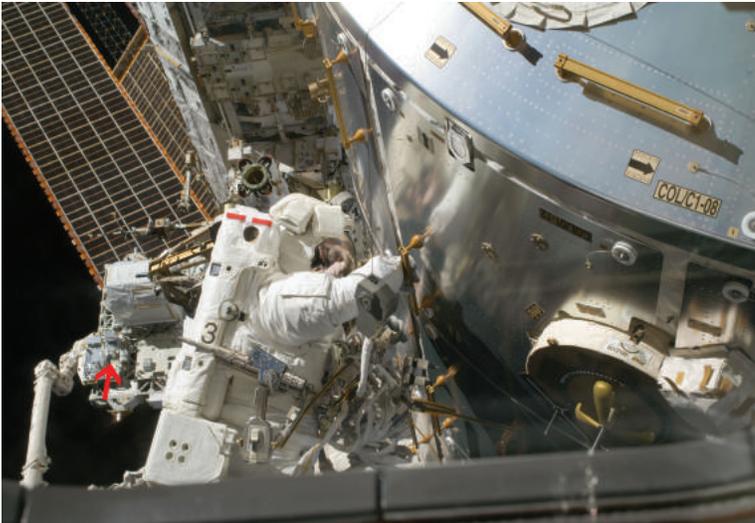


# Goddard Tech 12

Each month the Strategic Partnerships Office will tell the story of renowned innovators at NASA's Goddard Space Flight Center and show how their technological breakthroughs are brought from the labs to our lives. Goddard Space Flight Center licensed the SpaceCube 2.0 design to Maryland based Genesis Engineering which will produce space based processors.



SpaceCube onboard the International Space Station. Credit: NASA Goddard Flickr



SpaceCube 2.0. Credit: Chris Gunn/NASA

## The Technology

### SpaceCube 2.0

SpaceCube 2.0 is a reconfigurable multi-processing platform based on Xilinx Field Programmable Gate Arrays, and it's coupled with an integrated upset detection and correction architecture to provide improvements in computing power over traditional flight systems.

The machine's goal is to make 10 to 100 times improvements to spacecraft's onboard computing power while lowering relative costs. SpaceCube 2.0 and the entire family of "spacecubes" have had tremendous success in space and have assisted numerous missions.

## Featured Missions



**Raven:** Creating autopilot and autonomous docking capabilities for spacecraft



**NavCube:** X-ray communication in space, allowing for gigabits per second to be transported throughout the solar system



**Hubble Servicing Mission:** SpaceCube was used to compress and download camera imagery



**Restore-L:** Providing satellite servicing

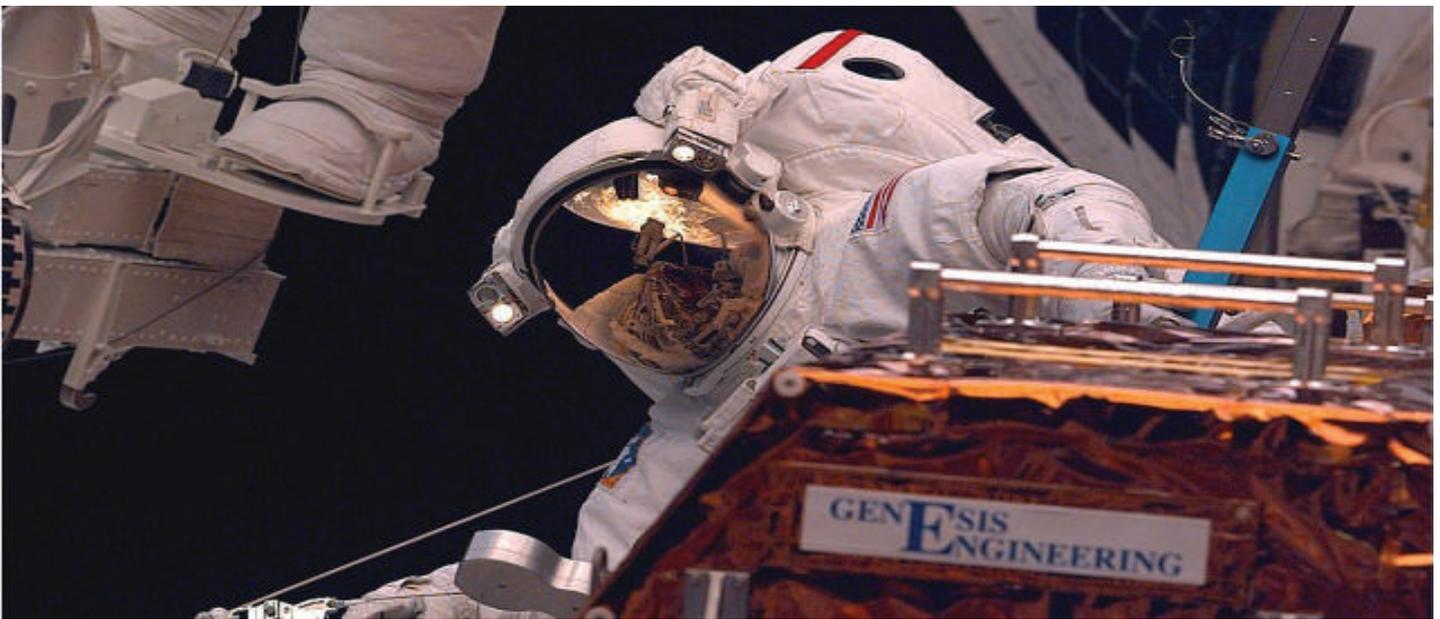


Photo Credit: Genesis Engineering

## The Partnership

### Genesis Engineering Solutions

Genesis Engineering, a Lanham, Maryland company, prides itself on being at the forefront of cutting-edge technologies and engineering developments. Genesis provided NASA with space flight hardware for the Hubble Space Telescope as well as logistic supply to the International Space Station, and the company is currently contracted to develop instruments for James Webb Space Telescope.

With the SpaceCube 2.0 license, Genesis will manufacture and sell data processors based on the SpaceCube design. This deal will allow NASA to have a qualified supplier of the systems in the future and support the local innovative economy.

Genesis is also working on making spacewalks safer and less time consuming. One of the dangerous parts of being an astronaut is putting on a space suit and going outside the spacecraft. The suits can be punctured by micrometeoroids or suffer failure. Spacewalks also take up much of the precious time astronauts have in space. Before going into space, astronauts must pre-breathe pure oxygen to get rid of all of the nitrogen in their bodies. Without doing that they run the risk of gas bubbles building up in their bodies which can cause death. After breathing pure oxygen for hours, there is a necessary recovery period.

Their solution is a single person spacecraft (SPS). With three arm like manipulators in the front, the SPS allows astronauts to be safely inside the protective shell. The meticulous preparation and recovery will be eliminated from the spacewalk process and the SPS could be a pioneering invention in space exploration.

## The Innovators

David Petrick   Dennis Albaijes  
Luan Vo

## SpaceCube Awards

- 🏆 2015 Rotary National Award for Space Achievement, Stellar Award
- 🏆 2015 NASA Silver Achievement Medal
- 🏆 2014 Mentor Graphics Technology Leadership Award
- 🏆 2012 American Astronautical Society, William Randolph Lovelace II Award
- 🏆 2011 NASA Exceptional Engineering Achievement Medal