Imagine you're walking down a sidewalk and you look ahead to see the horizon spanning from left to right. With the help of gravity and your inner ear, your body is planted firmly on the pavement causing you not to waver. But what if all of the sudden, you don't know which way is down? Your senses aren't in agreement anymore, and you find yourself with the inability to maintain balance.

You're experiencing spatial disorientation. The same thing pilots and astronauts experience during flight.

"In flight, it's common to experience accelerations in various directions, and this has the potential to fool pilots' into believing the ground is in a different direction than what it really is," said NASA Langley aerospace research engineer, Kyle Ellis.

To prevent this, pilots use a spatial disorientation trainer called the Bárány Chair, which is named after Hungarian psychologist, Bárány Róbert. "The chair allows pilots to safely simulate disorientation by accelerating the vestibular system – the inner ear - in a direction that's not in the 'down' direction typically sensed on the ground," Ellis added.

Just in a matter of several months, sixteen students from Kecougtan High School (KHS) and New Horizons Technical Center (NH) in Hampton, Va. designed, built, assembled and tested a Bárány Chair.

The students were part of NASA Langley's United with NASA to Create Hardware or (HUNCH) program, which involves students fabricating real-world products for NASA as they apply their science, technology, engineering and mathematics (STEM) skills as well as learning to work in teams and think creatively.

Langley is brand new to the program – starting in November of last year – joining NASA's Johnson Space Center (JSC) and Marshall Space Flight Center after a ten year lead. Langley HUNCH students and NASA engineers collaborated to execute Langley's first HUNCH project - the Bárány Chair.

KHS students were given the preliminary sketches, provided by JSC and Langley, and used a Computer Aided Design (CAD) system to design the chair with the help of Langley engineers. NH students then spent a mentored internship at Langley learning about fabrication – eventually leading them to weld, assemble and test the chair.

Langley HUNCH students had the chance to test out their self-built chair by sitting in it, closing their eyes and laying their head sideways on the bar in front of them. Their peer then spun the chair in slow, but steady rotations. The sitting student was then brought to a sudden halt and was asked to open their eyes followed by lifting their hands toward the ceiling. Or what they thought was the ceiling.

Instead of reaching toward the ceiling, their hands veered off in different directions due to their confused sense of gravity. Students learned that their disorientation, dizziness and nausea meant that they built the chair flawlessly.

"It feels like a roller coaster," said New Horizon student, Brandon Hogan. "Now that it's all done and you can sit it in, you're like, 'Wow, it's done. We built that.' It's a good feeling."

The Bárány Chair will be shipped mid-June to JSC's Human Test and Space Medicine Division where it will be used to teach the effects of spatial disorientation and what happens when pilots and astronauts are subjected to multi-directional accelerations during flight.

Langley's first HUNCH project is just the beginning.

Students who participate in the Langley HUNCH program may have the opportunity to run the HUNCH website – currently led out of JSC – and possibly build a mockup of the International Space Station's Destiny Laboratory.

Before moving on to the next thing however, Langley took a moment to acknowledge those involved in their first HUNCH project.

NASA Langley hosted a HUNCH Recognition Ceremony at the National Institute for Aeronautics in Hampton, Va. where students, instructors and Langley mentors were recognized for their participation in the design and fabrication of the Bárány Chair. The honorees were presented a HUNCH certificate, lapel pin and t-shirt. Stacy Hale, HUNCH Program Manager from JSC, Langley management, Superintendent and Board of Trustees from participating six school districts were there to congratulate the team.

Langley HUNCH leads, Tammy Cottee and Timothy Wood, couldn't help but express their excitement about not only what the students had accomplished, but also what the future holds for them.

"This is a rare opportunity to be able to learn from Langley experts who have a lot of experience in welding and brazing," said Timothy Wood, HUNCH lead. "In addition to getting training that's specific to their field, they also had exposure to many different potential opportunities."