Silicon Valley startups in forefront of new space race

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Prepare yourselves for the Greatest Show Not on Earth. Offering us all a front-row seat for planetary images that could make Google Earth seem so last decade, a slew of Bay Area startups have begun launching small, relatively inexpensive satellites into space. They lug powerful cameras that send back pictures and video, and those images soon could dramatically change the way we perceive our orbital home.

"It's totally an Earth-observation space race out there," says Stanford University professor and global ecologist Greg Asner. "With the cost of putting a satellite into orbit dropping because of cheaper materials and so many competing commercial launch ventures, a lot of really cool innovation has begun to happen."

The possibilities are intriguing: For the first time, Earthlings will be able to peruse high-resolution satellite images of their planet, both photographs and videos, practically in near-real time. Then, by using readily available online mapping tools to enhance the visual data, users essentially could create storylines to show things such as environmental degradation to rain forests, human and wildlife migration patterns, and political crises such as the Arab Spring, pretty much as they unfold.

Two of the most talked-about companies in the vanguard of this Bay Area space race - Mountain View-based Skybox Imaging and San Francisco-based Planet Labs - have recently put up small satellites or are on the verge of adding more to their sky-high collections. A third company, Vancouver, British Columbia-based UrtheCast, which has a

growing presence in the Bay Area, recently sent up two powerful cameras to be installed on the outside of the International Space Station by the end of this month.

Other startups and incubators, such as San Francisco's Lemnos Labs, have worked with satellite pioneers such as San Francisco-based Nanosatisfi on open-source software and crowdfunding to harness imaging technology in ways never before possible.

Centered right here in what increasingly looks like Satellite Valley, this privately funded rush to space is the result of a confluence of factors, including lowered costs. A satellite that once cost hundreds of millions of dollars to build and launch is now doable for a tiny fraction of that amount. And there's plenty of money to be made selling satellite photos, as well as the data they impart, to governments, analytical firms - and even huge retailers such as Wal-Mart, who could see things like traffic flow in its parking lots every day of the year.

"We're building our satellites right now in Mountain View, and it's sort of a balancing act between Silicon Valley and aerospace," says Ching-Yu Hu, a co-founder of Skybox, which launched its first satellite from Russia in November and is now transmitting what she calls the world's first high-resolution commercial video from space.

Hu says that marrying together big-data and satellite startups is a match made in, well, Silicon Valley.

Skybox plans to combine its orbital images with powerful databases, selling services that could dramatically improve global business applications, from managing supply chains to tracking shipping containers on the world's oceans, all on a daily or even hourly basis. For example, satellites could monitor agricultural activity, replacing quarterly commodity reports on soybeans with a snapshot of crop

production delivered within hours of the images being recorded.

"We have assets in space, like these other startups, but what's different is the data we have on the ground," Hu says. "We've gotten a lot of interest from people who want to combine our images and video with things like drone-produced (data) or even Twitter data."

There's also a strong drive for democratizing space under way, as firms such as UrtheCast pledge to offer free the same images that until recently only well-heeled corporate entities could afford. Many of the aerospace scientists behind these startups want to use satellite technology to help save the Earth, documenting troubling trends such as melting ice caps and coastal erosion in the hopes they can be remedied.

Seeing ourselves from space in more detail also will profoundly change the way we perceive the planet, says Steve Jurvetson, managing director of Draper Fisher Jurvetson and a member of Planet Lab's board of directors. That iconic "blue marble" photograph of Earth taken in 1972 from Apollo 17, he says, sparked "an epiphany that made us all realize the fragile lifeboat we live on. Now, nanosatellites and the daily access to imagery of the planet will create a Zeitgeist impact as we see ourselves as truly global citizens."

Investors are fueling the space race; Skybox, for example, has raised more than $91 million from Khosla Ventures, Bessemer Venture Partners, Canaan Partners and Norwest Venture Partners. UrtheCast, which went public in last year, plans to use its cameras, which are about the size of large soda bottles, to beam back high-quality pictures and video that the company will share for free on its website while making money on partnerships with media companies and global retailers.

"We'll have a high-definition video camera up there, similar to a telescope but pointed toward Earth," says Dan Lopez, who's building a

consumer-oriented Web platform at UrtheCast's San Francisco office. "We'll be able to move it around to follow a target or track different areas on the ground as we fly over."

Those images, he says, then can be integrated into maps with layers of data from other sources, "so we'll be able to see for the first time things like changing vegetation patterns on the planet."

Not surprisingly, concerns about privacy have been raised.

"While I'm glad there are government regulations in place that restrict things like resolution of these images, the potential for privacy abuses is still significant," says Beth Givens, director of the San Diego-based Privacy Rights Clearinghouse. "Who's watching the watchers? And what's the accountability mechanism in place? Sounds a bit like the Wild West to me."

Yet even as these new technologies enable private companies to zoom down close enough to see buildings and crowds of people, the satellite entrepreneurs say the public should not worry.

"We take privacy very, very seriously," says Skybox's Hu. "Our camera's resolution is such that we can't see individual faces. We can tell a car from a truck, but we can't see people and we can't see which car belongs to which person."

THREE PIONEERS IN THE NEW RACE FOR SPACE

Planet Labs: Founded in 2010 as Cosmogia and based in San Francisco, the privately held company already has 31 microsatellites it calls "Doves" in orbit and plans to send more to gather images of the Earth

and monitor things such as climate change.

UrtheCast: Based in Vancouver, British Columbia, the publicly traded company is in the process of installing two cameras, one still and one video, on the outside the International Space Station, and collect streaming imagery of the planet for commercial and humanitarian purposes.

Skybox Imaging: This privately held company, which is based in Mountain View, has launched one satellite and plans to launch a second one soon. It also asserts that it's now sending the world's first commercial high-resolution video of the Earth taken from space.