through a pressure-relief device. The average RTG flight masses were 39.69 kg for LES 8/9 and 37.69 kg for Voyager 1/2. The 312 thermoelectric couples were arranged in 24 circumferential rows, each row containing 13 couples individually bolted to the outer case. The design hot-junction temperature was 1,273 K with a cold-junction temperature of 573 K. Design voltage was 30 V. The peak initial power was 159.6 W(e) for RTG Number 3 on Voyager 2. The MHW-RTGs allowed the LES 8/9 satellites to operate beyond the five-year operational life; enabled NASA to complete flights to Jupiter and Saturn; and will enable Voyager 2 to conduct an extended mission to Uranus in 1986.

GPHS-RTG. The successful performance of the MHW-RTG led to the use of SiGe technology for the high-power — 285 W(e) — General Purpose Heat Source RTG, which is to be launched in 1986 on the NASA Galileo Mission to Jupiter and the International Solar-Polar Mission around the sun.

Transition to High-Temperature Materials. The use of high-temperature SiGe alloys as thermoelectric power-conversion materials was a direct outgrowth of spacecraft requirements for higher RTG power levels and lower RTG masses. In general, higher hot-side operating temperature means a high efficiency, although the optimum temperature is dictated by the mission life, i.e., minimizing sublimation. The cold-side temperature is optimized to obtain the desired power-to-mass ratio. To a first approximation, PbTe can be used from room temperature to about 900 K before materials properties and the figure of merit become concerns. The SiGe alloy can be used from room temperature to about 1,300 K and offers the potential of higher power with improved efficiency.