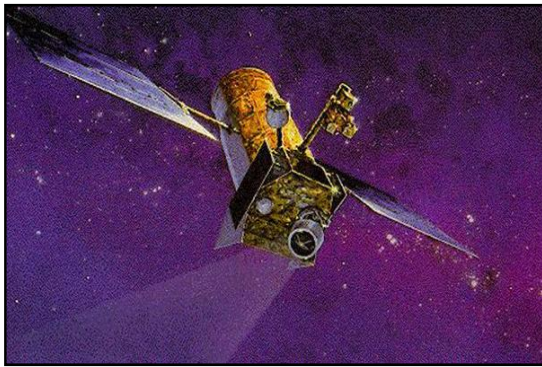


# CryoCoolers

## Cool Infrared Sensors to Enable Space Intelligence, Surveillance, Reconnaissance and Situational Awareness

**Satellite Applications:** The Air Force is looking for a few good refrigerators—well, not exactly. In its quest to develop cryogenic refrigeration technology for satellites that can enable the performance of onboard infrared sensors to enhance missile detection, conduct intelligence gathering and enable space situational awareness, the Air Force Research Laboratory's Space Vehicles Directorate conducts cryocooler research.

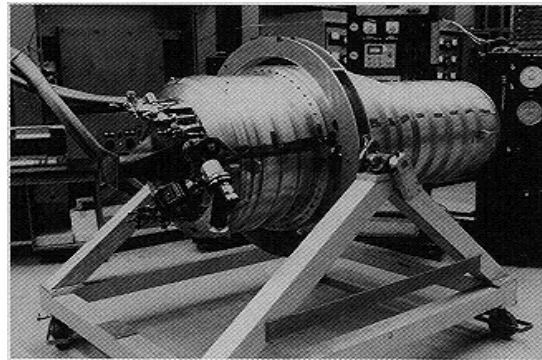


Cryocoolers are small, simple refrigerators that operate at very low temperatures. Mechanically, they compress and expand a gas, usually helium, which lowers the temperature of critical payload elements such as sensors.



For space-based sensors to work, they must be equipped to function in a cold environment to properly contrast and accurately identify distant objects in space or on the ground through their heat signatures, or spectral “fingerprints.”

Past Dewar Cooler



- < 1 yr. life      Short Life
- > 1000 lbs.      Heavy
- < 0.5W cooling    Limited Cooling

Future Cryocooler



- <10 yr. life      Long Life
- < 5 kg.            Lightweight
- 0.1-20W          Extended Cooling