CubeSat Development at NCU

Chi-Kuang Chao
Professor, Department of Space Science and Engineering, National Central University, Taoyuan Taiwan

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The CubeSat concept was first developed by professors from California Polytechnic State University and Stanford University to provide students with an affordable, hands-on experience in space since 1999. After that, the 1st CubeSats were lifted off, more than 1,960 CubeSats have been launched into space by 50 countries. A CubeSat is a solid shape with six rectangle faces miniature satellite (10 cm × 10 cm × 10 cm as 1U), weighing about 1 kg. A CubeSat can be used alone (1U) or in groups of multiple units (maximum 24U at present). CubeSats can be used to perform technical demonstration, conduct science experiments, enable commercial applications, and support educational projects. For National Central University (NCU), PEARL (Propagation Experiment using kurz-Above-band radio in Low earth orbit) mission was proposed for domestic companies to catch up with New Space race. It currently consists of two 6U XL CubeSats, named as PEARL-1C and PEARL-1H, integrated by NCU and Hon Hai Precision Industry Co., Ltd. (Foxconn) for educational training/scientific research on earth-space radio propagation channel experiments over Taiwan. Two payloads, a Ka-band communication payload (KCP) for broadband communication experiment and a Compact Ionospheric Probe (CIP) for ionospheric plasma measurement, will be installed on PEARL-1C. KCP is developed by Rapidtek Technologies and NCU to perform like a transponder, a transmitter, a transceiver, and a channel study with ground stations over Taiwan. CIP is an all-in-one in-situ ion sensor developed by NCU to measure global ionospheric ion concentration, velocity, and temperature. A Communication PayLoad (CPL) developed by Tron Future will be installed on PEARL-1H for broadband communication experiment with beam-steering phase array antenna. These two CubeSats were scheduled to launch in SpaceX Transporter-9 rideshare mission in 2023.