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Harambee's New Gadget Sends Imaginations Into Orbit

By Merin McDonald
The Outlook

Students at Harambee Preparatory School have spent much of the past couple of weeks staring into space. Their teachers aren't concerned, however — it's not the result of boredom, day-dreaming or even post-lunch food coma, but rather the donation of a new device that allows them an astronaut's view from the International Space Station.

The ISS-Above is a small, single-board computer, or "Raspberry Pi," that streams live NASA video feed from the Space Station through a router to any TV or HDMI monitor, displaying the station's position as it orbits the Earth every 90 minutes. In addition to offering views of the planet from the front, back and bottom of the Space Station, the device is programmed with software that tracks the station's movement and indicates when it is passing overhead.

"Every time the Space Station is above the horizon here, this thing will go crazy and light up, so you'll know every time the Space Station is in our skies," explained ISS-Above inventor Liam Kennedy, who came to the school to install the device and give a brief presentation to the students. "It happens five to seven times every day. Sometimes, that can be within school time. If you look up, you can actually see it as it goes by."



Photo by Merin McDonald / OUTLOOK

Harambee Prep School Principal and Executive Director Harlan Redmond shows off the school's ISS-Above with its inventor, Liam Kennedy, and donor Brent Whitfield. The device links students to the International Space Station as it orbits Earth.

The device was donated to Harambee by Brent Whitfield, whose company, DCG Technical Solutions, provides the school's Wi-Fi services at no cost. As an old friend of Kennedy's, Whitfield had learned about the ISS-Above and purchased one for his own living room.

"I just thought, wow — this should be in every school," said Whitfield. "Because of that relationship [with Harambee], I thought it would be great to get the kids exposed to this so they can start learning about the Space Station."

"We jumped at the opportunity," said Harlan Redmond,

Harambee's principal and executive director. "It was a spontaneous thing, and it's perfect timing because we just ordered some Chromebooks and we have a STEM program starting up at the same time. No pun intended, but the stars are just aligned for us to get this program off the ground in the science areas where we've been trying to create a focus."

Redmond said he plans to set up a monitor in the school's main hallway so that parents and students can see the view from the Space Station as they arrive every day. The first test run, however,

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took place in a classroom.

As the feed from the Space Station appeared, eyes were glued to a projector screen and hands shot up without hesitation. Some students were eager to share what they already knew about space, while others had burning questions:

"Where do astronauts go to the bathroom?" one child asked.

"If you take off your helmet in space, will your head explode?" another inquired, while a classmate snowballed on that: "Can gravity kill you?"

"What happened in here is no surprise to me," said Kennedy, after doing his best to respond to the deluge of questions. "That's the spark that I really enjoy seeing and hearing about — when students get inspired, because they'll go away and they'll tell someone else."

It was infectious word of mouth that got the ISS-Above to market in the first place. Kennedy, a software developer and "amateur astronomer," came up with the idea for the device in 2013 as a means of keeping his grandchildren in England connected to outer space. Using ISS orbital data and basic equation elements from NASA, he wrote a computer program that could calculate the station's location and installed it on a Raspberry Pi. The original prototype, a box that simply lit up when the Space Station was above, was fittingly placed at the top of his grandkids' Christmas tree.

Video streaming capability

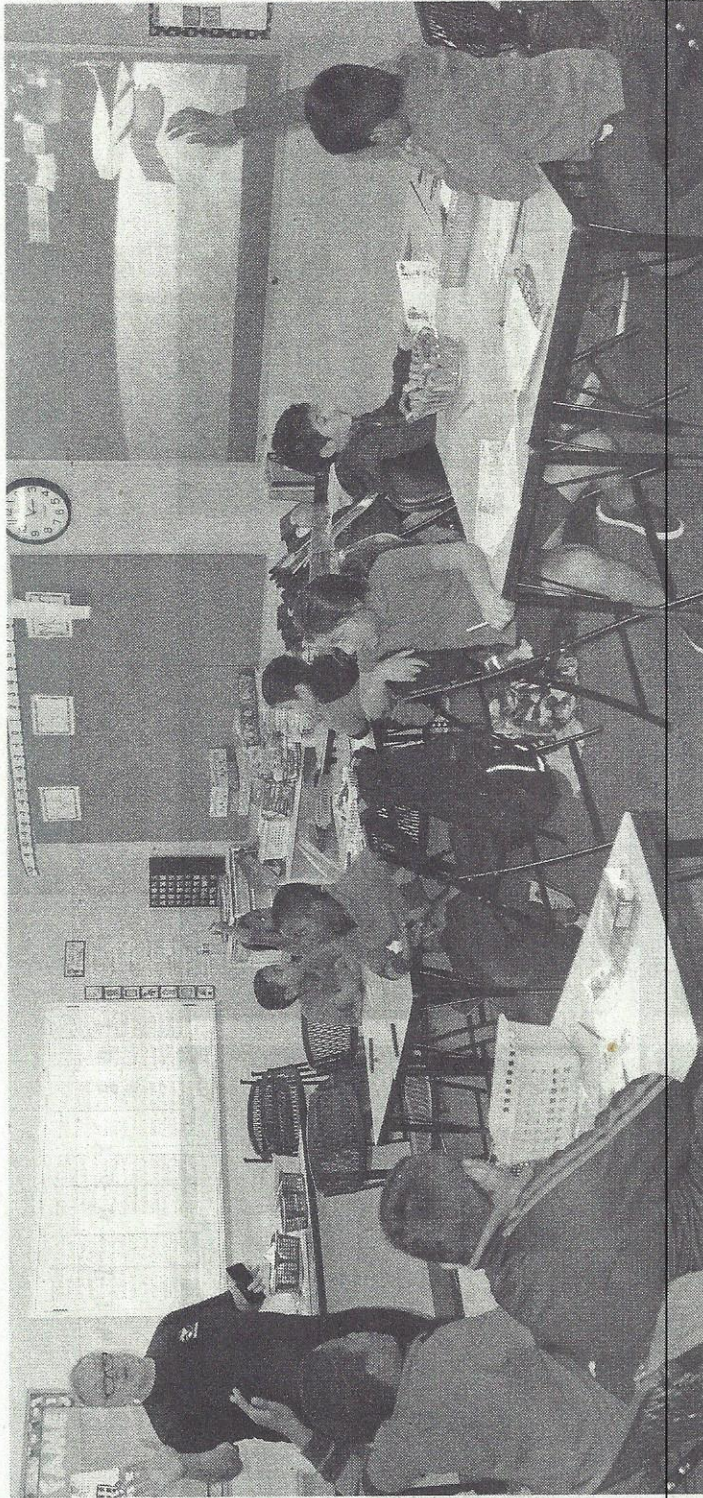


Photo by Merin McDonald / OUTLOOK

ISS-Above inventor Liam Kennedy fields questions from eager Harambee students as live feed from the International Space Station streams into their classroom.

came later on, but not before Kennedy launched a Kickstarter campaign for his invention, which reached its fundraising goal in five days, thanks to support from NASA, JPL and even Bill Nye the Science Guy. In addition to one in Nye's home and in the Planetary Society's Pasadena headquarters, there are currently 1,100 ISS-Above devices operating worldwide, and now, there's one at Harambee.

Students will not only be able to see views from the Space Station, they'll also get to know who's up there. Between moving images of the Earth, the ISS-Above provides information screens showing the station's speed, altitude and orbital

path, along with photos and information about the current crew — at the moment, a mix of American, Russian and British astronauts. Each time the station approaches the sky above Harambee, the school's device will automatically tweet a greeting to those onboard.

"There really is something that has you feel closer to those human beings who are up in space," remarked Kennedy.

By seeing the planet from the astronauts' perspective, students can also indirectly experience what Space Station veterans refer to as the "overview effect," a transformative shift during spaceflight that changes the way one per-

ceives and relates to Earth. From more than 200 miles above the atmosphere, the Earth is viewed as a whole: National borders disappear, conflicts are trivialized and differences dissolve with the realized commonality that we are all humans sharing the same planet.

"It's my secret weapon for world peace," Kennedy said. "It's about elevating your empathy to the level of the world while empowering solutions to problems on a local level." As the Harambee kids were dismissed, their minds and mouths still buzzing with ideas of science and space travel, it was clear that a spark had been ignited, and even

For more information on ISS-Above, visit issabove.com.