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FACTORS AFFECTING SPACECRAFT IN-ORBIT ANOMALIES CAUSING INSURANCE LOSSES

Abstract

Commercial space companies rarely disclose spacecraft anomalies to the public unless obligated by financial authorities, or because customers become aware of a service outage. However, a nearly complete dataset exists for in-orbit anomalies and failures which have caused insurance losses. This data has been acquired over 40 years and exists on the Seradata launch and spacecraft database. While the sample size remains small, it is large enough to examine trends in reliability, and perform a useful analysis of factors such as time in orbit, mission phase or which subsystems or equipment are most at fault. This can be done both in terms of loss numbers and the actual value of the insurance loss. In addition, the insurance loss percentage can be compared with estimates of the mission capability lost using a calculation of the estimated capacity and life lost. This paper attempts to present information to help satellite operators and manufacturers improve the reliability of products and services. This could result in fewer failed spacecraft that cannot be actively de-orbited, and thus achieve more sustainable space operations.