Rapid On-Orbit Checkout of Space Systems
Abstract

The *Rapid On-Orbit Checkout of Space Systems* study was chartered to assess the reasons for and mitigations of long on-orbit checkout periods experienced by newly launched military satellites. For some new Air Force systems, on-orbit checkout extends for more than a year. This consumes a considerable portion of the satellite's life, and, more importantly, delays the delivery of critical capabilities to global military operations. By contrast, on-orbit checkout times of commercial satellites and most legacy military systems are shorter. The Study Panel was directed to compare the practices and approaches used for military systems to those of the civil, commercial, and international space communities; to identify root causes for the long on-orbit checkout periods; and to make recommendations for near-term and long-term approaches to speed on-orbit checkout of satellites.

The Study Panel met with Air Force, other US government, industry, and international space organizations to understand the different approaches, motivations, and constraints on military, civil, commercial, and international space systems. The team collected detailed information over 150 legacy and on-going programs, and distilled experiences and best practices into a collection of findings and recommendations.

The Panel found that new military satellite systems do not have stressing on-orbit checkout requirements, and have few incentives and little motivation to speed through the on-orbit checkout process. First-of-a-kind satellites were found to have significantly longer checkout times than subsequent satellites in a series. The Panel identified numerous opportunities for early use of space system services prior to completion of checkout that are not being fully exploited. The number of stakeholders involved in checking out a military satellite system was found to be much larger than in the commercial world, resulting in longer testing periods. Finally, characteristics of commercial systems and legacy military systems were identified that result in faster checkouts than recently experienced by the Air Force.

Based on these findings, the Panel made several recommendations: The Air Force should set expectations, clear objectives, and incentives for more rapid checkout; multi-system studies should be conducted to assess the impact of orbit raising on the Air Force's ability to reconstitute space assets and to produce satellites that can be made operational faster; a number of approaches should be used to shorten on-orbit checkout through effective spacecraft and payload design; developmental testing and evaluation (DT&E) and operational testing and evaluation (OT&E) should be integrated and coordinated to the greatest extent possible; and early data release and early access to space services should be institutionalized for ongoing and future programs.