

OVERVIEW OF NASA SPACE CRYOCOOLER PROGRAMS

R.G. Ross, Jr.† and R.F. Boyle*

†Jet Propulsion Laboratory
California Institute of Technology
Pasadena, CA 91109

* NASA Goddard Space Flight Center
Greenbelt, MD 20771

Mechanical cryocoolers represent a significant enabling technology for NASA's Earth and Space Science Enterprises, as well as augmenting existing capabilities in space exploration.

An overview is presented of ongoing efforts at the Jet Propulsion Laboratory and the Goddard Space Flight Center in support of current flight projects, near-term flight instruments, and long-term technology development.

NASA programs in Earth and space science observe a wide range of phenomena, from crop dynamics to stellar birth. Many of the instruments require cryogenic refrigeration to improve dynamic range, extend wavelength coverage, and enable use of advanced detector technologies. Over the last two decades, NASA has supported cryocooler technology development in support of many projects, and has also taken advantage of coolers developed under Defense Department and commercial funding.

Although the largest utilization of coolers has been for instruments operating at medium to high cryogenic temperatures (55 to 150 K), reflecting the relative maturity of the technology at these temperatures, important new developments are now focusing at the lower temperature range from 6 to 20 K. The Planck and ACTDP cooler developments are examples of these new low-temperature cryocooler technologies under development by NASA.

Ronald G. Ross Jr.
Jet Propulsion Laboratory
M/S 157-316
4800 Oak Grove Dr.
Pasadena, CA 91109

Phone (818) 354-9349
FAX (818) 393-4206
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Ronald.G.Ross-Jr@jpl.nasa.gov