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PIONEERING RESEARCH WITH LONG-DURATION BALLOONS IN ANTARCTICA

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The recent report of the U.S. National Aeronautics and Space Administration (NASA) Scientific Ballooning Planning Team concluded that ballooning enables significant scientific discoveries while providing test beds for space instruments and training for young scientists. Circumpolar flights around Antarctica have been spectacularly successful, with fight durations up to the 42 days achieved by the Cosmic Ray Energetics and Mass (CREAM) payload between December 15, 2004 and January 27, 2005. The second flight of CREAM achieved 28 days of flight between December 15, 2005 and January 12, 2006. CREAM obtained a total exposure of 70 days within a 13-month period! A modest trajectory modification capability would enable such long-duration missions to be conducted routinely. Requests for participation in the Antarctic Long-Duration Balloon (LDB) program, a NASA partnership with the U.S. National Science Foundation Office of Polar Programs, is greater than the current capacity of two flights per campaign in Antarctica. Given appropriate international agreements, LDB flights in the Northern Hemisphere would be more-or-less competitive with Antarctic flights, and super-pressure balloons now under development would allow comparable flights at any latitude. Investigations such as the Antarctic Impulsive Transient Antenna (ANITA) experiment require the Antarctic environment, but scientific ballooning provides an avenue for frequent access to near-space for cutting-edge research and technology development for a wide range of experiments.