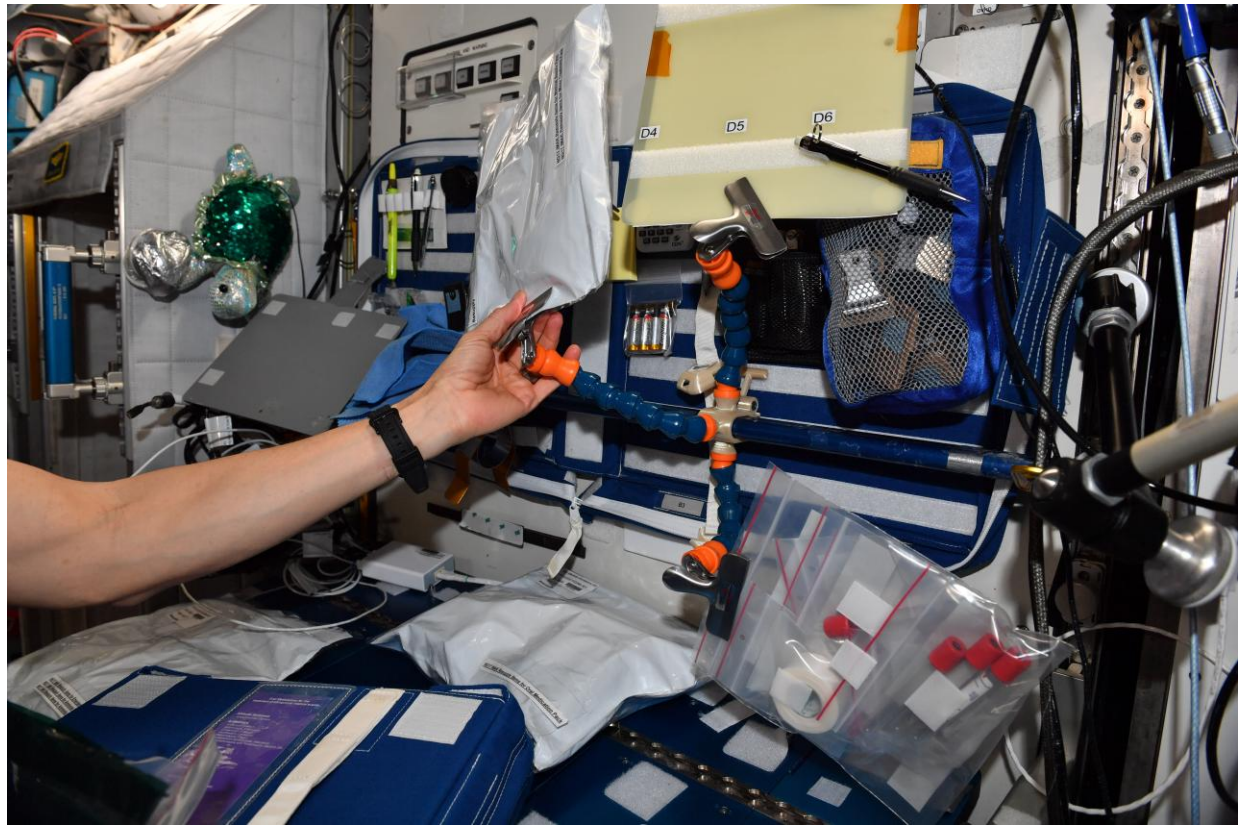
Handrail Flex Clips

(aka the Hydra)

Glenn Johnson



Robert Bryan and James Keiser at the 2018 Final Design Review showing their idea for a single chip clip with Lock Line and a clip that attaches to the ISS handrail.

Astronauts were looking for some new restraints for the Space Station. Occasionally there are things that don't have Velcro on them and the crew needs something to keep them from floating away while they are doing an experiment or maintenance tasks. This could be a pen, bag of nuts and bolts, a tool, a procedure, supplies for the experiment or maintenance,…. Sometimes they need an extra hand to keep things from getting away from them. The Handrail Flex Clips was developed to help with organizing the micro gravity workspace by using a combination of off the shelf materials and a specially designed clip for attaching to the handrail. Although the students started off using ABS 3D printing, ISS material requirements drove us to using ULTEM for flammability reasons.

A good idea for clipping onto a handrail

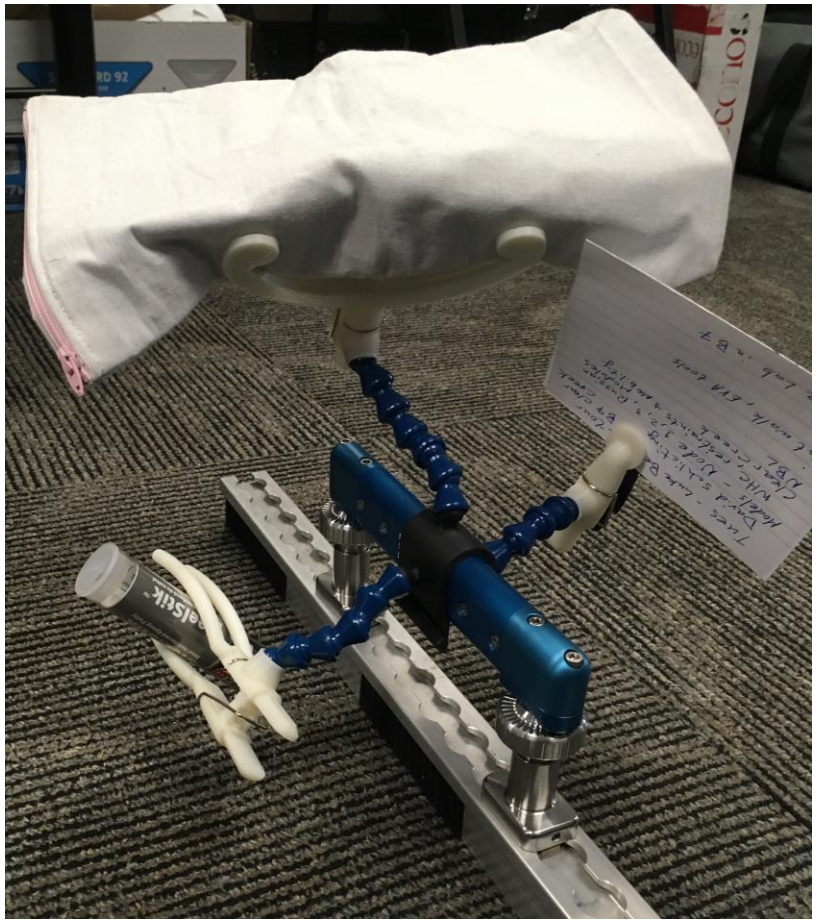
Main clip (black) slips onto the ISS handrails. ¼”Lock line (blue) allows infinite positioning of the chip clip on top. The chip clip can hold onto many objects—gravity or not.

3 settings for attaching to the handrail

1. clips onto handrail
2. T-bar rotates over and snaps loosely onto handrail
3. T-bar onto 2nd position to lock onto handrail

Ideas for different kinds of clips

- Is it better to have specialized chip clips to hold specific materials or equipment or all the clips are the same
- Expand the Lock line onto each side of handrail clip (3 instead of 1)



Evaluating Commercial off the shelf clips available in stainless steel

Switch to the 1\2” Lock Line since it is more common on the ISS.
If we use off the shelf Lock Line attachments to the handrail clip for better friction, what kind of fasteners can we use but still prevent scratching the handrails?

Following NASA naming style HUNCH went with the ‘Handrail Flex Clips’ that would have an acronym of HFC if they desired. But once it got on orbit, the crew called it the “hydra” because it looks like the Greek mythological beast with multiple heads.

Weighing a late model prototype for flight hardware information.

Assembly and preparations for flight

Summer college interns Zach Tullier and Diego Valencia assembling flight hardware at Clear Creek High School.

College intern Logan Sammons inspects final assembly with the printed ULTEM handrail clip. He helped make improvements on the design for easier assembly, preventing screws from scratching the handrails and final drawings.

Carlos Valencia, Lead NASA HUNCH Assembler, testing final assembly on a flight handrail.

Tom Marshburn using the ‘Hydra’ for maintenance activities on the ISS.

Don Pettit using the ‘Hydra’ for experiments on the ISS.