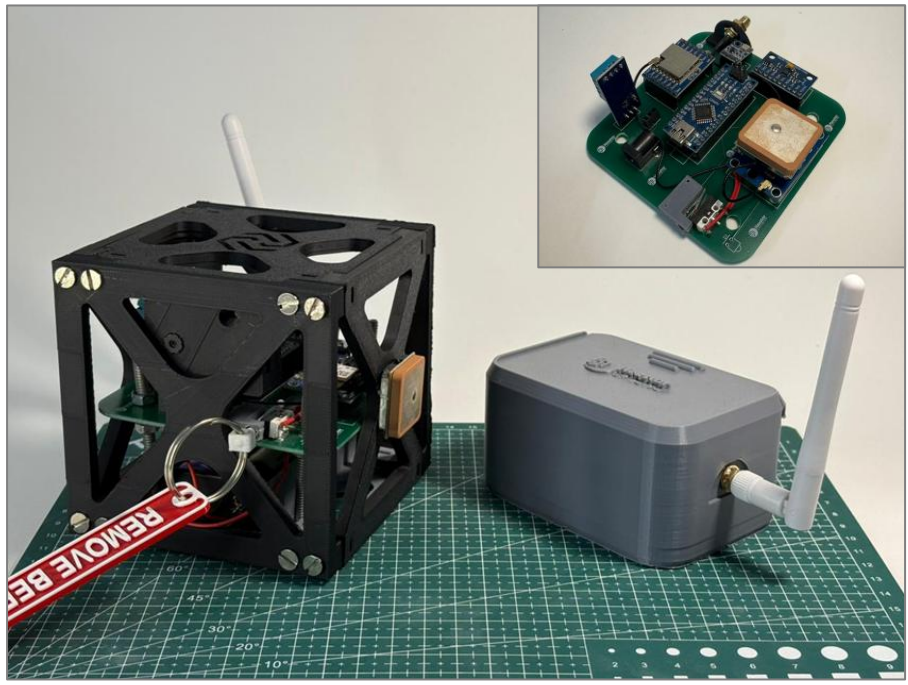




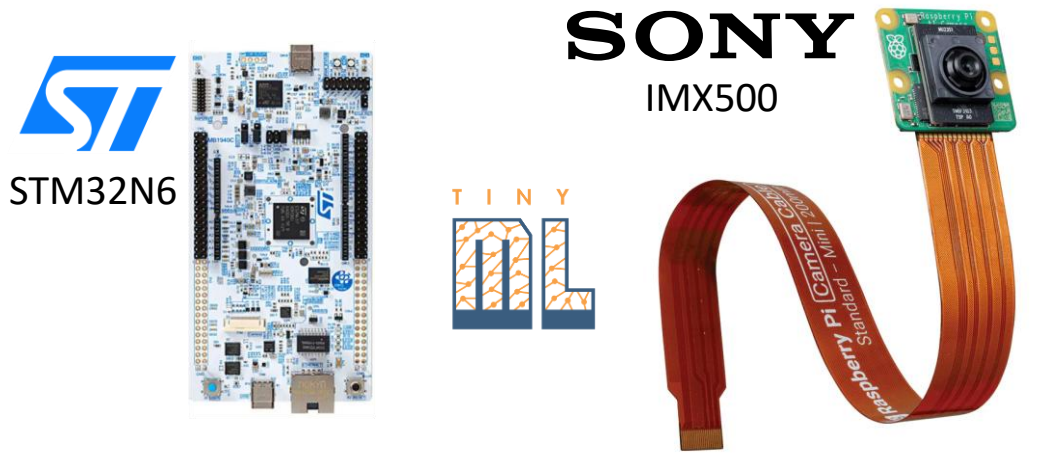
Introduction To SPOK

- **CubeSat** are **small** (10x10x10 cm) and **low-cost**
- But they face strict **constraints**
 - **Power**
 - **Onboard memory**
 - **Compute capability**
 - **Communication bandwidth**
- **Traditional workflow:**
 - **Capture** images in orbit
 - **Downlink** raw data
 - **Process** on Earth



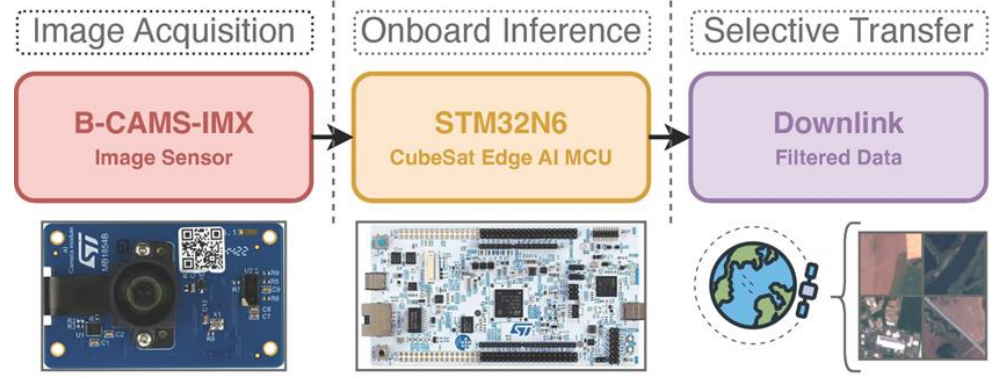
SPOK, our custom-developed educational and research CubeSat prototype

TinyML For CubeSat Systems



Hardware-aware TinyML pipeline tailored for ultra-low-power MCUs equipped with NPUs

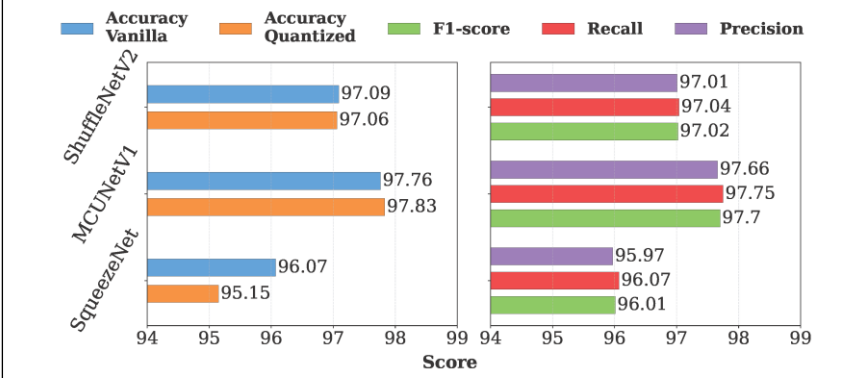
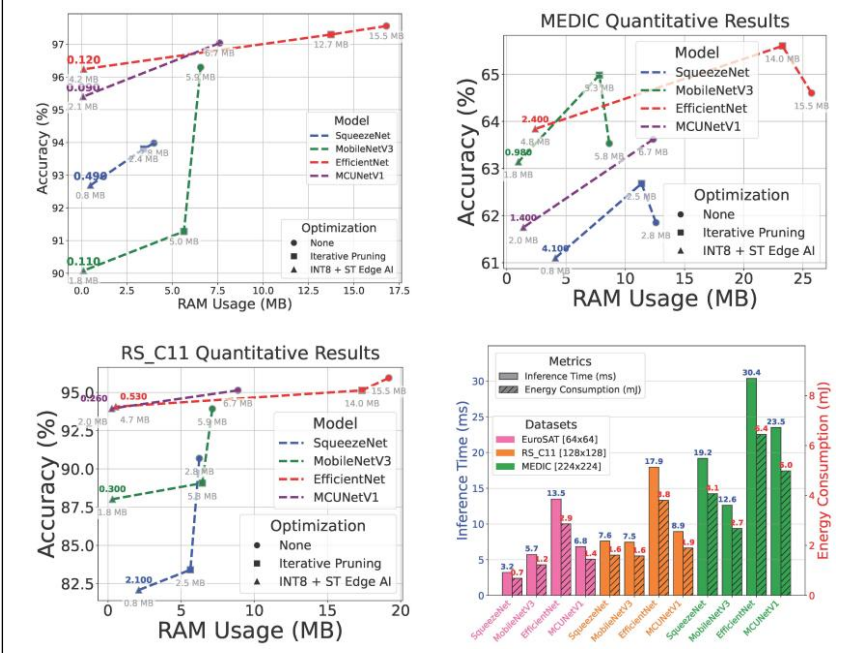
Computation to the absolute edge by executing Deep Neural Networks directly on the image sensor die



Main challenges:

- **FP32 DNNs** are **accurate** but too **large** and **energy-hungry**
- CubeSat **downlink windows** are **short** and **infrequent**
- **Raw transmission** wastes **bandwidth** when images are **redundant**

Achieved Results



[1] TinyML Enhances CubeSat Mission Capabilities, ICCPS 2026
 [2] Exploiting In-Sensor Computing for Energy-Efficient Earth Observation, AISEM 2026
 [3] Event-Based Vision in Space: Applications, Trends, and Future Directions, AISEM 2026