Affordable STEM experiments on the ISS

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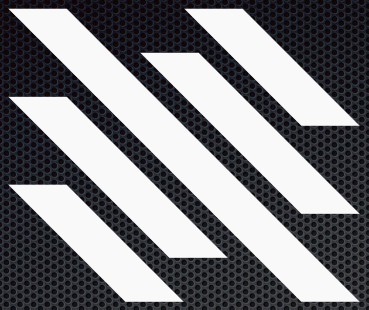
Credits: Michael Galvin, Princeton University

Partner:



Nanoracks

VOYAGER SPACE

- MaxIQ Space has partnered with Nanoracks to offer a “low cost” ride share solution for institutions, especially high schools, who wants an introduction to space.
- Using Nanoracks’ 2U NanoLab, up to 15 institutions shares the payload area.
- The NanoLab stays on ISS for ~1 Month, and the individual payloads are returned to the institutions.

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Payload

Each institution gets one 9.6mm layer in a ride-share solution similar to this 1U NASA HAB launch module…

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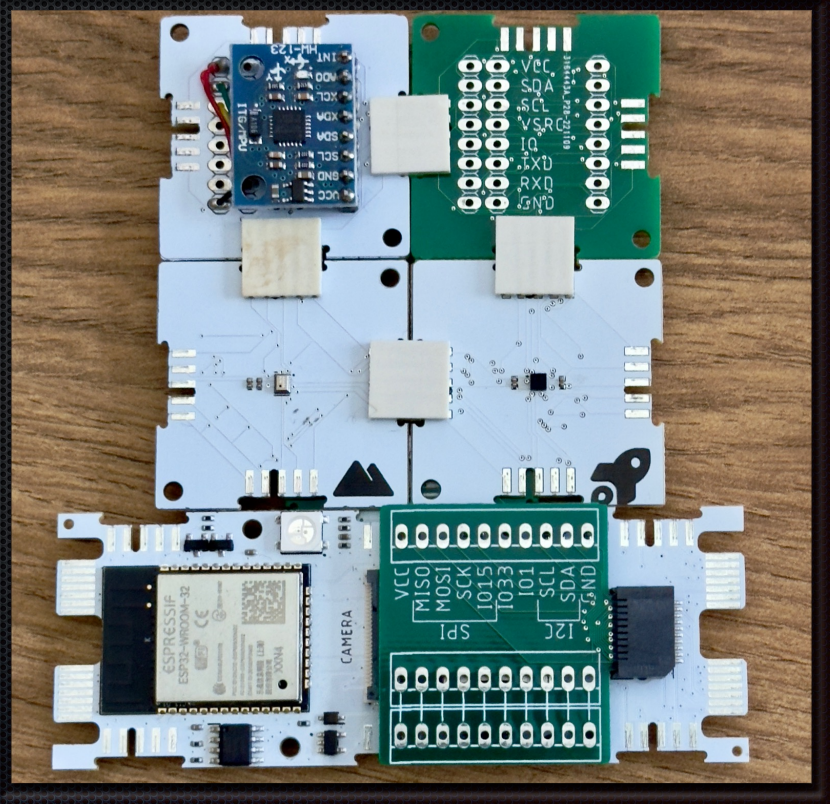
Why are we doing this?

Giving access to micro-gravity as a first space mission

We provide the power, communication, ride to ISS and return

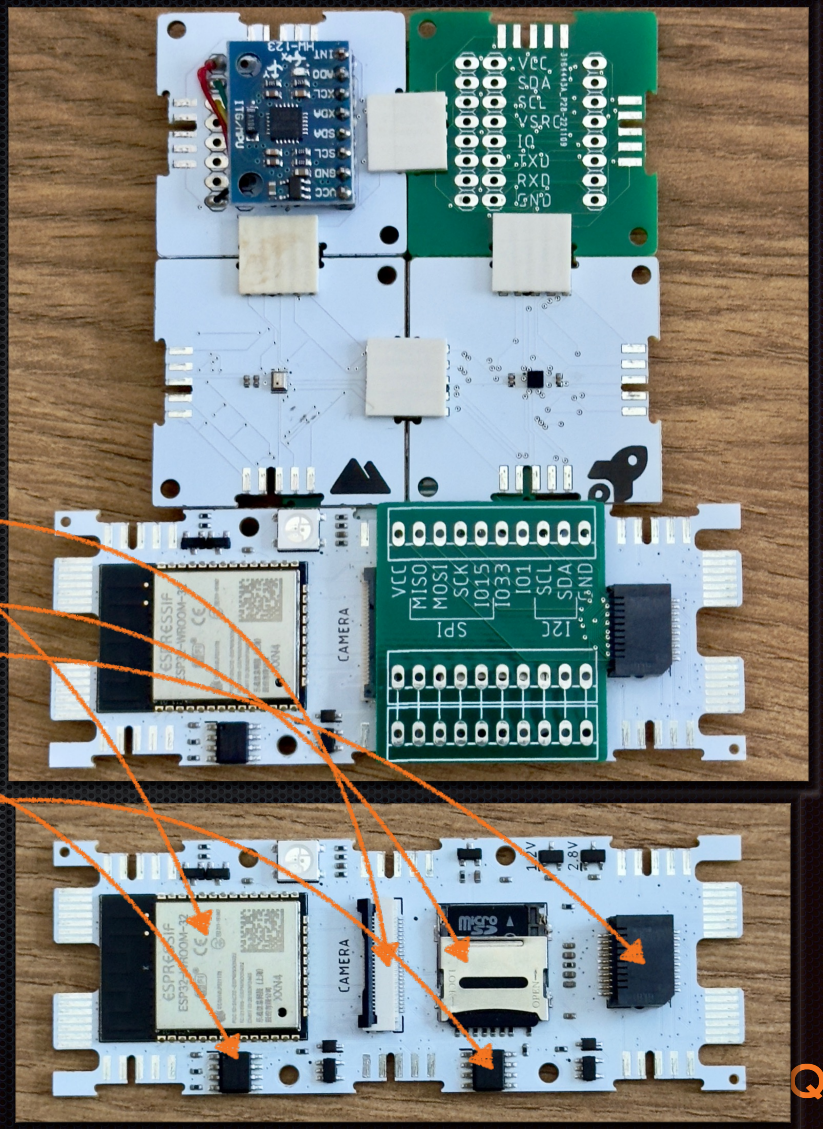
Payload Layer

- Each layer has to fly with MaxIQ's ESP32 based "Extended Core":
  - The core has a SD Card.
  - It communicates over CAN-bus to the control module.
- The actual payload area is 79x63mm:
  - Typically 4 xChips with a selection of sensors, and/or…
  - Prototype board to affix a 3rd party sensor, or…
  - Dedicated PCB following the MaxIQ guidelines.



Payload Core

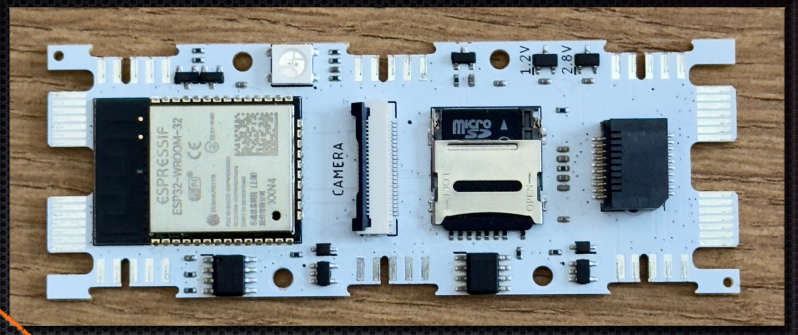
- MaxIQ's Extended Core:
  - ESP32
  - Serial Camera Control Bus (SCCB)
  - SD Card (Max 32 Gb)
  - Extension Slot
  - 4Mb PSRAM
  - CAN-bus Transceiver

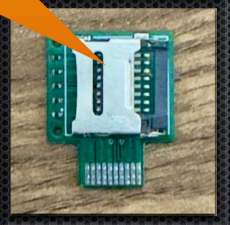


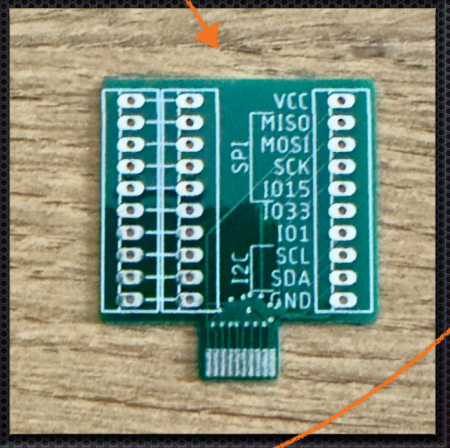
Payload Prototype

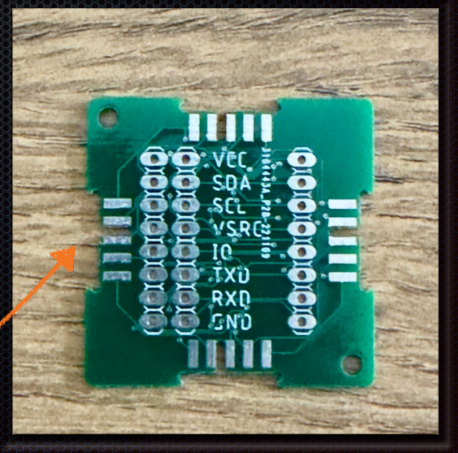
- Extension Slot
  - SPI
  - I²C
  - 2x GPIO
  - +3.3V
- xChip
  - I²C
  - Serial (UART)
  - 1x GPIO
  - +3.3V

…or extra 32 Gb









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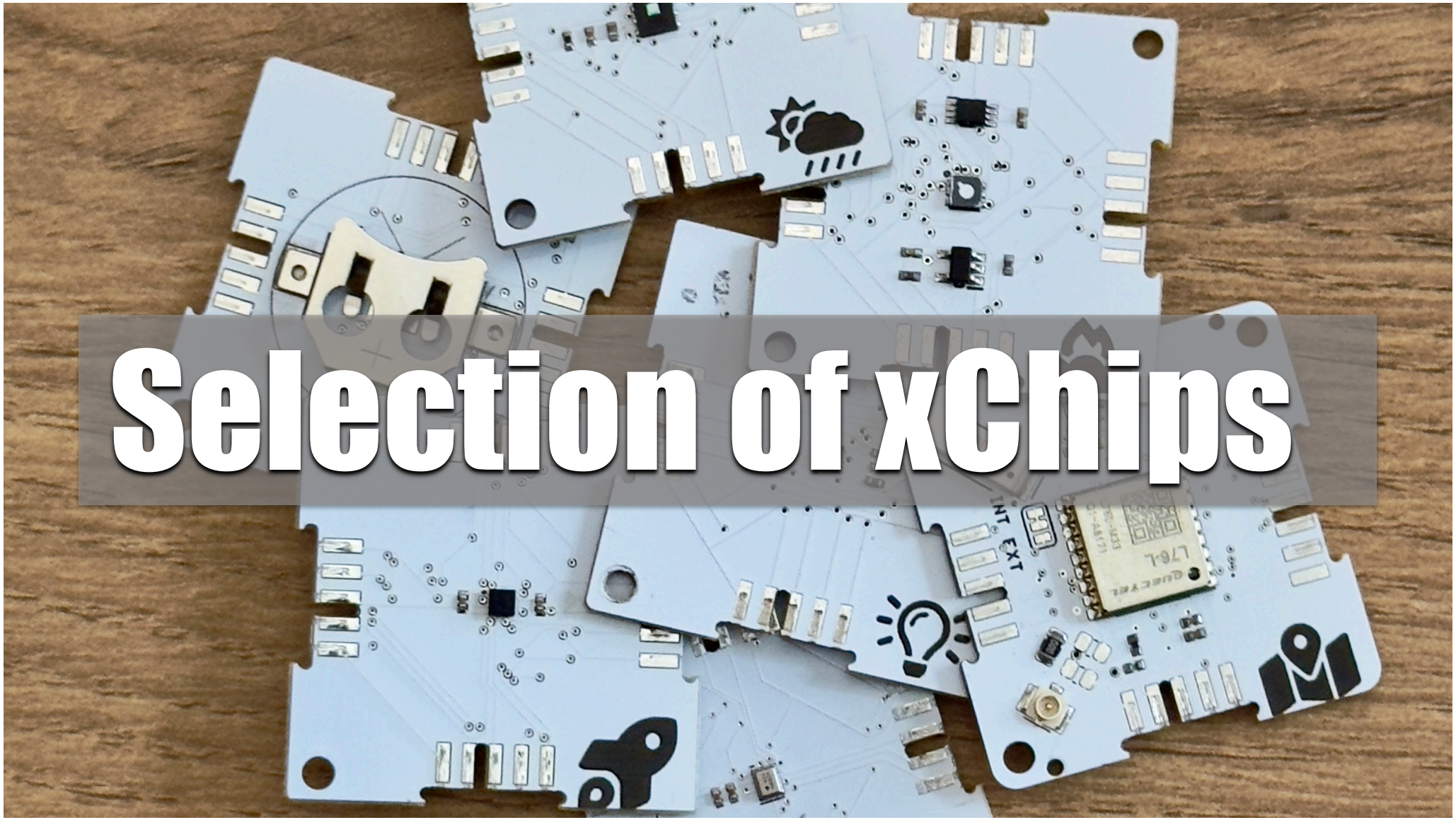
Selection of xChips

Power & Comms

Nanoracks

VOYAGER SPACE

- Power:
  - NanoLab is provided with ISS Power.
  - Each payload area is provided with its own power supply of **3.3v/350mA**.
  - Control Module can control power supply to each payload.
- Communication:
  - Main data acquisition using **SD Card**.
  - Low Bandwidth data communication to Control Module over CAN-bus.
  - Control Module is interfaced to Nanoracks' ISS stationed comms interface.

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Mission Parameters

- First flight deployment scheduled for July/August 2025
- Current occupation is 40%, with next deployment in 2026
- Shout-out to Mike Galvin from Princeton for introducing us to the Nanolab
- How much? US$ 9,990 per participating team*

**includes our Space STEM program for middle and high schools*

Prototype:
1½U Model

Mike Galvin, Princeton University

https://tigersats.princeton.edu/projects/stem-launch-programs/iss-stem-launch-platforms#ISS

Thank You

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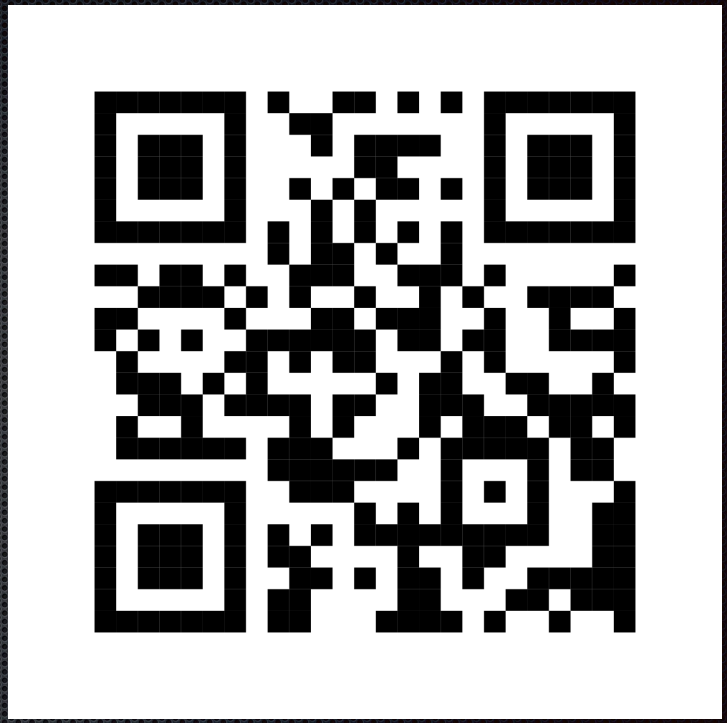

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