Cold Stowage Flight Systems

The International Space Station (ISS) provides a test bed for researchers to perform science experiments in a variety of fields, including human research, life sciences, and space medicine. Many of the experiments being conducted today require science samples to be stored and transported in a temperature controlled environment. NASA provides several systems which aide researchers in preserving their science. On orbit systems provided by NASA include the Minus Eighty Laboratory freezer for ISS (MELFI), Microgravity Experiment Research Locker Incubator (MERLIN), and Glacier. These freezers use different technologies to provide rapid cooling and cold stowage at different temperature levels on board ISS. Systems available to researchers during transportation to and from ISS are MERLIN, Glacier, and Coldbag. Coldbag is a passive cold stowage system that uses phase change materials. Details of these current technologies will be provided along with operational experience gained to date.

With shuttle retirement looming, NASA has protected the capability to provide a temperature controlled environment during transportation to and from the ISS with the use of Glacier and Coldbags, which are compatible with future commercial vehicles including SpaceX's Dragon Capsule, and Orbital's Cygnus vehicle. This paper will discuss the capability of the current cold stowage hardware and how it may continue to support NASA's mission on ISS and in future exploration missions.