

16th IAA SYMPOSIUM ON SPACE DEBRIS (A6)
Operations in Space Debris Environment, Situational Awareness (7)

Author: Dr. T.S. Kelso
Center for Space Standards and Innovation (CSSI), United States

Mr. Daniel Oltrogge
Analytical Graphics, Inc., United States

THE NEED FOR COMPARATIVE SSA

Abstract

In Space Situational Awareness, an oft-advocated assertion by some is that “you never want to wear two watches, because you’ll never know what time it is.” The equivalent of this analogy in the SSA arena is to state that “there will only be one authoritative Resident Space Object (RSO) catalog” or “there is only one official SSA system.”

However, drawing upon decades of space operations, we have found quite the opposite to be true: If you only have a single watch, then you don’t know what time it is because you have no insights that your system may be systematically wrong or be imprecise.

In this presentation, we cite numerous examples where comparative assessments between multiple SSA and CA systems have led to significant discoveries of systemic biases, process deficiencies, undersampling, ineffective fault tolerance and recovery mechanisms and characterizations of system errors by type.

The very existence of duplicative, parallel systems permits such comparative assessments to be done. And while our focus has been on comparing SSA results from separate SSA systems, we also advocate for such comparative assessments to be accomplished within the context of single SSA systems as well: An ideal SSA system continually and tirelessly seeks to assess its performance and accuracy. Comparative SSA, orbit and CA assessments using a variety of observation data sets, analysis methods, force models, data fusion approaches and positionally well-known “truth” depictions is fundamental to ensuring SSA system accuracy and precision, thereby minimizing Type 1 and 2 SSA errors, such that decision-quality SSA products can be generated.