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# MEMORANDUM

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Date: January 24, 2017

To: The Honorable Chair and Members  
Pima County Board of Supervisors

From: C.H. Huckelberry  
County Administrator

A handwritten signature in black ink, appearing to be "CHH", is written over the printed name "C.H. Huckelberry".

Re: ***BizTucson*** Winter 2017 Article on Vector Space and the growing interest in the County's Aerospace Research Campus

The attached *BizTucson* article discusses Vector Space, the latest tenant to locate in the Pima County Aerospace Research Campus.

As the Board of Supervisors knows, in December 2015, the County and Vector Space entered into a 25-year land lease agreement for 15 acres located in the Aerospace Research Campus (ARC) where Vector will construct at least a 60,000 square foot manufacturing and headquarters building. Vector has wide ranging professional, international ties in the space industry, including NASA, SpaceX and World View. Their choice to be in Tucson was based on the presence of other strong participants in the space industry such as Raytheon and World View, as well as the strength of The University of Arizona programs in space, optical and computer sciences; and they wanted to be located near Raytheon and World View.

Vector did not attempt to compete Tucson against other locations or ask for incentives and special considerations; they signed a market rate lease. The principals of the company see the value of being a part of an emerging space industry that leverages many of the strengths being attracted to and already existing in Tucson. Also, as World View has done, they are spreading the word through a very close-knit industry, which has already generated unsolicited interest in SpacePort Tucson and potential investment in the ARC.

The emerging, lower-cost space exploration industry is growing rapidly; whether via balloon-based technology from World View or cost effective microsattellites and virtual satellite technology that is affordable to universities, small scientific companies and international companies needing to deploy large numbers of satellites. The worldwide market for this technology knows no boundaries resulting in interest from all corners of the world. With two of the leaders in the industry located in our Aerospace Research Campus, more companies continue to explore local opportunities. The presence of a workforce with extensive aerospace experience, Raytheon's leadership and recent expansion announcements, not only in weapons systems but in other cutting edge technologies combined with access to separating military technical expertise from Davis-Monthan and Ft. Huachuca makes our region a prime candidate for space industry attraction.

The Honorable Chair and Members, Pima County Board of Supervisors  
Re: ***BizTucson*** Winter 2017 Article on Vector Space and Growing Interest in the County's ARC  
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Vector-Space is currently planning their site and building with completion expected late in the first quarter of 2018. Their building will likely cost in the \$6 million range with several million in equipment and test facilities adding to the local investment. They focus on utilizing local suppliers which is consistent with our efforts to attract more supply chain vendors for Raytheon and our other aerospace based employers. They will quickly attract 200 new, high paid employees and are projected to have an anticipated \$273 million impact on our community over the next five years. Vector already has interns on staff from The University of Arizona; and as stated in the article, Vector Chief Executive Officer Jim Cantrell stated that *"I fully intend to be an evangelist for doing business here."*

The Board's support of the ARC is attracting leading-edge companies such as Vector that support the County's adopted economic development goal of providing more high-tech jobs, and these companies are willing to help us attract critical suppliers, which further increases the attractiveness of the region. The investment is and will continue paying dividends as we work to refine the attractiveness of the region to this rapidly expanding industry.

CHH/mjk

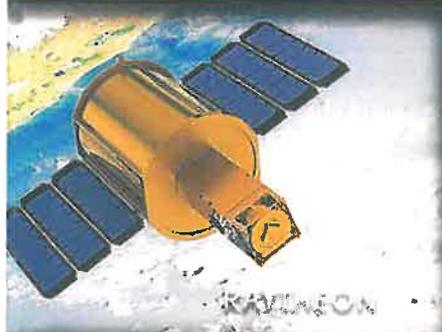
Attachment

c: Dr. John Moffatt, Director, Economic Development  
Patrick Cavanaugh, Deputy Director, Economic Development

# Biz Tucson

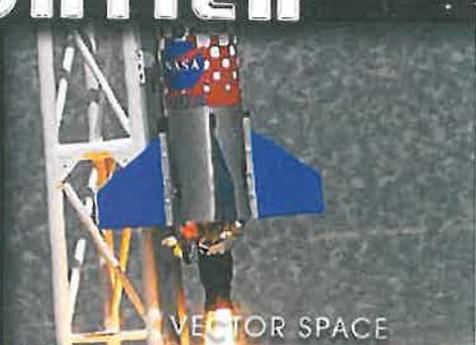
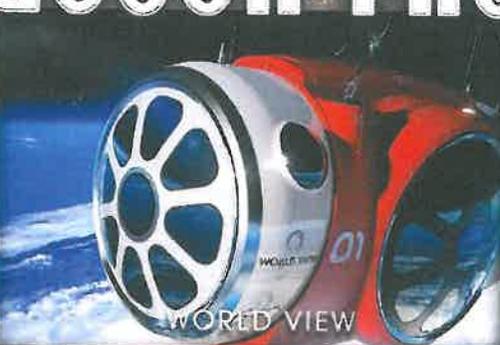
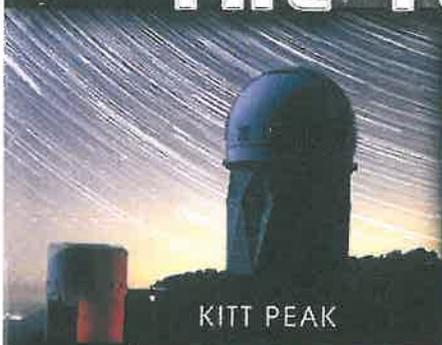
WINTER 2017

THE REGION'S BUSINESS MAGAZINE



# SPACE

## THE TUCSON FRONTIER



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Jim Cantrell  
CEO & Co-Founder  
Vector Space Systems

PHOTO: BRENT G. MATHIS



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PHOTO: COURTESY VECTOR SPACE SYSTEMS



# Vector Rockets into Tucson

## Fledgling Manufacturer Boosts Local Industry

By Eric Swedlund

With advances in technology enabling satellites to become smaller, cheaper and better, it seems to follow that the rockets that launch them into orbit should do the same.

That concept led to the formation of Vector Space Systems, a microsatellite launch company that seeks to fill a growing market space by manufacturing smaller rockets for frequent and relatively inexpensive launches. Created by founders of SpaceX, which provides launch vehicles for NASA and commercial flights, Vector is producing the first rocket built exclusively for the microsatellite market. It opens the door to space for innovators who don't need or can't afford the traditional \$100 million rocket launch to put their satellite in orbit.

Founded in April, Vector Space Systems announced in October that it will locate the company's manufacturing facilities and headquarters in Tucson, at the Pima County Aerospace, Defense and Technology Business and Research Park, alongside both the established high-tech giant Raytheon Missile Systems and the fledgling World View Enterprises.

Jim Cantrell, CEO and co-founder of Vector Space Systems, explained the microsatellite industry with an analogy that reflects the changes Moore's Law has brought about in the computing world. Mainframes that used to take up entire rooms were scaled down over time to personal computers and ultimately smart phones with astonishing computing power relative to their size. Now, he said, is a moment of enticing acceleration in the microsatellite industry.

"This whole idea stems from a recognition that the microsatellites that are emerging are really the equivalent of the PC in space," Cantrell said. "I'm old enough to have started programming on mainframes and getting to space has been the same thing up until recently. What we have now is an exceptional growth

period that is fueled by the microtechnology. That's a new dynamic that has never really existed."

Microsatellites range in size roughly from a breadbox to a laser printer. Vector offers the smallest satellite-launch vehicles on the market, the Vector-R, which can take 50 kilograms to orbit at a cost of \$1.5 million, and the Vector-H, which can take 100 kilograms to orbit at a cost of \$3 million.

"What used to be \$100 million to build a satellite is now \$100,000. What has not kept up pace with that evolution is the launch vehicles," Cantrell said. "The big launch vehicles are always going to exist. But the business with microsatellites is a lot more innovative and people are flying lots of them."

By 2020, Cantrell estimates worldwide launches of microsatellites will number about 800 annually. And Vector's plans are aggressive, with a goal of 100 launch rockets each year.

"We're trying to service that market directly and give them a rocket that's scaled to the microsatellite," Cantrell said. "Our business model is different. We're going to mass produce these things so we can fly often."

Part of what drew Vector to Tucson is the example of what their neighbor Raytheon has been able to accomplish in terms of large-scale manufacturing.

"We can clearly sell that many. The issue is can we manufacture and can we launch that many," Cantrell said. "Raytheon is a master of building complex machines in mass numbers and we're confident of that side of our analysis."

The business is ramping up at a pace that surprises even its founders. Just four days after announcing the company's headquarters would be in Tucson, Vector issued a press release to announce a \$60 million agreement with York Space Systems for launches from 2019 to 2022.

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"We're making sales rather quickly. We've got the best team in the industry to do this sort of thing and the satellite builders are signing up. It's exceeded all my expectations in every way," Cantrell said. "When we first started the company, we thought it would take us nine months to raise the initial round and it took us 13 hours. The customers have flooded in because they see the team is credible and they see the product is credible."

The purposes of the satellites are myriad, and companies from around the world are seeking Vector out for their ride into space.

"Our first customer is a Finnish company, Iceye, that is building a constellation of radar satellites," Cantrell said. "They're about the size of an inkjet printer and they go up and send radar waves down to the earth to create images, useful for ice-flow tracking and things like that. They've bought 21 launches from us."

Another customer is PlanetQ, a next-generation weather forecasting

and climate-monitoring company that will put up 100 satellites and use GPS signals to create a highly accurate view of the Earth's atmosphere.

"The technology is really quite incredible and it's one of those things that has enabled microsattellites to do more," Cantrell said. "We still deal with the limits of physics but you can get around that by having more satellites."

In July, the company acquired 16-year-old aerospace engineering firm Garvey Space Systems to boost its engineering capability. A portion of Vector Space System's engineering workforce will remain in California, while the launches are slated for Alaska and Florida. But the bulk of the company will be in Tucson.

Several factors led Vector to Tucson, among them the city's long-standing reputation as a space-science hub, a good workforce and educational pipeline in the University of Arizona, and eager cooperation from elected officials and industry partners.

"We're always raising money and when I go to venture capitalists and

show them the slide that Pima County has passed a resolution to negotiate with us, that's a very big plus. A lot of people in the investment community look at who else has put faith in them and they see a county that puts their skin in the game and that's important," Cantrell said.

"Hopefully we can become a magnet for people who want to start a business here. It's a great place to do startups. I watched what World View has done here and I've talked to them about dealing with the county. I can see a lot of that happening, people coming to talk to us, and I fully intend to be an evangelist for doing business here."

For Cantrell, Vector represents an exciting step forward in an industry that hadn't seen the same sort of innovation as its early years.

"I left the space industry five years ago because it had become stodgy and old," Cantrell said. "I'd been done with it and went off to do some other things, but this new energy brought me back into it because I think some new accomplishments can be made." **Biz**

# Rethinking Reality

The 2017 UA Science Lectures focus on the cutting edges of physics, from the abstract to the concrete, from the simply "weird" to the truly exotic. This year five University of Arizona physicists explain their craft as pioneers researching the rules of reality. Join us Mondays, beginning January 30th. **All lectures are free** and begin at 7PM at The University of Arizona's Centennial Hall.

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