

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Small Satellites Potential for Future Integrated Applications and Services (4)

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STUDY TO COMPARE THE COST AND THE RISK IMPLICATIONS OF IMPLEMENTING THE
AEROSOL-CLOUD-ECOSYSTEM (ACE) MISSION USING A TRADITIONAL ARCHITECTURE
APPROACH VERSUS A SMALL SATELLITE BASED ARCHITECTURE

Abstract

The Aerosol-Cloud-Ecosystem (ACE) mission is described in the National Academy of Sciences' decadal survey for Earth sciences and it is intended to be used primarily for the study of aerosol-cloud interactions. There are four primary instruments on ACE and the science objective requires collecting a five year minimum data set, using all four instruments concurrently. In this paper we present two architecture concepts for ACE, and we compare the risk and cost implications of these approaches. The first architecture concept is considered to be a more traditional approach, housing all four instruments on a single satellite bus platform. The second architecture uses one small satellite bus dedicated to each of the primary instruments. Additionally to ensure that the field-of-views of the instruments overlap, the small satellite buses have been designed to have orbit maintenance capability. The discussed study results include the total launch cost, reliability considerations, programmatic considerations, and operational issues concerning these two approaches.