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EAST VALLEY

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MCC student proposes cube satellite project

BY DAVID M. BROWN

Tribune Contributor

If Lennon Brugada has his way, Mesa Community College may soon see its way into space.

On May 3, the MCC student and Mesa native proposed to build a cube satellite as part of the requirements of the Digital Data Communications course for Electronics Technology students, led by adjunct professor Dennis Blum. If funded, the satellite could be launched by an independent launch facility.

A cube satellite, or CubeSat, comprises multiples of 10×10×10 centimeter cubic units. Intended for space research in near earth orbit, it reduces overall costs and risk to the launch vehicle and its contents because of its miniaturization. Proposed in 1999 by two California professors, the first CubeSats were launched in June 2003 on a Russian Eurocket, and NASA has since developed an extensive CubeSat program.

"Mr. Blum gave me the idea to do the proposal and gave me a bit of resources to help get me started, but other than that I have been working on the proposal independently," said Brugada, who is majoring in electronics technology because he likes to figure out how everyday devices work and to fix them.

As part of the advanced electronics courses, Blum assigns these special projects to increase students' learning experience and to enhance their résumés.

"This is especially important to a younger student because they have something interesting about themselves to discuss at a job interview," Blum said. "I have been doing this for years, and it has worked for them. Worldwide competition for technical jobs is fierce."

MCC is already using hardware and software for tracking and reception of satellites in one of Blum's classrooms, which serves as a ground station.

"We have already received Cube Satellite beacon signals and, on a related note, members of our amateur radio club have made two-way contact with the International Space Station recently from the MCC campus.

"The satellite will have two-way communications capabilities and provide a tremendous educational experience for a number of classes here at MCC," added Blum, a Phoenix resident who moved to the Valley from Cleveland, Ohio, 40 years ago with his



(Dennis Blum/Special to the Tribune)

Lennon Brugada, holding 3-D printed model of the Cube Satellite framework, became interested in satellites after he started electronics courses at Mesa Community College.

parents.

His background in communications and the aerospace industry includes employment at Sperry Flight Systems, Honeywell and Boeing, where he worked on Longbow helicopter communications equipment. He began teaching in the Army at 19 and has been an adjunct faculty member at MCC since 2001.

Many countries have CubeSat projects in their schools, he explained. "Hundreds have been launched and are in orbit. We need to keep up!"

Brugada's proposal is directed toward funding the project. He has identified one possible source so far.

"If the school likes the proposal, I am sure they will seek out other possible sources of funding," he said.

His interest in satellites began after he started electronics courses at MCC.

"I have always been somewhat fascinated in them and what they can do but I had never really done much research about them until this opportunity came about to possibly launch one into space for my school," said Brugada, who has been supported in his interests by his mom, Lynn Caho, and grandparents. Following graduation in May, he will seek employment from major electronics companies with local presences such as Microchip, Freescale and United Technologies.

An entry-level cube satellite project

can be accomplished for under \$10,000, Blum explained, citing Brugada's estimate. If funded, two satellites would be built, one to be launched and one as a research model, which would allow for essential ground testing.

If the proposal is accepted by a company, MCC will purchase a kit from a manufacturer, and different classes in the college's technology department would complete different aspects of construction.

"I have discussed this potential program with other technology department instructors, especially the manufacturing program, and they will give us support if we have a 'go,'" Blum said.

Following this, a launch company would be contracted to lift the MCC CubeSat into near, or low, earth orbit, of about 192 miles up, at one of a number of possible sites worldwide. Students, faculty and everyone else will be able to watch this on the internet. He estimates about a year-long project to build both satellites and to launch one.

"Many Cube Satellites have been 'piggy backed' on other launch vehicles," Blum explained, noting that because they are in low-earth orbit, decay occurs after a few years. But this is positive for orbital mechanics and MCC students: "It gives, and requires, continuous opportunity for technology, and our students, to advance."