

# If aliens are energy-wise, searches for their signals have been foolish

## Tom Siegfried

So far, the search for signals from space aliens has turned up nothing but false alarms.

An isolated blip here or there could hardly be an intelligent message from an advanced civilization. Unless, of course, the aliens are a lot smarter than humans and are sending their signals without wasting energy. If so, the false alarms may actually be real signals, a new analysis argues. And argues convincingly.

Most searches for signals from extraterrestrials (SETI projects) assume the aliens are sending a constant signal on a narrow range of frequencies, says David G. Messerschmitt, professor emeritus in the electrical engineering and computer sciences department at the University of California, Berkeley. But if E.T. is sending messages with the minimum average energy needed to convey a given amount of information, the frequency range would be wider and the signal would arrive intermittently.

Signals with maximum power efficiency would be sent as “bundles of energy” with enough energy to stand out from natural static but spaced out over time to keep average power use low. So multiple observations over time would be needed for a signal from any suspected signal-sending planet.

“Discovery at a single location is a long-term project consisting of numerous short observations spread over a significant period of time,” Messerschmitt writes.

It’s the same even if the aliens just use beacons — signals carrying no messages other than their existence. Optimizing the power for beacon signals means they would also come in discrete pulses spaced out over time. Whether the aliens are optimizing power for beacon signals, or optimizing efficiency for sending information, detecting their communication will require patience.

“The practical limitation on detection reliability follows from the limited patience of a receiver to extend its observation time or its number of observations,” Messerschmitt writes.

Optimized signals would not have been recognized by past and present SETI projects, he says. And actually, some real signals may have been unwittingly recorded.

“Existing searches may in fact have detected individual energy bundles from a power-efficient information-bearing signal, or a power-optimized beacon, but also rejected these detected events as ‘false alarms,’” he writes. The famous “Wow!” signal recorded in 1977 might be one such example, he says.

Current searches could be modified to improve their chances of recognizing alien messages, Messerschmitt says. He examines the scientific and engineering issues in depth in a 237-page paper, posted May 21 at [arxiv.org](http://arxiv.org).

“Both power-efficient information-bearing and power-optimized beacon signals can be discovered using a common search strategy and algorithms, because they both seek individual energy bundles,” he writes. “Although neither is likely to be discovered by existing SETI observational strategies, a roadmap is

provided for how existing strategies can be initially enhanced, and later optimized to search for power-efficient and power-optimized signals.”

Messerschmitt recommends a worldwide shared database be established to record isolated signals (now dismissed as false alarms) from many directions in space at a wide range of frequencies. Some promising directions for sustained “listening” could then be identified.