

Train as you fly

"Should be" is not a **validation** strategy.
If two is one and one is none, then why is the MOQ five?

SmallSat 2026 — PocketQube Side Meeting



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Electrical and Computer Engineering





Everyone starts with a PQ-EDU

semi scripted
discovery
architecture
+ operations

SATELLITE ON A STICK

REAL SATELLITE EXPERIENCE, RIGHT HERE ON EARTH.

1 BUILD A COMPLETE SATELLITE

All the essential systems—just like a real satellite.



SOLAR PANELS
Generate power



RADIO / ANTENNA
Communicate with the ground



PROCESSING
Onboard computer runs the mission

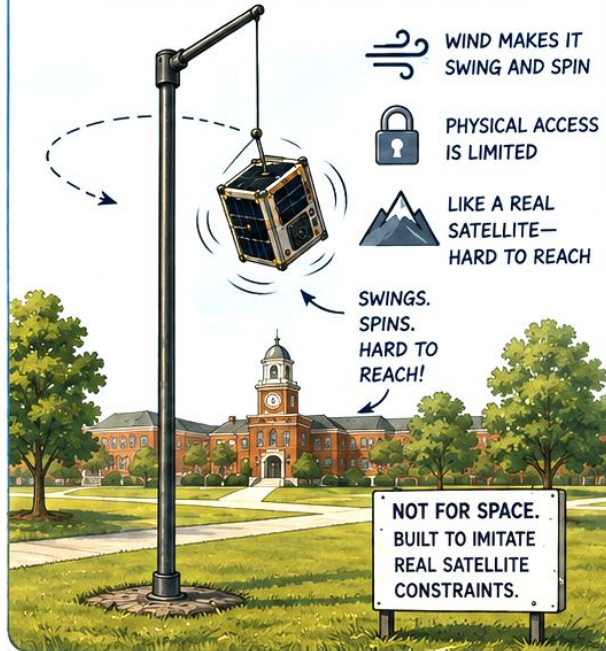


EXPERIMENT PAYLOAD
Collects science or engineering data



2 MOUNT IT HIGH OUTDOORS

Placed high on a pole so direct access is difficult.



WIND MAKES IT
SWING AND SPIN



PHYSICAL ACCESS
IS LIMITED



LIKE A REAL
SATELLITE—
HARD TO REACH

SWINGS.
SPINS.
HARD TO
REACH!

3 OPERATE FROM A GROUND STATION

Students across campus communicate and collect data.



**DIRECTIONAL
ANTENNAS**



RADIOS



**COMPUTERS &
SOFTWARE**

4 LEARN THE FULL MISSION

Students gain real mission operations skills.



COMMANDING

Send instructions to the satellite



TELEMETRY

Receive health and status data



TROUBLESHOOTING

Diagnose and solve problems



SCHEDULING

Plan operations and experiments



DATA COLLECTION

Gather, store, and analyze results



NOT FOR SPACE.

This system is on Earth to teach the challenges of real satellite operations.

JUST LIKE IN SPACE, THESE THINGS ARE HARD:



CHARGING

Limited power.
No quick plug-in.



REPROGRAMMING

Updates must be
sent over the air.



PHYSICAL MODIFICATION

You can't easily open it up
and change things.



**REAL CONSTRAINTS.
REAL LEARNING.
REAL IMPACT.**

Hardware must precede the firmware

oreally!! but what about _____?

→ for first-time students

to Hold / Use is to Understand

But who makes `serial_001` ?

I don't want to sell PQ-EDU kits ...

Requirements:

- **Same** bus as mission's Flight Model
- **Same** power architecture
- **Same** comms architecture
- **Same** software architecture

... but will if that's what it takes.

Reuse is *difficult*

Adopt **baseline** → modify for the mission

baseline is the trainer

Open source can be *custom-in-public*

