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## Can our TV signals be picked up on other planets?



Gliese C is a very long way away

WHO, WHAT, WHY?  
The Magazine answers...

**A television company has joined forces with a social networking site to send a message to the nearest theoretically inhabitable planet. But can our television and radio broadcasts already be picked up in space?**

There is no widely accepted evidence of intelligent extraterrestrial life.

And yet the idea of sending messages to whoever is out there has been a recurrent theme over the years, whether it has been the plaques on Pioneer 10 and 11, Blur's call-sign for Beagle 2, the Arecibo message of 1974 or the Soviet "Mir" message of 1962.

The latest is a collaboration between RDF and Bebo to send a signal to the planet Gliese C, more than 20 light-years away, carrying 500 messages from Earth.

In a letter to the Daily Telegraph, former BBC News website science editor Dr David Whitehouse raised the possibility that transmissions from Earth



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could draw the attention of "malevolent aliens", were any to exist.



Early television broadcasts will have reached planets around other stars

But ordinary television and radio broadcasts can also travel out of Earth's atmosphere and through space, albeit quickly becoming mind-bogglingly diffuse and hard to pick up.

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Space scientist Dr Chris Davis, of the Rutherford Appleton Laboratory, says it is possible that television and radio signals from Earth could be picked up on other planets, but it isn't easy.

Some radiowaves, such as those of a short-wave frequency, bounce back off the ionosphere and are therefore poor candidates to be picked up in space. But waves like FM radio or television signals can pierce it and travel through the vacuum of space at the speed of light.

"There are two things that you would need to get a signal [to other planets] - firstly, it has to be able to leave our planet, secondly it would have to have as much power as possible," says Dr Davis.

THE ANSWER
Many broadcasts penetrate the Earth's atmosphere and travel through space at the speed of light
Crossing trillions of miles they would become incredibly diffuse and hard to pick up


"As you go into space that power would dissipate. They would need more and more sensitive equipment to pick it up."

In the case of the RDF/Bebo message, it is being sent in a concentrated beam by the giant RT-70 radio telescope in Ukraine.

But television and radio broadcasts are omni-directional - albeit focused as much as possible towards the horizon - and that means a lot of diffusion.

Assuming the energy spread out equally in a sphere, and that the receiver on Gliese C was as big as the planned Square Kilometre Array of antennas on Earth, the television signals reaching the

WHO, WHAT, WHY?
A regular feature in the BBC News Magazine - aiming to answer some of the questions behind the headlines



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planet would be a billion, billion, billion times smaller than the original signal generated on Earth, says Dr Maggie Aderin, a space scientist at technology firm Astrium.

"Detecting a signal like this with lots of background noise would be incredibly hard, but what they would look for is a pattern in the signals to show that they were not naturally occurring."

And that of course is what is going on on Earth in the form of the Search for Extra Terrestrial Intelligence programme.

Seti uses facilities such as the Allen Array in California to, among other things, look for meaningful patterns in radio waves from space. And that means if there were aliens out there, they could be doing the same thing.

"Some of our radars are easily detectable quite far, hundreds of light-years, into space, if the aliens wish to try, and if they're in the beam," says Seth Shostak, an astronomer at Seti.



The Seti project is listening out for alien broadcasts

"Of course, no one more than about 50-70 light years away will have yet heard from us, but I figure that our earliest broadcasts are washing over about one new star system each day. So the potential audience is growing."

Shostak calculates that Nasa's recent broadcast of Beatles music towards Polaris, the North Star, using a 210ft antenna and 20kW of power, would require any potential aliens to have an antenna seven miles across to be aware of it. To actually receive it as music, this would need to be increased to a 500-mile wide antenna. Polaris is 430 light years away.

But if aliens can watch our television, there might be a problem. Astronomer Carl Sagan, in his book Contact, suggested the first high-powered television broadcast the aliens would have picked up would be Hitler's broadcasts at the Nuremburg rallies.

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