The Stirling Cycle engine is a nearly two hundred year old invention which has had new currency of late. ***Pawn*** experimented with these efficient little puppies as long ago as 1973 (Yikes!) and even presented a paper at an international conference on the subject of solar powered Stirling engines over 30 years ago, as a young pup. Now NASA is looking at using a Stirling Cooler, which is simply a Stirling engine run in reverse as a heat pump, to cool Venus landers.

The surface of Venus broils at a temperature of about 450 Â°C â€“ hot enough to melt lead. Several probes in the Soviet Venera and Vega series, as well as a NASA Pioneer Venus probe, landed on Venus and returned data from the surface in the 1970s and early 1980s. But they all expired in less than 2 hours because of the tremendous heat.

Now, two NASA researchers have designed a refrigeration system that might be able to keep a robotic rover going for as long as 50 Earth days. The work was carried out by Geoffrey Landis and Kenneth Mellott of NASA's Glenn Research Center in Cleveland, Ohio, US.

The main concern is keeping the electronics cool. The NASA pair plan to do this by packing the electronics in a ceramic-based insulator and placing it inside a metal sphere about the size of a grapefruit.

Heat would then be pumped out of the sphere using a Stirling cooler, which works by compressing and then expanding a gas with a piston. When the gas expands, it cools down, absorbing heat from the electronics chamber. Then, as the gas is compressed and its temperature rises, the heat is allowed to dissipate in the atmosphere via a radiator.

Stirling coolers were invented in 1816 by Reverend Robert Stirling, a Scottish clergyman, but were largely ignored until the mid 20th century, when their impressive energy efficiency became better known.

Antique fridge could keep Venus rover cool – space – 12 November 2007 – New Scientist Space

Thanks to the eagle-eyed folks over at Slashdot /. for pointing out this story.