Seeking the universe from an apple orchard in Washington state

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Eastern terminus of the VLBA, St. Croix, U.S. Virgin Islands

Out here by an apple orchard just off Highway 97 is one of the Hubble Space Telescope's ignored cousins, an 82-foot dish painted all white that weighs in at 240 tons.

Yet it is part of a telescope system that produces images that are hundreds of times more detailed than what the Hubble can do.

On its 20th birthday, the Hubble is being honored for the breathtaking cosmic images it has produced. Meanwhile, the ignored cousins -- 10 in all, spread from the Caribbean to Brewster to Hawaii, placed in locations away from big-city pollution, and united by computers -- are struggling for financing.

Ever heard of the VLBA?

Probably not, unless you're an astronomy professor or hobbyist.

It stands for Very Long Baseline Array, the kind of name a committee of scientists would think is very catchy.

But this system is so good that it has the ability to see fine detail equivalent to standing in New York City and reading a newspaper in Los Angeles. It peers through clouds and dust into other galaxies, into regions where planets are being formed. It has produced images that go to the very beginnings of the universe, and helped discover a black hole in the center of the Milky Way.

Some tourists stop by the dish asking if it has anything to do, you know, with the CIA, or maybe listening for extraterrestrials, like in that 1997 Jodie Foster movie, "Contact."

No, it doesn't, but a visit still is an astounding experience.

If you pull up on Monse River Road to the small, windowless, one-story, 45-by-25-foot building where two technicians run the dish, they usually don't mind showing you around.

There are no windows in the building for the same reason it's wrapped with a copper mesh in its walls -- to block outside radio interference that could contaminate the data collected by the dish. The small kitchen area has no microwave because it also might pollute the data.

It can get lonely out here by the apple orchard, where a considerable part of the technicians' time is spent, well, waiting.

In between the waiting, they need to be able to fix things quickly. Motors need to be replaced, pulleys go out.

In the winter, sometimes a crucial part on the outside of the dish ices up, and it can stop moving.

"It gets boring at times," says Mark Hoffman, 55, one of the technicians. Sometimes he surfs news websites, or goes outside for some daylight and to feed birds. So a tourist stopping by breaks the monotony.

Anyway, says Hoffman, "The taxpayers helped build this. They should be able to see what's going in here."

This will be Hoffman's 19th year with the dish, and he'll be taking over the duties of the senior technician, Bob Sanderson, 69, who's retiring in June after 20 years with the dish. Sanderson plans to hike and pursue wood carving.

A replacement will be hired, says Hoffman, and that replacement should know, "It's not a very social job. You have to be self-motivated. Our boss is in New Mexico, and we see him only every two or three years."

Their boss is at the National Radio Astronomy Observatory, in Socorro, N.M.

The "radio" part in the observatory's name explains why the work of the VLBA hasn't caught the public's imagination, says Professor Bruce Balick of the University of Washington's Department of Astronomy.

The radio telescope images make visual what humans can't see -- using a bright red, for example, to show a high-intensity radio emission. The radio telescopes can do something that an optical telescope can't do -- penetrate the clouds and dust at the core of galaxies and regions when new stars and planets are being formed.

"But people don't relate to a radio picture they way they do to an optical image," Balick says.

"It all seems abstract. There are no foreground stars, no galaxies roaming about in the background. You just have these color blobs and you can't quite tell what the image is trying to tell you."

So the astronomers do their best to explain in layman's terms why the radio telescopes are important.

In comparison to the Hubble, which is estimated to cost $10 billion by the time it dies, the VLBA cost peanuts.

All 10 dishes, the final one completed in 1993, cost $85 million to construct. They cost about $10 million a year to run.

The National Science Foundation, which funds the radio dishes, wants help in funding half of that $10 million; some groups have expressed interest.

But it's hard to capture the public's imagination with news releases about the groundbreaking work astronomers have done with the VLBA.

About as simply as some of the work can be explained is that the VLBA has been used to study the mysterious "Dark Energy" that pervades the universe, or to study a black hole more than 6 billion times more massive than the sun.

For visitors who drop by, Hoffman is a congenial guide, the more outgoing of the two technicians, although he does admit about the research done by the dish, "C384G, the name of some star, somewhere.

It doesn't mean that much to me."

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The little building in which Hoffman and Sanderson spend much of their time includes a back-generator in the front room. It produces a loud, constant buzzing.

After a couple of decades, says Sanderson, you don't notice the buzzing, "Until somebody mentions it, so thanks."

In the backroom are the computers, and disk packs that contain the hard drives.

Each morning, the men make coffee and the wait for the FedEx driver to pick up the hard drives with the previous day's data. In the afternoon, the FedEx driver returns with new packs.

Almost casually, Hoffman points to a metal box that has a sign, "Do not place objects on top of maser."

That would be the atomic clock that is accurate to within one second in a million years.

Because the information of 10 radio dishes across 5,000 miles is combined, it's crucial that the information is synchronized. An atomic clock runs about $300,000, says the Radio Astronomy Observatory.

Then it's time to visit the giant dish. When pointing straight up, it is as tall as a 10-story building.

The dish sits on four wheels and can be moved in a complete circle.

At the base there is a small room that contains a lot of computers, and the controls that can move the dish from a 90-degree position, all the way to 2 degrees.

Sanderson says that when kids visit, he tips the dish as far down as it can go.

The kids love it, he says. "They can look right up into it."

Then it's a bunch of steps up to something called the vertex room.

It also contains a lot of wires, and electronic equipment, all explained in detail on the VLBA website in what is an effort to keep it simple -- simple if you managed to get A's and B's in college physics.

In the vertex room, there is a 2-by-2-foot metal door. It opens to the actual dish, and you can step out onto its aluminum plates.

On a sunny day, the reflective white paint on the dish is so bright, "it hurts your eyes," says Hoffman.

Then it's back down to the tiny office as the time slowly passes.

The actual astronomical work done by the radio dish might be too complicated for the two technicians to understand, but they recognize its literal cosmic importance.

Even after two decades of working at the dish, says Sanderson, he marvels at its beauty.

"I guess I like the geometry of it," he says. And "the concept of what it's doing. It's able to detect such minute amounts of energy coming from so far away. It's just amazing."