

Executive Summary

The National Aeronautics and Space Administration (NASA), in cooperation with the Japan Aerospace Exploration Agency (JAXA), launched the Tropical Rainfall Measuring Mission (TRMM) in 1997. Designed as a minimum three-year mission with the goal of five years duration, TRMM has been collecting data for seven years, in large part due to the reliability of its sensors and the high quality of their measurements. Although initially intended as a purely research-oriented mission, TRMM now is used in operational applications such as hurricane forecasting because data from its suite of complementary sensors are unique and available in near real time. In the United States TRMM data are used operationally by the Joint Typhoon Warning Center, the National Center for Environmental Prediction, and the National Hurricane Center, among others. Internationally the data are used operationally by entities such as JAXA, the European Centre for Medium-Range Weather Forecasts, and the World Meteorological Organization tropical cyclone warning centers.

In July 2004 NASA announced that it would finally terminate TRMM in August 2004. At the request of the National Oceanic and Atmospheric Administration (NOAA), and with additional urging from others in the scientific and operation user community and the White House (see Appendix E through H), NASA agreed to continue TRMM operation through the end of the hurricane season and until the end of 2004 (see Appendix 1). But many users hope that the mission will be extended even longer, setting the stage for a difficult decision.

A further extension of TRMM beyond 2004 will put financial constraints against the operation and scientific benefits of continuing; that is, are the benefits greater than the costs and can the necessary funds be secured? The scenario becomes more complicated if the mission is extended beyond late 2005. The TRMM spacecraft is sufficiently large that it will not burn up completely on reentry. Thus NASA will face a second decision point in roughly December 2005 when it must weigh in the element of the additional risk to life and property. For this second decision NASA must choose whether to (1) use TRMM's remaining fuel to conduct a controlled reentry into the atmosphere that directs the remains of the satellite into the ocean far from human settlements¹ or (2) continue TRMM operation until the fuel runs out in 2010 or 2011 and accept the added risk of an uncontrolled reentry because of the operational and scientific benefits of doing so.

¹ In this scenario controlled reentry would be in 2008 after the satellite had drifted to a lower orbit for roughly two years.