



Figure 10.16 The SCARLET array used on Deep Space 1

The first commercial concentrator array developed for space was the Boeing 702. It was used on the Galaxy XI spacecraft and was deployed on January 12, 2000. It has a reflective planar centralized focus concentrator design in which the sun's rays are reflected onto a single rectangular plane of solar cells. It used thin-film reflectors and had a 1.7X concentration. It was designed for power levels of 7 to 17 kW over a 16+ year design life. The array deployed as expected and its initial power output was within the expected range. However, its concentrator surfaces degraded very quickly while in orbit. The specific power of this array was ~ 60 W/kg using 24% efficient MJ solar cells. The similar Boeing 601 bus, which uses an ordinary planar solar array, is limited to about 15 kW of power owing to the array stowed volume limitations.

10.5.6 High-temperature/Intensity Arrays

Missions to Mercury and other missions with close encounters to the sun (i.e. solar probe) have generated the need for cells and arrays that are capable of operating in high-light intensity, high-radiation, and high-temperature environments. Two missions that had to contend with such an environment have already flown. Helios A, which reached