorship from industry partners, including Taiwan-Asahi Environmental Technology, SINBON Electronics, QST International, Skwentex International, WIN Semiconductor, Taiwan Innovative Space, WK Automated Intelligence, and Dragonfly UAS—many of which are founded or led by TKU alumni. Their support enables the TKU rocket team to continue advancing and move toward the next stage of space technology development.


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