Working on Venus: How to build the electronics for a Venus lander

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There are applications with such high operating temperatures that established silicon electronics does not survive long enough to handle the task. Fortunately, silicon carbide (SiC) could replace silicon in these applications. We have already demonstrated digital [1] and analog [2] circuits in SiC operating at 500 °C at KTH. We will demonstrate for the first time all the electronics needed for working on Venus. The surface temperature of 460 °C is extremely challenging, and the electronics of earlier landers on Venus in the seventies failed after a few hours [3]. Basic scientific investigation of the atmosphere of Venus and seismic activities over time would be useful for climate modeling and planetary understanding. Imaging could answer the question of whether there is or has been life on Venus.

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1. L. Lanni, B. G. Malm, M. Östling, and C.-M. Zetterling, "500 °C bipolar integrated OR/NOR gate in 4H-SiC", *IEEE Electron Dev. Lett.* **34**, 1091 (2013).
2. R. Hedayati, L. Lanni, S. Rodriguez, B. G. Malm, A. Rusu, and C.-M. Zetterling, "A monolithic, 500 °C operational amplifier in 4H-SiC bipolar technology", *IEEE Electron Dev. Lett.* **35**, 693 (2014).
3. Historical background on earlier landers available at *http://en.wikipedia.org/wiki/Venera*
4. See *www.workingonvenus.se*