An Approach to Robotic In-Space Assembly

Abstract: With the retirement of the Space Shuttle program, the option to lift heavy payloads to orbit has become severely constrained. Combined with the increasing success and decreasing costs of commercial small- to medium-lift launch vehicles, robotic in-space assembly is becoming attractive for large mission concepts. Challenges in autonomous assembly include reasoning with uncertainties in the structure, agents, and environment, delegating a large variety of assembly tasks, and making error corrections and adjustments as needed.

Dr. Komendera and Langley Research Center have developed assembly methods to address some of these challenges. This talk will describe ongoing research, and discuss the results of three recent robotic assembly demonstrations.

Bio: Dr. Erik Komendera is a robotics researcher at NASA Langley. His research focuses on autonomous assembly of space structures and techniques to identify and overcome errors in the assembly process. He currently serves as assembly robot task lead on the NASA/Orbital ATK Tipping Point project “Commercial Infrastructure for Robotic Assembly and Servicing” (CIRAS). In addition, he is Principal Investigator for a Langley IRAD project to investigate methods for ensuring robust assembly of solar array modules by a heterogeneous team of robots, and is a key member of the “Robotic Assembly of Modular Space Exploration Systems” in-space assembly incubator effort.