



Dark skies often caught in glare of security lights

Tom Beal Arizona Daily Star | Posted: Saturday, March 6, 2010 12:00 am

A helicopter, patrolling a mountain road 24 miles from the international border, trains its spotlight on a white Jeep Cherokee, stopped with its lights off.

In the process, it illuminates a 40-foot-diameter mirrored disc at the base of Mount Hopkins, one of four giant collectors flanking the Whipple Observatory visitor center that search for faint traces of light from gamma rays in an attempt to pinpoint their origin deep in space.

Fortunately, the astronomers running the array called VERITAS had just completed a 20-minute run and turned it off. Otherwise, that direct hit from the helicopter's spotlight could have fried the hundreds of extremely sensitive photomultiplier tubes in the dish's \$200,000 camera.

The battle for a secure border has brought several sources of unwanted light to some of Arizona's darkest skies, where a \$1 billion investment in astronomical observatories is threatened by the glow from nearby cities and, increasingly, by the more proximate lights of Homeland Security installations. Incidents like the one detailed above are rare, but not unprecedented.

The Border Patrol tries to be sensitive to the needs of astronomy, said Tucson Sector spokes-man Mario Escalante, but its first mission is securing the border.

"We have to do our job the best we can," he said. "Our main concern is the safety of our communities and our officers."

On this dark December night, the vehicle parked at Whipple carried a reporter and photographer from the Arizona Daily Star, who had been waiting for the VERITAS run to conclude before pulling into the parking lot at the Fred Lawrence Whipple Observatory.

The radio carried by Whipple spokesman Dan Brocius, who was driving the observatory's Jeep, crackled into life, as astronomers on the ridge and peak above the center tried to ascertain the path of the helicopter and its possible impact on their work.

Spotlighting of VERITAS, which stands for Very Energetic Radiation Telescope Array System, had been witnessed at least once before. Observatory directors complained in meetings with the Border Patrol and in writing.

"If all four VERITAS cameras were overloaded by a helicopter or truck-mounted searchlight, the replacement of the array's cameras would be \$800,000," warned the directors of eight Southern Arizona observatories in a June 2008 response to Homeland Security's Tucson West Draft Environmental Assessment of operations related to the Secure Border Initiative.

Staff turnover and increased illegal traffic in the foothills of the Santa Rita Mountains led to the latest incident, said Jessie P. Scruggs, aviation safety officer for the Tucson branch of U.S. Customs and Border Protection Air and Marine.

Some "tribal knowledge" was lost with personnel changes, Scruggs said. "A lot of guys, they weren't even aware that array was there."

Scruggs said helicopter crews were briefed on VERITAS for two weeks running at each shift change after the December incident. The array was placed in the notebook crews must read and sign and annotated on their hazards map as a "no-fly area," he said.

In their letter, observatory directors also complained about lighting from Border Patrol checkpoints and sought more details on potential light and radio interference from the towers that will form the "virtual fence."

The final Environmental Assessment on the virtual fence project took little note of the concerns and simply said that operations would have no adverse effect on astronomy in the area.

Local officials of the Homeland Security Department and its Border Patrol arm have been cooperative and accommodating, local astronomers say, even agreeing to honor lighting ordinances that don't bind their activities. Over time, though, the agreements get ignored.

Mount Hopkins, home of Whipple and UA/Smithsonian MMT observatories, is located in a corridor heavily traveled by migrants and smugglers, many forced onto mountain paths by increased patrols and checkpoints in the valleys of Southern Arizona.

Checkpoints on Interstate 19, Arizona 82 and Arivaca Road are "the brightest sources of lights in the valley," Brocius said.

He said the problem lies with the design and intensity of the lighting, not its mere presence.

Brocius said the Border Patrol has been approachable and amenable to suggested lighting strategies, but fixes aren't permanent.

"They have a huge turnover. You never see the same face twice," said Emilio Falco, science director at Whipple.

At Kitt Peak, west of Tucson, a Border Patrol checkpoint on Arizona 86 isn't visible from the telescopes, but its light stands, often aimed horizontally, "cause sky glow for us," said Elizabeth Alvarez, assistant to Kitt Peak director Buell Jannuzi.

"When we call Border Patrol, they point them down, then over time they point them back up."

Jannuzi said the Border Patrol's lights are a minor component of the growing city glow that threatens astronomy on Kitt Peak, but a glaring example of the wrong way to light tasks.

Escalante said in an e-mail that the Border Patrol plans to shield the lights at its checkpoint on I-19.

"Currently, at the I-19 checkpoint we are using portable Magnum lights. These units have four 1,000-watt bulbs, and each is able to be pointed in a different direction to illuminate a large area.

"The Nogales Station is in the process of retrofitting these units with 400-watt bulbs, fritted lenses (to reduce glare), and visor hoods to reduce light pollution."

Observatory directors and officials with the National Science Foundation, which also expressed official concern with the SBInet towers planned for installation in the border area, say they have yet to receive an official response to their concerns about radio interference.

Tomas Gergely, electromagnetic spectrum manager for the National Science Foundation, which funds operation of the national observatory on Kitt Peak, said the radio transmissions planned for SBInet are well within FCC regulations, but "radio astronomy installations are extremely, extremely sensitive" and need added protection.

He said informal meetings with SBInet's planners have been productive and he expects that, if interference occurs "they will take into account our mission and we take into account their mission. We are always willing to work with them," he said.

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