Mystery Radio Burst from Outer Space

"The sudden burst of radio energy lasted only 0.005 seconds, and had spectral characteristics that suggested that it was from a distant galaxy, probably billions of light-years from us." - Seth Shostak, Ph.D., SETI Institute

January 16, 2008 Oakland, California - This afternoon, KTVU-TV Channel 2, removed their earlier report quoted below and by tonight, a correction was posted saying the mystery signal had been recorded by an Australian radio telescope (confirmed now to be the Parkes Radio Telescope) and that the complex signal is still being studied. Yesterday, KTVU-TV in the San Francisco Bay area, reported: "Across the globe, researchers searching for signs of life in space were abuzz this week with word that a mystery signal has been picked up by a giant radio-telescope (Arecibo) in Puerto Rico. Now the dilemma is -- how do you answer it? Dan Werthimer of the UC Berkeley SETI Project, said the dilemma is compounded by the fact that the signal may never be completely decoded. 'We probably won't be able to decode it,' he said. 'We'll know something's out there, but we won't know much about their civilization.'" See: **KTVU-TV.**

Back on November 16, 1974, the Arecibo radio telescope was used to send humanity's first message into outer space, which contained basic information about Earth's fundamental chemicals of life, the formula for DNA, a crude diagram of our solar system, simple pictures of male and female human beings and the diameter of the Arecibo dish.

There is a SETI (Search for Extraterrestrial Intelligence) Institute in Mountain View, California. Its website states its goal as:

> "exploratory science that seeks evidence of life in the universe by looking for some signature of its technology. Our current understanding of life's origin on Earth suggests that given a suitable environment and sufficient time, life will develop on other planets. Whether evolution will give rise to intelligent, technological civilizations is open to speculation. However, such a civilization could be detected across interstellar distances, and may actually offer our best opportunity for discovering extraterrestrial life in the near future."

The SETI Institute's Senior Astronomer is Seth Shostak, Ph.D., author of *Cosmic Company: The Search for Life in the Universe* © 2003. Dr. Shostak thrust himself into the controversy about a January 15, 2008, KTVU-TV Channel 2 Bay area report entitled: "Has E. T. Made A Call?" datelined Berkeley, California. The KTVU.com report began:

> "Across the globe, researchers searching for signs of life in space were abuzz this week with word that a mystery signal has been picked up by a giant radio-telescope in Puerto Rico. Now the dilemma is - how do you answer it?
>
> Dan Werthimer of the UC-Berkeley SETI Project said the dilemma is compounded by the fact that the signal may never be completely decoded. 'We probably won't be able to decode it,' he said. 'We'll know something's out there, but we won't know much about their civilization.'
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> Meanwhile, Seth Shostak of the SETI Institute, said he was hopeful that future technical advances will eventually point scientists in the right direction. 'I'm cautiously optimistic we'll find something by the year 2025,' Shostak said."

Dan Werthimer, Ph.D., specializes in signal processing
for radio astronomy and directs the SERENDIP, Optical SETI
and CASPER projects in the Space Sciences Laboratory,
University of California, Berkeley, California.

Dan Werthimer, Ph.D., works in the Space Sciences Laboratory at the University of California in Berkeley, California, where he specializes in signal processing for radio astronomy. He has been in the search for extraterrestrial intelligence since 1979, and he runs the SERENDIP, Optical SETI, and CASPER projects also associated with the SETI@home Project. It was Dr. Werthimer's statement that triggered the KTVU headline implying that maybe an extraterrestrial signal had been detected. But the result was some kind of professional panic that the media was reporting an “E. T.” signal, while the scientists didn't really know what the signal was.

By Wednesday afternoon, January 16, 2008, the KTVU.com web news report had been removed and left blank for hours. Then by early evening, a correction was posted saying the mystery signal had been recorded by an Australian radio telescope (confirmed now to be the Parkes Radio Telescope) and that the complex signal is still being studied.

Finally, by the evening of January 16, 2008, Seth Shostak, Ph.D., weighed in with this formal statement at the SETI Institute website in Mountain View:

Seth Shostak, Ph.D., SETI Institute
Senior Astronomer, Mountain View, California.

January 16, 2008
by Seth Shostak, SETI Institute Senior Astronomer

A news story from television station KTVU, Oakland (California) that appeared on the internet on January 15 has led some to believe that a credible radio signal from space may have been recently detected - a signal that might be ascribable to extraterrestrial intelligence.

This story, while obviously exciting, is somewhat misleading, and derives from some miscommunication between the reporter and Dan Werthimer, who runs the University of California, Berkeley SETI program.

Dan was describing Berkeley's new instrumentation for detecting very short radio pulses - a signal type that might be used by extraterrestrials to “ping” our world to get attention. He also mentioned the detection of such a pulse, a few months ago (not “last week”, as reported in the internet story). That pulse was actually recorded by the Parkes Radio Telescope, in New South Wales, Australia several years ago during a search for pulsars, but only recently looked at by researchers at West Virginia University as they sifted through these old data. Their results were published on September 27 of last year. [Howe: see NRAO report below.]

The sudden burst of radio energy lasted only 0.005 seconds, and had spectral characteristics that suggested that it was from a distant galaxy, probably billions of light-years from us. Since the burst was seen only once, it is as yet unclear what produced it, although many scientists suspect that it was caused by the collision of two highly dense neutron stars. Radio astronomers are planning a search for more such radio bursters, as they may be a new (and

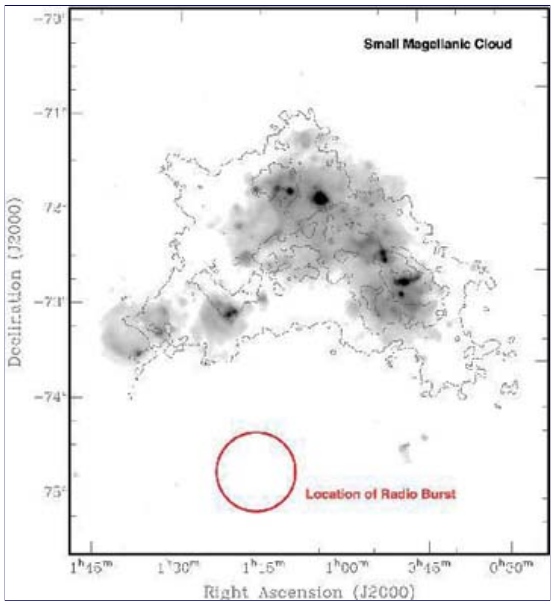
clearly interesting) type of natural phenomenon.

This signal doesn't seem to have anything to do with SETI searches (and wasn't found as part of any such search), although until more “bursters” are found, its true nature will remain mysterious. It is certainly not claimed to be a SETI detection. For such a claim to be made, a signal would have to not only have the characteristics of a deliberate transmission, but would also need to be observed more than once - in order to verify its position on the sky, and to rule out the kind of brutal cosmic event that is probably responsible for the burst reported in September.

Seth Shostak, Ph.D., referenced the September 27, 2007, science report by the National Radio Astronomy Observatory (NRAO) that first published about the anomalous radio signal. That's the outer space radio burst mystery that KTVU-TV.com picked up in its January 15, 2008, controversial web news report.

Powerful Radio Burst Indicates New Astronomical Phenomenon

Source, September 27, 2007: **National Radio Astronomy Observatory (NRAO)**



Visible-light (negative greyscale) and radio (contours) image of Small Magellanic Cloud and area where burst originated. CREDIT: Lorimer et al., NRAO/AUI/NSF.

Astronomers studying archival data from an Australian radio telescope have discovered a powerful, short-lived burst of radio waves that they say indicates an entirely new type of astronomical phenomenon.

“This burst appears to have originated from the distant Universe and may have been produced by an exotic event such as the collision of two neutron stars or the death throes of an evaporating black hole,” said Duncan Lorimer, Assistant Professor of Physics at West Virginia University (WVU) and the National Radio Astronomy Observatory (NRAO). The research team led by Lorimer consists of Matthew Bailes of Swinburne University in Australia, Maura McLaughlin of WVU and NRAO, David Narkevic of WVU, and Fronefield Crawford of Franklin and Marshall College in Lancaster, Pennsylvania. The astronomers announced their findings in the September 27 issue of the online journal Science Express.

The startling discovery came as WVU undergraduate student David Narkevic re-analyzed data from observations of the Small Magellanic Cloud made by the 210-foot Parkes radio telescope in Australia. The data came from a survey of the Magellanic Clouds that included 480 hours of observations.

“This survey had sought to discover new pulsars, and the data already had been searched for the type of pulsating signals they produce,” Lorimer said. “We re-examined the data, looking for bursts that, unlike the usual ones from pulsars, are not periodic,” he added.

The survey had covered the Magellanic Clouds, a pair of small galaxies in

orbit around our own Milky Way Galaxy. Some 200,000 light-years from Earth, the Magellanic Clouds are prominent features in the Southern sky. Ironically, the new discovery is not part of these galaxies, but rather is much more distant.

“It was a bit of luck that the survey included some observations of the sky surrounding the clouds,” Narkevic said. It was from those “flanking” observations that the mysterious radio burst appeared in the data.

The burst of radio waves was strong by astronomical standards, but lasted less than five milliseconds. The signal was spread out, with higher frequencies arriving at the telescope before the lower frequencies. This effect, called dispersion, is caused by the signal passing through ionized gas in interstellar and intergalactic space. The amount of this dispersion, the astronomers said, indicates that the signal likely originated about three billion light-years from Earth.

No previously-detected cosmic radio burst has the same set of characteristics. “This burst represents an entirely new astronomical phenomenon,” Bailes said. The astronomers estimate on the basis of their results that hundreds of similar events should occur over the sky each day. “Few radio surveys have the necessary sensitivity to such short-duration bursts, which makes them notoriously difficult to detect with current instruments,” added Crawford. The next generation of radio telescopes currently under development should be able to detect many of these bursts across the sky.

Although the nature of the mysterious new object is unclear, the astronomers have some ideas of what may cause such a burst. One idea is that it may be part of the energy released when a pair of superdense neutron stars collide and merge. Such an event is thought by some scientists to be the cause of one type of gamma-ray burst, but the only radio emission seen so far from these has been from the long-lived “afterglow” that follows the original burst.

Another, more exotic, candidate is a burst of energy from an evaporating black hole. Black holes, concentrations of mass so dense that not even light can escape their powerful gravity, can lose mass and energy through a process proposed by famed British physicist Stephen Hawking. The newly-discovered radio burst, the researchers said, might be the “last gasp” of a black hole as it finally evaporates completely.

“We're actively looking for more of these powerful, short bursts, in other archival pulsar surveys, and hope to resolve the mystery of their origin,” said McLaughlin. “In addition, if we can associate these events with galaxies of known distance, the radio dispersion we measure can be used as a powerful new way to determine the amount of material in intergalactic space,” she added.

The Parkes radio telescope is part of the Australia Telescope, which is funded by the Commonwealth of Australia for operation as a National Facility. The National Radio Astronomy Observatory is a facility of the National Science Foundation, operated under cooperative agreement by Associated Universities, Inc.

Parks Australia Radio Telescope National Facility,
a division of CSIRO, north of Parkes, New South Wales, Australia.

More Information:

For further reports about unusual cosmic mysteries, please see **Earthfiles Archive:**

• 10/18/2007 — A Quantum Math Description of Parallel Universes
• 11/27/2006 — Namibia Telescopes Find First "Gamma Clock" in Milky Way Galaxy
• 04/22/2006 — Cassiopeia A Is Not Dying Peacefully. Is It A Rare Magnetar?
• 10/07/2002 — Large Kuiper Belt Planetoid Found Beyond Pluto

• 12/20/2001 — Will Our Universe End With Its Final Light Frozen in Time?
• 02/12/2001 — NEAR Shoemaker Spacecraft's Historic First Landing On Eros Asteroid
• 03/11/2000 — Is 433 Eros Asteroid Younger Than Expected?
• 01/28/2000 — Black Hole Mystery at the Center of the Andromeda Galaxy
• 01/17/2000 — Chandra Telescope Helps Solve X-Ray Mystery
• 02/01/1999 — Astronomy Updates with Brian Marsden and John Huchra, Harvard

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Websites:

NRAO: http://www.nrao.edu/pr/2007/brightburst/

SETI@home: http://setiathome.berkeley.edu/sah_about.php

SETI Institute: http://www.seti.org/

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